DHARMSINH DESAI UNIVERSITY

DETAILS OF PROGRAMME SYLLABUS REVISION IN THE LAST FIVE YEARS

S.N.	Programme Code	Programme name	Year of Introduction	Status of Revision
1	BPH	Bachelor of Pharmacy	2006	Revised
2	MPH	M.Pharm (Pharmaceutics)	2011	Revised
3	MQA	M.Pharm (Pharmaceutical Quality Assurance)	2011	Revised
4	BTECH (CE)	Computer Engineering	1985	Revised
5	MTECH (CE)	M.TECH (Computer Engineering)	2000	Revised
6	B. TECH (CH)	B.Tech Chemical	1968	Revised
7	DCH	Diploma Chemical	1981	Revised
8	M.TECH (MC)	M.Tech Chemical	1981	Revised
9	BTECH (CL)	Btech Civil Engineering	1981	Revised
10	M.TECH (Str.)	M.TECH (Structural Engineering)	1989	Revised
11	M.TECH (Geo.)	M.TECH (Geotechnical Engineering)	1989	Revised
12	B.TECH (EC)	Electronics & Communication	1981	Revised
13	M.TECH (EC)	Electronics & Communication Systems	1985	Revised
14	BDS	Bachelor of dental surgery	2006	Revised
15	MDSENDO	Master of dental surgery(endodontics)	2010	Revised
16	MDSPERIO	Master of dental surgery(periodontics)	2010	Revised
17	MDSOS	Master of dental surgery(oral surgery)	2011	Revised
18	MDSOP	Master of dental surgery(oral pathology)	2010	Revised
19	MDSPROSTHO	Master of dental surgery(prosthodontics)	2010	Revised
20	MDSORTHO	Master of dental surgery(orthodontics)	2010	Revised
21	BTECH (IC)	Instrumentation and Control	1985	Revised
22	BTECH (IT)	Bachelor of Technology in Information Technology	2009	Revised
23	MBA	Master of Business Administration	1994	Revised
24	BTECH (MH)	B. Tech. Mechanical	2010	Revised
25	MTECH (MM)	M. Tech. Mechanical (CAD/CAM)	2015	Revised
27	B.C.A.	Bachelor of Computer Application	1999	Revised
28	M.C.A.	Bachelor of Computer Application	1987	Revised
29	BBA - HM	Bachelor of Business Administration in Hotel Management	2013	Revised
31	BBA	Bachelor of Business Administration	1999	Revised
32	MCOM	Masters of Commerce	2014	Revised

NAAC ACCREDITED

Registrar
Dharmsinh Desai University
NADIAD - 387 001. INDIA

DHARMSINH DESAI UNIVERSITY NADIAD

ISOQAR QUALITY ASSURED FIRM ISO 9001 : 2008 Certificate No. 5673 QMS 001

DharmsinhDesaiUniversity, Nadiad-387001.

Minutes of Academic Council Meeting
26th December 2017 at 12.00 noon

Following members were present in the meeting:

1)Dr H M Desai 2)Prof D G Panchal 3) Dr B N Suhagia 4) Dr R N Misra5) Dr P A Joshi 6) Dr N K Patel 7) Dr Hiren Patel

1.It was resolved to consider the minutes of the last meeting held on 27th April 2017 at 12.00 noon approved since there was no written dissent received.

2.The Academic Council members discussed, deliberated and resolved to take on record the following agenda and proposals from those received from various Board of Studies :

2.1 Faculty of Technology :

2.1.1Department of Computer Engineering (Refer Annexure-I for details)

2.1.1.1 B.Tech : It was resolved to update the content of "Service Oriented Architecture " subject of Sem VI and renaming the subject as "Service Oriented Computing" to match the updated content

2.1.1.2 M.Tech: It was resolved to approve introduction of the subject "Advanced Programming in UNIX" as an elective in Sem-I in Group 2 of electives along with Operating System Design and Implementation (OSDI) Subject

2.1.1.3 It was resolved to approve the Examiners Panel for B.Tech and M.Tech

2.1.2 Department of Electronics and Communication (Refer Annexure–II for details)

2.1.2.1 B.Tech/M.Tech: It was resolved to specify the approach used in designing the project under the title Term Project. Term Projects are carried out in three different semesters. Their differences should be highlighted in the transcripts and preferably in the marksheet in brief as follows. Following table also suggests the credits of subjects.

Sr No:	Sem	Present Subject Name	Present Credits	Approved Name
1	BTechSem V	Term Project	1	Term Project (Electronic Circuits)
2	BTechSem VI	Term Project	1	Term Project (Microcontroller)
3	BTechSem VII	Term Project	1	Term Project (Software)
4	MTechSem I	Term Project	1	Term Project (Programming)
5	MTechSem II	Term Project	1	Term Project (Simulation)

2.1.2.2 It was resolvedto approve the updating of content at BTechSemVI(EC) for the subject Advanced Microprocessors

2.1.2.3 It was resolvedto approve the updating of content at BTechSemVII(EC) for the subject Embedded Systems wherein the detailed syllabus of the topics added will be put up in the next AC Meeting.

2.1.2.4 It was resolvedto approve the updating of content at MTechSemII(ECS) for the subject Image Processing

2.1.2.53 It was resolved to approve the Examiners Panel for B.Tech and M.Tech

2.1.3 Department of Instrument &Control (Refer Annexure–III for details)

2.1.3.1 B.TechProgram: Under CBCS Scheme detailed syllabi for Sem I to Sem IV was passed in the earlier AC. It was resolved to approve the detailed syllabi for B Tech Sem V to Sem VII IC program.

2.1.3.2It was resolved to approve the Examiners List for B.Tech and M.Tech

2.1.4 Department of Civil Engineering (Refer Annexure–IV for details)
2.1.4.1It was resolved to approve the Examiners Panel for B.Tech and M.Tech

2.1.5 Department OF information Technology (Refer Annexure–V for details)
2.1.5.1It was resolved to approve the Examiners Panel for B.Tech and M.Tech

2.2 Faculty of Information and Science:

2.2.1 Master of Business Management :
It was resolved to approve CBCS Scheme course structure for M BA program tobe implemented from the Academic year 2018-19 as per **Annexure VI.**

2.2.2 Master of Computer Applications :
It was resolved to approve CBCS Scheme course structure for MCA program to be implemented from the Academic year 2018-19 as per **Annexure VII.**

2.3 Constituent Institutes:
2.3.1 Bachelor of Computer Applications:
It was resolved to approve the Examiners Panel for B C A Annexure VIII

3.0 The chair thanked all the members for their participation and valuable contribution.

B. TECH. SEMESTER – VI (CE)
SUBJECT: SERVICE ORIENTED ARCHITECTURE
OLD SYLLABUS

Teaching Scheme (Hours/Week)			Examination Scheme (Marks)					
Lectures	Tutorial	Practical	Theory (3 hrs.)	Sessional (1.25 hr.)	Practical	T.W.	Total	Credits
4	0	2	60	40	25	25	150	5

[Part 1]
A) Introducing SOA with Evolution-comparing SOA to past architectures-client server, distributed internet, hybrid web service arch-tectures.
B) Web Services and primitive SOA- Web Services Framework, Service Descriptions with WSDL and Messaging with SOAP, UDDI basics.
C) Web Services and contemporary SOA part I-Service activity, Atomic transactions, coordination, business activities, orchestration, choreography

[Part 2]
A) Web Services and contemporary SOA part II- addressing, reliable messaging, correlation, policies, metadata exchange, security, notification and eventing.
B) Principles of Service Orientation- common principles, interrelation between principles, comparing service orientation with object orientation.
C) Service Layers- abstraction with configuration of layers -application business and orchestration layers

[Part 3]
A) SOA delivery strategies- Delivery life cycle, comparing top-down, bottom-up and agile strategies.
B) Introduction to Service-Oriented Analysis- Business-centric SOA, Deriving business services, service modeling.
C) Introduction to Service-Oriented Design- WSDL basics, SOAP basics, XML Schema, SOA compostion guidelines – Entity-centric business service design – Application service design – Task centric business service design
D) WS-BPEL basics, Introduction to fundamental WS-* Extensions.
E) Introduction of SOA platforms- SOA support in J2EE, SOA support in .NET along with Windows Communication Foundation

Text Books:

1. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design", Pearson Education.

Reference Books:

1. Thomas Erl, "SOA Principles of Service Design "(The Prentice Hall Service-Oriented Computing Series from Thomas Erl).
2. Newcomer, Lomow, "Understanding SOA with Web Services", Pearson Education.
3. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services, An Architect's Guide", Pearson Education.
4. Scott Klein, "Professional WCF Programming", Wiley Publishing, Inc.
5. Bipin Joshi, "Beginning XML with C# 2008", Apress

B. TECH. SEMESTER – VI (CE)
SUBJECT: SERVICE ORIENTED COMPUTING
PROPOSED SYLLABUS & SCHEME (W.E.F. 2018)

Teaching Scheme (Hours/Week)			Examination Scheme (Marks)					
Lectures	Tutorial	Practical	Theory (3 hrs.)	Sessional (1.25 hr.)	Practical	T.W.	Total	Credits
4	0	2	60	40	25	25	150	5

i) Introducing SOA with Evolution-comparing SOA to past architectures-client server, distributed internet, hybrid web service architectures.

ii) Web Services and primitive SOA- Web Services Framework, Service Descriptions with WSDL and Messaging with SOAP, UDDI basics.

iii) Web Services and contemporary SOA - Service activity, Atomic transactions, coordination, business activities, orchestration, choreography.

iv) Web Services and contemporary SOA - addressing, reliable messaging, correlation, policies, metadata exchange, security, notification and events.

v) Principles of Service Orientation- common principles, interrelation between principles, comparing service orientation with object orientation.

vi) Service Layers - abstraction with configuration of layers

vii) Service Layers - business application and orchestration layers

viii) Windows Communication Foundation: WCF introduction, Operations, Service, data and message contracts, Fault management, Instancing and concurrency management.

ix) Web API: Introduction, controller, configuration, routing, parameter binding, action return type, media type formatters, message handlers, filters, CRUD operation, consuming Web API, dependency injection.

Text Books:

1. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design", Pearson Education.
2. Juval Lowy & Michael Montgomery, "Programming WCF Services", O'Reilly, 4th Edition.
3. Tugberk Ugurlu, Alexander Zeitler and Ali Kheyrollahi, "Pro. ASP .NET Web API", Apress,

Reference Books:

1. Thomas Erl, "SOA Principles of Service Design "(The Prentice Hall Service-Oriented Computing Series from Thomas Erl).
2. Kurtz, Jamie, Wortman, Brian,"ASP.NET Web API 2: Building a REST Service from Start to Finish", APress,
3. Scott Klein, "Professional WCF Programming", Wiley Publishing, Inc.
4. Bipin Joshi, "Beginning XML with C# 2008", Apress

M. TECH. SEMESTER – I (CE)

SUBJECT: ADVANCED PROGRAMMING IN UNIX

SYLLABUS & SCHEME (W.E.F. 2018)

Teaching Scheme (Hours/Week)			Examination Scheme (Marks)					
Lectures	Tutorial	Practical	Theory (3 hrs.)	Sessional (1.25 hr.)	Practical	T.W.	Total	Credits
3	1	2	60	40	25	25	150	5

A. OBJECTIVES OF THE COURSE:

In depth knowledge of Operating Systems concepts are inevitable for any system programming task. UNIX is widely acceptable operating systems for not only server side but also desktop systems. Even Linux has evolved from the UNIX operating systems.

B. DETAILED SYLLABUS:

1) UNIX system overview
2) File I/O & Files and directories
3) System data files and information
4) Process environment
5) Process control & Process relationships
6) Signals
7) Threads
8) Daemon processes
9) Interprocess communication

C. LEARNING OUTCOMES:

Learning fundamentals of UNIX operating system and programming in it is the first steps toward kernel programming. It will help students to write systems programs like device drivers, network routines and kernel patches.

D. RECOMMENDED TEXT BOOK:

1. "Advanced Programming in the UNIX Environment" by W. Richard Stevens and Stephen A. Rago, 3rd edition, Addision Wesley Professional

E. REFERENCE BOOKS:

1. "Advanced Linux Programming" by Mark Mitchell, Jeffrey Oldham, Alex Samuel, 1st edition, Pearson Education

2. "Beginning Linux Programming" by Neil Matthew and Richard Stones, 4th edition, Wiley Publishing Inc.
3. "Linux System Programming" by Robert Love, O'reilly

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Sr. No.	Aim
1	Learning UNIX commands.
2	i) Write a C program to concatenate set of files given as a command line argument. ii) Write a C program to copy source file to destination file. (Use of *open, creat, read, write, close* system calls)
3	Write a C program to create a new process and run another program in it. (Use of *fork, wait, exec* system calls) and to display process information of all the processes existing in the system (Understand /proc file system)
4	Write a C program to display files and directories from the current directory. (Use of *opendir, readdir, closedir* system calls)
5	Write a C program that can understand the redirection and pipe features similar to shell. (Use of *dup* system call)
6	Write C programs which will communicate with each other using shared memory. (Use of *shmget, shmat, shmdt* system calls)
7	Write a C program to send signals and handle various signals. (Use of *signal, kill* system calls)
8	Write a C program to create threads and perform the job using threads. (Use of *pthread* library)
9	Write a C program to create parent and child processes which will communicate with each other using pipes. (Use of *pipe* system call)

DHARMSINH DESAI UNIVERSITY
FACULTY OF TECHNOLOGY
B.TECH – COMPUTER ENGINEERING

Subject List

Old Scheme	Proposed New Scheme(CBCS)
Semester I	**Semester I**
Mathematics - I	Mathematics – I
Basic Electrical and Electronics Engineering	Basic Electrical and Electronics Engineering
Elements of Linux Operating System and C Programming - I	Elements of Linux Operating System and C Programming – I
Engineering Mechanics	Engineering Mechanics
Engineering Graphics	Engineering Graphics
Environmental Science	Environmental Science
WorkShop – I	WorkShop – I
Semester II	**Semester II**
Mathematics – II	Mathematics – II
Electronic Principle	Electronic Principle
C Programming -II	C Programming –II
Mechanics of Solid	Mechanics of Solid
Heat Power	Heat Power
Electronic Workshop	Electronic Workshop
Engineering Economics & Principles of Management	Engineering Economics & Principles of Management
Semester III	**Semester III**
Mathematics – III	Mathematics – III
Data Structures and Algorithms	Data Structures and Algorithms
Database Management Systems	Database Management Systems

Object Oriented Programming with Java	Object Oriented Programming with Java
Design of Digital Circuits	Design of Digital Circuits
Financial & Managerial Accouting	Financial & Managerial Accouting
Semester IV	**Semester IV**
Discrete Mathematics	Discrete Mathematics
Design and Analysis of Algorithms	Design and Analysis of Algorithms
Software Engineering	Software Engineering
Computer System Architecture	Computer System Architecture
Computer Peripherals	Computer Peripherals
Elective – I (Any one from the following)	**Elective – I (Any one from the following)**
Java Technologies	Java Technologies
Visual Technologies	Visual Technologies
Semester V	**Semester V**
Microprocessor Fundamentals and Programming	Microprocessor Fundamentals and Programming
Web Development in .NET	Web Development in .NET
Advanced Algorithms	Advanced Algorithms
Advanced Web Technologies	Advanced Web Technologies
Operating Systems	Operating Systems
Professional Communication - 1	Professional Communication - 1
Semester VI	**Semester VI**
	Professional Communication - 2
Theory of Automata and Formal Languages	Theory of Automata and Formal Languages
Service Oriented Architecture	**Service Oriented Computing**
Computer Networks	Computer Networks

Object Oriented Software Engineering	Object Oriented Software Engineering
System Design Practice	System Design Practice
Elective – II (Any one from the following)	**Elective – II (Any one from the following)**
Advanced Computer Architecture	Advanced Computer Architecture
Network and Information Security	Network and Information Security
Semester VII	**Semester VII**
Artificial Intelligence	Artificial Intelligence
Compiler Construction	Compiler Construction
Elective – III	Elective – III
Elective – IV	Elective – IV
Elective – V	Elective – V
Elective III,IV & V (Any three from the following)	**Elective III,IV & V (Any three from the following)**
Embedded Systems	Embedded Systems
Computer Graphics	Computer Graphics
Advanced Computer Networks	Advanced Computer Networks
Distributed Operating System	Distributed Operating System
Image Processing	Image Processing
Knowledge Discovery	Knowledge Discovery
Mobile Application Development	Mobile Application Development
Semester VIII	**Semester VIII**
Project / Industrial Training	Project / Industrial Training

DHARMSINH DESAI UNIVERSITY
FACULTY OF TECHNOLOGY
M.TECH – COMPUTER ENGINEERING

Subject List

Old Scheme	Proposed New Scheme(CBCS)
Semester I	**Semester I**
Object Oriented Analysis And Design	Object Oriented Analysis And Design
Advanced Compiler Techniques	Advanced Compiler Techniques
Advance Computer Networks	Advance Computer Networks
Seminar	Seminar
Digital Image Processing (Group 1 - ELECTIVE – I)	Digital Image Processing (Group 1 - ELECTIVE – I)
Advance Software Engineering (Group1 - ELECTIVE – I)	Advance Software Engineering (Group 1 -ELECTIVE – I)
Operating System Design And Implementation	Operating System Design And Implementation **(Group2 - ELECTIVE – II)**
	Advanced Programming in UNIX (Group 2 - ELECTIVE – II)
Semester II	**Semester II**
Mobile Communication & Computing	Mobile Communication & Computing
Distributed Computing	Distributed Computing
Design And Analysis Of Algorithms	Design And Analysis Of Algorithms
Big Data Analytics	Big Data Analytics
Soft Computing	Soft Computing
Pedagogic Practices	Pedagogic Practices
Semester III	**Semester III**
Dissertation – I	Dissertation - I
Pedagogic Practice – I	Pedagogic Practice – I
Semester IV	**Semester IV**
Dissertation – II	Dissertation – II
Pedagogic Practice – II	Pedagogic Practice – II

Examiner Name	Designation	Institute Name	Experience	Email-Id	Mobile No	Subjects
Prof Nirav Bhatt	Asst Prof	Charusat,Changa	9 Years	niravbhatt.it@charusat.ac.in	9998582812	Database Management System
						Knowledge Discovery
						Ele. of Linux & C Prog.
						C Programming –II
						Operating Systems
						Computer System Architecture
						Microprocessor Funda & Prog
						Computer Networks
						Compiler Construction
						Theo. of Automata & Formal Lang.
Prof Jayshree Upadhyay	Asst Prof	Aditya Silver Oak Institute of Technology, Ahemdabad	10 Years	jayshreeupadhyay.ce@socet.edu.in	9825096670	Ele. of Linux & C Prog.
						C Programming –II
						Java Technology
						Object Oriented Programming with Java
						Computer Networks
						Advanced Computer Networks
						Network & Information Security
Prof. Purvi Prajapati	Asst Prof	Charusat,Changa	9 Years	purviprajapati.it@charusat.ac.in	9879753987	Knowledge Discovery
						Data Structure and Algorithms
						Computer Networks
						Advanced Computer Networks
						Network & Information Security
						Ele. of Linux & C Prog.
						C Programming –II
						Compiler Construction
Prof Harshal Shah	Hod	Parul Institute of Engineering and Technology,Vadodara	13 Years	harshalshah.mece@gmail.com	9998010542	Operating Systems
						Data Structure and Algorithms
						Knowledge Discovery
						Database Management Systems
						Software Engineering
						Object Oriented Software Engineering
						Design and Analysis of Algorithms
						C Programming-II

Examiner Name	Designation	Institute Name	Experience	Email-Id	Mobile No	Subjects
Prof. Nikita Bhatt	Asst Prof	Charusat,Changa	11 Years	nikitabhatt.ce@charusat.ac.in	9725028431	Data Structure and Algorithms
						Design and Analysis of Algorithms
						Advanced Algorithms
						Operating Systems
						Compiler Construction
						Theo. of Automata & Formal Lang.
						Ele. of Linux & C Prog.
						Network & Information Security
						Knowledge Discovery
						C Programming-II
Prof. Premal Patel	Associate Professor	KITE,Bakrol	13 Years	premalj_patel@yahoo.com	9925198251	Database Management Systems
						Computer Networks
						Advanced Computer Networks
						C Programming –II
						Design of Digital Circuits
						Network & Information Security
Prof. Brijesh Shah	Associate Professor	Charusat,Changa	11 Years	brijeshshah.ec@charusat.ac.in	9426588167	Design of Digital Circuits
						Image Processing
						Microprocessor Funda. & Prog.
						Computer System Architecture
						Advanced Computer Architecture
						Computer Networks
						Advanced Computer Networks
Prof. Vishal Rathod	Research Scholar	National Institute of Technology Karnataka	6 Years	vishal_55432@yahoo.com	987995770	Theo. of Automata & Formal Lang.
						Object Oriented Programming with Java
						Java Technology
						Data Structure and Algorithms
						Computer Networks
						Distributed Operating Systems
						Advanced Computer Networks

Examiner Name	Designation	Institute Name	Experience	Email-Id	Mobile No	Subjects
Prof Deepak Ramolia	Asst Prof	Silver Oak Institute of Technology, Ahemdabad	5 Years	deepakce1991@gmail.com dipakramolia.ce@socet.edu.in	9998771587	Web Development in .Net
						Advanced Web Technologies
						Operating Systems
						Database Management Systems
						Knowledge Discovery
						Software Engineering
						Visual Technology
						Embedded Systems
						C Programming-II
Prof. Tejas Mehta	Lecturer	RCTI, Sola Ahemdabad	15 Years	tejasmehta@gmail.com	9428913657	Design of Digital Circuits
						Software Engineering
						Object Oriented Software Engineering
						Design and Analysis of Algorithms
						Advanced Algorithms
						Service Oriented Architecture
						Database Management System
						Discrete Mathematics
						Operating Systems
						Image Processing
						Embedded Systems
Prof Nishidh Chavda	Asst Prof	RC Technical,Ahemdabad	9 Years	nishidh.bece@gmail.com	9979073405	Computer System Architecture
						Microprocessor Funda. & Prog.
						Advanced Computer Architecture
						Object Oriented Programming with Java
						Java Technology
						Knowledge Discovery
						Embedded Systems
						Operating Systems
						Advanced Computer Networks
						Network & Information Security

Examiner Name	Designation	Institute Name	Experience	Email-Id	Mobile No	Subjects
Prof. Chirag Thaker	Professor	GEC, Bhavnagar	20 Years	chiragthaker@yahoo.com	9898835789	Knowledge Discovery
						Artificial intelligence
						Ele. of Linux & C Prog.
						C Programming-II
						Service Oriented Architecture
						Web Development in .Net
						Visual Technology
						Advanced Web Technologies
						Software Engineering
						Discrete Mathematics
						Object Oriented Software Engineering
Prof Sarita Visavaliya	Asst Prof	ADIT, New Vvnagar	7 Years	it.sarita@adit.ac.in	9429181142	Theo. of Automata & Formal Lang.
						Compiler Construction
						Image Processing
						Design and Analysis of Algorithms
						Advanced Algorithms
						Ele. of Linux & C Prog.
						C Programming –II
Prof. Vishal Rathod	Research Scholar	National Institute of Technology Karnataka	6 Years	vishal_55432@yahoo.com	987995770	Object Oriented Programming with Java
						Theo. of Automata & Formal Lang.
						Compiler Construction
						Java Technology
						Data Structure and Algorithms
						Advanced Computer Networks
						Computer Networks
Prof. Radha Teredesai	Asst Prof	Bits Edu. Campus	12 Years	radhateredesai.ce@bitseducampus.ac.in	9879557337	Design and Analysis of Algorithm
						Advanced Algorithms
						Operating Systems
						Image Processing
						Theo. of Automata & Formal Lang.
						Compiler Construction
						Software Engineering
						Object Oriented Software Engineering

Examiner Name	Designation	Institute Name	Experience	Email-Id	Mobile No	Subjects
Prof. Minal Patel	Asst Prof	ADIT, New Vidhyanagar	10 Years	mppatel.adite@gmail.com	9998574188	Object Oriented Software Engineering
						Computer Networks
						Advanced Computer Networks
						Network & Information Security
						Service Oriented Architecture
						Data Structure and Algorithms
						Software Engineering
						Database Management Systems
Prof. Chintan Bhatt	Asst Prof	Charusat, Changa	7 Years	chinranbhatt.ce@charusat.ac.in	9909953994	Software Engineering
						Object Oriented Software Engineering
						Knowledge Discovery
						Computer Networks
						Advanced Computer Networks
						Operating Systems
						Network & Information Security
						Database Management Systems
Prof.Keyur Brahmbhatt	Hod	BVM, Vidhyanagar	10 Years	keyur.brahmbhatt@bvmengineering.ac.in	9408151969	Database Management System
						Computer Networks
						Advanced Computer Networks
						Image Processing
						Software Engineering
						Design and Analysis of Algorithms
						Advanced Algorithms
						Object Oriented Software Engineering
						Network & Information Security
Prof. Amit Naik	Asst Prof	Charusat,Changa	11 Years	amitnayak.it@charusat.ac.in	9925307605	Microprocessor Funda. & Prog.
						Advanced Computer Architecture
						Computer System Architecture
						Knowledge Discovery
						Computer Networks
						Data Structure and Algorithms
						Distributed Operating Systems
						Operating Systems

Examiner Name	Designation	Institute Name	Experience	Email-Id	Mobile No	Subjects
Prof. Ashwin Makwana	Asst Prof	Charusat,Changa	10 Years	ashwinmakwana.ce@charusat.ac.in	9408151969	Artificial intelligence
						Web Development in .Net
						Advanced Web Technologies
						Software Engineering
						Object Oriented Software Engineering
						Ele. of Linux & C Prog.
						C Programming –II
						Java Technology
						Visual Technology
						Object Oriented Programming with Java
Prof.Arpita Shah	Asst Prof	Charusat,Changa	16 Years	arpitashah.ce@charusat.ac.in	9825551555	Operating Systems
						Computer Architecture
						Advanced Computer Architecture
						Microprocessor Funda. & Prog.
						Database Management System
						Distributed Operating Systems
						Embedded Systems
						Data Structure and Algorithms
Prof. Hasmukh Koringa	Asst Prof	GEC, Rajkot	11years	hasmukh_meec@rediffmail.com	9428037980	Design of Digital Circuits
						Computer Architecture
						Advanced Computer Architecture
						Embedded Systems
						Microprocessor Funda. & Prog.
Prof Gopi Sanghani	Hod	Darshan Institute,Rajkot	18 Years	gopi.sanghani@darshan.ac.in	9825621471	Theo. of Automata & Formal Lang.
						Compiler Construction
						Artificial intelligence
						Design and Analysis of Algorithm
						Advanced Algorithms
						Operating Systems
						Ele. of Linux & C Prog.
						Embedded Systems
						C Programming-II

Examiner Name	Designation	Institute Name	Experience	Email-Id	Mobile No	Subjects
Prof. Rutu Atalia	Asst Prof	Charusat,Changa	2 Years	rutuataliya.ce@charusat.ac.in	9409414408	Java Technology
						Object Oriented Programming with Java
						Network & Information Security
						Image Processing
						Design and Analysis of Algorithms
						Design of Digital Circuits
						Advanced Algorithms
Prof Kinnar Vaghela	Associate Professor	LD College of Engineering, Ahmedabad	22 Years	v.kinnar@gmail.com	9426014007	Computer Networks
						Advanced Computer Networks
						Network & Information Security
						Design of Digital Circuits
						Image Processing
						Microprocessor Funda. & Prog.
						Computer System Architecture
						Advanced Computer Architecture
Prof Ramji Makwana	Prof &Head	VVP Eng College, Rajkot	14 Years	ramjimmakwana@gmail.com	9428564945	Image Processing
						Artificial intelligence
						Operating Systems
						Discrete Mathematics
						Advanced Computer Architecture
						Data Structure and Algorithms
						Computer System Architecture
						Mobile Application Development
Prof Hemal Shah	Professor	ICT, Ahemdabad	18 Years	hemal.shah@ganpatuniversity.ac.in	9427711969	Object Oriented Programming with Java
						Java Technology
						Database Management Systems
						Software Engineering
						Object Oriented Software Engineering
						Service Oriented Architecture
						Data Structure and Algorithms
						Operating Systems

Examiner Name	Designation	Institute Name	Experience	Email-Id	Mobile No	Subjects
Prof N M Patel	Associate Professor	BVM, VV Nagar	22 Years	nmpatel@bvmengineering.ac.in	9428660842	Image Processing
						Computer Networks
						Operating Systems
						Advanced Computer Networks
						Data Structure and Algorithms
						Design and Analysis of Algorithms
						Advanced Algorithms
						Design of Digital Circuits
						Database Management Systems
Prof Narendra Chauhan	Prof &Head	ADIT, New Vvnagar	12 Years	narendracchauhan@gmail.com	9377559385	Artificial intelligence
						Image Processing
						Knowledge Discovery
						Design and Analysis of Algorithms
						Advanced Algorithms
						Database management Systems
						Data structure and Algorithms
						Software Engineering
						Operating Systems
Prof. Dhaval Bhoi	Asst Prof	Charusat,Changa	14 Years	dhavalbhoi.ce@charusat.ac.in	9879974807	Theo. of Automata & Formal Lang.
						Compiler Construction
						Knowledge Discovery
						Design and Analysis of Algorithms
						Advanced Algorithms
						Discrete Mathematics
						Operating Systems
						Data Structure and Algorithms
Prof.Mrugendra Rahevar	Asst Prof	Charusat, Changa	11 Years	mrugendrarahevar.ce@charusat.ac.in	9925856399	Object Oriented Programming with Java
						Java Technology
						System Oriented Architecture
						Knowledge Discovery
						Web Development in .Net
						Advanced Web Technologies
						Mobile Application Development

Examiner Name	Designation	Institute Name	Experience	Email-Id	Mobile No	Subjects
Prof. Hardik Upadhyay	Asst Prof	GPERI, Mevad	10 Years	hardik.upadhyay@gperi.ac.in hardik31385@gmail.com	9825926747	Web Development in .Net
						Advanced Web Technologies
						Ele. of Linux & C Prog.
						C Programming-II
						Network & Information Security
						Visual Technology
						Computer Networks
						Advanced Computer Networks
Prof Amit Ganatra	Professor	Charusat, Changa	16 Years	amitganatra.ce@charusat.ac.in	9426350639	Software Engineering
						Object Oriented Software Engineering
						Knowledge Discovery
						Theo. of Automata & Formal Lang.
						Compiler Construction
						Design and Analysis of Algorithms
						Database Management Systems
						Data structure and Algorithms
						Operating Systems
						Advanced Algorithms
Prof. Mahasweta J Joshi	Asst Prof	BVM, Vidhyanagar	10 Years	mjjoshi@bvmengineering.ac.in	9427203751	Artificial intelligence
						Image Processing
						Java Technology
						Object Oriented Programming with Java
						Ele. of Linux & C Prog.
						C Programming –II
						Data Structure and Algorithms
Prof Amit Thakkar	Associate Professor	Charusat, Changa	15 Years	amitthakkar.it@charusat.ac.in	9601290990	Knowledge Discovery
						Network & Information Security
						Database Management System
						Data Structure and Algorithms
						Computer System Architecture
						Design and Analysis of Algorithm
						Operating Systems
						Advanced Algorithms

Examiner Name	Designation	Institute Name	Experience	Email-Id	Mobile No	Subjects
Prof.Udaysang Jaliya	Asst Prof	BVM, Vidhyanagar	14 Years	udayjaliya@gmail.com	9426762538	Image Processing
						Data Structure and Algorithms
						Computer Networks
						Software Engineering
						Operating Systems
						Computer System Architecture
						Advanced Computer Networks
						Network & Information Security
Prof Ritesh Patel	Asst Prof	Charusat,Changa	15 Years	riteshpatel.ce@charusat.ac.in	9879580096	Computer Networks
						Advanced Computer Networks
						Operating Systems
						Knowledge Discovery
						Network & Information Security
						Service Oriented Architecture
						Operating Systems
						Database Management Systems
Prof Pradip Panchal	Associate Professor	Charusat,Changa	16 Years	pradippanchal.ec@charusat.ac.in	9426556389	Image Processing
						Design of Digital Circuits
						Microprocessor Funda & Prog
						Computer System Architecture
						Advanced Computer Architecture
						Ele. of Linux and C Prog
						C-Programming-II
Prof. Nilay Ganatra	information System Analyst	Charusat, Changa	6 Years	nilayganatra.mca@charusat.ac.in	9924048124	Mobile Application Development
						Database Management Systems
						Ele. of Linux & C Prog.
						C Programming –II
						Object Oriented Programming with Java
						Java Technology
						Network & Information Security
						Service Oriented Architecture
						Operating Systems

Examiner Name	Designation	Institute Name	Experience	Email-Id	Mobile No	Subjects
Prof Jaimin Chavda	Asst Prof	Charusat,Changa	9 Years	jaiminchavda.it@charusat.ac.in	9825982074	Image Processing
						Ele. of Linux & C Prog.
						C Programming-II
						Object Oriented Programming with Java
						Design and Analysis of Algorithms
						Operating System
						Java Technology
						Computer System Architecture
						Database Management System
						Data Structure and Algorithms
Prof. Ketan Pandya	Asst Prof	GIT, Gandhinagar	4 Years	ketan.pandya@git.org.in	9428130410	Operating Systems
						Data Structure and Algorithms
						Object Oriented Programming with Java
						Java Technology
						Design and Analysis of Algorithm
						Advanced Algorithms
						Ele. of Linux & C Prog.
						C Programming-II
Prof. Anand Pandya	Asst. Prof	ADIT, New Vidhyanagar	5 Years	it.anandpandya@adit.ac.om	9428708535	Database Management System
						Software Engineering
						Object Oriented Software Engineering
						Computer Networks
						Advanced Computer Networks
						Network & Information Security
						Data Structure and Algorithms
Prof. Nirali Thakkar	Asst. Prof	ADIT, New Vidhyanagar	6 Years	thakkarniralis@gmail.com	9998568489	Design and Analysis of Algorithms
						Theo. of Automata & Formal Lang.
						Compiler Construction
						Database Management System
						Operating Systems
						Ele. of Linux & C Prog.
						C Programming-II

Examiner Name	Designation	Institute Name	Experience	Email-Id	Mobile No	Subjects
Prof.Rahul Joshi	Asst. Prof	Parul Institute of Engineering and Technology, Vadodara	8 Years	rah1985@gmail.com	9662001903	Operating Systems
						Database Management System
						Software Engineering
						Object Oriented Software Engineering
						Web Development in .Net
						Data Structure and Algorithms
						Embedded Systems
						Advanced Web Technologies
Prof. Prachi Shah	Asst. Prof	BVM, V.V Nagar	4 Years	prachi.shah@bvmengineering.ac.in	9408400907	Data Structure and Algorithms
						Database Management Systems
						Software Engineering
						Object Oriented Software Engineering
						Operating Systems
						Advanced Computer Networks
						Computer Networks
Prof. Prerak Thakkar	Asst. Prof	ADIT, New Vidhyanagar	4 Years	cp.prerak@adit.ac.in	9998145150	Ele. of Linux & C Prog.
						C Programming-II
						Data Structure and Algorithms
						Computer Networks
						Advanced Computer Networks
						Network & Information Security
Prof. Tarjini Vyas	Asst. Prof	Nirma University Ahemdabad	7 Years	tarjnivyas@gmail.com tarjni.vyas@nirmauni.ac.in	9898021984	Theo. of Automata & Formal Lang.
						Discrete Mathematics
						Compiler Construction
						Software Engineering
						Object Oriented Software Engineering
						Operating Systems
						Data Structure and Algorithms

Examiner Name	Designation	Institute Name	Experience	Email-Id	Mobile No	Subjects
Prof. Sonal Rami	Asst Prof	Charusat, Changa	6 Years	sonalrami.it@charusat.ac.in	9879892061	Data Structure and Algorithms
						Design and Analysis of Algorithms
						Advanced Algorithms
						Artificial intelligence
						Knowledge Discovery
						Database Management Systems
						Operating Systems
Prof. Ankit Didwania	Lecturer	Govt Poly Tech. Gandhinagar	7 Years	ankit.didwania@gmail.com	9974162691	Network & Information Security
						Mobile Application Development
						Web Development in .Net
						Visual Technology
						Advanced Web Technologies
						Database Management Systems
						Embedded Systems
						Operating Systems
Prof. Hitesh Nimbark	Principal	Gyanmanjari Institute of Tech Bhavnagar.	17 Years	hmnimbark@gmail.com	9825281150	Network & Information Security
						Knowledge Discovery
						Artificial intelligence
						Service Oriented Architecture
						Operating Systems
						Computer Networks
						Advanced Computer Networks
						Data Structure and Algorithms
						Software Engineering
Prof. Gopi Bhatt	Assistant Prof.	ADIT, New V.V Nagar	12 Years	ce.gopi@adit.ac.in	9979270920	Compiler Construction
						Image Processing
						Operating Systems
						Data structure and Algorithms
						Design and Analysis of Algorithms
						Advanced Algorithms

Examiner Name	Designation	Institute Name	Experience	Email-Id	Mobile No	Subjects
Prof. Swapnil Parikh	Asst. Prof	BIT, Vadodara	11 Years	swapnil.parikh@gmail.com	9998168061	Operating Systems
						Computer Networks
						Artificial Intelligence
						Network & Information Security
						Advanced Computer Networks
						C Programming-II
						Ele. of Linux & C Prog.
Prof. Nikunj Vadher	Asst Prof	Marwadi insti. of Tech, Rajkot	5 Years	nikunjvadher@mavadieducation.edu.in	9978446077	Computer System Architecture
						Web Development in .Net
						Visual Technology
						Advanced Web Technologies
						Microprocessor Funda. & Prog.
						Advanced Computer Architecture
						Ele. of Linux & C Prog.
						Design of Digital Circuits
						C Programming-II
Prof. Yask Patel	Asst Prof	Parul Uni, Vadodara	7 Years	patelyask@gmail.com	8000426542	Object Oriented Programming with Java
						Java Technology
						Web Development in .Net
						Advanced Web Technologies
						Computer Networks
						Ele. of Linux & C Prog.
						C Programming-II
						Mobile Application Development
						Advanced Computer Networks
Prof. Rutvik Mehta	Asst Prof	Parul Uni, Vadodara	4 Years	rutvik.mehta@paruluniversity.ac.in	9429066168	Database Management Systems
						Theo. of Automata & Formal Lang.
						Compiler Construction
						Data Structure and Algorithms
						Computer Networks
						Discrete Mathematics
						Advanced Computer Networks

Examiner Name	Designation	Institute Name	Experience	Email-Id	Mobile No	Subjects
Prof. Anirudhha Kurtkoti	Asst Prof	ADIT, New V.V Nagar	9 years	ce.akk@adit.ac.in	9924763040	Java Technology
						Object Oriented Programming With Java
						Design and Analysis of Algorithm
						Advanced Algorithms
						Operating Systems
						Distributed operating Systems
						Computer Networks
						Advanced Computer Networks
						Mobile Application Development
Prof. Chinmay Joshi	Asst Prof	ADIT, New V.V Nagar	4 years	jchinmay.er@gmail.com	9525982074	Software engineering
						Discrete Mathematics
						Design and Analysis of Algorithms
						Database management Systems
						Operating Systems
						Software Oriented Architecture
						Computer Networks
						Object Oriented Software Engineering
Bharat Panchal	Senior Manager	IGATE Global Solutions Ltd	15 Years	bharat.panchal@capegemini.com	9727716196	Service Oriented Architecture
						System Design Practice
						Object Oriented Software Engineering
						Project/industrial Training
Nakulvachhrajani	Technical Architect	IGATE Global Solutions Ltd	13 Years	nakul.vachhrajani@capegemini.com	8000487078	Service Oriented Architecture
						System Design Practice
						Object Oriented Software Engineering
						Project/industrial Training
Purav Gandhi	CEO	Aspire Software Solutions	17 Years		9428803305	Service Oriented Architecture
						System Design Practice
						Object Oriented Software Engineering
						Mobile Application Development
						Project/industrial Training

Examiner Name	Designation	Institute Name	Experience	Email-Id	Mobile No	Subjects
Mahendra Narodia	Project Mananger	Excellence infocom Pvt. Ltd	12 Years	m.narodia@gmail.com	9586921598	Service Oriented Architecture System Design Practice Object Oriented Software Engineering Project/industrial Training
Jayanta Sarkar	Director	Synoverge Technologies Pvt. Ltd.	28 Years	jayanta@synoverge.com	9825024808	Service Oriented Architecture System Design Practice Object Oriented Software Engineering Project/industrial Training
Niraj Salot	Head of Development Operations-Java	SPEC india	17 Years	niraj.salot@spec-india.com	9824632352	Mobile Application Development Service Oriented Architecture System Design Practice Object Oriented Software Engineering Project/industrial Training
Mehul Shah	CEO	V R Software Systems Pvt. Ltd.	24 Years	mehul.shah@vrsspl.com	9824021720	Mobile Application Development Service Oriented Architecture System Design Practice Object Oriented Software Engineering Project/industrial Training
Ashish Buch	Director	IGATE Global Solutions Ltd.	21 Years	ashish.buch@capegemini.com	9428404871	Service Oriented Architecture System Design Practice Object Oriented Software Engineering Project/industrial Training
Jaydip Bhensdadia	Scrum Master	Excellence infocom Pvt. Ltd	5 Years	bjp004@gmail.com	9724776079	Service Oriented Architecture System Design Practice Object Oriented Software Engineering Project/industrial Training

SEM:I	Prof. J.M.Pandya
	Prof. H. A.Pandya
	Prof. A.M.Shah
	Prof. N.J.Buch
	Prof. V.S.Patel
SEM:II	Prof. J.M.Pandya
	Prof. H. A.Pandya
	Prof. A.M.Shah
	Prof. N.J.Buch
	Prof. V.S.Patel
SEM:III	Prof. M.T.Mehta
	Prof. M.S. Bhatt
	Prof. T.V.Ratanpara
	Prof A. A.Mehta
	Prof. P.R.Dave
	Prof. P.M.Jadav
	Prof. S.P.Shah
	Prof. A.K.Gor
	Prof. N.J.Buch
	Prof. V.S.Patel
	Prof. S.S.Shah
	Prof. B.M.Gambhava
	Prof. S.P.Malukani
	Prof. J.M.Pandya
	Prof. A.M.Shah
	Prof. H. A.Pandya
SEM:IV	Prof A. A.Mehta
	Prof. A.M.Shah
	Prof. V.N Dangar
	Prof. T.V.Ratanpara
	Prof. B.S.Bhatt
	Prof. M.S. Bhatt
	Prof. P.C.Chauhan
	Prof. A.K.Gor
	Prof. P.M.Jadav
	Prof. S.P.Shah
	Prof. V.S.Patel
	Prof. N.J.Buch
	Prof. P.R.Dave
	Prof. S.S.Shah
	Prof. S.P.Malukani
	Prof. A.P.Vaishnav
	Prof. M.T.Mehta
SEM:V	Prof. B.S.Bhatt
	Prof. M.T.Mehta
	Prof. P.M.Jadav
	Prof. M.S. Bhatt
	Prof. S.S.Shah
	Prof. J.M.Pandya
	Prof. B.M.Gambhava
	Prof. S.P.Shah
	Prof. A.K.Gor
	Prof. A.P.Vaishnav
	Prof. T.V.Ratanpara
	Prof. P.C.Chauhan
	Prof. J.H.Baxi
	Prof. A.A.Mehta
	Prof. P.R.Dave
	Prof. H. A.Pandya
	Prof. V.S.Patel

SEM:VI	Prof. C.K.Bhensdadia
	Prof. B.S.Bhatt
	Prof. M.T.Mehta
	Prof. P.M.Jadav
	Prof. M.S. Bhatt
	Prof. S.S.Shah
	Prof. J.M.Pandya
	Prof. B.M.Gambhava
	Prof. S.P.Shah
	Prof. A.P.Vaishnav
	Prof. A.K.Gor
	Prof. P.C.Chauhan
	Prof. S.P.Malukani
	Prof. J.H.Baxi
	Prof. P.R.Dave
	Prof. V.S.Patel
SEM:VII	Prof. C.K.Bhensdadia
	Prof. B.S.Bhatt
	Prof. M.T.Mehta
	Prof. P.M.Jadav
	Prof. M.S. Bhatt
	Prof. S.S.Shah
	Prof. J.M.Pandya
	Prof. B.M.Gambhava
	Prof. S.P.Shah
	Prof. A.M.Shah
	Prof. A.P.Vaishnav
	Prof. A.K.Gor
	Prof. T.V.Ratanpara
	Prof. P.C.Chauhan
	Prof. S.P.Malukani
	Prof A. A.Mehta
	Prof. H. A.Pandya
	Prof. V.N Dangar

M.Tech semester: I							
Subject	**Internal Faculty**	**External Faculty**	**Designation**	**Institute name**	**Experience**	**Email-id**	**Mobile No**
Advanced Computer Networks	Prof. B.S Bhatt	Prof Kinnar Vaghela	Associate Professor	LD , Ahmedabad	22 years	v.kinnar@gmail.com	9426014007
	Prof. B.M Gambhava	Prof. Hitesh Nimbark	Principal	Gyanmanjari Institute of tech	17 years	hmnimbark@gmail.com	9825281150
	Prof. M.T Mehta	Prof Ritesh Patel	Asst Prof	Charusat,changa	15 years	riteshpatel.ce@charusat.ac.in	9879580096
	Prof. S.P Shah	Prof. Purvi Prajapati	Asst Prof	Charusat,changa	9 years	purviprajapati.it@charusat.ac.in	9879753987
	Prof. S.P. Malukani	Prof. Hardik Upadhyay	Asst Prof	GPERI, Mevad	10 years	hardik.upadhyay@gperi.ac.in hardik31385@gmail.com	9825926747
		Prof Jayshree Upadhyay	Asst Prof	Aditya Silver Oak Institute of Technology, Ahemdabad	10 years	jayshreeupadhyay.ce@socet.edu.in	9825096670
		Prof. Minal Patel	Asst Prof	ADIT, New vidhyanagar	10 years	mppatel.adite@gmail.com	9998574188
Advance Compiler Techniques	Prof. C. K Bhensdadia	Prof Sarita Visavaliya	Asst Prof	ADIT, New VVNagar	7 Years	it.sarita@adit.ac.in	9429181142
	Prof. B.S Bhatt	Prof Nirav Bhatt	Asst Prof	Charusat,changa	9 years	niravbhatt.it@charusat.ac.in	9998582812
	Prof. M.S Bhatt	Prof. Nikita Bhatt	Asst Prof	Charusat,changa	11 years	nikitabhatt.ce@charusat.ac.in	9725028431
	Prof. Vanraj Dangar	Prof. Radha Teredesai	Asst Prof	BITs Edu. Campus	12 years	radhateredesai.ce@bitseducampus.ac.in	9879557337
	Prof. Aashish Gor	Prof Gopi Sanghani	HoD	Darshan Institute,Rajkot	18 years	gopi.sanghani@darshan.ac.in	9825621471
		Prof. Dhaval Bhoi	Asst Prof	Charusat,changa	14 years	dhavalbhoi.ce@charusat.ac.in	9879974807
		Prof Amit Ganatra	Professor	Charusat, changa	16 years	amitganatra.ce@charusat.ac.in	9426350639
		Prof. Nirali Thakkar	Asst. Prof	ADIT, New Vidhyanagar	6 years	thakkarniralis@gmail.com	9998568489
Object Oriented Analysis and Design	Prof C K Bhensdadia	Prof Amit Ganatra	Professor	Charusat,changa	16 years	amitganatra.ce@charusat.ac.in	9426350639
	Prof. B.S Bhatt	Prof Harshal Shah	HoD	Parul Institute, Vadodara	13 years	harshalshah.mece@gmail.com	9998010542
	Prof. P.M Jadav	Prof. Chirag Thaker	Asst Prof	LD Engineering, Ahemdabad	20 years	chiragthaker@yahoo.com	9898835789
	Prof. J. M Pandya	Prof.Keyur Brahmbhatt	HoD	BVM, Vidhyanagar	10 years	keyur.brahmbhatt@bvmengineering.ac.in	9408151969
	Prof. A. P Vaishnav	Prof. Ashwin Makwana	Asst Prof	Charusat,changa	10 years	ashwinmakwana.ce@charusat.ac.in	9408151969
	Prof. J. H Baxi	Prof Hemal Shah	Professor	ICT, Ahemdabad	18 years	hemal.shah@ganpatuniversity.ac.in	9427711969
		Prof. Tarjini Vyas	Asst. Prof	Nirma University Ahemdabad	7 years	tarjnivyas@gmail.com Tarjni.vyas@nirmauni.ac.in	9898021984

Subject	Internal Faculty	External Faculty	Designation	Institute name	Experience	Email-id	Mobile No
Operating System Design and Implementation	Prof. P.M Jadav	Prof N M Patel	Associate Professor	BVM, VV Nagar	22 years	nmpatel@bvmengineering.ac.in	9428660842
	Prof. J. M Pandya	Prof Nikita Bhatt	Asst Prof	Charusat,changa	11 years	nikitabhatt.ce@charusat.ac.in	9725028431
	Prof. S.P Shah						
	Prof. A. P Vaishnav	Prof Ritesh Patel	Asst Prof	Charusat,changa	15 years	riteshpatel.ce@charusat.ac.in	9879580096
	Prof A. K Gor	Prof Jaimin Chavda	Asst Prof	Charusat,changa	9 years	jaiminchavda.it@charusat.ac.in	9825982074
	Prof. H. A Pandya	Prof Hemal Shah	Professor	ICT, Ahemdabad	18 years	hemal.shah@ganpatuniversity.ac.in	9427711969
		Prof. Amit Naik	Asst Prof	Charusat,changa	11 years	amitnayak.it@charusat.ac.in	9925307605
		Prof.Arpita Shah	Asst Prof	Charusat,changa	16 years	arpitashah.ce@charusat.ac.in	9825551555
Digital Image Processing	Prof. P.M Jadav	Prof. Brijesh Shah	Associate Professor	Charusat,changa	11 years	brijeshshah.ec@charusat.ac.in	9426588167
	Prof. M.S Bhatt	Prof.Keyur Brahmbhatt	HoD	BVM, Vidhyanagar	10 years	keyur.brahmbhatt@bvmengineering.ac.in	9408151969
	Prof. T.V Ratanpara	Prof.Uday Jaliya	Asst Prof	BVM, Vidhyanagar	14 years	udayjaliya@gmail.com	9426762538
	Prof. S.P Malukani	Prof Pradip Panchal	Associate Professor	Charusat,changa	16 years	Pradippanchal.ec@charusat.ac.in	9426556389
	Prof. A.K. Gor	Prof. Mahasweta J Joshi	Asst Prof	BVM, Vidhyanagar	10 years	mjjoshi@bvmengineering.ac.in	9427203751
		Prof. Radha Teredesai	Asst Prof	BITs Edu. Campus	12 years	radhateredesai.ce@bitseducampus.ac.in	9879557337

M.Tech semester: II							
Subject	**Internal Faculty**	**External Faculty**	**Designation**	**Institute name**	**Experience**	**Email-id**	**Mobile No**
Soft computing	Dr. C K Bhensdadia	Prof Narendra Chauhan	Prof &Head	ADIT, New VVNagar	12 years	narendracchauhan@gmail.com	9377559385
	Prof. B.S Bhatt	Prof Amit Ganatra	Professor	Charusat,changa	16 years	amitganatra.ce@charusat.ac.in	9426350639
	Prof. P.M Jadav	Prof Ramamohan	Professor	IIT-RAM Gandhinagar	35 years	ramamohan@iitram.ac.in	079-67775419
	Prof. M.S.Bhatt	Prof Gopi Sanghani	HoD	Darshan Institute,Rajkot	18 years	gopi.sanghani@darshan.ac.in	9825621471
	Prof. T.V Ratanpara	Prof. sonal Rami	Asst Prof	Charusat, Changa	6 years	sonalrami.it@charusat.ac.in	9879892061
	Prof. A.P.Vaishnav	Prof Amit Thakkar	Associate Professor	Charusat, changa	15 years	amitthakkar.it@charusat.ac.in	9601290990
	Prof. A.A Mehta						

Subject	Internal Faculty	External Faculty	Designation	Institute name	Experience	Email-id	Mobile No
Big Data Analytics	Dr. C K Bhensdadia	Prof. Amit Naik	Asst Prof	Charusat,changa	11 years	amitnayak.it@charusat.ac.in	9925307605
	Prof. B.S. Bhatt	Prof Amit Ganatra	Professor	Charusat,changa	16 years	amitganatra.ce@charusat.ac.in	9426350639
	Prof. M.S.Bhatt	Prof Nirav Bhatt	Asst Prof	Charusat,changa	9 years	niravbhatt.it@charusat.ac.in	9998582812
	Prof. J. M Pandya	Prof.Mrugendra Rahevar	Asst Prof	Charusat, Changa	11 years	mrugendrarahevar.ce@charusat.ac.in	9925856399
	Prof. A. P Vaishnav	Prof Harshal Shah	HoD	Parul Inst. Of Engg & Tech,Vadodara	13 years	harshalshah.mece@gmail.com	9998010542
	Prof A. K Gor	Prof. Chirag Thaker	Asst Prof	LD Engineering, Ahemdabad	20 years	chiragthaker@yahoo.com	9898835789
	Prof. P.C. Chauhan	Prof Amit Thakkar	Associate Professor	Charusat, changa	15 years	amitthakkar.it@charusat.ac.in	9601290990
	Prof. A.A Mehta	Prof. Purvi Prajapati	Asst Prof	Charusat,changa	9 years	purviprajapati.it@charusat.ac.in	9879753987
Mobile Communication and Computing	Prof. M.T.Mehta	Prof. Chintan Bhatt	Asst Prof	Charusat, Changa	7 years	chinranbhatt.ce@charusat.ac.in	9909953994
	Prof. S.P. Malukani	Prof Kinnar Vaghela	Associate Professor	LD College of Engineering, Ahmedabad	22 years	v.kinnar@gmail.com	9426014007
	Prof. B.M.Gambhava	Prof N M Patel	Associate Professor	BVM, VV Nagar	22 years	nmpatel@bvmengineering.ac.in	9428660842
	Prof. S.P.Shah	Prof. Amit Naik	Asst Prof	Charusat,changa	11 years	amitnayak.it@charusat.ac.in	9925307605
		Prof. Hitesh Nimbark	Principal	Gyanmanjari Institute of tech, bhavnagar	17 years	hmnimbark@gmail.com	9825281150
		Prof. Anirudhha Kurtkoti	Asst Prof	ADIT, New V.V Nagar	9 years	ce.akk@adit.ac.in	9924763040
		Prof Ritesh Patel	Asst Prof	Charusat,changa	15 years	riteshpatel.ce@charusat.ac.in	9879580096
		Prof. P. B Swadas	Associate Professor	BVM, VV Nagar	27 years	pbswadas@bvmengineering.ac.in	9824057139
Distributed computing	Prof P.M. Jadav	Prof. Chirag Thaker	Asst Prof	LD, Ahemdabad	20 years	chiragthaker@yahoo.com	9898835789
	Prof. M.T.Mehta	Prof Ritesh Patel	Asst Prof	Charusat,changa	15 years	riteshpatel.ce@charusat.ac.in	9879580096
	Prof. J. M Pandya	Prof N M Patel	Asso. Prof.	BVM, VV Nagar	22 years	nmpatel@bvmengineering.ac.in	9428660842
	Prof. S.P.Shah	Prof DG thakore	Prof &Head	BVM, VV Nagar	25 years	dgthakore@bvmengineering.ac.in	9825272963
	Prof Vanraj Dangar	Prof. Tejas Mehta	Lecturer	RCTI, sola Ahemdabad	15 years	tejasmehta@gmail.com	9428913657
		Prof. Swapnil Parikh	Asst. Prof	BIT, vadodara	11 years	swapnil.parikh@gmail.com	9998168061
		Prof.Uday Jaliya	Asst Prof	BVM, Vidhyanagar	14 years	udayjaliya@gmail.com	9426762538
		Prof Hemal Shah	Professor	ICT, Ahemdabad	18 years	hemal.shah@ganpatuniversity.ac.in	9427711969

Subject	Internal Faculty	External Faculty	Designation	Institute name	Experience	Email-id	Mobile No
Design and Analysis of algorithm	Prof. M.S.Bhatt	Prof Sarita Visavaliya	Asst Prof	ADIT, New VVNagar	7 Years	it.sarita@adit.ac.in	9429181142
	Prof P.M. Jadav	Prof. Nikita Bhatt	Asst Prof	Charusat,changa	11 years	nikitabhatt.ce@charusat.ac.in	9725028431
	Prof M.T.Mehta	Prof. Radha Teredesai	Asst Prof	BITs Edu. Campus	12 years	radhateredesai.ce@bitseducampus.ac.in	9879557337
	Prof. P.C. Chauhan	Prof Gopi Sanghani	HoD	Darshan Institute,Rajkot	18 years	gopi.sanghani@darshan.ac.in	9825621471
	Prof. A.K Gor	Prof. Dhaval Bhoi	Asst Prof	Charusat,changa	14 years	dhavalbhoi.ce@charusat.ac.in	9879974807
		Prof Amit Thakkar	Associate Professor	Charusat, changa	15 years	amitthakkar.it@charusat.ac.in	9601290990
		Prof. Tejas Mehta	Lecturer	RCTI, sola Ahemdabad	15 years	tejasmehta@gmail.com	9428913657
		Prof. Nirali Thakkar	Asst. Prof	ADIT, New Vidhyanagar	6 years	thakkarniralis@gmail.com	9998568489

M.Tech semester: III/IV							
Subject	**Internal Faculty**	**External Faculty**	**Designation**	**Institute name**	**Experience**	**Email-id**	**Mobile No**
Dissertation-I	Dr C K Bhensdadia	Prof Y P Kosta	Director	Marwadi Institute, Rajkot	25 years	ypkosta@gmail.com	9727724685
	Prof B S Bhatt	Prof V N Kamat	Principal	MBICT, New vidhyanagar	31 years	vk@kvah.in	9824074054
	Prof P M Jadav	Prof Ramamohan	Professor	IIT-RAM Gandhinagar	35 years	ramamohan@iitram.ac.in	079-67775419
	Prof M S Bhatt	Dr. S. Sharma	Scientist	ISRO-Ahemdabad	31 years	sasharma@sac.isro.gov.in	9427010568
	Prof M T Mehta	Prof. P. B Swadas	Associate Professor	BVM, VV Nagar	27 years	pbswadas@bvmengineering.ac.in	9824057139
		Prof DG thakore	Prof &Head	BVM, VV Nagar	25 years	dgthakore@bvmengineering.ac.in	9825272963
		Prof N M Patel	Associate Professor	BVM, VV Nagar	22 years	nmpatel@bvmengineering.ac.in	9428660842
		Prof Amit Ganatra	Professor	Charusat,changa	16 years	amitganatra.ce@charusat.ac.in	9426350639
		Prof Narendra Chauhan	Prof &Head	ADIT, New VVNagar	12 years	narendracchauhan@gmail.com	9377559385
		Prof Hemal Shah	Professor	ICT, Ahemdabad	18 Years	hemal.shah@ganpatuniversity.ac.in	9427711969
		Prof Ramji Makwana	Prof &Head	VVP Eng college, Rajkot	14 years	ramjimmakwana@gmail.com	9428564945
		Dr Sanjay Chaudhary	Prof and Assoc Dean	Ahmedabad Univ., Ahmedabad	30 years	sanjay.chaudhary@ahduni.edu.in	93277 2637
		Dr Sanjay Garg	Prof & Head	CE Dept, Nirma University	22 years	sgarg@nirmauni.ac.in	9427062228
		Dr Chirag Thaker	Professor	GEC, Bhavnagar	20 years	chiragthaker@yahoo.com	9898835789
		Dr Amit Thakkar	Assoc. Prof.	Charusat, Changa	15 years	amitthakkar.it@charusat.ac.in	9601290990

M.Tech semester: III/IV							
Subject	**Internal Faculty**	**External Faculty**	**Designation**	**Institute name**	**Experience**	**Email-id**	**Mobile No**
Dissertation-II	Dr C K Bhensdadia	Prof Y P Kosta	Director	Marwadi Institute, Rajkot	25 years	ypkosta@gmail.com	9727724685
	Prof B S Bhatt	Prof V N Kamat	Principal	MBICT, New vidhyanagar	31 years	vk@kvah.in	9824074054
	Prof P M Jadav	Prof Ramamohan	Professor	IIT-RAM Gandhinagar	35 years	ramamohan@iitram.ac.in	079-67775419
	Prof M S Bhatt	Dr. S. Sharma	Scientist	ISRO-Ahemdabad	31 years	sasharma@sac.isro.gov.in	9427010568
	Prof M T Mehta	Prof. P. B Swadas	Associate Professor	BVM, VV Nagar	27 years	pbswadas@bvmengineering.ac.in	9824057139
		Prof N M Patel	Associate Professor	BVM, VV Nagar	22 years	nmpatel@bvmengineering.ac.in	9428660842
		Prof Amit Ganatra	Professor	Charusat,changa	16 years	amitganatra.ce@charusat.ac.in	9426350639
		Prof Ramji Makwana	Prof &Head	VVP Eng college, Rajkot	14 years	ramjimmakwana@gmail.com	9428564945
		Prof DG thakore	Prof &Head	BVM, VV Nagar	25 years	dgthakore@bvmengineering.ac.in	9825272963
		Prof Narendra Chauhan	Prof &Head	ADIT, New VVNagar	12 years	narendracchauhan@gmail.com	9377559385
		Prof Hemal Shah	Professor	ICT, Ahemdabad	18 Years	hemal.shah@ganpatuniversity.ac.in	9427711969
		Dr Sanjay Chaudhary	Prof and Assoc Dean	Ahmedabad Univ., Ahmedabad	30 years	sanjay.chaudhary@ahduni.edu.in	93277 2637
		Dr Sanjay Garg	Prof & Head	CE Dept, Nirma University	22 years	sgarg@nirmauni.ac.in	9427062228
		Dr Chirag Thaker	Professor	GEC, Bhavnagar	20 years	chiragthaker@yahoo.com	9898835789
		Dr Amit Thakkar	Assoc. Prof.	Charusat, Changa	15 years	amitthakkar.it@charusat.ac.in	9601290990

1. To specify the approach of designing the project in the title Term Projects, Term Projects are carried out in three different semesters. Their differences should be highlighted at least in the transcripts and preferably in the mark sheet in brief as follows. Following table also suggests change in the credits of the subjects.

Sr. No.	Sem.	Present Subject Name	Present Credits	Proposed Name
1	B.Tech. SEM-V	Term Project	1	Term Project (Electronic Circuits)
2	B.Tech. SEM -VI	Term Project	1	Term Project (Microcontroller)
3	B.Tech. SEM-VII	Term Project	1	Term Project (Software)
4	M.Tech. SEM-I	Term Project	1	Term Project (Programming)
5	M.Tech. SEM-II	Term Project	1	Term Project (Simulation)

2. Following changes are proposed in Advanced microprocessor and Embedded Systems Subjects.

Sem.	Subject:	Proposed Changes in Subjects:	Justification
B.Tech. VI(EC)	**Advanced Microprocessors**	**Topics to be removed**	
		DATA MOVEMENT INSTRUCTIONS: MOV, PUSH/POP, Load effective address, String data transfer, Miscellaneous, Segment override prefix, assembler details.	Similar instructions are covered in the 8051. These Instructions are covered in the laboratory
		ARITHMATIC AND LOGICAL INSTRUCTIONS: Addition, subtraction, comparison, multiplication, division, basic logic instructions shift and rotate, string comparison.	Similar instructions are covered in the 8051.These Instructions are covered in the laboratory
		PROGRAM CONTROL INSTRUCTIONS: Jump group, controlling the flow of an ALP, procedures, machine control and miscellaneous instructions	
		MEMORY INTERFACE: 80186, 80286, 80386SX, 80386DX,80486, Pentium and Pentium pro memory interface, Dynamic RAM.	Concepts are covered in the memory interface of 8086 and 8088)

		BASIC I/O INTERFACE: Introduction to i/o interface, i/o address decoding, the programmable peripheral device (8255), The 8279Progarmmable keyboard/display interface. **INTERRUPTS:** 8259A Programmable interrupt controller. **DIRECT MEMORY ACCESS:** Basic DMA operation. **80186, 80188, 80286** Introduction to the 80286. **THE PENTIUM AND PENTIUM PROMICROPROCESSORS:** Introduction to Pentium microprocessor, system timings, how to interface slower memory with Pentium, Introduction Pentium Pro.	Obsolete chips Similar features are available in latest microcontroller chips.
B.Tech. VI(EC)	**Advanced Microprocessors**	**Topics to be Added**	
		INTRODUCTION TO ARM: Overview of ARM Processor, Fundamental of RISC & CISC, Evolution of RISC, Comparison of RISC & CISC, Design for LPC. **ARM ARCHITECTURE:** Architectural inheritance, Programmer's model, ARM development tools, Software Assembler (ARM), 'C' Language Complier, Simulator, Hardware Board, Board organization, Communication with external world. 3-stage pipeline ARM organization, ARM instruction execution, ARM implementation. **ARM ASSEMBLY LANGUAGE PROGRAMMING:** Data processing instructions, Data transfer instructions, Control flow instructions, Programs based on assembly language. Introduction, Exceptions, Conditional execution, Branch and Branch with Link (B, BL), Branch, Branch with Link and eXchange (BX, BLX), Software Interrupt (SWI), Data processing instructions, Multiply instructions, Count leading zeros (CLZ),	These topics shifted from 7th Semester, Subject "Embedded systems" to 6th semester subject Advanced Microporcessor so as to make space in the subject Embedded Systems at 7th semester for industry requirements.

		Single word and unsigned byte data transfer instructions, Halfword and signed byte data transfer instructions, Multiple register transfer instructions, Swap memory and register instructions (SWP), Status register to general register transfer instructions, General register to status register transfer instructions, Coprocessor instructions. (Omit topics Data types, Floating-point data types from the book.) **THE THUMB INSTRUCTION SET:** The Thumb bit in the Current Program Status Register (CPSR), The Thumb programmer's model, Thumb branch instructions, Thumb software interrupt instruction, Thumb data processing instructions, Thumb single register data transfer instructions, Thumb multiple register data transfer instructions, Thumb breakpoint instruction, Thumb implementation, Thumb applications. (Omit the instruction encoding from the book) **INTRODUCTION TO VECTORED NTERRUPT CONTROLLER**	
B.Tech. VII(EC)	**Embedded Systems***	**Topics to be removed**	**Justification**
		INTRODUCTION TO ARM: Overview of ARM Processor, Fundamental of RISC & CISC, Evolution of RISC, Comparison of RISC & CISC, Design for LPC. **ARM ARCHITECTURE:**Architectural inheritance, Programmer's model, ARM development tools, Software Assembler (ARM), 'C' Language Complier, Simulator, Hardware Board, Board organization, Communication with external world. 3-stage pipeline ARM organization, ARM instruction execution, ARM implementation.	These topics shifted to 6th Semester, Subject "Advanced Microprocessors" to make space to accommodate current industry requirements.

		ARM ASSEMBLY LANGUAGE PROGRAMMING: Data processing instructions, Data transfer instructions, Control flow instructions, Programs based on assembly language. Introduction, Exceptions, Conditional execution, Branch and Branch with Link (B, BL), Branch, Branch with Link and eXchange (BX, BLX), Software Interrupt (SWI), Data processing instructions, Multiply instructions, Count leading zeros (CLZ), Single word and unsigned byte data transfer instructions, Halfword and signed byte data transfer instructions, Multiple register transfer instructions, Swap memory and register instructions (SWP), Status register to general register transfer instructions, General register to status register transfer instructions, Coprocessor instructions. (Omit topics Data types, Floating-point data types from the book.) **THE THUMB INSTRUCTION SET:** The Thumb bit in the Current Program Status Register (CPSR), The Thumb programmer's model, Thumb branch instructions, Thumb software interrupt instruction, Thumb data processing instructions, Thumb single register data transfer instructions, Thumb multiple register data transfer instructions, Thumb breakpoint instruction, Thumb implementation, Thumb applications. **INTRODUCTION TO VECTORED INTERRUPT CONTROLLER** **ARCHITECTURAL SUPPORT FOR SYSTEM DEVELOPMENT & MEMORY HIERARCHY:** The ARM memory interface, The Advanced Microcontroller Bus Architecture (AMBA), Memory size and speed, On-chip memory, Caches, Cache design - an example, Memory management.	To make space for latest technologies, Similar topics are covered in the subject "Advanced Microprocessors" 6th sem.

B.Tech. VII(EC)	Embedded Systems*	Topics to be added	
		ARM CORTEX M3 MICRO CONTROLLER **ARM CORTEX M4 MICRO CONTROLLER** **COMMONLY USED SERIAL & PARALLEL BUS PROTOCOLS: I2C, SPI** **RTOS IMPLEMENTATION** **DEVICE DRIVERS**	Topics are important as per current industry needs. (Suggested by industry experts)

***Outline of the subject Embedded systems are mentioned.**
Detailed syllabus will be finalized in the next meeting of Board of Studies and submitted to the academic council subsequently.

3. Following Changes are suggested in the Image Processing Subject of M.Tech. Sem.I. It is also suggested to change book edition to 3rd.

Sem.	Subject:	Proposed Changes in Subjects:	Justification
M. Tech. I(ECS)	**Image Processing**	**Topics to be removed**	
		IMAGE ENHANCEMENT IN THE FREQUENCY DOMAIN: • Laplacian in frequency domain, Unsharp masking, Highboost filtering, High-freq emphasis filtering • Homomorphic filtering, **IMAGE SEGMENTATION:** • Optimal global and adaptive thresholding	Removal of these rarely used techniques will create room for commonly used techniques.
		Topics to be Added	
	Image Processing	**IMAGE SEGMENTATION:** • Canny edge detector • Otsu's thresholding	Commonly used methods in almost all related pre-processing algorithms.

EXISTING TEACHING SCHEME FOR THE COURSE
B.TECH. ELECTRONICS & COMMUNICATION (w. e. f. April, 2016)

SEMESTER I

Sem	Subject Code	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Sess.	Prac.	T.W.		
Sem. I	AF111	Mathematics-I	3	1	-	60	40	-	-	100	4
		Environmental Science	3	0	0	60	40	-	-	100	3
	AF122	Basic Electrical & Electronics Engineering	4	0	2	60	40	25	25	150	5
	CT116	Elements Of Linux OS and C Programming –I	3	0	2	60	40	25	25	150	4
	AF115	Engineering Graphics	4	0	3	60	40	-	50	150	4.5
	AF114	Engineering Mechanics	4	0	2	60	40	25	25	150	5
	AF116	Workshop-I	-	-	3	-	-	-	50	50	1
									TOTAL	750	

SEMESTER II

Sem	Subject No	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Sess.	Prac.	T.W.		
Sem. II	AF201	Mathematics-II	3	1	-	60	40	-	-	100	4
	AF212	Electronics Principles	4	0	2	60	40	25	25	150	5
		Engg. Economics & Principles of Management	3	0	0	60	40	-	-	100	3
	CT215	C Programming -II	4	0	2	60	40	25	25	150	4
	AF214	Mechanics of Solids	3	0	2	60	40	25	25	150	4
	AF215	Heat Power	3	0	2	60	40	25	25	150	4
	CT216	Electronics Workshops	-	-	3	-	-	-	50	50	1
									TOTAL	750	

SEMESTER III

Sem	Subject No	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Sess.	Prac.	T.W.		
Sem. III	AF301	Mathematics-III	4	0	-	60	40	-	-	100	4
	CI308	Linear Electronics-I	4	-	2	60	40	25	25	150	5
	EC302	Electronic Instrumentation	4	-	2	60	40	25	25	150	5
	EL315	Introduction to Yoga	1	-	1	50	-	50	-	100	1.5
	EL304	Network Analysis	4	-	2	60	40	25	25	150	5
	EC316	Control Theory	4	-	2	60	40	25	25	150	5
									TOTAL	**800**	

SEMESTER IV

Sem	Subject No	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Sess.	Prac.	T.W.		
Sem. IV	AF401	Mathematics-IV	3	1	-	60	40	-	-	100	4
	CL418	Linear Electronics-II	4	-	2	60	40	25	25	150	5
	EC404	Object Oriented Programming	4	-	2	60	40	25	25	150	5
	CI416	Electrical Machines & Power	4	-	2	60	40	25	25	150	5
	EL416	Personality development	2	-	-	50	-	-	-	50	2
	EC403	Digital Electronics	4	-	2	60	40	25	25	150	5
	EL405	Applied Mathematics	0	0	2	-	-	25	25	50	2
									TOTAL	**800**	

SEMESTER V

Sem	Subject No	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Sess.	Prac.	T.W.		
Sem. V	EC511	Microcontroller & Applications	4	-	2	60	40	25	25	150	5
	EC512	Electronic Communication	4	-	2	60	40	25	25	150	5
	EC505	Electromagnetic Fields	4	1	-	60	40	-	-	100	5
	EC506	**TERM PROJECT**	**-**	**-**	**2**	**-**	**-**	**25**	**25**	**50**	**1**
	EC516	Project Management	4	-	-	60	40	-	-	100	4
	EC 507	Power Electronics	4	-	2	60	40	25	25	150	5
										TOTAL 700	

SEMESTER VI

Sem	Subject No	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Sess.	Prac.	T.W.		
Sem. VI	EC601	Advanced Microprocessors	4	-	2	60	40	25	25	150	5
	EC604	Communication Systems	4	-	2	60	40	25	25	150	5
	EC610	Microwave & Antennas	4	-	2	60	40	25	25	150	5
	EC607	**TERM PROJECT**	**-**	**-**	**2**	**-**	**-**	**-**	**50**	**50**	**1**
	EC611	Digital Signal Processing	4	-	2	60	40	25	25	150	5
	EC 612	Elective I	4	-	2	60	40	-	25	150	5
	EC 614	Audio-Video Engineering	0	0	2	-	-	25	25	50	1
										TOTAL 850	

SEMESTER VII

Sem	Subject No	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Sess.	Prac.	T.W.		
Sem. VII	EC 720	Elective II	4	-	2	60	40	25	25	150	5
	EC702	Elective V	4	-	2	60	40	25	25	150	5
	EC719	Elective III	4	-	-	60	40	-	-	100	4
	EC707	**TERM PROJECT**	**-**	**-**	**2**	**-**	**-**	**-**	**50**	**50**	**1**
	EC717	Coding Theory & Compression Techniques	4	-	-	60	40	-	-	100	4
	EC718	Elective IV	4	-	2	60	40	25	25	150	5
										TOTAL 700	

SEMESTER VIII

Sem	Subject No	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Seminar	Prac.	T.W.		
Sem. VIII	EC801	Project/Industrial Training	**-**	**-**	**24**	**-**	**100**	**300**	**100**	**500**	**18**

EXISTING TEACHING SCHEME FOR THE COURSE

M.TECH. ELECTRONICS & COMMUNICATION SYSTEMS (w. e. f. 2014)

SEMESTER I

Sem	Subject Code	Subject	Teaching Scheme		Examination Scheme			Total	Credit
			L	P	Theory	Sess.	Pra./T.W.		
Sem. I	ME 135	Advance Digital Signal Processing	3	2	60	40	25	125	4
	ME 132	Image Processing	3	2	60	40	25	125	4
	ME 141	Wireless Communication Technology	3	2	60	40	25	125	4
	ME 140	Probability Theory & Random Processes	3	2	60	40	25	125	4
	ME 136	Internetworking	3	2	60	40	25	125	4
	ME 118	Pedagogic Practice	--	2	--	--	50	50	2
	ME 138	**Term Project**	**--**	**--**	**--**	**--**	**50**	**50**	**1**
							Total	725	23

SEMESTER-II

Sem	Subject Code	Subject	Teaching Scheme		Examination Scheme			Total	Credit
			L	P	Theory	Sess.	Pra./T.W.		
Sem. II	ME 241	Advanced Wireless Networks	3	2	60	40	25	125	4
	ME 243	Advance Wireless Communication Systems	3	2	60	40	25	125	4
	ME 234	Advance Microwave Engineering	3	2	60	40	25	125	4
	ME 240	ASIC Design	3	2	60	40	25	125	4
	ME 242	Fiber Optic Communication & Sensor Systems	3	2	60	40	25	125	4
	ME 228	Pedagogic Practice	--	2	--	--	50	50	2
	ME 239	**Term Project**	**--**	**--**	**--**	**--**	**50**	**50**	**1**
							Total	**725**	**23**

SEMESTER-III

Sem.	Subject Code	Subject	Teaching Scheme		Examination Scheme				Total	Credit
			L	P	The.	Sess.	Pra.	T.W.		
Sem. III	ME 311	Project	--	28	--	--	225	125	350	8
	ME 312	Pedagogic Practice	--	2	--	--	--	50	50	2
							Total		400	10

SEMESTER-IV

Sem.	Subject Code	Subject	Teaching Scheme		Examination Scheme				Total	Credit
			L	P	Theory	Sess.	Pra.	T.W.		
Sem. IV	ME 411	Project	--	28	--	--	300	150	450	10
	ME 412	Pedagogic Practice	--	2	--	--	--	50	50	2
							Total		500	12

PROPOSED TEACHING SCHEME FOR THE COURSE
B.TECH. ELECTRONICS & COMMUNICATION

SEMESTER I

Sem	Subject Code	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Sess.	Prac.	T.W.		
Sem. I	AF111	Mathematics-I	3	1	-	60	40	-	-	100	4
		Environmental Science	3	0	0	60	40	-	-	100	3
	AF122	Basic Electrical & Electronics Engineering	4	0	2	60	40	25	25	150	5
	CT116	Elements Of Linux OS and C Programming –I	3	0	2	60	40	25	25	150	4
	AF115	Engineering Graphics	4	0	3	60	40	-	50	150	4.5
	AF114	Engineering Mechanics	4	0	2	60	40	25	25	150	5
	AF116	Workshop-I	-	-	3	-	-	-	50	50	1
									TOTAL	750	

SEMESTER II

Sem	Subject No	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Sess.	Prac.	T.W.		
Sem. II	AF201	Mathematics-II	3	1	-	60	40	-	-	100	4
	AF212	Electronics Principles	4	0	2	60	40	25	25	150	5
		Engg. Economics & Principles of Management	3	0	0	60	40	-	-	100	3
	CT215	C Programming -II	4	0	2	60	40	25	25	150	4
	AF214	Mechanics of Solids	3	0	2	60	40	25	25	150	4
	AF215	Heat Power	3	0	2	60	40	25	25	150	4
	CT216	Electronics Workshops	-	-	3	-	-	-	50	50	1
									TOTAL	750	

SEMESTER III

Sem	Subject No	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Sess.	Prac.	T.W.		
Sem. III	AF301	Mathematics-III	4	0	-	60	40	-	-	100	4
	CI308	Linear Electronics-I	4	-	2	60	40	25	25	150	5
	EC302	Electronic Instrumentation	4	-	2	60	40	25	25	150	5
	EL315	Introduction to Yoga	1	-	1	50	-	50	-	100	1.5
	EL304	Network Analysis	4	-	2	60	40	25	25	150	5
	EC316	Control Theory	4	-	2	60	40	25	25	150	5
									TOTAL	**800**	

SEMESTER IV

Sem	Subject No	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Sess.	Prac.	T.W.		
Sem. IV	AF401	Mathematics-IV	3	1	-	60	40	-	-	100	4
	CL418	Linear Electronics-II	4	-	2	60	40	25	25	150	5
	EC404	Object Oriented Programming	4	-	2	60	40	25	25	150	5
	CI416	Electrical Machines & Power	4	-	2	60	40	25	25	150	5
	EL416	Personality development	2	-	-	50	-	-	-	50	2
	EC403	Digital Electronics	4	-	2	60	40	25	25	150	5
	EL405	Applied Mathematics	0	0	2	-	-	25	25	50	2
									TOTAL	**800**	

SEMESTER V

Sem	Subject No	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Sess.	Prac.	T.W.		
Sem. V	EC511	Microcontroller & Applications	4	-	2	60	40	25	25	150	5
	EC512	Electronic Communication	4	-	2	60	40	25	25	150	5
	EC505	Electromagnetic Fields	4	1	-	60	40	-	-	100	5
	EC506	**TERM PROJECT**	**-**	**-**	**2**	**-**	**-**	**25**	**25**	**50**	**2**
	EC516	Project Management	4	-	-	60	40	-	-	100	4
	EC 507	Power Electronics	4	-	2	60	40	25	25	150	5
										TOTAL 700	

SEMESTER VI

Sem	Subject No	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Sess.	Prac.	T.W.		
Sem. VI	EC601	Advanced Microprocessors	4	-	2	60	40	25	25	150	5
	EC604	Communication Systems	4	-	2	60	40	25	25	150	5
	EC610	Microwave & Antennas	4	-	2	60	40	25	25	150	5
	EC607	**TERM PROJECT**	**-**	**-**	**2**	**-**	**-**	**-**	**50**	**50**	**2**
	EC611	Digital Signal Processing	4	-	2	60	40	25	25	150	5
	EC 612	Elective I	4	-	2	60	40	-	25	150	5
	EC 614	Audio-Video Engineering	0	0	2	-	-	25	25	50	1
										TOTAL 850	

SEMESTER VII

Sem	Subject No	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Sess.	Prac.	T.W.		
Sem. VII	EC 720	Elective II	4	-	2	60	40	25	25	150	5
	EC702	Elective V	4	-	2	60	40	25	25	150	5
	EC719	Elective III	4	-	-	60	40	-	-	100	4
	EC707	**TERM PROJECT**	**-**	**-**	**2**	**-**	**-**	**-**	**50**	**50**	**2**
	EC717	Coding Theory & Compression Techniques	4	-	-	60	40	-	-	100	4
	EC718	Elective IV	4	-	2	60	40	25	25	150	5
										TOTAL 700	

SEMESTER VIII

Sem	Subject No	Subject	Teaching Scheme			Examination Scheme				Total	Credits
			L	T	P	Theory	Seminar	Prac.	T.W.		
Sem. VIII	EC801	Project/Industrial Training	**-**	**-**	**24**	**-**	**100**	**300**	**100**	**500**	**18**

PROPOSED TEACHING SCHEME FOR THE COURSE

M.TECH. ELECTRONICS & COMMUNICATION SYSTEMS

SEMESTER I

Sem	Subject Code	Subject	Teaching Scheme		Examination Scheme			Total	Credit
			L	P	Theory	Sess.	Pra./T.W.		
Sem. I	ME 135	Advance Digital Signal Processing	3	2	60	40	25	125	4
	ME 132	Image Processing	3	2	60	40	25	125	4
	ME 141	Wireless Communication Technology	3	2	60	40	25	125	4
	ME 140	Probability Theory & Random Processes	3	2	60	40	25	125	4
	ME 136	Internetworking	3	2	60	40	25	125	4
	ME 118	Pedagogic Practice	--	2	--	--	50	50	2
	ME 138	**Term Project**	**--**	**--**	**--**	**--**	**50**	**50**	**2**
							Total	725	23

SEMESTER-II

Sem	Subject Code	Subject	Teaching Scheme		Examination Scheme			Total	Credit
			L	P	Theory	Sess.	Pra./T.W.		
Sem. II	ME 241	Advanced Wireless Networks	3	2	60	40	25	125	4
	ME 243	Advance Wireless Communication Systems	3	2	60	40	25	125	4
	ME 234	Advance Microwave Engineering	3	2	60	40	25	125	4
	ME 240	ASIC Design	3	2	60	40	25	125	4
	ME 242	Fiber Optic Communication & Sensor Systems	3	2	60	40	25	125	4
	ME 228	Pedagogic Practice	--	2	--	--	50	50	2
	ME 239	**Term Project**	**--**	**--**	**--**	**--**	**50**	**50**	**2**
							Total	**725**	**23**

SEMESTER-III

Sem.	Subject Code	Subject	Teaching Scheme		Examination Scheme				Total	Credit
			L	P	The.	Sess.	Pra.	T.W.		
Sem. III	ME 311	Project	--	28	--	--	225	125	350	8
	ME 312	Pedagogic Practice	--	2	--	--	--	50	50	2
								Total	400	10

SEMESTER-IV

Sem.	Subject Code	Subject	Teaching Scheme		Examination Scheme				Total	Credit
			L	P	Theory	Sess.	Pra.	T.W.		
Sem. IV	ME 411	Project	--	28	--	--	300	150	450	10
	ME 412	Pedagogic Practice	--	2	--	--	--	50	50	2
								Total	500	12

Existing Syllabus
B.TECH. SEMESTER-VI (EC)

SUBJECT: ADVANCED MICROPROCESSORS (EC 601) (Credits : 5.0)

SYLLABUS & SCHEME (w.e.f. 2006)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] THE MICROPROCESSOR AND ITS ARCHITECTURE:
Internal Architecture, Real mode memory addressing, protected mode memory addressing, memory paging.
[B] ADDRESSING MODES:
Data addressing mode, program memory addressing mode, stack memory addressing mode.
[C] DATA MOVEMENT INSTRUCTIONS:
MOV, PUSH/POP, Load effective address, String data transfer, Miscellaneous, Segment override prefix, assembler details.
[D] ARITHMATIC AND LOGICAL INSTRUCTIONS:
Addition, subtraction, comparison, multiplication, division, BCD and ASCII arithmetic, basic logic instructions shift and rotate, string comparison.
[E] PROGRAM CONTROL INSTRUCTIONS:
Jump group, controlling the flow of an ALP, procedures, interrupts, machine control and miscellaneous instructions
[F] 8086/8088 HARDWARE SPECIFICATIONS:
Pin-outs, pin functions, clock generator, bus buffering and latching, bus timing, ready and the wait state, minimum mode versus maximum mode.
[G] MEMORY INTERFACE:
Memory devices, address decoding, 8088 and 80188 memory interface, 8086, 80186, 80286, 80386SX, 80386DX, 80486, Pentium and Pentium pro memory interface, Dynamic RAM.
[H] BASIC I/O INTERFACE:
Introduction to i/o interface, i/o address decoding, the programmable peripheral device (8255), The 8279Progarmmable keyboard/display interface, USB basics and interfacing.
[I] INTERRUPTS:
Basic interrupt processing, Hardware interrupts, Expanding the interrupt structure, 8259A Programmable interrupt controller.
[J] DIRECT MEMORY ACCESS:
Basic DMA operation.
[K] 80186, 80188, 80286 MICROPROCESORS:
Introduction to the 80286.
[L] THE PENTIUM AND PENTIUM PROMICROPROCESSORS:
Introduction to Pentium microprocessor, system timings, how to interface slower memory with Pentium, Protected mode, paging mode, virtual 8086 mode, memory management mode with Pentium, Introduction Pentium Pro.

Text Book:

1. The Intel Microprocessors 8086, 8088, 80186, 80188, 80286, 80386, 80486,Pentium, Pentium Pro Processors, 6th Edition
   By: Barry B. Brey
   Publisher: Prentice Hall of India

Ref. Books:

1. Microprocessors and Interfacing-
   Programming & Hardware, 2nd Edition
   By: Douglas V. Hall
   Publisher: Tata McGraw Hill

2. IBC PC Assembly Language Programming,
   2nd Edition
   By: Peter Abel
   Publisher: Prentice Hall of India

Proposed Syllabus
B.TECH. SEMESTER-VI (EC)

SUBJECT: ADVANCED MICROPROCESSORS (EC 601) (Credits : 5.0)

SYLLABUS & SCHEME (w.e.f. 2017)

Teaching Scheme (Hours/Week)						Examination Scheme (Marks)				
L Hrs	C	T hrs	C	P hrs	C	Theory (3 hrs.)	Sessional (1 hr.)	Practical	T.W.	Total
4	4	0	0	2	1	60	40	25	25	150

[A] THE MICROPROCESSOR AND ITS ARCHITECTURE:
Internal Architecture, Real mode memory addressing, protected mode memory addressing, memory paging.
[B] ADDRESSING MODES:
Data addressing mode, program memory addressing mode, stack memory addressing mode.
[C] 8086/8088 HARDWARE SPECIFICATIONS:
Pin-outs, pin functions, clock generator, bus buffering and latching, bus timing, ready and the wait state, minimum mode versus maximum mode.
[D] MEMORY INTERFACE:
Memory devices, address decoding, 8086 and 8088 memory interface
[E] INTERRUPTS:
Basic interrupt processing, Hardware interrupts, Expanding the interrupt structure
[F] THE PENTIUM MICROPROCESSOR:
Protected mode, paging mode, virtual 8086 mode, memory management mode with Pentium.
[G] INTRODUCTION TO ARM:
Overview of ARM Processor, Fundamental of RISC & CISC, Evolution of RISC, Comparison of RISC & CISC, Design for LPC.
[H] ARM ARCHITECTURE:
Architectural inheritance, Programmer's model, ARM development tools, Software Assembler (ARM), 'C' Language Complier, Simulator, Hardware Board, Board organization, Communication with external world. 3-stage pipeline ARM organization, ARM instruction execution, ARM implementation.
[I] ARM ASSEMBLY LANGUAGE PROGRAMMING:
Data processing instructions, Data transfer instructions, Control flow instructions, Programs based on assembly language. Introduction, Exceptions, Conditional execution, Branch and Branch with Link (B, BL), Branch, Branch with Link and eXchange (BX, BLX), Software Interrupt (SWI), Data processing instructions, Multiply instructions, Count leading zeros (CLZ), Single word and unsigned byte data transfer instructions, Halfword and signed byte data transfer instructions, Multiple register transfer instructions, Swap memory and register instructions (SWP), Status register to general register transfer instructions, General register to status register transfer instructions, Coprocessor instructions.
[J] THE THUMB INSTRUCTION SET:
The Thumb bit in the Current Program Status Register (CPSR), The Thumb programmer's model, Thumb branch instructions, Thumb software interrupt instruction, Thumb data processing instructions, Thumb single register data transfer instructions, Thumb multiple register data transfer instructions, Thumb breakpoint instruction, Thumb implementation, Thumb applications.
[K] INTRODUCTION TO VECTORED INTERRUPT CONTROLLER
IRQ and FIQ using Vectored interrupt controller of LPC23xx
Text Book:

1. The Intel Microprocessors 8086, 8088,
   80186, 80188, 80286, 80386, 80486,
   Pentium, Pentium Pro Processors, 6th Edition
   By: Barry B. Brey
   Publisher: Prentice Hall of India
2. ARM - System-On- Chip Architecture,
   2nd Edition
   By: Steve Furber
   Publisher: Prentice Hall of India

Ref. Books:

1. Microprocessors and Interfacing-
   Programming & Hardware, 2nd Edition
   By: Douglas V. Hall
   Publisher: Tata McGraw Hill
2. IBC PC Assembly Language Programming,
   2nd Edition
   By: Peter Abel
   Publisher: Prentice Hall of India
3. ARM System Developer Guide
   By: Antrew Sloss, Dominic Symes, Chris Wright
   Publication: Morgan Kaufmann
4. Technical Ref. Manual, ARM7TDMI (3)
   UM10211 LPC 2364/66/68/78 User Manual, NXP Ltd.

Existing syllabus
M.Tech. SEMESTER-I (ECS)

SUBJECT: IMAGE PROCESSING (M.Tech. 132)

SYLLABUS & SCHEME

Teaching Scheme (Hours/Week)			Examination Scheme (Marks)			
Lecture	Tutorial	Practical	Theory (3 hrs.)	Sessional (1 hr.)	Practical/T.W.	Total
3	--	2	60	40	25	125

[A] INTRODUCTION:

Examples of Fields that Use Digital Image Processing - Gamma-Ray Imaging, X-Ray Imaging, Imaging in the Ultraviolet Band, Imaging in the Visible and Infrared Bands, Imaging in the Microwave Band, Imaging in the Radio Band, Examples in which Other Imaging Modalities Are Used, Fundamental Steps in Digital Image Processing, Components of an Image Processing System.

[B] DIGITAL IMAGE FUNDAMENTALS:

Elements of Visual Perception - Structure of the Human Eye, Image Formation in the Eye, Brightness Adaptation and Discrimination, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition - Image Acquisition Using a Single Sensor, Image Acquisition Using Sensor Strips, Image Acquisition Using Sensor Arrays, A Simple Image Formation Model, Image Sampling and Quantization - Basic Concepts in Sampling and Quantization, Representing Digital Images, Spatial and Gray-level Resolution, Aliasing and Moire Patterns, Zooming and Shrinking Digital Images, Some Basic Relationships Between Pixels - Neighbors of a Pixel, Adjacency, Connectivity, Regions, and Boundaries, Distance Measures, Image Operations on a Pixel Basis, Linear and Nonlinear Operations.

[C] IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN:

Background, Some Basic Gray Level Transformations - Image Negatives, Log Transformations, Power-Law (Gamma) Transformations, Piecewise-Linear Transformation Functions, Histogram Processing - Histogram Equalization, Histogram Matching (Specification), Local Histogram Processing, Using Histogram Statistics for Image Enhancement, Enhancement Using Arithmetic/Logic Operations - Image Subtraction, Image Averaging, Basics of Spatial Filtering, Smoothing Spatial Filters - Smoothing Linear Filters, Order-Statistic (Nonlinear) Filters, Sharpening Spatial Filters - Foundation, Use of Second Derivative for Enhancement-The Laplacian, Use of First-Order Derivatives for Enhancement-The Gradient, Combining Spatial Enhancement Methods.

[D] IMAGE ENHANCEMENT IN THE FREQUENCY DOMAIN:

Background, the Fourier Transform and the Frequency Domain analysis of image - The One-Dimensional Fourier Transform and its Inverse, The Two-Dimensional DFT and its Inverse, Filtering in Frequency Domain, Correspondence between Filtering in Spatial and Frequency Domains, Smoothing Frequency-Domain Filters - Ideal Lowpass Filters, Butterworth Lowpass Filters, Gaussian Lowpass Filters, Additional Examples of Lowpass Filtering, Sharpening Frequency Domain Filters - Ideal Highpass Filters, Butterworth Highpass Filters, Gaussian Highpass Filters, Laplacian in the Frequency Domain, Unsharp Masking, Highboost Filtering, and High-Frequency- Emphasis Filtering, Homomorphic Filtering, Implementation - Some Additional Properties of the 2-D Fourier Transform, Computing the Inverse Fourier Transform Using a Forward Transform Algorithm, More on Periodicity: the Need for Padding, The Convolution and Correlation Theorems, Summary of Properties of the 2-D Fourier Transform, The Fast Fourier Transform, Some Comments on Filter Design.

[E] IMAGE RESTORATION:

A Model of the Image Degradation/Restoration Process, Noise Models - Spatial and Frequency Properties of Noise, Some Important Noise Probability Density Functions, Periodic Noise, Estimation of Noise Parameters, Restoration in the Presence of Noise Only-Spatial Filtering - Mean Filters, Order-Statistic Filters, Adaptive Filters, Periodic Noise Reduction by Frequency Domain Filtering - Bandreject Filters, Bandpass Filters, Notch Filters, Optimum Notch Filtering, Linear, Position-Invariant Degradations, Estimating the Degradation Function - Estimation by Image Observation, Estimation by Experimentation, Estimation by Modeling, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering, Constrained Least Squares Filtering. Geometric Mean Filter, Geometric Transformations - Spatial Transformations, Gray-Level Interpolation.

[F] COLOR IMAGE PROCESSING:

Color Fundamentals, Color Models - The RGB Color Model, The CMY and CMYK Color Models, The HSI Color Model, Pseudo color Image Processing - Intensity Slicing, Intensity to Color Transformations, Basics of Full-Color Image Processing.

[G] IMAGE COMPRESSION:

Fundamentals - Coding Redundancy, Interpixel Redundancy, Psychovisual Redundancy, Fidelity Criteria, Image Compression Models - The Source Encoder and Decoder, The Channel Encoder and Decoder, Elements of Information Theory - Measuring Information, The Information Channel, Fundamental Coding Theorems, Using Information Theory, Error-Free Compression - Variable-Length Coding, LZW Coding, Bit-plane Coding, Loseless Predictive Coding, Lossy Compression - Lossy Predictive Coding, Transform Coding, Wavelet Coding, Image Compression Standards - Binary Image Compression Standards, Continuous Tone Still Image Compression Standards, Video Compression Standards.

[H] MORPHOLOGICAL IMAGE PROCESSING:

Preliminaries - Some Basic Concepts from Set Theory, Logic Operations Involving Binary Images, Dilation and Erosion, Opening and Closing, The Hit-or-Miss Transformation, Some Basic Morphological Algorithms - Boundary Extraction, Hole Filling, Extraction of Connected Components, Convex Hull, Thinning, Thickening, Skeletons, Pruning, Summary of Morphological Operations on Binary Images, Extensions to Gray-Scale Images - Dilation, Erosion, Opening and Closing, Some Applications of Gray-Scale Morphology.

[I] IMAGE SEGMENTATION:

Detection of Discontinuities - Point Detection, Line Detection, Edge Detection, Edge Linking and Boundary Detection - Local Processing, Global Processing via the Hough Transform, Global Processing via Graph-Theoretic Techniques, Thresholding - Foundation, The Roll of Illumination, Basic Global Thresholding, Basic Adaptive Thresholding, Optimum Global and Adaptive Thresholding, Use of Boundary Characteristics for Histogram Improvement and Local Thresholding, Region-Based Segmentation - Basic Formulation, Region Growing, Region Splitting and Merging.

[J] REPRESENTATION AND DESCRIPTION:

Representation - Chain Codes, Polygonal Approximations, Signatures, Boundary Segments, Skeletons, Boundary Descriptors - Some Simple Descriptors, Shape Numbers, Statistical Moments, Regional Descriptors - Some Simple Descriptors, Topological Descriptors, Texture, Moment Invariants, Use of Principal Components for Description, Relational Descriptors.

Text Book:

1. Digital Image Processingm, 2nd Edition
   By: Rafel C. Gonzalez
   Publisher: Addition Wesley Publishing Co.

Ref. Books:

1. Image Processing, 1st Edition
   By: Pearson Education
   Publisher: Tata McGraw Hill
2. Digital Picture Processing, 1st Edition
   By: Azriel Resenfeld, Avinash C.Kak
   Publisher: Academic Press, New York.
3. Digital Image Processing, 1st Edition
   By: Kenneth R. Castleman
   Publisher: Pearson Education
4. Fundamental of Digital Image Processing, 1st Edition
   By: Anil K. Jain
   Publisher: Pearson Education

Proposed Syllabus
M.Tech. SEMESTER-I (ECS)

SUBJECT: IMAGE PROCESSING (M.Tech. 132)

SYLLABUS & SCHEME

Teaching Scheme (Hours/Week)			Examination Scheme (Marks)			
Lecture	Tutorial	Practical	Theory (3 hrs.)	Sessional (1 hr.)	Practical/T.W.	Total
3	--	2	60	40	25	125

[A] INTRODUCTION:
Examples of Fields that Use Digital Image Processing - Gamma-Ray Imaging, X-Ray Imaging, Imaging in the Ultraviolet Band, Imaging in the Visible and Infrared Bands, Imaging in the Microwave Band, Imaging in the Radio Band, Examples in which Other Imaging Modalities Are Used, Fundamental Steps in Digital Image Processing, Components of an Image Processing System.
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[C] IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN:
Background, Some Basic Gray Level Transformations - Image Negatives, Log Transformations, Power-Law (Gamma) Transformations, Piecewise-Linear Transformation Functions, Histogram Processing - Histogram Equalization, Histogram Matching (Specification), Local Histogram Processing, Using Histogram Statistics for Image Enhancement, Enhancement Using Arithmetic/Logic Operations - Image Subtraction, Image Averaging, Basics of Spatial Filtering, Smoothing Spatial Filters - Smoothing Linear Filters, Order-Statistic (Nonlinear) Filters, Sharpening Spatial Filters - Foundation, Use of Second Derivative for Enhancement-The Laplacian, Use of First-Order Derivatives for Enhancement-The Gradient, Combining Spatial Enhancement Methods.
[D] IMAGE ENHANCEMENT IN THE FREQUENCY DOMAIN:
Background, the Fourier Transform and the Frequency Domain analysis of image - The One-Dimensional Fourier Transform and its Inverse, The Two-Dimensional DFT and its Inverse, Filtering in Frequency Domain, Correspondence between Filtering in Spatial and Frequency Domains, Smoothing Frequency-Domain Filters - Ideal Lowpass Filters, Butterworth Lowpass Filters, Gaussian Lowpass Filters, Additional Examples of Lowpass Filtering, Sharpening Frequency Domain Filters - Ideal Highpass Filters, Butterworth Highpass Filters, Gaussian Highpass Filters, Implementation - Some Additional Properties of the 2-D Fourier Transform, Computing the Inverse Fourier Transform Using a Forward Transform Algorithm, More on Periodicity: the Need for Padding, The Convolution and Correlation Theorems, Summary of Properties of the 2-D Fourier Transform, The Fast Fourier Transform, Some Comments on Filter Design.
[E] IMAGE RESTORATION:
A Model of the Image Degradation/Restoration Process, Noise Models - Spatial and Frequency Properties of Noise, Some Important Noise Probability Density Functions, Periodic Noise, Estimation of Noise Parameters, Restoration in the Presence of Noise Only-Spatial Filtering - Mean Filters, Order-Statistic Filters, Adaptive Filters, Periodic Noise Reduction by Frequency Domain Filtering - Bandreject Filters, Bandpass Filters, Notch Filters, Optimum Notch Filtering, Linear, Position-Invariant Degradations, Estimating the Degradation Function - Estimation by Image Observation, Estimation by Experimentation, Estimation by Modeling, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering, Constrained Least Squares Filtering. Geometric Mean Filter, Geometric Transformations - Spatial Transformations, Gray-Level Interpolation.
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[G] IMAGE COMPRESSION:
Fundamentals - Coding Redundancy, Interpixel Redundancy, Psychovisual Redundancy, Fidelity Criteria, Image Compression Models - The Source Encoder and Decoder, The Channel Encoder and Decoder, Elements of Information Theory - Measuring Information, The Information Channel, Fundamental Coding Theorems, Using Information Theory, Error-Free Compression - Variable-Length Coding, LZW Coding, Bit-plane Coding, Loseless Predictive Coding, Lossy Compression - Lossy Predictive Coding, Transform Coding, Wavelet Coding, Image Compression Standards - Binary Image Compression Standards, Continuous Tone Still Image Compression Standards, Video Compression Standards.
[H] MORPHOLOGICAL IMAGE PROCESSING:
Preliminaries - Some Basic Concepts from Set Theory, Logic Operations Involving Binary Images, Dilation and Erosion, Opening and Closing, The Hit-or-Miss Transformation, Some Basic Morphological Algorithms - Boundary Extraction, Hole Filling, Extraction of Connected Components, Convex Hull, Thinning, Thickening, Skeletons, Pruning, Summary of Morphological Operations on Binary Images, Extensions to Gray-Scale Images - Dilation, Erosion, Opening and Closing, Some Applications of Gray-Scale Morphology.
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Detection of Discontinuities - Point Detection, Line Detection, Edge Detection, Edge Linking and Boundary Detection - Local Processing, Global Processing via the Hough Transform, Canny Edge Detector, Global Processing via Graph-Theoretic Techniques, Thresholding - Foundation, The Roll of Illumination, Basic Global Thresholding, Basic Adaptive Thresholding, Use of Boundary Characteristics for Histogram Improvement and Local Thresholding, Otsu's Thresholding, Region-Based Segmentation - Basic Formulation, Region Growing, Region Splitting and Merging.

[J] REPRESENTATION AND DESCRIPTION:

Representation - Chain Codes, Polygonal Approximations, Signatures, Boundary Segments, Skeletons, Boundary Descriptors - Some Simple Descriptors, Shape Numbers, Statistical Moments, Regional Descriptors - Some Simple Descriptors, Topological Descriptors, Texture, Moment Invariants, Use of Principal Components for Description, Relational Descriptors.

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   By: Rafel C. Gonzalez
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2. Digital Picture Processing, 1st Edition
   By: Azriel Resenfeld, Avinash C.Kak
   Publisher: Academic Press, New York**.**
3. Digital Image Processing, 1st Edition
   By: Kenneth R. Castleman
   Publisher: Pearson Education
4. Fundamental of Digital Image Processing, 1st Edition
   By: Anil K. Jain
   Publisher: Pearson Education

Final Teaching Scheme

B. TECH. (Electronics & Communication) COURSE STRUCTURE

Proforma for Study

Level	Semes		Subject Category	Department	Teaching Scheme				
					Th	Prac	Tut	Total	Credits
I	I	Mathematics -I	Basic Sc.- Core	Maths	3	0	1	4	4.0
		Environmental Sciences	Basic Sc.- Core	Chem./Core Sc.	3	0	0	3	3.0
		Engineering Graphics	Engg Sc. - Core	Mechanical	3	3	0	6	4.5
		Basics of Electrical & Electronics Engineering	Engg Sc. - Core	EC	4	2	0	6	5.0
		Engineering Mechanics	Engg Sc. - Core	Civil	3	2	0	5	4.0
		Elements Of Linux OS and C Programming –I	Institution-Core	EC	3	2	0	5	4.0
		Workshop Practice-1	Engg Sc. - Core	Mechanical	0	2	0	2	1.0
					19	11	1	31	25.5
	II	Mathematics-II	Basic Sc.- Core	Maths	3	0	1	4	4.0
		Engg. Economics & Principles of Management	Gen. - Elective	Mngment	3	0	0	3	3.0
		Heat Power	Engg Sc. - Core	Mechanical	3	2	0	5	4.0
		Electronic Principles	Engg Sc. - Core	EC	4	2	0	6	5.0
		Mechanics of Solids	Engg Sc. - Core	Civil	3	2	0	5	4.0
		C Programming II	Institution-Core	EC	4	2	0	6	5.0
		Electronic Workshop	Engg Sc. - Core	EC	0	2	0	2	1.0
					20	10	1	31	26.0
II	III	Mathematics -III	Basic Sc.- Core	Maths	4	0	0	4	4.0
		Financial & Managerial Accounting	Gen. - Elective	Mngment	3	0	0	3	3.0
		Linear Electronics-I	Program Core	EC	4	2	0	6	5.0
		Electronic Instrumentation	Program Core	EC	4	2	0	6	5.0
		Network Analysis	Program Core	EC	4	2	0	6	5.0
		Digital Electronics	Program Core	EC	4	2	0	6	5.0
					23	8	0	31	27.0
	IV	Mathematics IV	Basic Sc-Elective	Maths	4	0	0	4	4.0
		CMOS VLSI design	Program Core	EC	4	2	0	6	5.0
		Applied Mathematics Laboratory	Program Core	EC	0	2	0	2	1.0
		Linear Electronics-II	Program Core	EC	4	2	0	6	5.0
		Object Oriented Programming	Institution-Elective	EC	4	2	0	6	5.0
		Electrical Machines & Power	Program Core	EC	4	2	0	6	5.0
					20	10	0	30	25.0
III	V	Professional Communication-1	Gen. - Core	Language	2	1	0	3	2.5
		Microcontroller & Applications	Program Core	EC	4	2	0	6	5.0
		Electronic Communication	Program Core	EC	4	2	0	6	5.0
		Electromagnetic Fields	Program Core	EC	4	0	1	5	5.0
		Power Electronics	Program Core	EC	4	2	0	6	5.0
		Control Theory	Program Core	EC	4	2	0	6	5.0
		Term Project	Program Core	EC	0	2	0	2	1.0
					22	11	1	32	28.5
		Professional Communication-2	Gen. - Core	Language	2	1	0	3	2.5
		Advanced Microprocessors	Program Core	EC	4	2	0	6	5.0
		Communication Systems	Program Core	EC	4	2	0	6	5.0

	VI	Microwave & Antennas	Program Core	EC	4	2	0	6	5.0
		Audio-Video Engineering	Program Core	EC	0	2	0	2	1.0
		Term Project	Program Core	EC	0	2	0	2	1.0
		Digital Signal Processing	Program Core	EC	4	2	0	6	5.0
					18	13	0	31	24.5
IV	VII	Term Project	Program Core	EC	0	2	0	2	1.0
		Coding Theory & Compression Techniques	Program Core	EC	4	0	0	4	4.0
		Elective -I (EC) : (Image Processing,Biomedical Instrumentation Advanced Digital Signal Processing) .		EC	4	2	0	6	5.0
		Elective -II (EC) : (Wireless Communication,Radar and Navigation) .			4	0	0	4	4.0
		Elective -III (EC) : (Embedded Systems,RF Circuit Design) .			4	2	0	6	5.0
		Communication,Fiber Optic Communication) .*			4	2	0	6	5.0
					20	8	0	28	24.0
	VIII	seminar	Program Core		0	4	0	4	4.0
		Project/Industrial Training			0	0	28	28	14.0
					0	4	28	32	18.0

198.5

EC (MC-511) MICROCONTROLLER & APPLICATIONS

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

To develop in-depth understanding of operations, assembly language programming and interfacing techniques related to 8051 microcontroller.

B. DETAILED SYLLABUS

[1] MICROPROCESSORS AND MICROCONTROLLERS:
Introduction, Microprocessors and Microcontrollers, The Z80 and the 8085, A Microcontroller survey., Development systems for Microcontrollers.

[2] THE 8051 ARCHITECTURE:
Introduction, 8051 Microcontroller Hardware, Input/Output pins, ports and circuits, External memory, Counter and timers, Serial data input/output, Interrupts.

[3] MOVING DATA:
Introduction, Addressing Modes, External data moves, Code memory read only data moves, Push and Pop opcodes, Data exchanges.

[4] LOGICAL OPERATIONS:
Introduction, Byte-level logical operations, Bit-level logical operations, Rotate and Swap operations.

[5] ARITHMETIC OPERATIONS:
Introduction, Flags, Incrementing and Decrementing, Addition, Subtraction, Multiplication and Division, Decimal arithmetic.

[6] JUMP AND CALL INSTRUCTIONS:
Introduction, The jump and call program range, Jump types, Call and Subroutines, Interrupts and Returns, Enabling, Disability & Priority in interrupts.

[7] AN 8051 MICROCONTROLLER DESIGN:
Introduction, A Microcontroller specification, A Microcontroller Design, Testing the design, Subroutines., Lookup tables for the 8051, Serial data transmission.

[8] APPLICATIONS:
Introduction, Keyboards, Displays, Pulse Measurement, D/A and A/D conversions, Case Study.

[9] SERIAL DATA COMMUNICATION:
Serial I/O Modes of Operation, serial data input output programming.

[10] 8006/97 OVERVIEW
8096/97 (16-bit Microcontroller) Architecture overview and additional features.

C. LEARNING OUTCOMES

At the completion of the course, students will be able to …

- Write and execute assembly language program for given application.

- Determine the execution time and memory occupancy of a given program.
- Interface microcontroller with several input/output peripherals for the given application.
- Understand internal architecture of other microcontrollers by referring their reference manuals.
- Select an appropriate microcontroller for the particular application.
- Develop microcontroller based applications, which can be commercialized and useful to the nation.

D. RECOMMENDED TEXTBOOK

1. The 8051 Microcontroller based Embedded Systems
   Authors : Manish K. Patel
   Edition : 1st
   Publisher : McGraw Hill Education

E. REFERENCE BOOKS

1. The 8051 Microcontroller Architecture, Programming & Applications
   Authors : Kenneth J Ayala
   Edition : 2nd
   Publisher : Penram International Pub(India)

2. The 8051 Microcontroller & Embedded Systems
   Authors : Muhammad A.Mazidi & Janice G.Mazidi
   Edition : 2nd
   Publisher : Pearson Education

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

1. Introduction to S51 Simulator
2. To study the 8051 data transfer instructions
3. To study the 8051 arithmetic instructions
4. To study the 8051 logical Instructions
5. To study the 8051 Bit level Programming
6. To study the 8051 Jump and Call instructions
7. Introduction to interrupts of 8051
8. Interfacing keypad with 8051
9. Interfacing LCD with 8051

EC 512–ELECTRONIC COMMUNICATION

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

To offer in-depth understanding of various aspects of Analog Communication systems, Satellite Communication and Optical Communication.

B. DETAILED SYLLABUS

[1] RESONANT CIRCUITS
Series and Parallel Equivalence, Series RLC Circuit, Parallel Tuned Circuit, Skin Effect, Mutual Inductance, Coupling Circuits.

[2] WAVEFORM SPECTRA :
Introduction, Complex Repetitive Waves, Effect of Filtering on Complex Signals.

[3] NOISE:
Introduction, Thermal Noise, Shot Noise, Partition Noise, Low- Frequency or Flicker Noise, High frequency or Transmit Time Noise, Generation Recombination Noise, Equivalent Noise Resistance, Signal to Noise Ratio, Noise Factor, Noise Temperature.

[4] RF AMPLIFIERS:
Tuned RF Amplifiers, Neutralization, Special RF Amplifiers, Frequency Conversion and Mixers.

[5] RECEIVERS:
Introduction, Super heterodyne Receivers, Choice of Intermediate and Oscillator Frequencies, Image Rejection, Adjacent Channel Selectivity, Spurious Responses, Tracking Automatic Gain Control, Double Conversion Receivers, HF Communications Receivers.

[6] AMPLITUDE MODULATION:
Introduction, Amplitude Modulation, Amplitude Modulated Transmitters, AM Receivers

[7] SINGLE-SIDEBAND MODULATION:
Introduction, Single Sideband Principles, The Balanced Modulator SSB Generation, SSB Reception, Modified SSB Systems.

[8] ANGLE MODULATION:
Introduction, Frequency Modulation, Phase Modulation, Equivalence between FM and PM, Angle Modulator Circuits, Angle Modulation Detectors.

[9] SATELLITE COMMUNICATION:
Introduction, Orbits, Station Keeping, Satellite Attitude, Transmission Path, Path Loss, Noise Considerations, The Satellite System, Saturation Flux Density, Effective Isotropic Radiated Power, Antenna Look Angles, Elevation and azimuth angle calculations, Uplink and down link power budget calculations, Multiple Access Methods.

[10] FIBER OPTIC COMMUNICATIONS:
Introduction, principles of Light Transmission in Fiber, Losses in Fiber, Dispersion, Light Sources for Fiber Optics Photo Detectors, Connectors and Splices, Fiber Optic

Communication Systems.

C. LEARNING OUTCOMES

At the completion of the course, students will be able to …

- Describe parameters like resonant frequency, bandwidth, gain etc. related about RF amplifier.
- Analyse and express signal in time domain as well as frequency domain.
- Understand concepts of Satellite and Optical Communication.
- Implement different blocks of analog transmitter and receiver.
- Analyse effect of noise in Analog Communication Systems.
- Design Amplitude modulator/demodulator and Angle modulator/demodulator circuits.

D. RECOMMENDED TEXTBOOK

1. Electronic Communication
   Authors : Dennis Roddy & John Coolen
   Edition : 3rd
   Publisher : Prentice Hall of India

E. REFERENCE BOOKS

1. Electronic Communications
   Authors : George Kennedy
   Edition : 4th
   Publisher : Tata McGraw Hill

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

1. To observe the effect of emitter current on the Colpitt's oscillator using different high frequency transistors.
2. To build and test Crystal oscillator circuit.
3. To implement an amplitude modulator circuit and measure modulation index for different modulating signals.
4. Design peak detector circuit, using Ge diode, to avoid diagonal peak clipping in the demodulated output. Repeat same using Si diode and compare results.
5. To obtain frequency response of single tuned amplifier and determine its Q factor.
6. To build and test additive mixer circuit for down conversion.
7. To set up communication link with the help of AM transmitter and receiver kits and observe output for standard AM, DSB-SC and SSB-SC modulations.
8. To study different types of Frequency Modulation and Demodulation test bed.
9. To set up a Fiber Optic link between the transmitter and receiver and measure the bending loss, attenuation and Numerical Aperture of Optical Fiber Cable.
10. To observe frequency spectrum of various periodic signal on spectrum analyzer.
11. To Study satellite link trainer kit.

EC 517 – ELECTROMAGNETIC FIELDS

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	1	0	60	40	50	00	150	4	1	0	5

A. OBJECTIVES OF THE COURSE

To inculcate the strong foundation of the static as well as time varying electromagnetic fields, to help the students identify, formulate and solve the problems related to electromagnetic fields and wave propagation.

B. DETAILED SYLLABUS

[1] VECTOR ANALYSIS

Scalars and Vectors, Vector Algebra, The Cartesian coordinate system, Vector Components and Unit Vectors, The Vector Field, The Dot Product, The Cross Product, Other Coordinate Systems; Circular Cylindrical Coordinates, The Spherical Coordinate System.

[2] COULOMB'S LAW AND ELECTRIC FIELD INTENSITY

The Experimental Law of Coulomb, Electric Field Intensity, Field Due to a Continuous Volume Charge Distribution, Field of a Sheet of Charge, Streamlines and Sketches of Fields.

[3] ELECTRIC FLUX DENSITY, GAUSS'S LAW, AND DIVERGENCE

Electric Flux Density, Gauss's Law, Application of Gauss's Law Some Symmetrical Charge, Distributions, Application of Gauss's Law, Differential Volume Element, Divergence, Maxwell's First Equation (Electrostatics), The Vector Operator V and the Divergence Theorem.

[4] ENERGY AND POTENTIAL

Energy Expended in Moving a Point Charge in an Electric Field, The Line Integral, Definition of Potential Difference and Potential, The Potential Field of a Point Charge, The Potential Field of a System of Charges, Conservative Property, Potential Gradient, The Dipole, Energy Density in the Electrostatic Field.

[5] CONDUCTORS, DIELECTRICS, AND CAPACITANCE

Current and Current Density, Continuity of Current, Metallic Conductors, Conductor Properties and Boundary Conditions, The Method of Images, Semiconductors, The Nature of Dielectric Materials, Boundary Conditions for Perfect Dielectric Materials, Capacitance, Several Capacitance Examples, Capacitance of a Two-Wire Line.

[6] POISSON'S AND LAPLACE'S EQUATIONS

Poisson's and Laplace's Equations, Uniqueness Theorem, Examples of the Solution of Laplace's Equation, Example of the Solution of Poisson's Equation, Product Solution of Laplace's Equation.

[7] THE STEADY MAGNETIC FIELD

Biot-Savart Law, Ampere's Circuital Law, Curl, Stokes' Theorem, Magnetic Flux and Magnetic Flux Density, The Scalar and Vector Magnetic potential, Derivation of Steady-Magnetic.

[8] MAGNETIC FORCES, MATERIALS AND INDUCTANCE

Force on a Moving Charge, Force on a Differential Current Element, Force between Differential Current Elements, Force and Torque on a closed Circuit, The Nature of Magnetic Materials, Magnetization and Permeability, Magnetic Boundary Conditions, The Magnetic Circuit, Potential Energy and Forces on Magnetic Materials, Inductance and Mutual Inductance.

[9] TIME-VARYING FIELDS AND MAXWELL'S EQUATIONS

Faraday's Law, Displacement Current, Maxwell's Equations in Point Form, Maxwell's Equations in Integral Form, The Retarded Potentials.

[10] THE UNIFORM PLANE

Wave Motion in Free Space, Wave Motion in Perfect Dielectrics, Plane Waves in Lossy Dielectrics, The Poynting Vector and Power Considerations, Propagation in Good Conductors: Skin Effect, Reflection of Uniform Plane Waves, Standing-Wave Ratio.

[11] TRANSMISSION LINES

Basic Principles, Reflection co-efficient, Transmission co-efficient, Equation of the impedance on the transmission line.

C. LEARNING OUTCOMES

At the completion of the course, students will be able to …

- Understand & create substantial transition from circuit theory to field theory.
- Evaluate the problems in different EM fields.
- Apply the Maxwell's Equations for solving the electrostatic and magnetostatic systems.
- Understand and analyse the moving charges on magnetic fields.
- Initiate the design of a range of field theory applications such as transmission line, antennas, wave propagation so on.

D. RECOMMENDED TEXTBOOK

1. Engineering Electromagnetics
   Authors : William H. Hayt
   Edition : 7th
   Publisher : Tata McGraw Hill
2. Electronic Communication Systems
   Authors George Kenedy
   Edition 3rd
   Publisher Tata McGraw Hill

E. REFERENCE BOOKS

1. Theory and Problems in Electromagnetics
   Authors Joseph Edminister
   Edition 1st

Publisher Tata McGraw Hill

2. Principles of Electromagnetics
   Authors : Mathew N.O. Sadiku
   Edition : 3rd
   Publisher : Oxford University Press
3. Electromagnetics
   Authors : John D. Kraus
   Edition : 3rd
   Publisher : Tata McGraw Hill

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Not Applicable.

G. LIST OF TUTORIALS TO BE PERFORMED UNDER THIS SUBJECT HEAD

Problem solving of…

1. Vector analysis.
2. Surface and Volume Integrals, E Field of Linear Charges and Surface Charges.
3. Electric Flux Density and Electric Flux through a Surface.
4. Electric Potential, Electric Energy and Electric Current.
5. Boundary Conditions and Capacitance.
6. Steady magnetic field.
7. Magnetic force, Magnetic torque, Magnetization, Inductance.
8. Time-varying fields and Maxwell's equations.
9. Wave propagation and pointing theorem, .
10. Reflection coefficient, transmission coefficient and standing wave.

EC 507 – POWER ELECTRONICS

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

To prepare students for analysis and designing power converter circuits for different power applications by offering deep insight into characteristics and functioning of various power semiconductor devices.

B. DETAILED SYLLABUS

[1] INTRODUCTION TO POWER ELECTRONICS

Overview of Power Electronics, Power Semiconductor Devices, Control Characteristics of Power Devices, Characteristic & Specifications of Switches, Types of Power Circuits, Reverse Recovery Characteristics, Types of Power Diodes, Freewheeling Diodes, Structure and Volt-Current Characteristics of Power MOSFETS, COOLMOS, SITs, Structure and Volt-Current Characteristics of IGBTs, SiC – MOSFET, SiC – IGBT.

[2] THYRISTORS

Thyristor Characteristics, Two Transistor Model of Thyristor, Thyristor Turn-on, Thyristor Turn-off, Types of Thyristors, Series & Parallel Connection of Thyristors, di/dt & dv/dt Protection, Gate Drive Circuits.

[3] UNCONTROLLED AND CONTROLLED RECTIFIERS

Multiphase Star Rectifiers, Three-Phase Bridge Rectifiers, Three-Phase Bridge Rectifier With RL Load, 3-Phase Rectifier Design, Principal of Phase Controlled Converter, Single Phase Semi Converter, Single Phase Full Converter, Three Phase Half Wave Converters, Three Phase Semi Converter, Three Phase Full Converter. (Without Analysis for RL Load), Power Factor Improvement, Pulse Width Modulation using IGBT, Single Phase Sinusoidal PWM using IGBT, Three Phase PWM Control using IGBT.

[4] INVERTERS

Principal of Operation of Pulse Width Modulated Inverters, Performance Parameters, Single-Phase Bridge Inverters, Voltage Control of Single-Phase Inverters, Current Source Inverter, Multilevel Concept, Applications & Features of Multilevel Inverter.

[5] DC-DC CONVERTERS

Principal of Step Down Converter, Principal of Step Up Converter, Performance Parameters, Converter Classification, Switch Mode Buck, Boost, Buck-Boost & Cuk Regulators, Chopper Circuit Design.

[6] AC CONTROLLERS

Principal of On-Off Control, Principal of Phase Control, Cycloconverters, PWM Controlled AC Voltage Controllers.

[7] PROTECTION OF DEVICES & CIRCUITS

Cooling and Heat Sinks, Snubber Circuits, Reverse Recovery Transients, Supply & Load

Side Transients, Current & Voltage Protection, Magnetic Interference, Protection of IGBT

[8] DC DRIVES

Characteristics of DC Motor, Operating Modes, Single-Phase DC Drives, Breaking Schemes of DC-DC Converter Drives, Closed-Loop Control of DC Drives.

[9] AC DRIVES

Induction Motor Drives, Close-Loop Control of Induction Motors, Synchronous Motor Drives, Stepper Motor Control, Basics of DC Drives and Comparison with AC Drives.

[10] POWER SUPPLIES

Switched-Mode Power Supplies, UPS, CVT.

C. LEARNING OUTCOMES

At the completion of the course, students will be able to

- Acquire knowledge about fundamental concepts and techniques used in power electronics.
- Understand the behaviour of different power semiconductor components.
- Design and analyze various power converter circuits in power applications.
- Identify basic requirements for power electronics based applications.
- Build and troubleshoot power electronics circuits.
- Understand the use of power converters in commercial and industrial applications.

D. RECOMMENDED TEXTBOOK

1. Power Electronics circuits, Devices and Applications
   Authors : Muhammad H. Rashid
   Edition : 3rd
   Publisher : Pearson Education and PHI

E. REFERENCE BOOKS

1. Power Electronics
   Authors : M. D. Singh and K. B. Khanchandani
   Edition : 2nd
   Publisher : The McGrow Hill
2. Power Electronics
   Authors : Dr. P.S.Bhimbhara
   Edition : 4th
   Publisher : Khanna Publication
3. Power Electronics
   Authors : B. R. Gupta & V. Singhal
   Edition : 2nd
   Publisher : S.K. Kataria & Sons

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

1. To study the Characteristics of Silicon Controlled Rectifier (SCR).
2. To implement Class – C Commutation.
3. To study the Characteristics of DIAC and TRIAC.
4. To study the Characteristics of IGBT.
5. To study the Characteristics of MOSFET.
6. To design Programmable Unijunction Transistor (PUT).
7. To understand the Working of Single Phase Half Wave Controlled Rectifier.
8. To study the Working of Single Phase Full-Wave Controlled Rectifier.
9. To design Light Dimmer Circuit using TRIAC and DIAC.
10. To study Three Phase Half Wave and Three Phase Full Wave Uncontrolled Rectifier.
11. To implement Single Phase Inverter.

_____- CONTROL THEORY

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

To prepare students to have knowledge of various types of control systems with characteristics, Transfer function of any control system with different techniques and mathematical model for physical systems, various stability criteria, define system specifications in time and frequency domain, identify stable/unstable systems and relative/ marginally stable various time and frequency domain stability analysis techniques, time-frequency domain concepts, calculate system specifications and solve control problems.

B. DETAILED SYLLABUS

[1] INTRODUCTION:

Open-loop and closed loop control system, Servomechanism, Historical development of control system, sampled data & digital control system, Multivariable control system, Application in non-engineering field.

[2] MATHEMATICAL MODELS OF PHYSICAL SYSTEMS:

Introduction, Differential equation of physical systems, Transfer functions, Block diagram algebra, signal flow graph. (Note: Problems on electrical, mechanical & electromechanical systems only.)

[3] FEEDBACK CHARACTERISTICS OF CONTROL SYSTEMS:

Feedback and non feedback systems, reduction of parameter variations by use of feedback, control over system dynamics by use of feedback, effects of disturbance signals by use of feedback, linearizing effect of feedback, regenerative feedback, Basics of Feed forward Control System with example

[4] TIME RESPONSE ALALYSIS, DESIGN SPECIFICATION AND PERFORMANCE INDICES CONCEPTS OF STABILITY AND ALGEBRAIC CRITERIA:

Introduction, standard test signals, time response of first order system, time response of second order system, steady state errors and error constants, effects of adding zero to a system, design specifications and constructions for second and higher order systems, performance indices, examples, concepts and conditions for stability, Huwitz's and Routh's stability criteria, relative stability criteria.

[5] THE ROOT LOCUS TECHNIQUE:

Introduction, Rules of construction of root loci, sketching of root locus and applications

[6] FREQUENCY DOMAIN ANALYSIS & STABILITY:

Frequency domain specifications, correlation between time and frequency domain specifications, Bode plot, Polar plot. Concept of stability, R-H criterion, Nyquist

stability.

C. LEARNING OUTCOMES

- The students shall be able to judge the best stable system by implementing the various techniques.
- The students shall understand and analysis LTI Systems using various stability analysis techniques.
- The students shall be able to solve control problems based on system specifications calculations.

D. RECOMMENDED TEXTBOOKS

1. Control System Engineering
   Authors : Nagrath & Gopal
   Edition : 5th
   Publisher : New Age International Publishers

E. REFERENCE BOOKS

1. Control systems Engineering
   Authors : U. A. Patel
   Publisher : Mahajan Publishing House
2. Problems and Solutions of Control Systems With Essential Theory
   Authors : Jairath
   Publisher : CBS Publisher
3. Modern Control Engineering
   Authors : K. Ogata
   Publisher : Prentice Hall
4. A course in control engineering
   Authors : A. Subbarao and Parag R. Desai
   Publisher : Dhanpat Rai Publications Ltd.
5. Automatic Control System
   Authors : S.N.Verma
   Publisher : Khanna Publications
6. Feedback Control Systems
   Authors : Di Staffeno

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

1. To Generate & Study Standard Test Signals using Function generate & DSO.
2. Design, Determine & Plot Transient response of First Order System using Scilab & RC Circuit.
3. Design, Determine & Plot Transient response of Second Order System using Scilab & RC Circuit.

4. Design, Determine, compare & Plot transient response of Type-0, Type-1 & Type-2 system using Scilab & RC Networks.
5. Design, Simulate & Plot Frequency response (Bode Plot) of First Order System. Compare Scilab Results with Practical Results.
6. Design, Simulate & Plot Frequency response (Bode Plot) of Second Order System. Compare Scilab Results with Practical Results.
7. Design & Plot Frequency response of Second Order system for damping factor – 0.1, 0.5 & 1 for second order RC filter using OPAMP.
8. Draw transient response of Under Damp, Over Damp system with respect to Step Input.
9. Design & Sketch Polar Plot for First Order & Second Order System.
10. Simulate Root Locus for first Order & Second Order System for different value of K; also observe the effect of K on Position of Poles.

Note: Other than Lab Experiments, Assignments shall be given to students during Laboratory

EC - 506 – TERM PROJECT

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
0	0	2	00	00	25	25	50	0	0	1	1

A. OBJECTIVES OF THE COURSE

To make students capable to apply and synthesize knowledge acquired in theories by implementation of hardware based projects.

B. DETAILED SYLLABUS

---NA---

C. LEARNING OUTCOMES

At the completion of course, Students will be able to,

- Plan, design and implement hardware projects.
- Analyze and interpret output.
- Explore skills to function on multi-disciplinary teams.
- Identify, formulate, and solve engineering problems
- To use the techniques, skills, and modern engineering tools necessary for engineering practice.
- Designing of PCB and implement hardware on PCB.

D. RECOMMENDED TEXTBOOKS

---NA---

E. REFERENCE BOOKS

---NA---

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

---NA---

EC 601 - ADVANCED MICROPROCESSORS

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

To understand basics of microprocessors. To offer a detailed understanding of the 8086 architecture and its hardware specifications. To develop assembly language programs of 8086. To apply interfacing techniques to design basic x86 based hardware systems. To be familiar with features of advanced microprocessors like Pentium and Pentium Pro.

B. DETAILED SYLLABUS

[A] THE MICROPROCESSOR AND ITS ARCHITECTURE:
Internal Architecture, Real mode memory addressing, protected mode memory addressing, memory paging.

[B] ADDRESSING MODES:
Data addressing mode, program memory addressing mode, stack memory addressing mode.

[C] DATA MOVEMENT INSTRUCTIONS:
MOV, PUSH/POP, Load effective address, String data transfer, Miscellaneous, Segment override prefix, assembler details.

[D] ARITHMATIC AND LOGICAL INSTRUCTIONS:
Addition, subtraction, comparison, multiplication, division, BCD and ASCII arithmetic, basic logic instructions shift and rotate, string comparison.

[E] PROGRAM CONTROL INSTRUCTIONS:
Jump group, controlling the flow of an ALP, procedures, interrupts, machine control and miscellaneous instructions

[F] 8086/8088 HARDWARE SPECIFICATIONS:
Pin-outs, pin functions, clock generator, bus buffering and latching, bus timing, ready and the wait state, minimum mode versus maximum mode.

[G] MEMORY INTERFACE:
Memory devices, address decoding, 8088 and 80188 memory interface, 8086, 80186, 80286, 80386SX, 80386DX, 80486, Pentium and Pentium pro memory interface, Dynamic RAM.

[H] BASIC I/O INTERFACE:
Introduction to i/o interface, i/o address decoding, the programmable peripheral device (8255), The
8279Progarmmable keyboard/display interface, USB basics and interfacing.

[I] INTERRUPTS:
Basic interrupt processing, Hardware interrupts, Expanding the interrupt structure, 8259A Programmable interrupt controller.

[J] DIRECT MEMORY ACCESS:
Basic DMA operation.

[K] 80186, 80188, 80286
Introduction to the 80286.

[L] THE PENTIUM AND PENTIUM PROMICROPROCESSORS:
Introduction to Pentium microprocessor, system timings, how to interface slower memory with Pentium, Protected mode, paging mode, virtual 8086 mode, memory management mode with Pentium, Introduction Pentium Pro.

C. LEARNING OUTCOMES

At the completion of the course, students will be able to …

- Understand 8086 architecture and program development tools
- to develop and debug assembly language programs of 8086
- interface memory systems with 8086
- develop interrupt service routines of 8086

D. RECOMMENDED TEXTBOOK(S)

1. The Intel Microprocessors 8086, 8088, 80186, 80188, 80286, 80386, 80486, Pentium, Pentium Pro Processors,
   Authors : Berry B Brey
   Edition : 6th Edition
   Publisher : Prantice Hall of India

E. REFERENCE BOOK(S)

1. Microprocessors and Interfacing-Programming & Hardware
   Authors : Douglas V. Hall
   Edition :2nd Edition
   Publisher : Tata McGraw Hill
2. IBM PC Assembly Language Programming
   Authors : Peter Abel
   Edition : 2nd Edition
   Publisher : Prentice Hall of India

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

1. To study DEBUG commands and their use in debugging assembly language programs
2. To study different DOS interrupt functions and use them to write user friendly programs
3. To study x86 program organization development process
4. To develop assembly language programs based on array processing

5. To demonstrate the use of string instructions
6. To implement ASCII and BCD arithmetic using ASCII and BCD instructions
7. To develop near procedures and study parameter passing techniques
8. To study recursive procedures
9. To develop far procedures within module and outside the module
10. To demonstrate the use of macros in the program development
11. To study Interrupt Handling and develop Interrupt service routines
12. To study mixing of Assembly and C programming

EC604 – COMMUNICATION SYSTEMS

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

To offer a profound understanding of signal analysis, digital and analog modulation techniques and digital communication systems.

B. DETAILED SYLLABUS

[A] INTRODUCTION

Overview of Communication System, Analog and Digital messages, Signal-to-Noise Ratio(SNR), Channel Bandwidth, Rate of Communication, Modulation, Randomness, Redundancy, and Coding.

[B] ANALYSIS AND TRANSMISSION OF SIGNALS

Signal Analysis

Periodic signal representation by Fourier Series, Exponential representation of non periodic signals, Fourier Transforms and its properties, Sampling theorem.

Signal Transmission

Distortion less transmission through a linear system, Signal distortion over a channel, Bandwidth and the rate of pulse transmission, Energy Spectral Density(ESD) of a signal, Power Spectral Density(PSD) of a signal.

[C] DIGITAL COMMUNICATION SYSTEMS

Conversion of analog signal to digital form: Pulse code and Delta modulation, Digital multiplexing, Line coding, Pulse shaping, Scrambling of data, The regenerative repeater, Detection error probability, M-ary communication, Digital carrier systems.

[D] DIGITAL MODULATION TECHNIQUES

Coherent Binary Phase Shift Keying, Coherent Binary Frequency Shift Keying, Coherent Qudra-Phase Shift Keying, Coherent Minimum Shift Keying, Non-Coherent Orthogonal Modulation, Non-Coherent Binary Frequency Shift Keying, Differential Phase Shift Keying, Comparison of Binary and Quaternary modulation schemes, M-ary modulation techniques.

[E] MODULATION

Amplitude (Linear) Modulation

Amplitude Modulation : Single Side Band (SSB) signal equation, Hilbert's Transform of a signal, Effects of frequency and phase errors in synchronous demodulation, Digital carrier systems, Interference and noise in AM systems, Frequency-Division Multiplexing.

Angle (Exponential) Modulation

Interference and Noise in Angle-Modulated systems, Stereo FM receiver.

C. LEARNING OUTCOMES

At the completion of the course, students will be able to …

- Understand basic signals and systems, Fourier series and Fourier transform and their application in signal analysis.
- Understand and analyze various aspects of digital communication systems such as Pulse code and Delta modulation, Digital multiplexing, Line coding, Pulse shaping, Scrambling, Regenerative repeater, Detection error probability, M-ary communication, Digital carrier systems.
- Understand various digital modulation techniques and their advantages and disadvantages.
- Analyse and compare the effect of of noise and interference in analog modulation systems like SSB, DSB-SC, AM, FM and PM.

D. RECOMMENDED TEXTBOOK(S)

1. Modern Digital and Analog Communication System
   Authors : B. P. Lathi
   Edition : 2nd
   Publisher : Oxford Publication
2. Communication Systems
   Authors : Simon Haykin
   Edition : 3rd
   Publisher : John wiley & sons

E. REFERENCE BOOK(S)

1. Electronic Communication System-Fundamental through Advance
   Authors : Tomas W.
   Edition : 3rd
   Publisher : Wisley
2. Communication System Analog & Digital
   Authors : R. P. Singh
   Edition : 1st
   Publisher : Tata McGraw Hill

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

1. To observe the effect of the following scenario, on Sampling and Reconstruction of signal.
   a) Different Types of Sampling.
   b) Effect of Sampling Frequency.
   c) Effect of the order of the filter.
2. To understand the concept of Analog Time Division Multiplexing.
3. To understand the concept of Pulse Code Modulation & Demodulation and also observe the effect of various channels on the demodulated output.
4. To implement the Pulse Amplitude Modulation & Demodulation.
5. To implement the Pulse Width Modulation & Demodulation.
6. To implement the Pulse Position Modulation & Demodulation.

7. To observe the effect of slope overload in Delta Modulation & Demodulation.
8. To implement the Adaptive Delta Modulation & Demodulation.
9. To observe and compare various types of line coding techniques.
10. To understand the concept of Digital Modulation Techniques like Phase Shift Keying, Frequency Shift Keying and Amplitude Shift Keying.
11. To study the concept of Framing and Marker used in Time Division Multiplexing (TDM) system.

EC 610 – MICROWAVE & ANTENNAS

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

To present a perceptive understanding of the fundamentals of a variety of antennas & the radio frequency networks. Further, nurturing the ability to design and analyze the performance of assorted antennas for wide range of operating frequency and microwave networks for various wired and wireless systems.

B. DETAILED SYLLABUS

[A] TRAMSMISSSION LINE
The Smith Chart & its Applications, Transmission Line Components.

[B] WAVEGUIDES, RESONATOR & COMPONENTS
Rectangular Waveguides, Circular and other Waveguides, Waveguide Coupling, Matching & Attenuation, Cavity Resonator, Auxiliary Components.

[C] MICROWAVE TUBES & CIRCUITS
Microwave Triodes, Multi-Cavity Klystron, Reflex Klystron, Magnetron, Travelling Wave Tube and other Microwave Tubes.

[D] SEMICONDUCTOR MICROWAVE DEVICES & CIRCUITS
Passive Microwave Circuits, Transistor & Integrated Circuits, Varactor and Step Recovery, Diodes and Multipliers, Parametric Amplifiers, Tunnel Diodes and Negative Resistance Amplifiers, Gunn Effect Diodes, Avalanche Effect and Diodes, other Microwave Diodes, Micro-strip Line.

[E] ANTENNAS
Basic Considerations, Radiation from the Hertz Dipole, Near and Far Field Analysis, Radiation Parameters of Antenna, Thin Linear Antenna, Effect of Ground on Antennas, Basic Antenna Parameters, Side Lobe Level of Antenna.

[F] ANTENNA ARRAYS
Array of Point Sources, Broad side and End Fire Array, Array Synthesis, Schelkunoff Zero Placement Method, Binomial Array, Folded dipole, Yagi-Uda Array, Log Periodic Dipole Array Antenna.

[G] SPECIAL ANTENNA
Directional High Frequency Antennas, Helical Antennas, Rhombic Antenna, Microwave Frequency Antennas, Horn Antennas, Parabolic Reflector Antenna.

[H] RADIATION AND PROPAGATION OF WAVES
Electromagnetic Radiation, Propagation of Waves, Ground, Space and Sky Wave Propagation, Scatter propagation, Duct propagation, Multi hop propagation, Fading and Diversity.

C. LEARNING OUTCOMES

At the completion of course, students will be able to...

- Develop a generalized technique to solve the network problems related to a range of transmission lines.
- Conceptualize the waveguide and propagation of diverse modes.
- Build their notion about the semiconductor devices used at RF.
- Figure-out a variety of the RF network parameters, such as characteristic impedance, standing wave ratio, reflection coefficient, VSWR, etc.
- Design the matching networks for the RF networks.
- Analyze performance of the RF networks.
- Gain the insight of the electromagnetic wave and wave theory.
- Categorize the antenna specifications required for designing.
- Classify antennas used in VHF/ UHF band.
- Compute the basic antenna parameters such as Gain, Efficiency, Directivity, etc.
- Understand the concept of the antenna arrays.
- Adopt antennas and antenna arrays as per the operating frequency/spectrum and/or the radiation pattern.
- Understand the different modes of wave propagation and effects of ground on the electromagnetic wave.

D. RECOMMENDED TEXTBOOK(S)

1. Electromagnetic Waves
   Authors : R. K. Shevgaonkar
   Edition : 1st
   Publisher : Tata McGraw Hill
2. Microwave Devices and Circuits
   Authors : S. Y. Liao
   Edition : 3rd
   Publisher : Prentice Hall of India

E. REFERENCE BOOK(S)

1. Electronic Communication systems
   Authors : George Kennedy
   Edition : 3rd
   Publisher : Tata McGraw Hill
2. Antennas
   Authors : C. A. Balani
   Edition : 3rd
   Publisher : Tata McGraw Hill

3. Antennas & Wave Propagation
   Authors : K. D. Prasad
   Edition : 2nd
   Publisher : Khanna Publication

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

1. a) To study working of Microstrip Trainer kit.
   b) Plot the radiation pattern of λ/2, λ/4 and 3λ/2 dipoles antenna.
   c) Effect of Co-polarization and Cross-Polarization using wire antenna.
2. Compute Voltage Standing Wave Ratio (VSWR) and reflection co-efficient for matched load, open load, and short circuit load using Microwave Test Bench Kit.
3. To determine the frequency of reflex klystron using frequency meter and slotted line section on Microwave Test Bench.
4. Validate the characteristics of variable attenuator using Microwave Test bench.
5. Compare the gain and bandwidth of folded dipole antenna with half wavelength dipole antenna.
6. To plot and compare the radiation pattern of different array antennas.
7. To plot and compare the radiation pattern of different elements Yagi - Uda antennas.
8. To plot the radiation pattern of log periodic dipole array and observe its radiation parameter.
9. Frequency response of Log Periodic Dipole Array (LPDA) antenna using microstrip trainer kit.
10. To plot the radiation pattern of helical antenna in axial mode and observe its radiation parameters.
11. a) Performance comparisons of Sectorial Horn and Pyramidal Horn antenna.
    b) Plot the radiation pattern of parabolic reflector antenna.
12. Design and analysis of Wire, Array and Aperture antennas using PCAAD software.

EC 614 – AUDIO-VIDEO ENGINEERING

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
0	0	2	0	0	25	25	50	0	0	1	1

A. OBJECTIVES OF THE COURSE

To understand and verify the functioning of a Television (TV) Transmitter and Receiver with its supporting instruments. To learn functioning of various audio-video technologies.

B. DETAILED SYLLABUS

— NA —

C. LEARNING OUTCOMES

At the completion of the course, students will be able to …

- Acquire the basic knowledge about TV Transmitter and Receiver.
- Study various aspects of TV signal.
- Operate TV kit, Vectroscope and Pattern Generator.
- Understand internal structure and functioning of various types of Microphones, Loudspeakers.
- Implement Audio Addressing Circuit.
- Know about working of TV technologies like LCD, LED and Plasma.
- Get information about TV transmission technologies and various audio video formats.

D. RECOMMENDED TEXTBOOK(S)

1. Modern Television Practice
   Authors : R. R. Gulati
   Edition : 1st
   Publisher : New age international publisher

E. REFERENCE BOOK(S)

1. Audio and Video Systems
   Authors : R. G. Gupta
   Edition : 1st
   Publisher : Technical education series

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

1. To study Television Transmitter & Receiver and compare Monochrome and Colour Television Receiver.
2. Fault finding in RF and VIF sections of Colour Television Receiver.
3. (a) To observe and to identify the components of Composite Video Signal.
   (b) To understand significance of standard patterns using Pattern Generator.
4. (a) To study various aspects of the colour picture signal.
   (b) To study Vectroscope.
5. To understand working principle and characteristics of various Microphones.
6. To understand working principle and characteristics of various Loudspeakers.
7. To design Audio Addressing System.
8. To compare LCD, LED and Plasma TV in term of display technology, colour reproduction and power consumption.
9. To understand HDTV standard.
10. To study functioning of Direct to Home network.

EC 607 – TERM PROJECT

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
0	0	2	0	0	25	25	50	0	0	1	1

A. OBJECTIVES OF THE COURSE

To offer a profound understanding and implementation of microcontroller based embedded systems in an elementary and integrated manner.

B. DETAILED SYLLABUS

N.A.

C. LEARNING OUTCOMES

At the completion of the course, students will be able to …

- Plan, design and Implement a small scale embedded system.
- Interface Microcontroller(s) with other peripherals.
- Develop an Integrated (in terms of hardware and software) system to fulfil the requirements.
- Design PCB for hardware implementation.

D. RECOMMENDED TEXTBOOK(S)

N.A.

E. REFERENCE BOOK(S)

N.A.

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

N.A.

EC 611 – DIGITAL SIGNAL PROCESSING

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

To offer in depth understanding of time domain and frequency domain analysis of discrete time signals and systems. To provide understanding of design of IIR and FIR digital filters.

B. DETAILED SYLLABUS

[A] INTRODUCTION
Signal and Signal Classification (Analog, Digital), Types of Signal Processing, Advantages and Disadvantages of DSP.

[B] DISCRETE SIGNALS
Operations on Discrete Signals, Decimation and Interpolation.

[C] DISCRETE TIME SYSTEMS
System Classification, Digital Filters-Difference Equation, Impulse Response, Stability, Connections.

[D] DISCRETE CONVOLUTION
Discrete Convolution, Convolution of Finite Sequences, Stability of LTI Systems, System Response to Periodic Inputs, Periodic Convolution, Discrete Correlation.

[E] THE Z-TRANSFORM
Definition, Properties, Z-Plane Representation, The Transfer Function, Inverse-Z Transform, System Analysis, Frequency Response.

[F] APPLICATIONS OF Z-TRANSFORM
Time Domain Analysis, Frequency Response - Graphical Interpretation, Application-Oriented Examples: Digital Audio Effects.

[G] IIR FILTER DESIGN
Introduction, IIR Filter Design, Response Matching, Matched-Z Transforms, Mappings, Bilinear Transformation.

[H] FIR FILTERS DESIGN
Linear Phase Requirement And Symmetric Sequences, FIR Design By Fourier Series & Windowing Method.

[I] THE DFT AND FFT
Fourier Series, Fourier Transform, DTFT, DFT - Definitions, Properties, Spectral Smoothing by Time Windows, The FFT, DIT- FFT, DIF-FFT , IDFT, Applications of Overlap-Add Method & Overlap - Save Method.

[J] ADVANCE DSP CONCEPTS
Multirate Signal Processing, Adaptive Signal Processing, Finite Word Length Effect.

[K] APPLICATIONS OF DSP
Speech Processing: Speech Analysis, Speech Synthesis, Speech Recognition, Speaker Recognition, Image Processing: Extracting The Edges, Blurring The Images, Biomedical Signal Processing: ECG Analysis, Noise Detection And Diagnosis.

[L] DSP PROCESSOR ARCHITECTURE

Introduction to Digital Signal Processors: Characteristics of DSP Algorithms and Hardware Requirements, Von Neumann Architecture, Harvard Architecture, Parallelism And Hardware Units of Typical Digital Signal Processor. Architectural Details of TMS320C6x.

C. LEARNING OUTCOMES

At the completion of the course, students will be able to …

- Understand different Types of Discrete Signals and Operations like Shifting, Scaling, Decimation, Interpolations.
- Classify Digital Systems and Analyze Digital Systems with Z-Transform.
- Find Response of Discrete time LTI Systems.
- Design FIR and IIR Filters.
- Represent Discrete Time Signal in Frequency Domain through DFT and Calculate it by FFT Algorithms.
- Calculate Discrete Fourier Transform with FFT algorithms.
- Understand specialized features of DSP Processors.
- Explore Applications of DSP in the field of Image Processing, Biomedical and Sound Processing.

D. RECOMMENDED TEXTBOOK(S)

1. Analog and Digital Signal Processing,
   Authors : Ashok Ambardar
   Edition : 2nd
   Publisher : Thomson Brooks-Cole
2. Digital Signal Processing
   Authors : John G. Proakis & Dimitris G. Manolakis
   Edition : 3rd
   Publisher : Prentice Hall of India

E. REFERENCE BOOK(S)

1. Digital Filters- Analysis, Design and Applications
   Authors : Andreas Antonion
   Edition : 2nd
   Publisher : Tata McGraw Hill
2. Digital Signal Processing - A Computer Based Approach
   Authors : Sanjit K Mitra
   Edition : 3rd
   Publisher : Tata McGraw Hill

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD

1. To Generate basic discrete signals used in Digital signal Processing.
2. To Implement operations like Scaling, Folding, Addition & Shifting on Discrete Signals.
3. To Implement Convolution and Correlation on two discrete signals.
4. To Understand Application of Correlation in RADAR and Binary Signal Detection.
5. To Implement Discrete Fourier Transform and understand its properties.
6. (a) To Design & implement different types of Analog Filter for given specifications.
   (b) To Design & Compare responses of IIR and FIR Filters.
7. To Simulate Applications of Digital Signal Processing like ECG signal generation, Rate alteration of Sound Signals and DTMF signal Coding & Decoding.
8. To Study Ti6x Architecture using Code Composer Studio.
9. To Explore Assembly Programming & C- programming techniques of Code Composer Studio.
10. To Generate Half-wave and Full-wave rectified Signal using CCS.

Examiner List
Department of Electronics & Communication - List of External Examinners (B.Tech./M.Tech.)
December 2017

Sem.	Subject	Name of Examiner	Address	Qualification	Experience	Contact No.
1	Basic Electrical & Electrical Engineering	Prof. J. K. Chauhan	EE Dept., BVM, V.V.Nagar.	BE (EC)	21 Yrs	9376834725
		Prof. Ashish Patel	VVP, Rajkot	ME(ECS)	2 Yrs	9662550318
		Prof. M. P. Patel	EE Dept., CITC , Changa.	ME (EC)	4 Yrs	9924211201
		Prof. Arpita Parmar	EC Dept, CITC, Changa.	ME (EC)	3 Yrs	9427856562
		Prof. S.D.Trapasiya	EC Dept., GCET, V.V.Nagar.	ME(EC)	3 Yrs	9227108034
		Prof. Dhiren Bhagat	EC Dept, SCET, Surat.	BE(EC)	5 Yrs	9898299266
		Prof. Veena Patel	LDRP, Gandhinagar	ME(ECS)	2 Yrs	9879726574
		Mr. Ronak gadariya H.	Alpha Institute of Technology	ME	2Yrs	9925474778
		Prof.Sagar Patel	Dr. Jivaraj Mehta	ME(ECS)	2 Yrs	9879334956
		Prof. Keyur Chauhan	ICCTW,Nr. V.V. Nagar	M.TECH.(EC)	4 Yrs.	9824999570
		Prof. Niraj Tevar	EC Dept., Parul University	ME	5 Years	9925220037
		Prof. Samir Joshi	EC Dept., UVPC, Ganpat University	ME	6 Years	9428853091
		Prof. Renuka Makwana	EC Dept. SVIT Vasad	ME	7 Years	9998980944
		Prof. Bhavik Prajapati	EC Dept. , SPIT, Piludra	ME	5 Years	9723706177
		Prof. Mitul Patel	EC Dept., Parul University	ME	5 Years	9974284715
		Prof. Mrugesh Shah	EC Dept. SVIT Vasad	ME	4 Years	9913545636
		Prof. Nirav Desai	GCET, V. V. Nagar	ME	11 Yrs	9427487829
		Prof. Nishant Parmar	SVMIT, Bharuch	ME	12 Yrs	9428037251
		Prof. Mehul Thakkar	ADIT, V.V.Nagar	ME		9033569124
		Prof.Anant Parmar	LDRP, Gandhinagar	ME(ECS)	2 Yrs	9998216254
		Prof. Ronak R. Vashi	BVM, V. V. Nagar	M.E(Comm)	4 Yrs	9426724335
		Prof. Babu Tosif	UV patel,kherva	M.Tech.(ECS)	1 Yr	9033648355
		Prof.Bhumika Leuva	LDRP, Gandhinagar	ME(ECS)	2 Yrs	9725045354
		Prof.Amit Chokshi	EC dept,BVM,V.V.Nagar	ME(ECS)	1 Yr	9723786348
		Prof.Vijayendra Desai	EC Dept., CKPCET, Surat.	BE(EC)	5 Yrs	9898115591
		Prof.Dhaval Patel	EC Dept.,Universal College, Ahmedabad	ME(EC)	8 Yrs.	9726579865
		Prof.Hitendra Joshi	ITM University, Vadodara	ME(EC)	3 Yrs.	9824146961
		Prof. Manthan Manvadaria	EC dept., CITC, Changa	ME	4 Yrs.	9824842703
1	Programming in C	Prof.Keyur Bhrambhatt	IT Dept., BVM, V.V.Nagar.	BE(EC)	5 Yrs	9428900107
		Prof. Bimal Patel	CIT,Changa	ME continue	5 Yrs	9909428681
		Prof. Miral Patel	GEC,Rajkot	ME(ECS)	6 Yrs	9428888628
		Prof.Nilofar Shaikh	EC Dept, SVIT, Vasad.	BE (EC)	3 Yrs	9586926464
		Prof.Rahul D. Mehta	EC Dept., VVPEC, Rajkot.	ME (EC)	5 Yrs	9428412767
		Prof.Dhiren Bhagat	EC Dept., SCET, Surat	BE(EC)	5 Yrs	9898299260
		Prof.Chintan Dave	GEC,Chandkheda,Ahmedabad	ME(ECS)	2 Yrs	9924237052
		Prof.Ankit Desai	CIT,Changa	BE(CE)	5 Yrs	9724563930
		Prof.Nirav Bhatt	CIT,Changa	ME(CE)	3 Yrs	9724563930
2	Electronic Principles					
		Prof. Ashish Patel	VVP, Rajkot	ME(ECS)	2 Yrs	9662550318
		Prof.N.B.Kanirkar	EC Dept.,SVNIT, Surat.	BE(EC)	4 Yrs	9924729298
		Prof. Babu Tosif	UV patel,kherva	M.Tech.(ECS)	1 Yr	9033648355
		Prof.G.J.Patel	EC Dept, GCET, V.V.Nagar.	BE (EC)	4 Yrs	9427081661
		Prof. Keyur Chauhan	ICCTW,Nr. V.V. Nagar	M.TECH.(EC)	1 Yr	9824999570
		Prof. A.C.Rathod	GEC, Bhavnagar	Mtech	4 Yrs	9662511781
		Prof. Krunal Patel	EC dept. Parul institute	M.Tech(ECS)	2 Yrs	9662262460
		Prof. Mitul Patel	EC dept. Parul institute	M.Tech(ECS)	2 Yrs	9974284714
		Prof. Kruti Dave	ADIT,V.V.Nagar	ME(EC)	4 Yrs	9824997114
		Prof. Keyur Chauhan	ICCTW,Nr. V.V. Nagar	M.TECH.(EC)	1 Yr	9824999570
		Prof. Kruti Dave	ADIT,V.V.Nagar	ME(EC)	4 Yrs	9824997114
		Prof.Arpita Parmar	EC Dept, CITC, Changa	ME (EC)	3 Yrs	9427620004
		Prof. Hiren Patel	SVIT,Vasad	M.Tech.(ECS)	1 Yr	9974103810
		Prof. Mrugesh Shah	SVIT,Vasad	M.Tech.(ECS)	1 Yr	9913545636
		Prof. Ronak R. Vashi	BVM, V. V. Nagar	M.E(Comm)	4 Yrs	9426724335
		Prof.Dhiren Bhagat	EC Dept., SCET, Surat	BE(EC)	5 Yrs	9898299260
		Prof.Geetali Shaha	EC Dept., GCET, V. V. Nagar	BE(EC)	4 Yrs.	9925538499
		Prof.Veena Patel	LDRP, Gandhinagar	ME(ECS)	2 Yrs	9879726574
		Prof.Bhumika Leuva	LDRP, Gandhinagar	ME(ECS)	2 Yrs	9725045354
		Prof. Niraj Tevar	EC Dept., Parul University	ME	5 Years	9925220037
		Prof. Samir Joshi	EC Dept., UVPC, Ganpat University	ME	6 Years	9428853091
		Prf. Renuka Makwana	EC Dept. SVIT Vasad	ME	7 Years	9998980944
2	Electronic Principle	Prof. Bhavik Prajapati	EC Dept. , SPIT, Piludra	ME	5 Years	9723706177
		Prof. Mitul Patel	EC Dept., Parul University	ME	5 Years	9974284715
		Prof.Sagar Patel	Dr. Jivaraj Mehta	ME(ECS)	2 Yrs	9879334956
		Prof. Nirav Desai	GCET, V. V. Nagar	ME	11 Yrs	9427487829
		Prof. Nishant Parmar	SVMIT, Bharuch	ME	12 Yrs	9428037251
		Prof. Chetna K. Shah	EC Dept., GCET, V. V. Nagar	ME(EC)	5 Yrs	9428656561
		Prof. Patel Prakash	L.D.R.P. engg.,Gandhinagar	ME	6.5Yrs	9429524427
		Prof.Anant Parmar	LDRP, Gandhinagar	ME(ECS)	2 Yrs	9998216254
		Prof.Amit Chokshi	EC dept,BVM,V.V.Nagar	ME(ECS)	1 Yr	9723786348
		Prof.Vijayendra desai	EC Dept., CKPCET, Surat	BE(EC)	5 Yrs	9898115591
		Prof.Hitendra D. Joshi	EC Dept.,ITM Univeristy,Vadodara	M.Tech.(ECS)	4 Yrs	9824146961
		Prof.Vrushank\ Shah	INDUS University, Ahmedabad	ME(CSE)	5 Yrs.	9898331701
		Prof. Dhaval Patel	EC Dept.,Universal College, Ahmedabad	ME	8 Yrs.	9726579867
		Prof. Manthan Manvadaria	EC dept., CITC, Changa	ME	4 Yrs.	9824842703

Examiner List
Department of Electronics & Communication - List of External Examinners (B.Tech./M.Tech.)
December 2017

Sem.	Subject	Name of Examiner	Address	Qualification	Experience	Contact No.
2	Advance C Programming	Prof.Keyur Bhrambhatt	IT Dept., BVM, V.V.Nagar.	BE(EC)	5 Yrs	9428900107
		Prof.Shobhit Patel	EC Dept, CITC, Changa	ME (EC)	3 Yrs	9427856562
		Prof. Bimal Patel	CIT,Changa	ME continue	5 Yrs	9909428681
		Prof. Miral Patel	GEC,Rajkot	ME(ECS)	6 Yrs	9428888628
		Prof.Rahul V. Mehta	EC Dept., CKPCET	BE(EC)	3 Yrs	9428142124
		Mr. Pinal Patel	e-infochips , ASIC, Ahmedabad	ME (EC)	5 Yrs	9427856562
		Prof.Ankit Desai	CIT,Changa	BE(CE)	5 Yrs	9724563930
		Prof.Nirav Bhatt	CIT,Changa	ME(CE)	3 Yrs	9724563930
		Prof.Dhiren Bhagat	EC Dept., SCET, Surat	BE(EC)	5 Yrs	9898299260
3	Network Analysis	Prof.Brijesh Shah	EC Dept, CITC, Changa.	ME(EC)	5 Yrs	9426508167
		Prof. Parth Jani	EC dept., Alpha college,ahmedabad	M.Tech(VLSI)	1Yr	8866110054
		Prof. Babu Tosif	UV patel,kherva	M.Tech.(ECS)	1 Yr	9033648355
		Prof.Kaushika Patel	EC Dept., BVM, V.V.Nagar.	ME(EC)	6 Yrs	9428479191
		Prof. A.C.Rathod	GEC, Bhavnagar	Mtech	4 Yrs	9662511781
		Prof. Hiren Patel	SVIT,Vasad	M.Tech.(ECS)	1 Yr	9974103810
		Prof. Mrugesh Shah	SVIT,Vasad	M.Tech.(ECS)	1 Yr	9913545636
		Prof Himanshu Patel	CIT,Changa	ME	2 Yrs	9409274477
		Prof. Dharmendra V. Chauhan	EC Dept, CITC, Changa.	ME(ECS)	3 Yrs	9909454907
		Prof.Amit Chokshi	EC dept,BVM,V.V.Nagar	ME(ECS)	1 Yr	9723786348
		Prof. Ronak R. Vashi	BVM, V. V. Nagar	ME(Comm)	5 Yrs	9426724335
		Prof.Vibha Patel	Hasmukh Goswami College of Engg.	ME(ECS)	2 Yrs	9428363924
		Prof. Chetna K. Shah	EC Dept., GCET, V. V. Nagar	ME(EC)	5 Yrs	9428656561
		Prof.V.C.Pandya	EC Dept., ADIT, V.V.Nagar.	ME(EC)	7 Yrs	9426341702
		Prof.Rahul D. Mehta	EC Dept., VVPEC, Rajkot.	ME(EC)	5 Yrs	9428412767
		Prof. Priyesh Gandhi	LCIT college, Mehsana	M. Tech(VLSI Design) Gold	9 yrs	9825440134
		Prof. Patel Prakash	L.D.R.P. engg.,Gandhinagar	ME	6.5Yrs	9429524427
		Prof.Hitendra D. Joshi	EC Dept.,ITM Univeristy,Vadodara	M.Tech.(ECS)	4 Yrs	9824146961
		Prof.Vrushank\ Shah	INDUS University, Ahmedabad	ME(CSE)	5 Yrs.	9898331701
3	Linear Electronics – I	Prof.Brijesh Shah	EC Dept, CITC, Changa.	ME(EC)	5 Yrs	9426508167
		Mr. Babu Tosif	UV patel,kherva	M.Tech.(ECS)	1 Yr	9033648355
		Prof.Pradeep Shah	EC Dept., GCET, V.V.Nagar	ME(EC)	6 Yrs	9825814124
		Prof.Rahul Mehta	EC Dept., VVPEC, Rajkot.	ME(EC)	5 Yrs	9428412767
		Prof. Dharmendra V. Chauhan	EC Dept, CITC, Changa.	ME(ECS)	3 Yrs	9909454907
		Prof. Ronak R. Vashi	BVM, V. V. Nagar	ME(Comm)	5 Yrs	9426724335
		Prof. Sagar Patel	CIT, Changa	Ph.D. (Pursuing)	5.5 Yrs	9427666162
		Prof.Ketan Patel	GEC,Chandkheda,Ahmedabad	ME(ECS)	4 Yrs	9228591609
3	Electronic Instrumentation	Prof.Rutvik Joshi	EC Dept., ADIT, V.V.Nagar.	ME(EC)	4 Yrs	9898988242
		Prof.Brijesh Shah	EC Dept, CITC, Changa.	ME(EC)	5 Yrs	9426508167
		Prof.J. K. Chauhan	EE Dept., BVM, V.V.Nagar.	BE (EC)	21 Yrs	9376834725
		Prof.S.D.Trapasiya	EC Dept., GCET, V.V.Nagar	ME(EC)	4 Yrs	9227108034
		Prof. Himanshu Patel	Nirma University, A'bad	M.Tech.(EC)	4 Yrs	9427855034
		Prof. Sagar Patel	CIT, Changa	Ph.D. (Pursuing)	5.5 Yrs	9427666162
		Prof.A. A. Daiya	EC Dept., BVM, V.V.Nagar.	BE (EC)	7 Yrs	9879804511
		Prof. Mehul Thakkar	ADIT, V.V.Nagar	ME	12 Yrs.	9033569124
		Prof.Shobhit Patel	EC Dept, CITC, Changa.	ME (EC)	3 Yrs	9427856562
		Prof.Nishant N. Parmar	EC. Dept.SVMIT.Bharuch.	BE(EC)	5 Yrs	9428037251
		Prof.Dharmendra Chauhan	EC Dept, CITC, Changa.	ME(Comp)	7 Yrs	9909464907
		Prof.Dhaval Patel	EC Dept.,Universal College, Ahmedabad	ME(EC)	8 Yrs.	9726579865
		Prof.Hiren Patel	BVM, Vallabh Vidyanagar	ME(EC)	7 Yrs	9228552500
		Prof.Hitendra Joshi	ITM University, Vadodara	ME(EC)	4 Yrs.	9824146961

Examiner List
Department of Electronics & Communication - List of External Examinners (B.Tech./M.Tech.)
December 2017

Sem.	Subject	Name of Examiner	Address	Qualification	Experience	Contact No.
3	Analog Electronics	Prof.Brijesh Shah	EC Dept, CITC, Changa.	ME(EC)	5 Yrs	9426508167
		Prof.Kaushika Patel	EC Dept., BVM, V.V.Nagar.	ME(EC)	6 Yrs	9428479191
		Prof.Pradeep Shah	EC Dept, GCET,V.V.Nagar.	ME(EC)	6 Yrs	9825814124
		Prof. Anand P. Mankodia	U. V. Patel College of Engineering Kherva, Ganpat University	Ph.D. (Pursuing)	10 Yrs	96380 96944
		Prof. Patel Prakash	L.D.R.P. engg.,Gandhinagar	ME	6.5Yrs	9429524427
		Prof.Geetali Shaha	EC Dept., GCET, V. V. Nagar	BE(EC)	4 Yrs.	9925538499
		Prof.Rahul Mehta	EC Dept, VVP Rajkot	ME(EC)	5 Yrs	9428412767
		Prof. Ronak R. Vashi	BVM, V. V. Nagar	ME(Comm)	5 Yrs	9426724335
		Dr. Rahul Kher	EC Dept., GCET, V.V.Nagar	MTech(EC)	11 Yrs	9825018315
		Prof. Mehul Thakkar	ADIT, V.V.Nagar	ME	12 Yrs	9033569124
		Prof. Dharmendra V. Chauhan	EC Dept, CITC, Changa.	ME(ECS)	3 Yrs	9909454907
		Prof.Ketan Patel	GEC,Chandkheda,Ahmedabad	ME(ECS)	4 Yrs	9228591609
		Prof.Rutavik Joshi	EC Dept., ADIT, V.V.Nagar.	ME(EC)	4 Yrs	9898988242
3	Digital Electronics(EC & IC)	Prof.Bhargav Goradiya	EC Dept, BVM, V. V. Nagar	ME(EC)	5 Yrs	9879182884
		Prof.Niti Joshi	EC Dept, CITC, Changa.	BE(EC)	5 Yrs	9879007203
		Prof.Hasmukh P. Koringa	GCET, Rajkot	ME(EC)	3 Yrs	9428037980
		Prof. Anand P. Mankodia	U. V. Patel College of Engineering Kherva, Ganpat University	Ph.D. (Pursuing)	10 Yrs	96380 96944
		Prof.Priyanka Patel	HJD Institute of technical edu. & rec.,Kera, Kutch	ME(ECS)	2 Yr	9909301211
		Prof.P.M.Shah	EC Dept, GCET,V.V.Nagar.	ME(EC)	6 Yrs	9825814124
		Prof.Shobhit Patel	EC Dept, CITC, Changa.	ME(EC)	3 Yrs	9824337948
		Prof.Geetali Shaha	EC Dept., GCET, V. V. Nagar	BE(EC)	4 Yrs	9925538499
		Prof. Sagar Patel	CIT, Changa	Ph.D. (Pursuing)	5.5 Yrs	9427666162
		Prof.Chintan Dave	GEC,Chandkheda,Ahmedabad	ME(ECS)	2 Yrs	9924237052
		Prof.Vyomal Pandya	SVNIT,Surat	ME(ECS)	1 Yr	9429181943
		Prof.Amit Chokshi	EC dept,BVM,V.V.Nagar	ME(ECS)	1 Yr	9723786348
		Prof Sumit Patel	SVIT, Vasad	M.Tech(ECS)	4 Yrs	9898961493
		Prof. Samir Joshi	EC Dept., UVPC, Ganpat University	ME	6 Years	9428853091
		Prof. Bhavik Prajapati	EC Dept. , SPIT, Piludra	ME	5 Years	9723706177
		Prof. Mitul Patel	EC Dept., Parul University	ME	5 Years	9974284715
		Prof. Mrugesh Shah	EC Dept. SVIT Vasad	ME	4 Years	9913545636
3	Digital Electronics(EC & IC)	Prof. Keyur Chauhan	ICCTW,Nr. V.V. Nagar	M.TECH.(EC)	1 Yr	9824999570
		Prof.Sanjay D.Joshi	Govt Engg College, Modasa	ME	10 Yrs	9428017505
		Prof. A. D. Dobariya	LCIT college, Mehsana	M. Tech Communication	7 Yrs	9687637271
		Prof. Dhaval Pipaliya	R.K.University, Rajkot	MTech	3 Yrs	8141639639
		Prof. Mikita Gandhi	ADIT, V.V.Nagar	ME(ECS)	7 Yrs	9924175300
		Prof.Vrushank Shah	INDUS University,Ahmedabad	ME(CSE)	5 1/2 Yrs	9898331721
		Prof. Suhas Patel	GIT Gandhinagar	ME(ECS)	3 Yrs	9909428845
		Prof.Parth Jani	EC dept., Nirma	M.Tech(VLSI)	1 Yr	8866110054
		Prof. Parul Pithadiya	LDCE, A'bad.	M.Tech. (CSR)	9 Yrs	9428187879
		Prof.Himanshu Patel	CITC, Changa	M. Tech Communication	6 Yrs.	9427855034
4	Electrical Machines & Power (EC/IC)	Prof.Mahesh Patel	EE Dept., CITC , Changa.	ME(EE)	3 Yrs	9924211201
		Prof. T.R.Shah	B-109, Agravat Tawors, Bhoyang Dev Society, Ahmedabad	ME(Electrical)	26 Yrs	079-27481508
		Prof.Chirag Vibhaker	EE Dept., VVPEC, Rajkot.	ME(EE)	9 Yrs	9898846377
		Prof.J.K.Chauhan	EC Dept., BVM, V.V.Nagar.	BE(EE)	21 Yrs	9376834725
		Prof.N.G.Mishra	EE Dept., BVM, V.V.Nagar.	ME(EE)	21 Yrs	9998284763
		Prof.Hemangini Panchal	GCET, V. V. Nagar	ME	3 Yrs	9879573060
		Prof.R. P. Mehta	BVM, V. V. Nagar	MTech	20 Yrs	9727720643
		Prof.Hardik Shah	ADIT, V.V.Nagar	ME	7 Yrs	9824394393
		Prof.A.M. Patel	BVM, V. V. Nagar	BE	8 Yrs	9898846387
		Prof.Dixit N. Pathak	GCET, V. V. Nagar	ME	5 Yrs	9427591673
		Prof.A.R.Patel	BVM, V. V. Nagar	ME	7 Yrs	9879296030
		Prof.K. M. Lokhandwala	EE Dept., Parul, Waghodia	ME(EE)	5 Yrs	9725945840
		Prof.Dipen Parikh	EC Dept.,BVM,V. V. Nagar	ME(EE)	23 Yrs	9377604508
		Prof.Pratik B. Panchal	EC Dept.CITC, Changa	M.Tech(EE)	4.5 Yrs.	9429773733
		Prof.Paresh R. Modha	EE Dept.,ADIT, Karamsad	M.E.(EE)	6 Yrs.	9998567827

Examiner List
Department of Electronics & Communication - List of External Examinners (B.Tech./M.Tech.)
December 2017

Sem.	Subject	Name of Examiner	Address	Qualification	Experience	Contact No.
4	Linear Electronics –II (EC/IC)	Prof.Pradeep Shah	EC Dept, GCET,V.V.Nagar.	ME(EC)	5 Yrs	9825814124
		Prof.Shriram V. D.	EC Dept., SVNIT, Surat	BE(EC)	4 Yrs	9879726578
		Prof.Rutavik Joshi	EC Dept., ADIT, V.V.Nagar.	ME(EC)	4 Yrs	9898988242
		Prof.Rutul Patel	EC Dept., ADIT, V.V.Nagar.	ME(EC)	4 Yrs	9879726579
		Prof. Sagar Patel	CIT, Changa	Ph.D. (Pursuing)	5.5 Yrs	9427666162
		Prof.Veena Patel	LDRP, Gandhinagar	ME(ECS)	1 Yr	9879726574
		Prof. Kamdar Dipesh	V.V.P. ,Rajkot	ME	6.5 Yrs	9925200852
		Prof. Mehul Thakkar	ADIT, V.V.Nagar	ME	12 Yrs.	9033569124
		Prof.Rahul Mehta	EC Dept., VVPEC, Rajkot.	ME(EC)	5 Yrs	9428412767
		Prof. Ronak R. Vashi	BVM, V. V. Nagar	ME(Comm)	5 Yrs	9426724335
		Prof. Patel Prakash	L.D.R.P. engg.,Gandhinagar	ME	6.5Yrs	9429524427
		Prof.Ketan Patel	GEC,Chandkheda,Ahmedabad	ME(ECS)	4 Yrs	9228591609
4	Communication System (IT)	Dr. J.M.Rathod	EC Dept., BVM, V.V.Nagar.	ME(EC)	11 Yrs	9428902849
		Prof.A.H.Lalluwadia	EC Dept., SVNIT, Surat	ME(EC)	21 Yrs	9879221651
		Prof.P.M.Shah	EC Dept, GCET,V.V.Nagar.	ME(EC)	5 Yrs	9825814124
		Prof. Dharmendra V. Chauhan	EC Dept, CITC, Changa.	ME(ECS)	3 Yrs	9909454907
		Prof.Arjun Bhambhania	EC Dept., BVM, V.V.Nagar.	BE(EC)	4 Yrs	9824627160
		Dr.Maulin Joshi	EC Dept., SCET, Surat	MTech(EC)	15 Yrs	9426855841
		Prof.T. B. Sheth	GEC, Chandkheda, Gandhinagar	ME(EC)	9 Yrs	9427814590
		Prof.Geetali Shaha	EC Dept., GCET, V. V. Nagar	BE(EC)	4 Yrs	9925538499
		Prof.Priyanka Patel	HJD Institute of technical edu. & rec.,Kera, Kutch	ME(ECS)	2 Yr	9909301211
		Prof.Vipul Dabhi	EC Dept., ADIT, V.V.Nagar.	ME(EC)	7 Yrs	9824798951
		Prof. Sagar Patel	EC Dept., CITC ,Changa	M.Tech	7 Yrs	9427666162
		Prof. Arpita Patel	EC Dept., CITC ,Changa	M.Tech	10 Yrs	9428661555
		Prof. Alpesh Dafda	VGEC, Gandhinagar	M.Tech	15 Yrs	9408481646
		Prof. Dhaval Patel	EC dept., Universal College,Ahmedabad	M.Tech	8 Yrs	9726579867
4	CMOS VLSI Design	Prof. D.R.Keraliya	GEC, Bhavnagar	ME	7 Yrs	9978476520
		Prof. Nilesh Patel	LCIT, Bhandup	M.Tech	10	9879381145
		Mr. K.R.Bhatt	S.V.I.T., Vasad.	M.Tech.	8 Yrs	9879182051
		Prof.N.B.Kanirkar	EC Dept.,SVNIT, Surat	BE(EC)	4 Yrs	9924729298
		Prof.Kehul A Shah	SPCE, Visnagar	MTech	11 Yrs	9228205337
		Prof.Vrushank Shah	INDUS University,Ahmedabad	ME(CSE)	3 yrs	9898331721
		Prof.Hetal G Bhatt	Sakalchand patel college of engg.,Visnagar	MTech	10 Yrs	9727264355
		Prof. Hardik Modi	CHARUSAT,Changa	ME(EC)	4 Yrs	9427083318
		Prof.H.C. Patel	Rtrd. Lecturer DDU, Nadiad	ME(EC)	16 Yrs	0268-2524582
		Prof. Sumit Patel	SVIT,Vasad	M.Tech.(ECS)	1 Yr	9898961493
		Mr.Pinal Patel	e-infochips, ASIC, Ahemedabad	ME(EC)	5 Yrs	9427856562
		Prof. Bhavesh Soni	Ganpat Uni., Mehsana	MTech	10 Yrs	940924477
		Prof. Seema Gosai	LDCE, Ahmedabad	M.tech (CSE)	5 Yrs	9712900851
		Prof. Pankaj Prajapati	LDCE, Ahmedabad	(VLSI design)	11 Yrs	9898018534
		Prof. Priyesh Gandhi	LCIT college, Mehsana	M. Tech(VLSI Design) Gold	9 yrs	9825440134
		Dr. Kiritkumar Bhatt	SVIT - VASAD	Ph.D	17 Yrs	9879182051
		Mr. Jigar Shukla	Saibridge	ME(EC)	8 Yrs	9825864415
		Prof. Rachana Jani	CHARUSAT,Changa	PhD Persuing	13 Yrs	9909612519
4	Electronics Measurement (IT)	Prof.J.K.Chauhan	EC Dept., BVM, V.V.Nagar.	BE(EC)	11 Yrs	9376834725
		Prof.S.D.Taapashiya	EC Dept, GCET,V.V.Nagar.	ME(EC)	4 Yrs	9227108034
		Prof.A.A.Daiya	EC Dept., BVM, V.V.Nagar.	BE(EC)	7 Yrs	9879804511
		Prof.Rutul Patel	EC Dept., ADIT, V.V.Nagar.	ME(EC)	3 Yrs	9924237051
		Mr. Pinal Patel	e-infochips, ASIC, Ahemedabad	ME(EC)	4 Yrs	9427856562
		Prof.Rutavik Joshi	EC Dept., ADIT, V.V.Nagar.	ME(EC)	4 Yrs	9898988242
		Prof.Shobhit Patel	EC Dept, CITC, Changa.	ME(EC)	3 Yrs	9427856562
		Prof.Dharmendra Chauhan	EC Dept.,CITC,Changa	ME(EC)	7 Yrs.	9909484907
		Prof. Sagar Patel	EC Dept.,CITC,Changa	M.Tech.(EC)	7 Yrs	9427666162
		Prof. Hiren Patel	BVM, V. V. Nagar	ME(EC)	4 Yrs.	9228582520
		Prof.Hitendra Joshi	ITM University, Vadodara	ME(EC)	4 Yrs.	9824146961
4	Object Oriented Programming	Prof.Keyur Bhrambhatt	IT Dept., BVM, V.V.Nagar.	BE(EC)	4 Yrs	9428900107
		Prof. Bimal Patel	CIT,Changa	ME continue	5 Yrs	9909428681
		Prof. Miral Patel	GEC,Rajkot	ME(ECS)	6 Yrs	9428888628
		Prof.Chintan Dave	GEC,Chandkheda,Ahmedabad	ME(ECS)	2 Yrs	9924237052
		Prof.Ankit Desai	CIT,Changa	BE(CE)	5 Yrs	9724563930
		Prof.Prem Sindhi	IT Dept,GCET, V. V. Nagar	BE(IT)	5 Yrs	9924216330
		Prof.Hetal chudasama	ICCTW,Nr. V.V. Nagar	ME(CE)	5 Yrs	02692-230880
		Prof.Nirav Bhatt	CIT,Changa	ME(CE)	3 Yrs	9428037980

Examinner List
Department of Electronics & Communication - List of External Examinners (B.Tech./M.Tech.)
December 2017

Sem.	Subject	Name of Examiner	Address	Qualification	Experience	Contact No.
5	Microcontroller & Applications	Prof.N. M. Patel	CE Dept., BVM, V.V.Nagar.	ME(EC)	13 Yrs	9428660842
		Prof. Hiren Patel	BVM, V. V. Nagar	ME(EC)	4 Yrs.	9228582520
		Dr. B. C. Dharmani	ITC Dept., DAIICT, Gandhinagar	BE(EC)	14 Yrs	9427859416
		Prof.Sanjay D. Joshi	Govt. Engg College,Patan	BE(EC)	5 Yrs	9428017505
		Prof.Ami V. Vora	EC Dept., NIT, Ahmedabad.	BE(EC)	5 Yrs	9825706087
		Prof.Bhargav Goradia	EC Dept, BVM, V. V. Nagar	BE(EC)	5 Yrs	9879182884
		Prof. Vishal S. Vora	Atmiya college,Rajkot	ME	6.3 Yrs	9428230975
		Prof.J.N.Patel	SVIT- Vasad	ME(EC)	11 Yrs	9825386666
		Prof.Priyanka Patel	HJD Institute of technical edu. & rec.,Kera, Kutch	ME(ECS)	2 Yr	9909301211
		Prof. Hiren Patel	BVM, V. V. Nagar	ME(EC)	3 Yrs	9228582520
		Prof.Pramod Modi	Faculty of Tech. M.S. University	M.Tech	15 Yrs	9898234397
		Prof. R.P.Sanghani	GEC,bhavnagar	ME(Electrical)	11 Yrs	9427666608
		Prof. Keyur Chauhan	ICCTW,Nr. V.V. Nagar	M.Tech.(ECS)	3 Yrs	9824999570
		Prof. Mitul Patel	EC Dept., Parul University	ME	5 Years	9974284715
		Prof. Dharita Patel,	BVM, V. V. Nagar	BE	5 Years	9925365442
		Prof. Devang Shah	R.K.University, Rajkot	M.Tech	13 Yrs	8141979556
		Prof. Dhaval Pipaliya	R.K.University, Rajkot	M.Tech	3 Yrs	8141639639
		Dr. Kiritkumar Bhatt	SVIT - VASAD	Ph.D	17 Yrs	9879182051
5	Electronic Communication	Prof.Arjun Bhambhania	EC Dept., BVM, V.V.Nagar.	BE(EC)	4 Yrs	9824627160
		Prof.Brijesh Shah	EC Dept, CITC, Changa.	ME(EC)	5 Yrs	9426508167
		Prof.Vipul Dabhi	EC Dept., ADIT, V.V.Nagar.	ME(EC)	7 Yrs	9824798951
		Prof. Sagar Patel	CIT, Changa	PhD (Pursuing)	5.5 Yrs	9427666162
		Prof. Krunal Patel	EC dept. Parul institute	M.Tech(ECS)	3 Yrs.	9662262460
		Prof. Mehul Thakkar	ADIT, V.V.Nagar	ME	12 Yrs.	9033569124
		Prof. Veena Patel	LDRP, Gandhinagar	ME(ECS)	3 Yrs.	9879726574
		Prof. Arpita Patel	EC Dept, CITC, Changa.	ME	8 years	9428661555
		Prof. Mitul Patel	EC dept. Parul institute	M.Tech(ECS)	3 Yrs	9974284715
		Prof.Himanshu Patel	U.V.Patel College of Engg., Kherva	ME (EC)	5 Yrs	9979057479
		Prof. Dharmendra V. Chauchan	EC Dept, CITC, Changa.	ME(ECS)	3 Yrs	9909454907
5	Electronic Communication	Prof. Madhusmita Sahoo	LDCE, Ahmedabad	M.tech (CSE)	10 Yrs	9277309816
		Prof. Shilpa Rana	LDCE, Ahmedabad	(ECS)	4 Yrs	9979535521
		Prof. Chandresh D. Parekha	Raksha Shakti University	M.E. (ECS) Ph.D.	12 Yrs	9099917403
		Prof.Vibha Patel	Hasmukh Goswami College of Engg.	ME(ECS)	1 Yr	9428363924
		Prof.Amit Chokshi	EC dept,BVM,V.V.Nagar	ME(ECS)	1 Yr	9723786348
		Prof.Gracy Shajan	Parul Insitute-Baroda	ME(EC)	16 Yrs	9825484736
		Prof.Mikita Gandhi	ADIT, V.V.Nagar	ME(EC)	5 Yrs.	
		Prof.Alpesh Dalda	VGEC,Chandkheda,Gandhinagar.	M.Tech.	15 Yrs.	9408481646
		Prof.S.K.Hadia	CITC, Changa	ME(EC)	10 Yrs.	9427062772
5	Electro Magnetic Fields	Prof.Anil Kshatriya	EC Dept., ADIT, V.V.Nagar.	ME(EC)	7 Yrs	9924242024
		Prof.P. C. Pandya	Narendra Park, Nadiad	ME(EC)	30 Yrs	2528998
		Prof. Jay M. Joshi	EC dept., SVMIT	PhD cont.	11 Yrs	9426123589
		Prof.Renuka J. Makwana	EC Dept,SVIT,Vasad	ME(EC)	11 Yrs.	9998980944
		Prof.Vihang H.Trivedi	EC Dept.,KJIT,Savli,Vadodara	ME(Elect)	3 Yrs.	9408104298
		Prof.Jalpa T.Shah	EC Dept.SVNIT,Bharuch	ME(EC)	7 Yrs.	9601768713
		Prof. Vishal Tank	CHARUSAT,Changa	BE(EC)	7 Yrs.	9712447066
		Prof.R.N.Patel	Saffroni Institute,	PhD cont.	12 Yrs.	9426123589
		Prof.Ronak R.Vashi	BVM,VVNagar	ME(Comm)	5 Yrs.	9426724335
		Prof.Falgun Thakkar	ECDept., GCET,VVNagar	Ph.D. Pursuiing	8 Yrs.	9904355301
		Prof.Chetan K. Shah	GCET,VVNagar.	ME(EC)	5 Yrs.	9428656561
		Prof.Niraj Tevar	EC Dept.Parul University,Vadodara	ME(EC)	5 Yrs.	9925220037
		Prof. Hitesh Desai	S.P. College of Engg.,Visnagar	M.Tech(EC)	13 Yrs.	9979623670
		Prof. Rutvij Joshi	EC Dept.ADIT, VVNagar	Ph.D.	7 Yrs.	9898988243
		Prof. Shailesh Khant	EC Dept.ADIT, VVNagar	M.Tech(EC)	12 Yrs.	9925090186
		Prof. Chetna K. Shah	EC Dept., GCET, V. V. Nagar	ME(EC)	5 Yrs	9428656561
		Prof. Khyati Kalawadia	Babariya Engg. College,Baroda	ME(EC)	10 Yrs	9879035838
5	Power Electronics	Dr. B. R. Parekh	Head, Electrical Dept. BVM, V. V. Nagar	Ph.D	24 Yrs	9879256663
		Prof. Saurabh Shah	EC Dept.,Babaria institute of technology, Baroda	ME(EC)	9 Yrs	9427540999
		Prof.Arjun Bhambania	EC Dept., BVM, V.V.Nagar.	BE(EC)	4 Yrs	9824627160
		Prof.H.C. Patel	Rtrd. Lecturer DDU, Nadiad	ME(EL)	16 Yrs	0268-2524582
		Prof.N.G.Mishra	EE Dept., BVM, V.V.Nagar.	ME(EE)	21 Yrs	9998284763
5	Power Electronics	Prof.Arvind Yadav	Parul Institute-Baroda	ME(EC)	6 Yrs	9426486371
		Prof.Pramod Modi	Faculty of Tech. M.S. University	M.Tech	15 Yrs	9898234397
		Prof. Ronak R. Vashi	BVM, V. V. Nagar	ME(Comm)	5 Yrs	9426724335
		Prof . Ashish Patel	BVM, V. V. Nagar	ME	14 Yrs	9879296030
		Prof.J. K.Chauhan	BVM, V. V. Nagar	ME(EC)	27 Yrs	9376834725
		Prof.K.M.Shah	ADIT, VVNagar	Ph.D. Pursuing	8 Yrs	9824346834
5	Communication Systems(IT)	Prof. Krunal Patel	EC dept. Parul institute	M.Tech(ECS)	2 Yrs	9662262460
		Prof. Mitul Patel	EC dept. Parul institute	M.Tech(ECS)	2 Yrs	9974284715
		Prof.A.H.Lalluwadia	EC Dept., SVNIT, Surat	ME(EC)	21 Yrs	9879221651
		Prof.P.M.Shah	EC Dept, GCET,V.V.Nagar.	ME(EC)	5 Yrs	(02692)247241
		Prof.Arjun Bhambhania	EC Dept., BVM, V.V.Nagar.	BE(EC)	4 Yrs	9824627160
		Prof. Dharmendra V. Chauchan	EC Dept, CITC, Changa.	ME(ECS)	3 Yrs	9909454907
		Prof. A. D. Dobariya	LCIT college, Mehsana	M. Tech Communication	7 Yrs	9687637271
		Prof.Geetali Shaha	EC Dept., GCET, V. V. Nagar	BE(EC)	4 Yrs	9925538499
		Dr. Maulin Joshi	EC Dept., SCET, Surat	M.Tech.(EC)	15 Yrs	9426855841
		Prof.Vipul Dabhi	EC Dept., ADIT, V.V.Nagar.	ME(EC)	7 Yrs	9824798951
		Prof. Sagar Patel	EC Dept.,CITC,Changa	M.Tech.(EC)	7 Yrs	9427666162
		Prof.Arpita Patel	EC Dept.,CITC,Changa	M.Tech.(EC)	10 Yrs	9428661555
		Prof.Alpesh Dalda	VGEC,Gandhinagar	M.Tech.(EC)	15 Yrs	9408481646
		Prof.Dhaval Patel	EC Dept.,Universal College, Ahmedabad	ME(EC)	8 Yrs.	9726579865
5	Project Management	Prof.J. J. Bhavsar	BVM, V. V. Nagar	ME(CL)	20 Yrs	9429033006
		Mr. Daxesh Shah	einfochips,Ahemdabad	BE(EC)	10 Yrs	9998606461
		Prof.Pranav Desai	CIT,Changa	MBA	3 Yrs	989876345
		Prof. H. C. Vakharia	BVM, V. V. Nagar	ME(CL)	22 Yrs	9426598529
		Prof.Devang Shah	ADIT,V.V.Nagar	MBA	4 Yrs	9824984583

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Sem.	Subject	Name of Examinner	Address	Qualification	Experience	Contact No.
		Prof.Darji Jitendra B.	Shri B.L.Parikh colege of BBA, opp. S.T.Workshop, college campus, palanpur	BE,MBA	3 Yrs	9374407943,02742-280755

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Sem.	Subject	Name of Examinner	Address	Qualification	Experience	Contact No.
		Prof. Keyur Chauhan	ICCTW,Nr. V.V. Nagar	M.Tech.(ECS)	3 Yrs	9824999570
6		Prof. Hiren Patel	BVM, V. V. Nagar	ME(EC)	4 Yrs	9228582520
		Prof.P.K.Shah	EC Dept, SVNIT,Surat	BE(EC)	7 Yrs	9429510861
		Prof.Ami V. Vora	EC Dept., NIT, Ahmedabad.	BE(EC)	7 Yrs	9825706087
		Prof.Anand D.Darji	EC Dept, SVNIT,Surat	MTech	11 Yrs	9426886446
		Dr. B. C. Dharmani	ITC Dept., DAIICT, Gandhinagar	BE(EC)	14 Yrs	9427859416
		Prof.Bhargav Goradia	EC Dept, BVM, V. V. Nagar	BE(EC)	5 Yrs	9879182884
		Prof. Sagar Patel	CIT, Changa	Ph.D. (Pursuing)	5.5 Yrs	9427666162
		Prof. Chaitali Bramhbhatt	LCIT, bhandu	ME(CSE)	1.5 Yrs	9016764216
	Advance Microprocessor	Prof. Anand P. Mankodia	U. V. Patel College of Engineering Kherva, Ganpat University	Ph.D. (Pursuing)	10 Yrs	96380 96944
		Prof.Jigar shah	EC. Dept. SVMIT, Bharuch	ME(EC)	10 Yrs	9427875130
		Prof.Sanjay D. Joshi	Govt. Engg College, Patan.	ME (EC)	3 Yrs	9428017505
		Prof. Miral Patel	GEC,Rajkot	ME(ECS)	6 Yrs	9428888628
		Prof. R.P.Sanghavi	GEC Bhavnagar	ME(Electrical)	10 Yrs	9427666608
		Prof. Vishal S. Vora	Atmiya college,Rajkot	ME	6.3 Yrs	9428230975
		Prof. Hiren Patel	SVIT,Vasad	M.Tech.(ECS)	1 Yr	9974103810
		Dr. Kiritkumar Bhatt	SVIT - VASAD	Ph.D	17 Yrs	9879182051
		Dr. Bhaskar Thakkar	GCET, V. V. Nagar	ME(EC)	10 Yrs	911899466
		Prof.Priyanka Patel	HJD Institute of technical edu. & rec.,Kera, Kutch	ME(ECS)	2 Yr	9909301211
		Dr. Rahul Kher	EC Dept., GCET, V.V.Nagar	MTech	11 Yrs	9825018315
		Prof. Kalpesh Shah	ADIT, V.V.Nagar	ME	6 Yrs	9824346834
		Prof. Dhaval Pipaliya	R.K.University, Rajkot	MTech	3 Yrs	8141639639
		Prof. Manisha Mayavanshi	Electrical Dept, M. S. University	ME	10 Yrs	9428691179
		Dr.Maulin Joshi	EC Dept., SCET, Surat	Ph.D.	15 Yrs	9426855841
		Prof. Dharmendra V. Chavakhar	EC Dept, CITC, Changa.	ME(ECS)	3 Yrs	9909454907
6	Communication Systems(EC)	Prof. Jayesh C. Prajapati	U.V.Patel College of Engg., Kherva	M.Tech	13.5 Yrs	9998270658
		Prof. A. D. Dobariya	LCIT college, Mehsana	M. Tech Communication	7 Yrs	9687637271
		Prof. Mikita Gandhi	ADIT, V.V.Nagar	ME(ECC)	7 Yrs.	9924175300
		Prof. Pradip Panchal	EC Dept., CITC, Changa.	ME(EC)	15 Years	9426556389
		Dr. Hiren Mewada	EC Dept, CITC, Changa.	Ph.D	10+ years	9725019975
		Prof. Arpita Patel	EC Dept, CITC, Changa.	ME	8 years	9428661555

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Sem.	Subject	Name of Examinner	Address	Qualification	Experience	Contact No.
6	Communication Systems(EC)	Prof. Vijayendra A Desai	EC Dept., CKPCET, Surat.	ME	10 Yrs	9408118010
		Prof. Vismay Yagnik	EC Dept., CKPCET, Surat.	ME	9 Yrs	7567263693
		Prof. Vyomal Pandya	EC Dept., CKPCET, Surat.	ME	7 Yrs.	9429181943
		Prof. Sagar Patel	CIT, Changa	Ph.D. (Pursuing)	5.5 Yrs	9427666162
		Prof.P.M.Shah	ICCTW,Nr. V.V. Nagar	ME(EC)	6 Yrs	(02692)247241
		Prof.Arjun Bhambhania	EC Dept., BVM, V.V.Nagar.	BE(EC)	4 Yrs	9824627160
		Prof.Jay Joshi	EC. Dept. SVMIT, Bharuch	ME(EC)	7 Yrs	9426123589
		Prof.Geetali Shaha	EC Dept., GCET, V. V. Nagar	BE(EC)	4 Yrs	9925538499
		Prof. Mikita Gandhi	ADIT, V.V.Nagar	ME(EC)	5 Yrs	9924175300
		Prof.Alpesh Dafda	VGEC,Chandkheda	M.Tech(EC)	15 Yrs/	9408481646
		Prof.S.K.Hadia	CIT, Changa	ME(EC)	10 Yrs/	9427062772
6	Antenna & Microwave	Prof. Vishal Tank	CHARUSAT,Changa	BE(EC)	7 Yrs.	9712447066
		Prof.Vipul Dabhi	EC Dept., ADIT, V.V.Nagar.	ME(EC)	7 Yrs	9824798951
		Prof.Anil Kshatriya	EC Dept., ADIT, V.V.Nagar.	ME(EC)	7 Yrs	9924242024
		Prof.Ila Parmar	Parul Institute- Baroda	ME(EC)	5 Yrs	9427590265
		Prof. Falgun Thakkar	EC Dept, GCET, V.V.Nagar.	Ph.D (Persuing)	7 Yrs	9904355301
		Prof.Shobhit Patel	EC Dept, CITC, Changa.	Ph.D (Persuing)	5 Yrs	9427856562
		Prof. Jayesh C. Prajapati	U.V.Patel College of Engg., Kherva	MTech(EC)	13.5 Yrs	9426534562
		Prof. R.N.Patel	Saffrony institute	MTech(EC)	9Yrs	9909468966
		Prof. Ronak R. Vashi	BVM, V. V. Nagar	M.E(Comm)	4 Yrs	9426724335
		Prof. Chetna K. Shah	EC Dept., GCET, V. V. Nagar	ME(EC)	5 Yrs	9428656561
		Prof. Renuka Makwana	EC Dept. SVIT Vasad	ME	7 Years	9998980944
		Prof. Niraj Tevar	EC Dept., Parul University	ME	5 Years	9925220037
		Prof.Hitendra Joshi	ITM University, Vadodara	ME(EC)	3 Yrs.	9824146961
		Prof.Shailesh Khant	EC Dept.,,ADIT,VVNagar	ME(EC)	8 Yrs	9898988242
		Prof. S. Kashyap	EC Dept. Marwadi ,Rajkot	ME(EC)	8 Yrs	9726673173
		Prof.Vivek Rana	EC Dept. Marwadi ,Rajkot	ME(EC)	5 Yrs	9601872917
		Prof.P.R.Prajapati	EC Dept.,,ADIT,VVNagar	ME(EC)		9429367045
		Prof.Rutvik Joshi	EC Dept., ADIT, V.V.Nagar.	ME(EC)	4 Yrs	9898988242
		Prof. Chetna K. Shah	EC Dept., GCET, V. V. Nagar	ME(EC)	5 Yrs	9428656561
		Prof. Khyati Kalawadia	Babariya Engg. College,Baroda	ME(EC)	10 Yrs	9879035838

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Sem.	Subject	Name of Examiner	Address	Qualification	Experience	Contact No.
6	Digital Signal Processing	Dr.Maulin Joshi	EC Dept., SCET, Surat	Ph.D.	9 Yrs	9426855841
		Dr.Ninad Bhatt	EC Dept., CKPCET, Surat.	ME(EC)	5 Yrs	9925047255
		Dr. Jaimin Bhalani	Babariya Engg. College,Baroda	ME(EC)	7 Yrs	9426352396
		Prof.Pramod Modi	Faculty of Tech. M.S. University	MTech	15 Yrs	9898234397
		Prof.Jigar shah	EC. Dept. SVMIT, Bharuch	ME(EC)	10 Yrs	9427875130
		Dr.B. C. Dharmani	ITC Dept., DAIICT, Gandhinagar	BE(EC)	14 Yrs	9427859416
		Prof. Kunal Acharya	LDCE, Ahmedabad	M.tech (CSE)	9 Yrs	8866882762
		Prof. Parul Pithadiya	LDCE, A'bad.	M.Tech.(CSR)	11 Yrs	9428187879
		Dr. Mehul Shah	GCET, V. V. Nagar	M.Tech.	14Yrs	9408033700
		Prof. Abhay Upadhyay	LDCE, Ahmedabad	M.tech (CSE)	10 Yrs	9824047727
		Prof. R.N.Patel	Saffrony institute		9Yrs	9909468966
		Prof. Priyesh Gandhi	LCIT college, Mehsana	M. Tech(VLSI Design) Gold	9 yrs	9825440134
		Prof. Pradip Panchal	EC Dept., CITC, Changa.	ME(EC)	15 Years	9426556389
		Dr. Hiren Mewada	EC Dept, CITC, Changa.	Ph.D	10+ years	9725019975
		Prof. Vijayendra A Desai	EC Dept., CKPCET, Surat.	ME	10 Yrs	9408118010
		Prof. Vismay Yagnik	EC Dept., CKPCET, Surat.	ME	9 Yrs	7567263693
		Prof.Jay Joshi	EC. Dept. SVMIT, Bharuch	ME(EC)	7 Yrs	9426123589
		Prof Amit Choksi	BVM, V. V. Nagar	ME	5 Yrs	9427487829
		Prof. S M Patel	SVIT - VASAD	ME(ECS)	8 Yrs	9979113911
		Prof. Vishal Tank	CHARUSAT,Changa	BE(EC)	7 Yrs.	9712447066
		Prof.Sargam D Parmar	U.V.Patel, Ganpat University	M.Tech	11 Yrs	9228199594
6	CMOS VLSI Design	Prof. D.R.Keraliya	GEC, Bhavnagar	ME	7 Yrs	9978476520
		Prof. Nilesh Patel	LCIT, Bhandu	M.Tech	10	9879381145
		Mr. K.R.Bhatt	S.V.I.T., Vasad.	M.Tech.	8 Yrs	9879182051
		Prof.N.B.Kanirkar	EC Dept.,SVNIT, Surat	BE(EC)	4 Yrs	9924729298
		Prof.Kehul A Shah	SPCE, Visnagar	MTech	11 Yrs	9228205337
		Prof.Vrushank Shah	INDUS University,Ahmedabad	ME(CSE)	3 yrs	9898331721
		Prof.Hetal G Bhatt	Sakalchand patel college of engg.,Visnagar	MTech	10 Yrs	9727264355
		Prof. Hardik Modi	CHARUSAT,Changa	ME(EC)	4 Yrs	9427083318
		Prof.H.C. Patel	Rtrd. Lecturer DDU, Nadiad	ME(EC)	16 Yrs	0268-2524582

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Sem.	Subject	Name of Examinner	Address	Qualification	Experience	Contact No.
6	CMOS VLSI Design	Prof. Sumit Patel	SVIT,Vasad	M.Tech.(ECS)	1 Yr	9898961493
		Mr.Pinal Patel	e-infochips, ASIC, Ahemedabad	ME(EC)	5 Yrs	9427856562
		Prof. Bhavesh Soni	Ganpat Uni., Mehsana	MTech	10 Yrs	940924477
		Prof. Seema Gosai	LDCE, Ahmedabad	M.tech (CSE)	5 Yrs	9712900851
		Prof. Pankaj Prajapati	LDCE, Ahmedabad	(VLSI design)	11 Yrs	9898018534
		Prof. Priyesh Gandhi	LCIT college, Mehsana	M. Tech(VLSI Design) Gold	9 yrs	9825440134
		Dr. Kiritkumar Bhatt	SVIT - VASAD	Ph.D	17 Yrs	9879182051
		Mr. Jigar Shukla	Saibridge	ME(EC)	8 Yrs	9825864415
		Prof. Rachana Jani	CHARUSAT,Changa	PhD Persuing	13 Yrs	9909612519
7	Data & Computer Comm.	Dr.Hemal shah	U.V.Patel college, Kherva.	ME(EC)	11 Yrs	9427711969
		Prof.Kinnar Vaghela	Govt. Engg. College, Modasa.	BE (EC)	11 Yrs	9924343433
		Prof.Minesh Thakar	Indus University,Ahmedabad	ME(EC)	11Yrs	9909039918
		Prof. Patel Prakash	L.D.R.P. engg.,Gandhinagar	ME	6.5Yrs	9429524427
		Ms.Bijal Simaria	e-infochips, Ahmedabad	BE(EC)	5 Yrs	9426754025
		Mr.Pinal Patel	e-infochips, ASIC, Ahemedabad	ME(EC)	5 Yrs	9427856562
		Prof.Khushali Shah	ADIT,V.V.Nagar	ME(ECS)	5 Yrs	9033281416
		Prof. Miral Patel	GEC,Rajkot	ME(ECS)	6 Yrs	9428888628
		Prof.Spruha Lad	EC Dept.,CITC,Changa	ME(EC)	2 Yrs	9924839364
		Prof. Ketan Tandel	SVIT,Vasad	M.Tech.(ECS)	1 Yr	9427866585
		Prof. Hansha Shingrakhia	Indus, Ahmedabad	ME(CSE)	2.5 Yrs	9327804414
		Prof.Vyomal Pandya	SVNIT,Surat	ME(EC)	1 Yr	9429181943
		Prof. Arjav Bavarava	R.K.University, Rajkot	ME(EC)	3 Yrs	8980724363
		Prof.Sagar Patel	Dr. Jivaraj Mehta,ANAND	ME(EC)	2 Yrs	9879334956
		Prof. Manisha Mayavanshi	Electrical Dept, M. S. University	ME	10 Yrs	9428691179

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Sem.	Subject	Name of Examinner	Address	Qualification	Experience	Contact No.
	Embedded Systems	Dr.B. C. Dharmani	ITC Dept., DAIICT, Gandhinagar	BE(EC)	14 Yrs	9427859416
7		Prof. A.C.Rathod	GEC, Bhavnagar	Mtech	4 Yrs	9662511781
		Mr.Prashant Patel	e Infochips	BE(EC)	7 Yrs	9427083522
		Prof.Chintan Dave	GEC,Chandkheda,Ahmedabad	M.E.(EC)	2 Yrs	9924237052
		Prof. Anand P. Mankodia	U. V. Patel College of Engineering Kherva, Ganpat University. Mehsana. Gujarat	Ph.D. (Pursuing)	10 Yrs	96380 96944
		Mr. Jigar Shukla	Sibridge	ME(EC)	11 Yrs	9825864415
		Prof. Kamdar Dipesh	V.V.P. ,Rajkot	ME	6.5 Yrs	9925200852
		Prof. Vishal S. Vora	Atmiya college,Rajkot	ME	6.3 Yrs	9428230975
		Prof.Bhargav Goradia	E&T Dept, BVM, V. V. Nagar	BE(EC)	5 Yrs	9879182884
		Mr. Ashok Vaghela	Head,Embitech,Anand nagar rd.	BE(EC)	8 Yrs	9909535303
		Prof Himanshu Patel	CIT,Changa	ME	6 Yrs.	9409274477
		Prof. Rahul Mehta	EC Dept., CKPCET, Surat.	ME	10 Yrs	9898436398
		Prof. Keyur Chauhan	ICCTW,Nr. V.V. Nagar	M.Tech.(ECS)	3 Yrs	9824999570
		Prof. Dhaval Pipaliya	R.K.University, Rajkot	MTech	3 Yrs	8141639639
		Prof. Seema Gosai	LDCE, Ahmedabad	M.tech (CSE)	5 Yrs	9712900851
		Dr. Kiritkumar Bhatt	SVIT - VASAD	Ph.D	17 Yrs	9879182051
		Prof. Hiren Patel	BVM, V. V. Nagar	ME(EC)	3 Yrs	9228582520
		Prof.Ketan Patel	GEC,Chandkheda,Ahmedabad	ME(EC)	4 Yrs	9228591609
		Prof. P.J. Engineer	SVNIT,Surat	Ph.D.(continue)	10 Yrs	9426148051
		Prof.Hitesh Shah	GCET, V. V. Nagar	MTech	11 Yrs	9601265236
		Prof. Hiren Patel	SVIT,Vasad	MTech	3 Yrs	9974103810
7	Coding Theory & Compression Techniques					
		Dr.Maulin Joshi	EC Dept., SCET, Surat	Ph.D.	9 Yrs	9426855841
		Dr.Rahul kher	EC Dept.,GCET, V.V.Nagar	MTech	11 Yrs	9825018315
		Prof. Mikita Gandhi	ADIT, V.V.Nagar	ME(ECC)	7 Yrs.	9924175300
		Prof. Pradip Panchal	EC Dept., CITC, Changa.	ME(EC)	15 Years	9426556389
		Dr. Hiren Mewada	EC Dept, CITC, Changa.	Ph.D	10+ years	9725019975
		Prof. Kunal Acharya	LDCE, Ahmedabad	M.tech (CSE)	9 Yrs	8866882762
		Prof.Bhavik Prajapati	EC Dept.,SPIT, Pilandra	ME(EC)	4 Yrs	9723706177

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7	Coding Theory & Compression Techniques	Prof.Amit Choksi	EC Dept.BVM College,VVNagar	ME(EC)	6 Yrs	9723786345
		Prof.Bhumika Leuva	EC Dept/.HGLE Wahelal,Ahmedabad	ME(EC)	6 Yrs	9725045354
		Prof.Alpesh Dalda	VGEC,Chandkheda,Gandhinagar.	M.Tech.	15 Yrs.	9408481646
		Prof.Arjun Bhambhania	EC Dept., BVM, V.V.Nagar.	BE(EC)	4 Yrs	9824627160
		Prof.S.D.Trapasiya	EC Dept., GCET, V.V.Nagar	ME(EC)	4 Yrs	9227108034
		Prof. Sagar Patel	EC Dept, CITC, Changa.	Ph.D. (Pursuing)	7 Yrs	9427856562
7	Image Processing	Prof.Sanjay D. Joshi	Govt. Engg. College, Patan	ME (EC)	3 Yrs	9428017505
		Prof.Amit Chokshi	EC dept,BVM,V.V.Nagar	ME(ECS)	3 Yr	9723786348
		Prof. Anand P. Mankodia	U. V. Patel College of Engineering Kherva, Ganpat University	Ph.D. (Pursuing)	10 Yrs	96380 96944
		Prof. Kunal Acharya	LDCE, Ahmedabad	M.tech (CSE)	9 Yrs	8866882762
		Prof. Devang Shah	R.K.University, Rajkot	MTech	13 Yrs	8141979556
		Prof. Nirav Desai	GCET, V. V. Nagar	ME	11 Yrs	9427487829
		Prof. A. D. Dobariya	LCIT college, Mehsana	M. Tech Communication	7 Yrs	9687637271
		Prof. Hitesh Vandra	Engg college, Botad	Ph.D	10Yrs	9898245634
		Prof.Sargam D Parmar	U.V.Patel, Ganpat University	MTech	13 Yrs	9228199594
		Prof. Kamdar Dipesh	V.V.P. ,Rajkot	ME	6.5 Yrs	9925200852
		Dr. Rahul Kher	EC Dept., GCET, V.V.Nagar	MTech	11 Yrs	9825018315
		Prof.Jignesh Bhatt	IIIT, Vadodara	Ph.D.	10Yrs	9409288312
		Prof.Purvi Koringa	DAIICT, Gandhinagar	MTech	2 Yrs.	8866236762

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	Wireless Communication	Prof. A.K.Sarvaiya	GEC, Bhavnagar	ME	3 Yrs	9978476520
7		Prof. A.C.Rathod	GEC, Bhavnagar	Mtech	4 Yrs	9662511781
		Prof.Himanshu Patel	U.V.Patel College, Kherva.	ME(EC)	6 Yrs	9979057479
		Prof. Sagar Patel	EC Dept, CITC, Changa.	Ph.D. (Pursuing)	5.5 Yrs	9427666162
		Prof.Kinjal Mehta	EC Dept., GCET, V.V.Nagar.	ME(EC)	2 Yrs	9428131070
		Prof.Vipul Dabhi	EC Dept., ADIT, V.V.Nagar.	ME(EC)	7 Yrs	9824798951
		Prof. Arpita Patel	EC Dept, CITC, Changa.	ME	8 years	9428661555
		Prof. Patel Prakash	L.D.R.P. engg.,Gandhinagar	ME	6.5Yrs	9429524427
		Prof. K.B.Sheth	EC dept., IPCOvala college Dharmaj	ME(ECS)	10 Yrs	99982805674
		Prof.V.K Patel	U.V.Patel college, Kherva.	MTech	10 Yrs	9979928955
		Mr. Hardik Acharya	Ericson India Pvt. Ltd.	BE	8 Yrs	9099034001
		Prof. Arjav Bavarava	R.K.University, Rajkot	ME(EC)	3 Yrs	8980724363
		Prof. Vijayendra A Desai	EC Dept., CKPCET, Surat.	ME	10 Yrs	9408118010
		Prof.Brijesh Shah	EC Dept, CITC, Changa.	ME(EC)	5 Yrs	9426508167
		Prof. Chandresh D. Parekha	Raksha Shakti University	M.E. (ECS) Ph.D	12 Yrs	9099917403
		Prof. S M Patel	SVIT - VASAD	ME(ECS)	8 Yrs	9979113911
		Prof. Chetna K. Shah	EC Dept., GCET, V. V. Nagar	ME(EC)	5 Yrs	9428656561
		Prof. Khyati Kalawadia	Babariya Engg. College,Baroda	ME(EC)	10 Yrs	9879035838
		Prof.Chandresh Parekh	L.D.College of Engg. ,Ahmedabad.	ME(EC)	11Yrs	9428277558
		Prof. R.N.Patel	Saffrony institute	Mtech.	9 Yrs.	9909468966
		Prof.S.K.Hadia	CIT, Changa	ME(EC)	10 Yrs/	9427062772
		Prof. Sagar Patel	EC Dept, CITC, Changa.	Ph.D. (Pursuing)	7 Yrs	9427856562
8	Industrial Training/ Project	Dr. V.N Kamat	Baroda Electric Meter, V.V.Nagar	Ph.D	21 Yrs	9824074054
		Mr. Hardik Acharya	Ericson India Pvt. Ltd.	BE	8 Yrs	9099034001
		Mr. Nitin Paranjpe	Edutech Systems, Baroda	BE(EC)	18 Yrs	9327226583
		Prof.H.C. Patel	Rtrd. Lecturer DDU, Nadiad	ME(EL)	16 Yrs	0268-2524582
		Dr. Hitesh Shah	GCET, V. V. Nagar	Ph.D	13Yrs	9601265236
		Prof.Amit Chokshi	EC dept,BVM,V.V.Nagar	ME(ECS)	5 Yr	9723786348
		Dr. Rahul Kher	EC Dept., GCET, V.V.Nagar	MTech(EC)	11 Yrs	9825018315

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8	Industrial Training/ Project	Mr. Chintan Jani	Idea Cellular Ltd, Gujarat	B.E. M.B.A.	9 Yrs.	9824204361
		Prof.N.M.Patel	GCET	ME(EC)	15 Yrs	2692234870
		Mr.Ketan Vaghela	SLS,V.V.Nagar	BE(EC)	10 Yrs	9925108828
		Ms. Ekta Mehul	einfochips,Ahemdabad	ME(CS)	10 Yrs	9824347721
		Dr. J.M.Rathod	EC Dept., BVM, V.V.Nagar.	ME(EC)	11 Yrs	9428902849
		Dr. Jaimin Bhalani	Babariya Engg. College,Baroda	ME(EC)	8 Yrs	9426352396
		Prof.Vipul Dabhi	EC Dept., ADIT, V.V.Nagar.	ME(EC)	7 Yrs	9824798951
		Prof.Chandresh Parekh	L.D.College of Engg., Ahmedabad.	MTech	11 Yrs	9428277558
		Prof.Mayur Vegad	CE Dept, BVM, V.V.Nagar.	MTech	9 Yrs	9376155526
		Dr.Bhaskar Thakkar	GCET, V. V. Nagar	ME(EC)	10 Yrs	9574383265
		Prof.Kinnar Vaghela	Govt. Engg. College, Modasa.	BE (EC)	11 Yrs	9924343433
		Prof.Kunal Archarya	LDCE, A'bad.	MTech	12 Yrs	9925965718
		Prof.V.K.Patel	UVPC,Head, EC , Mehasana	ME(EC)	12 Yrs	9979928955
		Prof.R.B.Patel	U.V.Patel, Ganpat University	M.Tech	8 Yrs	9909716318
		Prof.Sanjay D. Joshi	Govt. Engg. College, Patan	ME (EC)	3 Yrs	9428017505
		Dr.Maulin Joshi	EC Dept., SCET, Surat	Ph.D	15 Yrs	9426855841
		Mr. Rahul Sharma	DECU, ISRO, Ahmedabad	M.E.	10 Yrs	9427701708
		Mr. Krunal Patel	SLS, Anand	B.E.	7 Yrs	9898513669
		Mr.Bhavit Vadhadia	Vodafone	ME(EC)	6 Yrs	9879900953
		Prof.Jignesh N.Patel	SVIT,Vasad	ME(EC)	10 Yrs	9825386666
		Mr. Amar Kansagara	IDEA Cellular ltd.	BE	9 Yrs	9824204388
		Prof.Mary Grace	Prual Institute of Technology	ME(EC)	20 Yrs	9825484736
		Ms. Smriti Mistry	e-infochips	BE(EC)	6 Yrs	9427154708
		Mr. Samir Shroff	Saibridge	BE(EC)	18 Yrs	9909912568
		Mr. Jigar Shukla	Saibridge	ME(EC)	8 Yrs	9825864415
		Mr. Nirav Shah	IDEA	BE(EC)	5 Yrs	9702003329
		Mr. Hitesh Dhare	IDEA	BE(EC)	8 Yrs	9824004308
		Mr. Yagnesh Trivedi	IDEA	BE(EC)	8 Yrs	9824209339
		Mr.Dhruvesh Patel	director,sibridge	BE(EC)	10 Yrs	9825737572
		Mr. Mitesh Patel	Jekson Vision, Ahmedabad	ME(ECS)	5 Yrs	9727718519
		Mr. Niraj Patel	eInfochip, Ahmedabad	BE(EC)	10 Yrs	9825919242
		Mr. Vasoya Jignesh	Cimcon Lighting, Ahmedabad	M.Tech.(ECS)	3 Yrs	9978929522

Examiner List
Department of Electronics & Communication - List of External Examinners (B.Tech./M.Tech.)
December 2017

Sem.	Subject	Name of Examiner	Address	Qualification	Experience	Contact No.
8	Industrial Training/ Project	Mr. Ashok Vaghela	Head, Emoitech, Aanand nagar road , Ahmedabad	BE(EC)	8 Yrs	9909535303
		Mr. Kalpesh Nakum	Teleasia,Ahmedabad	BE(EC)	7 Yrs	9898036061
		Dr.B. C. Dharmani	ITC Dept., DAIICT, Gandhinagar	BE(EC)	14 Yrs	9427859416
		Mr. Mitesh Patel	Viztek Tech, A'bad	M.Tech. (ECS)	4 Yrs	9727718519
		Mr. Amit Saparia	Nokia Siemence, Ahmedabad	BE(EC)	7 Yrs	9925238060
		Hardik Jotani	Nokia Siemence, Ahmedabad	BE(EC)	10 Yrs	9825000131
		Ms. Bijal Simaria	e-infochips, Ahmedabad	BE(EC)	5 Yrs	9426754025
		Dr. Y.B.Shukla	EC dept., SVIT, Vasad	PhD	11 Yrs	9825510034
		Prof.Bhargav Goradia	EC Dept, BVM, V. V. Nagar	BE(EC)	5 Yrs	9879182884
		Mr. Nilesh Ranpura	e-infochips, Ahmedabad	BE(EC)	11 Yrs	9879261139
		Dr. Ninad Bhatt	EC Dept., CKPCET, Surat.	ME(EC)	7 Yrs	9925047255
		Dr. Mehul Shah	ET Dept.,BVM,VVNagar	Ph.D.	16 Yrs	9408033700
		Dr. K.R. Bhatt	S.V.I.T., Vasad.	M.Tech.	8 Yrs	9879182051
		Prof.Pramod Modi	Faculty of Tech. M.S. University	M.Tech	15 Yrs	9898234397
		Mr. Sandip Bhadani	AARASTU SYSTEMS	BE(EC)	5 Yrs	9998264504
		Mr. Divyeshkumar Sinojiya A.	SIBRIDGE	BE(EC)	5 Yrs	9426124791
		Mr. Parth Shah	SIBRIDGE	BE(EC)	4 Yrs	9427034899
		Mr. Nitya Kothari	KHS	BE(EC)	4 Yrs	9638995253
		Mr. Kewal Aagola	VOLANSYS	BE(EC)	4 Yrs	8980044877
		Mr. Chirag Sharma	SLS	BE(EC)	4 Yrs	9408599194
		Mr. Chintan Jobanputra	e-Infochips	BE(EC)	3 Yrs	9662288558
		Ms. Shweta Ratapara	SIBRIDGE	BE(EC)	3 Yrs	9173601860
		Mr. Rushin Patel V.	e-Infochips	BE(EC)	2 Yrs	9558753647
		Mr. Sandip Bhadani	AARASTU SYSTEMS	BE(EC)	5 Yrs	9998264504
		Mr. Divyeshkumar Sinojiya A.	SIBRIDGE	BE(EC)	5 Yrs	9426124791
		Mr. Parth Shah	SIBRIDGE	BE(EC)	4 Yrs	9427034899
		Mr. Nitya Kothari	KHS	BE(EC)	4 Yrs	9638995253
		Mr. Kewal Aagola	VOLANSYS	BE(EC)	4 Yrs	8980044877
		Mr. Chirag Sharma	SLS	BE(EC)	4 Yrs	9408599194
		Mr. Chintan Jobanputra	e-Infochips	BE(EC)	3 Yrs	9662288558
		Ms. Shweta Ratapara	SIBRIDGE	BE(EC)	3 Yrs	9173601860
		Mr. Rushin Patel V.	e-Infochips	BE(EC)	2 Yrs	9558753647
		Dr.Ninad Bhatt	EC Dept., CKPCET, Surat.	ME(EC)	7 Yrs	9925047255

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Sem.	Subject	Name of Examinner	Address	Qualification	Experience	Contact No.
1	Advance Digital Signal Processing	Dr. Jaimin Bhalani	Babariya Engg. College,Baroda	ME (EC)	7 Yrs	9426352396
		Prof. Parul Pithadiya	LDCE, A'bad.	M.Tech.(CSE)	9 Yrs	9428187879
		Prof. Abhay Upadhyay	LDCE, Ahmedabad	M.Tech.(CSE)	10 Yrs	9824047727
		Dr. Hiren Mewada	EC Dept, CITC, Changa.	Ph.D	10+ years	9725019975
		Prof. Kunal Acharya	LDCE, Ahmedabad	M.Tech.(CSE)	9 Yrs	8866882762
		Dr. Mehul Shah	GCET, V. V. Nagar	M.Tech.	14Yrs	9408033700
		Prof. Kishor Rupala	EC dept., SVNIT	Tech(phd pursuir	5	9998969067
		Prof.Chandresh Parekh	L.D.College of Engg. ,Ahmedabad.	M Tech	11 Yrs	9428277558
		Dr.B. C. Dharmani	ITC Dept., DAIICT, Gandhinagar	BE(EC)	14 Yrs	9427859416
		Prof.Sanjay D. Joshi	Govt. engg. College, Patan	ME (EC)	10 Yrs	9428017505

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Sem.	Subject	Name of Examinner	Address	Qualification	Experience	Contact No.
1	Image Processing	Prof. Kunal Acharya	LDCE, Ahmedabad	M.tech (CSE)	9 Yrs	8866882762
		Prof. Hitesh Vandra	Engg college, Botad	Ph.D	10Yrs	9898245634
		Prof.Sargam D Parmar	U.V.Patel, Ganpat University	MTech	13 Yrs	9228199594
		Prof.N. M. Patel	BVM, V. V. Nagar	ME(EC)	18 Yrs	02692 234870
		Dr. Rahul Kher	EC Dept., GCET, V.V.Nagar	MTech	11 Yrs	9825018315
		Prof. Anand P. Mankodia	U. V. Patel College of Engineering Kherva, Ganpat University	Ph.D. (Pursuing)	10 Yrs	96380 96944
		Prof.Jignesh Bhatt	IIIT, Vadodara	Ph.D.	10Yrs	9409288312
1	Wireless Communication Technology	Prof. Vrushank Shah	INDUS University,Ahmedabad	ME(CSE)	3 yrs	9898331721
		Prof.Khushali Shah	ADIT,V.V.Nagar	ME(ECS)	5 Yrs	9033281416
		Dr. .Ninad Bhatt	EC Dept., CKPCET, Surat.	ME(EC)	14 Yrs	9925047255
		Mr. Brijesh Shah	Relience Communication	Mtech	17 Yrs	9987084263
		Prof.Hasmukh P. Koringa	GCET, Rajkot	ME(EC)	3 Yrs	9428037980
		Prof. Jignesh Patel	SVIT,Vasad	ME(EC)	15 Yrs.	9825386666
		Prof. Khyati Zalawadiya	EC dept. Babariya Institute of Technology	ME(EC)	10 Yrs.	9879035838
		Prof.Alpesh Dafara	VGEC,Chandkheda,Gandhinagar.	M.Tech.	15 Yrs.	9408481646
		Prof. Pradip Panchal	EC Dept., CITC, Changa.	ME(EC)	15 Years	9426556389
		Dr. Rahul Kher	EC Dept., GCET, V.V.Nagar	Ph.D.	11 Yrs	9825018315
		Dr. Mehul Shah	ET Dept.,BVM,VVNagar	Ph.D.	16 Yrs	9408033700
		Prof.Samir Trapasiya	EC Dept., GCET, V.V.Nagar.	ME(EC)	3 Yrs	9879388712
		Dr. J.M.Rathod	EC Dept., BVM, V.V.Nagar.	Ph.D.	18 Yrs	9428902849
		Prof.S.K.Hadia	CITC, Changa	ME(EC)	10 Yrs.	9427062772
		Prof. Khyati Kalawadia	Babariya Engg. College,Baroda	ME(EC)	10 Yrs	9879035838
		Prof. Manisha Mayavanshi	Electrical Dept, M. S. University	ME	10 Yrs	9428691179

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Sem.	Subject	Name of Examinner	Address	Qualification	Experience	Contact No.
		Prof. Ankit Thakkar	Nirma University, A'bad	Ph.D. persuing	5 Yrs	02717-241911(526)
1	Internetworking	Prof.Hemal Shah	EC Dept.,U.V.Patel, Rajkot	ME(EC)	11 Yrs	9427711969
		Prof. Miral Patel	GEC,Rajkot	ME(ECS)	6 Yrs	9428888628
		Prof.Tejas Vasavada	ADIT,V.V.Nagar	MTech	5 Yrs	9426783925
		Prof.Kinnar Vaghela	Govt. Engg. College, Modasa.	BE (EC)	11 Yrs	9924343433
		Prof.Minesh Thakar	EC Dept.,CITC,Changa	ME(EC)	11Yrs	9909039918
		Prof.Khushali Shah	ADIT,V.V.Nagar	ME(ECS)	5 Yrs	9033281416
		Prof. Hansha Shingrakhia	Indus, Ahmedabad	ME(CSE)	2.5 Yrs	9327804414
		Mr. Vishesh Agraval	SAC,ISRO , Ahmedabad	ME(EC)	8 Yrs	079-26915278
		Mr. Mohan Sarkar	SAC,ISRO , Ahmedabad	PhD	10 Yrs	7926912404
		Prof.Ketan Tandel	SVIT,Vasad	ME(EC)	3 Yrs	9427866585
		Prof.Kaushika Patel	BVM, VVNagar	Ph.D. persuing	10 Yrs	9428479191
1	Probability Theory & Random Processes	Kishor Rupala	EC dept., SVNIT	Tech(phd pursuir	5 Yrs	9998969067
		Prof. Brijesh Shah	CITC, Changa	MTech	10+ Yrs	9426588167
		Mr. Brijesh Shah	Relience Communication	Mtech	17 Yrs	9987084263
		Prof.Chandresh Parekh	L.D.Engg. college,Ahmedabad.	ME(EC)	11 Yrs	9428277558
		Dr. B. C. Dharmani	ITC Dept., DAIICT, Gandhinagar	BE(EC)	14 Yrs	9427859416
		Dr.Maulin Joshi	EC Dept., SCET, Surat	Ph.D.	15 Yrs	9426855841
		Dr. Mehul Shah	GCET, V. V. Nagar	M.Tech.	14 Yrs	9408033700
		Prof. Sagar Patel	CITC, Changa	Ph.D. (Pursuing)	5.5 Yrs	9427666162
		Dr.Rahul Kher	EC Dept., GCET, V.V.Nagar	MTech(EC)	11 Yrs	9825018315
2	Fiber Optic Communication & Sensor Systems	Dr. Dhaval Pujara	EC dept, NIT,Ahmedabad	Ph.D	10 Yrs	9925965718
		Prof.Chandresh Parekh	L.D.Engg. college,Ahmedabad.	ME(EC)	11 Yrs	9428277558
		Mr. M.C.Koladia	SAC, ISRO, Ahmedabad	ME(EC)	9 Yrs	26862829
		Prof.R. B. Patel	U.V.Patel, Ganpat University	MTech	8 Yrs	9909716318
		Prof.Jay Joshi	EC. Dept. SVMIT, Bharuch	ME(EC)	7 Yrs	9426123589
		Prof. J.N.Patel	SVIT,Vasad	ME(EC)	10 Yrs	9825386666
		Prof.Kishore Moradia	Govt. Engg College, Modasa.	ME(EC)	11 Yrs	9426944500
		Prof. Jayesh C. Prajapati	U.V.Patel College of Engg., Kherva	M.Tech.	13.5 Yrs	9998270658
		Prof. Kunal Acharya	LDCE, Ahmedabad	M.tech (CSE)	9 Yrs	8866882762
		Prof. Chetan Chauhan	SVIT,Vasad	M.Tech. (ECS)	5 Yrs.	8866100217

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Sem.	Subject	Name of Examiner	Address	Qualification	Experience	Contact No.
		Prof. Brijesh Shah	CITC, Changa	M.Tech.	9 Yrs	9426508167
2	ASIC Design	Prof.Chintan Dave	Indus, Ahmedabad	MTech	2 Yrs	9924237052
		Prof. Nilesh Patel	LCIT, Bhandup	M.Tech	10	9879381145
		Mr. Pinal Patel	e-infochips, ASIC, Ahemedabad	ME(EC)	5 Yrs	9427856562
		Dr. Jaimin Bhalani	Babariya Engg. College,Baroda	ME(EC)	7 Yrs	9426352396
		Prof.H.C. Patel	Rtrd. Lecturer DDU, Nadiad	ME(EL)	16 Yrs	0268-2524582
		Dr. R. A. Thakkar	GEC, Chandkheda, Gandhinagar	Ph. D	16 Yrs	23293006
		Mr. Rahul Shah	e-infochips, Ahmedabad	BE(EC)	11 Yrs	9879177461
		Prof. Vrushank Shah	INDUS University,Ahmedabad	ME(CSE)	3 yrs	9898331721
		Mr. Pratik Adesara	e-infochips, Ahmedabad	ME(EC)	2 Yrs	9925596066
		Prof.Hasmukh P. Koringa	GCET, Rajkot	ME(EC)	3 Yrs	9428037980
		Dr. Kiritkumar Bhatt	SVIT - VASAD	Ph.D	17 Yrs	9879182051
		Prof. Devang Shah	R.K.University, Rajkot	M.Tech.	13 Yrs	8141979556
		Prof Sumit Patel	SVIT, Vasad	M.Tech(ECS)	3 Yrs	9898961493
		Prof. Rachana Jani	CHARUSAT,Changa	PhD Persuing	13 Yrs	9909612519
2	Advance Wireless Communication	Prof. Vrushank Shah	INDUS University,Ahmedabad	ME(CSE)	3 yrs	9898331721
		Prof.Khushali Shah	ADIT,V.V.Nagar	ME(ECS)	5 Yrs	9033281416
		Dr. .Ninad Bhatt	EC Dept., CKPCET, Surat.	ME(EC)	14 Yrs	9925047255
		Mr. Brijesh Shah	Relience Communication	Mtech	17 Yrs	9987084263
		Prof.Hasmukh P. Koringa	GCET, Rajkot	ME(EC)	3 Yrs	9428037980
		Prof. Jignesh Patel	SVIT,Vasad	ME(EC)	15 Yrs.	9825386666
		Prof. Khyati Zalawadiya	EC dept. Babariya Institute of Technology	ME(EC)	10 Yrs.	9879035838
		Prof.Alpesh Dalda	VGEC,Gandhinagar	M.Tech.(EC)	15 Yrs	9408481646
		Prof. Pradip Panchal	EC Dept., CITC, Changa.	ME(EC)	15 Years	9426556389
		Dr. Rahul Kher	EC Dept., GCET, V.V.Nagar	MTech(EC)	11 Yrs	9825018315
		Dr. Mehul Shah	GCET, V. V. Nagar	M.Tech.	14Yrs	9408033700
		Prof. S.D.Trapasiya	EC Dept., GCET, V.V.Nagar.	ME(EC)	3 Yrs	9227108034
		Dr. J.M.Rathod	EC Dept., BVM, V.V.Nagar.	ME(EC)	11 Yrs	9428902849
		Prof.S.K.Hadia	CITC, Changa	ME(EC)	10 Yrs.	9427062772
		Prof. Khyati Kalawadia	Babariya Engg. College,Baroda	ME(EC)	10 Yrs	9879035838
		Prof. Manisha Mayavanshi	Electrical Dept, M. S. University	ME	10 Yrs	9428691179
2	Adv.Microwave Engineering	Prof.R.B.Ishwar	Babariya Engg. College,Baroda	ME(EC)	7 Yrs	9924264636
		Mr. Deepak Raval	Nokia Ahmedabad	ME(EC)	11 Yrs	9825000061
		Prof.Chandresh Parekh	L.D.Engg. college,Ahmedabad.	ME(EC)	11 Yrs	9428277558
		Prof. Madhusmita Sahoo	LDCE, Ahmedabad	M.tech (CSE)	10 Yrs	9277309816
		Prof.J.N.Patel	SVIT,Vasad	ME(EC)	12 Yrs	9825386666
		Prof. Jayesh C. Prajapati	U.V.Patel College of Engg., Kherva	MTech	13.5 Yrs	9998270658
		Mr. Ashok Charaniya	SAC, Ahmedabad.	ME(EC)	20 Yrs	26912418
		Dr. Dhaval Pujara	EC dept, NIT,Ahmedabad	Ph.D	10 Yrs	9925965718
		Prof. Niraj Tevar	EC Dept., Parul University	ME	5 Years	9925220037
		Prf. Renuka Makwana	EC Dept. SVIT Vasad	ME	7 Years	9998980944
		Prof.R.N.Patel	Saffroni Institute,	PhD cont.	12 Yrs.	9426123589
		Prof. Rutvij Joshi	EC Dept.ADIT, VVNagar	Ph.D.	7 Yrs.	9898988243
2	Adv. Wireless Network	Dr. Dhaval Pujara	EC dept, NIT,Ahmedabad	Ph.D	10 Yrs	9925965718
		Prof.P.C.Pandya	Retd. Professor	ME(EC)	30 Yrs	2528998
		Prof.V.P.Parmar	Head, IT Dept. SVIT, Vasad	ME(EC)	10 Yrs	9925388373
		Prof.Kinnar Vaghela	Govt. Engg. College, Modasa.	BE (EC)	11 Yrs	9924343433
		Dr. Y.P.Kosta	CITC, Changa	Ph.D	15 Yrs	9426175033
		Prof.Hemal Shah	EC Dept.,U.V.Patel, Rajkot	ME(CE)	11 Yrs	9427711969
		Dr. Haresh Bhatt	SAC, ISRO, Ahmedabad	Ph. D	16 Yrs	7926912381
		Prof.Mayur Veghad	CE Dept., BVM, V.V.Nagar.	MTech	9 Yrs	9376155526
		Dr. Mehfoza Holia	BVM, V. V. Nagar	PhD	9 Yrs	9824518679
		Dr. Sachin Gajjar	Nirma University	PhD	5 Yrs	079-30642415

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Sem.	Subject	Name of Examinner	Address	Qualification	Experience	Contact No.
3&4	Dissertation	Prof.Shyamal Mehta	69, Vasantkunj Society, Paldi, Ahd.	MS	31 Yrs	9427314070
		Dr.V. N. Kamat	Baroda Electric Meter, V.V.Nagar	Ph.D	21 Yrs	9824074054
		Dr. Tanmay Pawar	EC Dept.,BVM, V.V.Nagar	Ph.D	11 Yrs	9428807640
		Prof.D. G. Thakor	CE Dept., BVM, V.V.Nagar	MTech	20 Yrs	9825272963
		Dr. Kiran Parmar	RTD.Joint Director, DTE	Ph.D	13 Yrs	9825489790
		Dr. Haresh Bhatt	SAC, ISRO, Ahmedabad	Ph. D	16 Yrs	7926912381
		Dr. Ketan Kotecha	Director, NIT, Ahmedabad	Ph. D	15 Yrs	9825320080
		Dr. S. B. Chakrabarty	SAC, ISRO, Ahmedabad	Ph. D	15 Yrs	9426756852
		Dr. Ankit Thakkar	Nirma University, A'bad	Ph.D. persuing	5 Yrs	02717-241911
		Mr. Rajiv Jyoti	SAC, ISRO, Ahmedabad	ME(EC)	20 Yrs	079-26912101
		Prof.H.C. Patel	Rtrd. Lecturer DDU, Nadiad	ME(EC)	16 Yrs.	0268-2524582
		Dr. Y.P.Kosta	CITC, Changa	Ph.D	15 Yrs	9426175033
		Dr. Himanshu Soni	GCET, V. V. Nagar	Ph.D	11 Yrs	9374816499
		Dr.Jaimin Bhalani	Babariya Engg. College,Baroda	ME(EC)	8 Yrs	9426352396
		Dr. V.K.Thakkar	ADIT,V.V.Nagar	Ph.D.	15 Yrs	9825431637
		Dr.Mayur Vegad	CE Dept, BVM, V.V.Nagar.	MTech	9 Yrs	9376155526
		Prof.Chandresh Parekh	L.D.College of Engg., Ahmedabad.	MTech	11 Yrs	9428277558
		Dr. Bhaskar Thakkar	GCET, V. V. Nagar	ME(EC)	10 Yrs	9574383265
		Prof.Kunal Archarya	LD College of engg.	MTech	8 Yrs	9925965718
		Prof.V.K.Patel	UVPC,Head, EC , Mehasana	MTech	12 Yrs	9979928955
		Dr. Hitesh Shah	GCET, V. V. Nagar	Ph.D	13Yrs	9601265236
		Mr. Hardik Acharya	Ericson India Pvt. Ltd.	BE	8 Yrs	9099034001
		Dr.Maulin Joshi	EC Dept., SCET, Surat	Ph.D.	15 Yrs	9426855841
		Dr. Mihir Shah	LDCE, Ahmedabad	PhD	12 Yrs	9426404816
		Mr.Amit Shrivastva	IPR, Bhat, Gandhinagar	ME(EC)	19 Yrs	9825838564
		Dr.Rahul Kher	EC Dept., GCET, V.V.Nagar	MTech(EC)	11 Yrs	9825018315
		Prof.Nitin Patel	EC Dept., SCET, Surat	Ph.D	9 Yrs	9426846773
		Dr.Hemal shah	U.V.Patel college, Kherva.	ME(EC)	11 Yrs	9427711969
		Dr.Milind Mahajan	SAC,ISRO , Ahmedabad	MTech	10 Yrs	26912150
		Mr. Sanjiv Kulshrestha	SAC,ISRO , Ahmedabad	M.Tech	8 Yrs	079-26912250
		Dr. Nagendra Gajjar	Nirma University, Ahemedabad	Ph.D	24 Yrs	9998280898
3&4	Dissertation	Dr. R.A. Thakkar	VGEC, Chandkheda	Ph.D	19 Yrs	9898267846
		Dr.Dhaval Pujara	EC dept, NIT,Ahmedabad	Ph.D	10 Yrs	9925965718
		Prof.Kishore Moradia	Govt. Engg College, Modasa.	ME(EC)	11 Yrs	9426944500
		Dr. Mohan Sarkar	SAC,ISRO , Ahmedabad	PhD	10 Yrs	7926912404
		Dr.J.M.Rathod	EC Dept., BVM, V.V.Nagar.	ME(EC)	11 Yrs	9428902849
		Dr. N.M.Patel	EC Dept., BVM, V.V.Nagar.	ME(EC)	16 Yrs	9428660842
		Dr.Anand Darji	NIT, Surat	Ph.D.Pursuing	15 Yrs	9426886446
		Dr.Mayur Veghad	CE Dept., BVM, V.V.Nagar.	MTech	9 Yrs	9376155526
		Mr.Vishal Agarwal	SAC, Ahmedabad.	MTech	10	26912489
		Dr.Kishore Moradia	Govt. Engg College, Modasa.	ME(EC)	11 Yrs	9426944500
		Dr. B. C. Dharmani	ITC Dept., DAIICT, Gandhinagar	BE(EC)	14 Yrs	9427859416
		Prof. Ronak R. Vashi	BVM, V. V. Nagar	ME(Comm)	5 Yrs	*9428660842*
		Dr.Ninad Bhatt	EC Dept., CKPCET, Surat.	ME(EC)	5 Yrs	9925047255
		Dr. Mehul Shah	ET Dept.,BVM,VVNagar	Ph.D.	16 Yrs	9408033700
		Dr.Ved Vyas	C.U.Shah university, VC	Ph.D.	20 Yrs	9825234361
		Mr. K.R.Bhatt	S.V.I.T., Vasad.	M.Tech.	8 Yrs	9879182051
		Prof. Y.B.Shukla	EC dept., SVIT, Vasad	PhD	11 Yrs	9825510034

Examinner List
Department of Electronics & Communication - List of External Examinners (B.Tech./M.Tech.)
December 2017

Sem.	Subject	Name of Examinner	Address	Qualification	Experience	Contact No.

ANNEXURE –I

Department of Instrumentation and Control Engineering
Faculty of Technology
Dharmsinh Desai University
Proposed CBCS based course structure and scheme of B.Tech (IC Engg.),
Teaching scheme and Exam scheme of 1st to 8th Semester

SEMESTER- I [IC]												
SUBJECT CODE	SUBJECT	TEACHING SCHEME			CREDIT STRUCTURE		TOTAL CREDIT	Exam Scheme (Marks)				
		LECT	TUT	PRA	L+T	P		Theory (3 hrs)	Sessional (1 hrs 15 min)	Practical	T/W	Total
AF-111	Mathematics -I	4	0	0	4	0	4	60	40	--	--	100
AF-124	Engineering Mechanics	3	0	1	3	0.5	3.5	60	40	25	25	150
AF-115	Engineering Graphics	4	0	3	4	1.5	5.5	60	40	--	50	150
AF-122	Basic Electrical & Electronic Engineering	4	0	2	4	1	5	60	40	25	25	150
AX-123	Programming in 'C'	4	0	2	4	1	5	60	40	25	25	150
AF-116	Workshop-I	0	0	3	0	1.5	1.5	--	--	--	50	50
AM-110	Engineering Economics and Principles of Management	3	0	0	3	0	3	60	--	40	--	100
							27.5					**850**

SEMESTER- II [IC]												
SUBJECT CODE	SUBJECT	TEACHING SCHEME			CREDIT STRUCTURE		TOTAL CREDIT	Exam Scheme (Marks)				
		LECT	TUT	PRA	L+T	P		Theory (3 hrs)	Sessional (1 hrs 15 min)	Practical	T/W	Total
AF-201	Mathematics - II	4	0	0	4	0	4	60	40	--	--	100
AF-214	Mechanics of Solids	3	0	2	3	1	4	60	40	25	25	150
CT-216	Electronic Work Shop	0	0	2	0	1	1	--	--	--	50	50
AF-215	Heat Power	4	0	2	4	1	5	60	40	25	25	150
AF-212	Electronics Principles	4	0	2	4	1	5	60	40	25	25	150
AX-223	Advanced C Programming	4	0	2	4	1	5	60	40	25	25	150
ES-210	Environmental Sciences	3	0	0	3	0	3	60	--	40	--	100
							27					**850**

SEMESTER- III [IC]												
SUBJECT CODE	SUBJECT	TEACHING SCHEME			CREDIT STRUCTURE		TOTAL CREDIT	Exam Scheme (Marks)				
		LECT	TUT	PRA	L+T	P		Theory (3 hrs)	Sessional (1 hrs 15 min)	Practical	T/W	Total
AF-301	Mathematics -III	4	0	0	4	0	4	60	40	--	--	100
AXXXX	Financial and Managerial Accounting	3	0	0	3	0	3	60	--	--	40	100
CI-308	Linear Electronics-I	4	0	2	4	1	5	60	40	25	25	150
IC-301	Electronic Measurement	4	0	2	4	1	5	60	40	25	25	150
EL-304	Network Analysis	4	0	2	4	1	5	60	40	25	25	150
IC-302	Digital Electronics	4	0	2	4	1	5	60	40	25	25	150
							27					**800**

SEMESTER- IV [IC]												
SUBJECT CODE	SUBJECT	TEACHING SCHEME			CREDIT STRUCTURE		TOTAL CREDIT	Exam Scheme (Marks)				
		LECT	TUT	PRA	L+T	P		Theory (3 hrs)	Sessional (1 hrs 15 min)	Practical	T/W	Total
AF-401	Mathematics -IV	4	0	0	4	0	4	60	40	--	--	100
IC-407	Control Theory	4	0	2	4	1	5	60	40	25	25	150
CI-418	Linear Electronics-II	4	0	2	4	1	5	60	40	25	25	150
IC-406	Power Electronics	4	0	2	4	1	5	60	40	25	25	150
CI-416	Electrical Machines and Power	4	0	2	4	1	5	60	40	25	25	150
IC-4XX	Control Technology: Components and Systems	4	0	2	4	1	5	60	40	25	25	150
							29					**850**

SEMESTER- V [IC]												
SUBJECT CODE	SUBJECT	TEACHING SCHEME			CREDIT STRUCTURE		TOTAL CREDIT	Exam Scheme (Marks)				
		LECT	TUT	PRA	L+T	P		Theory (3 hrs)	Sessional (1 hrs 15 min)	Practical	T/W	Total
IC-5XX	Micro Processor and Micro Controller	4	0	2	4	1	5	60	40	25	25	150
IC-5XX	Industrial Electronics & Drives **Program Elective-I**	4	0	2	4	1	5	60	40	25	25	150
IC-5XX	Simulation Tools **Program Elective-I**											
IC-5XX	Measurement Techniques	4	0	2	4	1	5	60	40	25	25	150
IC-5XX	Process Measurement	4	0	2	4	1	5	60	40	25	25	150
IC-5XX	Communication Systems	4	0	2	4	1	5	60	40	25	25	150
IC5-XX	Professional Communication-I	3	0	0	3	0	3	60	--	--	40	100
							28					**850**

SEMESTER- VI [IC]												
SUBJECT CODE	SUBJECT	TEACHING SCHEME			CREDIT STRUCTURE		TOTAL CREDIT	Exam Scheme (Marks)				
		LECT	TUT	PRA	L+T	P		Theory (3 hrs)	Sessional (1 hrs 15 min)	Practical	T/W	Total
IC-6XX	Micro Controller Applications	4	0	2	4	1	5	60	40	25	25	150
IC-6XX	Instrumentation Systems	4	0	2	4	1	5	60	40	25	25	150
IC-6XX	Smart Instruments **Program Elective-II**	4	0	2	4	1	5	60	40	25	25	150
IC-6XX	Analytical Instrumentation **Program Elective-II**											
IC-6XX	Power Plant Automation **Program Elective-II**											
IC-6XX	Process Instrumentation & Control	4	0	2	4	1	5	60	40	25	25	150
IC-6XX	Automation systems Integration	4	0	2	4	1	5	60	40	25	25	150
IC-6XX	Professional Communication-II	3	0	0	3	0	3	60	--	--	40	100
							28					**850**

SEMESTER- VII [IC]												
SUBJECT CODE	SUBJECT	TEACHING SCHEME			CREDIT STRUCTURE		TOTAL CREDIT	Exam Scheme (Marks)				
		LECT	TUT	PRA	L+T	P		Theory (3 hrs)	Sessional (1 hrs 15 min)	Practical	T/W	Total
IC-7XX	Biomedical Instrumentation	4	0	2	4	1	5	60	40	25	25	**150**
IC-7XX	Advanced Control Theory & System Design	3	1	2	4	1	5	60	40	25	25	**150**
IC-7XX	Digital Signal Processing **Program Elective-III**	4	0	2	4	1	5	60	40	25	25	**150**
IC-7XX	Modeling, Simulation and Evolutionary Techniques **Program Elective-III**	4	0	2	4	1						
IC-7XX	Embedded Systems **Program Elective-III**	3	1	2	4	1						
IC-7XX	Process Control	4	0	2	4	1	5	60	40	25	25	**150**
IC-7XX	Robotics Engineering	4	0	2	4	1	5	60	40	25	25	**150**
IC-716	Industrial Exposure and Practices	0	0	6	0	3	3	--	--	25	25	**50**
							28					**800**

SEMESTER- VIII [IC]												
SUBJECT CODE	SUBJECT	TEACHING SCHEME			CREDIT STRUCTURE		TOTAL CREDIT	Exam Scheme (Marks)				
		LECT	TUT	PRA	L+T	P		Theory (3 hrs)	Sessional (1 hrs 15 min)	Practical	T/W	Total
AF-801	Project and Industrial Training	0	0	8	0	4	18	--	--	300	100	**400**
AF-802	Seminar	0	0	28	0	14	6	--	--	-	100	**100**
							24					**500**
OR												
IC-8XX	Computer Numerical Control (CNC) **Program Elective-IV**	4	0	2	4	1	5	60	40	25	25	**150**
IC-8XX	Motion Control **Program Elective-IV**	4	0	2	4	1	5	60	40	25	25	**150**
	Program Elective-III											
	Program Elective-IV											
							24					**500**

Total Course Credit 219.0

Category	Reqd %	Reqd no. of courses	Provided no. courses	Breakup of courses	Breakup of credits
General Courses	10	4.5	4	Core-3	9.0
				Elective-1	3.0
Basic Science Foundation Courses	10	4.5	5	Core-5	19.0
Engg. Science Courses	15	6.75	6	Inst. Core-5	16.0
				Prog. Core-1	5.0
Professional Courses	65	29.25	32	Core-28	152.0
				Elective-10	15.0
		Total Courses	**47**	**Total Credits**	**218.5**

Level	SEM	CBCS Subject		Without CBCS Subject	
		SUBJECT CODE	SUBJECT	SUBJECT CODE	SUBJECT
		SEM-I			
I	I	AF-111	Mathematics I	AF-111	Mathematics-I
		AF-124	Engineering Mechanics	AF-124	Engineering Mechanics
		AF-115	Engineering Graphics	AF-115	Engineering Graphics
		AF-122	Basic Electrical & Electronic Engineering	AF-122	Basic Electrical And Electronics Engineering
		AX-123	Programming in 'C'	AX-123	Programming In 'C'
		AF-116	Workshop I	AF-116	Workshop -I
		AM-110	Basic Principles of Management / Engineering Economics	--	--
		SEM-II			
	II	AF-201	Mathematics II	AF-201	Mathematics-II
		AF-214	Mechanics of Solids	AF-214	Mechanics Of Solids
		AF-212	Electronics Principles	AF-212	Electronics Principles
		AF-215	Heat Power	AF-215	Heat Power
		CT-216	Electronic Work Shop	AF-206	Workshop -II
		ES-210	Environmental Sciences	AX-223	Advanced 'C' Programming
		AX-223	Advanced C Programming		
		SEM-III			
II	III	AF-301	Mathematics -III	AF-301	Mathematics-III
		A-XXXX	Financial and Managerial Accounting	--	--
		CI-308	Linear Electronics-I	CI-308	Linear Electronics-I
		IC-301	Electronic Measurement	IC-301	Electronic Measurement
		EL-304	Network Analysis	EL-304	Network Analysis
		IC-302	Digital Electronics	IC-302	Digital Electronics
		--	--	EL-316	Introduction To Yoga
		SEM-IV			
	IV	AF-401	Mathematics -IV	AF-401	Mathematics-IV
		IC-407	Control Theory	IC-407	Control Theory
		CI-418	Linear Electronics-II	CI-418	Linear Electronics-II
		IC-406	Power Electronics	IC-406	Power Electronics
		CI-416	Electrical Machines and Power	CI-416	Electrical Machines And Power
		IC-4XX	Control Technology: Components and Systems	--	--
		--	--	EL-416	Self Development

		PROPOSED CBCS SUBJECT **SEM-V**			
III	**V**	IC-5XX	Micro Processor and Micro Controller	IC-511	Microprocessor And Microcontroller
		IC-5XX	Industrial Electronics & Drives **Program Elective-I**	--	--
			Simulation Tools **Program Elective-I**	--	--
		IC-5XX	Measurement Techniques	IC-513	Measurement Techniques
		IC-5XX	Process Measurement	IC-507	Process Measurement
		IC-5XX	Communication Systems	IC-502	Communication Techniques
		IC-5XX	Professional Communication-I	--	--
		--	---	IC-506	Control Technology: Components And Systems
		SEM-VI			
	VI	IC-6XX	Micro Controller Applications	IC-607	Microcontroller Applications
		IC-6XX	Instrumentation Systems	IC-604	Instrumentation System
		IC-6XX	Smart Instruments **Program Elective-II**	--	--
			Analytical Instrumentation **Program Elective-II**		
			Power Plant Automation **Program Elective-II**		
		--	--	IC-617	Process Instrumentation **Elective-1**
				IC618	Applied Instrumentation **Elective-2**
		IC-6XX	Automation Systems Integration	IC615	Automation System Integration
		IC-6XX	Process Instrumentation & Control	--	--
		IC-6XX	Professional Communication-II	--	--
		--	--	IC-602	Industrial Management
		--	--	IC-609	Robotics Engineering

		SEM-VII			
IV	**VII**	IC-7XX	Biomedical Instrumentation	IC-708	Biomedical Instrumentation
		IC-7XX	Advanced Control Theory & System Design	--	--
		IC-7XX	Digital Signal Processing **Program Elective-III**	--	--
			Modeling, Simulation and Evolutionary Techniques **Program Elective-III**	--	--
			Embedded Systems **Program Elective-III**	--	--
		IC-7XX	Process Control	IC-703	Process Control
		IC-7XX	Robotics Engineering	--	--
		--	-	IC-701	Advanced Control Theory
		--	-	IC-702	System Design
		--	-	IC-707	Industrial Electronics
		IC-716	Industrial Exposure and Practices	IC-716	Industrial Exposure And Practice
	SEM-VIII				
	VIII	AF-801	Project and Industrial Training	AF-801	Project/Industrial Training
		AF-802	Seminar	AF-802	Seminar
		OR			
		IC-8XX	Computer Numerical Control (CNC) **Program Elective-IV**	--	--
		IC-8XX	Motion Control **Program Elective-IV**	--	--
		IC-8XX	**University Elective I**	--	--
		IC-8XX	**University Elective II**	--	--
		IC-8XX	**University Elective III**	--	--

ANNEXURE –II

Department of Instrumentation and Control Engineering
Faculty of Technology
Dharmsinh Desai University
Proposed CBCS based course structure and scheme of B.Tech (IC Engg.),
Teaching scheme and Exam scheme of 5th to 8th Semester

SEM	Subject Code	Name of Subject	Subject Category	Department
B.Tech-V	IC5XX	Micro Processor and Micro Controller	Professional Course - Program Core	IC
	IC5XX	Industrial Electronics & Drives	Professional Course - Program Elective1	IC
	IC5XX	Simulation Tools	Professional Course - Program Elective1	IC
	IC5XX	Measurement Techniques	Professional Course - Program Core	IC
	IC5XX	Process Measurement	Professional Course - Program Core	IC
	IC5XX	Communication Systems	Professional Course - Program Core	IC
	IC5XX	Professional Communication-I	General - University Core Course	IC
B.Tech-VI	IC6XX	Micro Controller Applications	Professional Course - Program core	IC
	IC6XX	Instrumentation Systems	Professional Course - Program Core	IC
	IC6XX	Smart Instruments	Professional Course - Program Elective2	IC
	IC6XX	Analytical Instrumentation	Professional Course - Program Elective2	IC
	IC6XX	Power Plant Automation	Professional Course - Program Elective2	IC
	IC6XX	Process Instrumentation & Control	Professional Course - Program Core	IC

	IC6XX	Automation systems Integration	Professional Course - Program Core	IC
	IC6XX	Professional Communication-II	General - University Core Course	IC
B.Tech VII	IC7XX	Biomedical Instrumentation	Professional Course - Program Core	IC
	IC7XX	Advanced Control Theory & System Design	Professional Course - Program Core	IC
	IC7XX	Digital Signal Processing	Professional Course - Program Elective3	IC
	IC7XX	Modeling, Simulation and Evolutionary Techniques	Professional Course - Program Elective3	IC
	IC7XX	Embedded Systems	Professional Course - Program Elective3	IC
	IC7XX	Process Control	Professional Course - Program Core	IC
	IC7XX	Robotics Engineering	Professional Course - Program Core	IC
	IC716	Industrial Exposure and Practices	Professional Course - Program Core	IC
B.Tech VIII	AF-801	Project and Industrial Training	Professional Course - Program Core	IC
	AF-802	Seminar	Professional Course - Program Core	IC
	OR			
	IC-8XX	Computer Numerical Control (CNC) **Program Elective-IV**	Professional Course	
	IC-8XX	Motion Control **Program Elective-IV**	Professional Course	
	IC-8XX	**University Elective-IV**		
	IC-8XX	**University Elective-IV**		

Department of Instrumentation and Control Engineering

Faculty of Technology, D.D.Universitry, Nadiad

B.Tech. - III, Semester - V (IC)

Syllabus and Scheme

Subject: Communication Systems (IC-5XX)

Teaching Scheme (Hours)			Marks				
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total
4	0	2	60	40	25	25	150

A. OBJECTIVES OF THE COURSE

- To prepare students to acquire knowledge about Analog & Digital Communication Systems, basic of Fiber Optic Communication and fundamental concept of Data Communication and Networking.

B. DETAILED SYLLABUS

[A] INTRODUCTION TO COMMUNICATION SYSTEMS:

Introduction to Communication, Elements of Communication System, Need for Modulation, Electromagnetic Spectrum & Typical Applications, basic Terminologies in Communication Systems, Signal Representation & Analysis.

[B] AMPLITUDE MODULATION:

Principles of Amplitude Modulation (AM), AM modulating circuits, AM Modulator & Demodulator Circuits, Basics of AM Transmitters & Receivers.

[C] ANGLE MODULATION:

Introduction, Principal of FM, Sinusoidal FM & Analysis, Non-Sinusoidal Modulation : Deviation Ratio, Phase Modulation, Comparison between PM & FM, Sinusoidal PM, Digital PM, Angle Modulators & Demodulators, FM Transmitters & Receivers.

[D] DIGITAL COMMUNICATION:

Introduction, Information Capacity, Bits, Bit Rate, Baud, and *M*-ary Encoding, Amplitude-Shift Keying, Frequency-Shift Keying, Phase-Shift Keying, Quadrature-Amplitude Modulation, Bandwidth Efficiency, Carrier Recovery, Clock Recovery, Differential Phase-Shift Keying, Probability of Error and Bit Error Rate. Error Performance.

[E] PULSE MODULATION:

Introduction, Pulse Amplitude Modulation, Pulse Code Modulation, Differential PCM, Delta Modulation, Pulse Frequency Modulation, Pulse Time Modulation, Pulse Position Modulation, Pulse Width Modulation.

[F] FIBER OPTICS:

Introduction , History of Optical Fiber Communications, Optical Fibers versus Metallic, Electromagnetic Spectrum, Block Diagram of an Optical Fiber Communications System, Optical Fiber Types, Light Propagation, Optical Fiber Configurations ,Optical Fiber Classifications, Cable Facilities, Losses in Optical Fiber Cables, Light Sources Optical Sources, Light Detectors, Lasers.

[G]INTRODUCTION TO DATA COMMUNICATIONS AND NETWORKING:

Introduction & History, Data Communications Network Architecture, Protocols and Standards, Standard Organization for Data Communication, Layered Network Architecture, Data Communication Circuits, Serial & Parallel Data Transmission, Data Communication Circuit Arrangement, Data Communication networks.

[H]FUNDAMENTAL CONCEPTS OF DATA COMMUNICATIONS:

Introduction, Data Communications Codes, Bar Codes, Error Control, Error Detection, Error Correction, Character Synchronization, Data Communications Hardware, Data Communications Circuits, Line Control Unit, Serial Interfaces (RS232 & RS485) , Data Communications Modems

C. LEARNING OUTCOMES

At the completion of the course, students will be able to

- Explain Amplitude Modulation –Demodulation Techniques , Frequency Modulation-Demodulation Techniques and applications
- To be able to used&analyze various parameters for digital modulation techniques like Frequency Shift Keying, Amplitude Shift Keying, Phase Shift Keying, Differential Phase-Shift Keying, Pulse Amplitude Modulation, Pulse Code Modulation, Differential PCM, Delta Modulation, Pulse Frequency Modulation, Pulse Time Modulation, Pulse Position Modulation, Pulse Width Modulation
- Explain fundamental concept of Data Communications& Networking

D. RECOMMENDED TEXTBOOKS

1. Electronic Communication Systems
   By: George Kennedy,Tata McGraw-Hill EducationPvt. Ltd.
2. Advanced Electronic Communications Systems
   By: Wayne Tomasi,Pearson Education Limited.
3. Electronics Communication
   By: Roddy & Coolen,Pearson Prentice Hall, Inc.

E. REFERENCE BOOKS AND STUDY MATERIAL

1. Modern digital ananlog communication system
   By: B.P.Lathi
2. Electronic Communication Systems
   By: William Schweber, PHI Publication.
3. Communication systems
   By: Simon Haykins, John Wiley Publication.

F. LIST OF EXPERIMENTS

1. Construct a triangular wave using Fourier series trainer
2. Construct a Square wave using Fourier series trainer
3. Analysis of Harmonics on DSO
4. Audio Input / Output Amplifier
5. To perform Amplitude Modulation
6. To perform the Frequency Modulation

7. To perform Pulse Code Modulation
8. To perform FSK & ASK
9. ADC & DAC
10. To perform PAM, PPM and PWM
11. Serial Communication using RS232 & RS485
12. Introduction to Wireless Communication

Department of Instrumentation and Control Engineering

Faculty of Technology, D.D.Universitry, Nadiad.

B.Tech. - III, Semester - V (IC)

Syllabus and Scheme

Subject: Measurement Techniques (IC-5XX)

Teaching Scheme (Hours)			Examination Scheme (Marks)					Credit Structure			
Lect	Tut	Prac	Ext	Sess	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

To make the students

- list and identify specifications, selection criteria and characteristics of instrumentation measurement systems
- describe analytical parameter measurement methods and select-apply best-fit sensing-transduction instrument(s)
- state and apply application specific suitable measurement instruments for physical and industrial process parameter measurements

B. DETAILED SYLLABUS

[A] FUNDAMENTALS OF INSTRUMENTATION:

Basic concepts of measurement , Fundamental elements of measurement system, Applications of instrumentation systems, Classification of Instruments, Standards & calibration, Errors & Uncertainties in performance parameters, Static performance parameters, Impedance loading & matching, Selection of the instrument, Formulation of system equations, Dynamic response.

[B] INDUSTRIAL MEASUREMENTS:

Displacement Measurement:
Introduction, Principles of transduction (variable resistance, inductance, reluctance and capacitance type transducers), digital transducers, measurement of Acceleration
Speed Measurement:
Introduction, Mechanical tachometers: Revolution counter, Centrifugal force tachometer, Resonance tachometers, Electric tachometers: Eddy current type tachometers, Electric Generator type tachometers, Contactless type tachometers, Frequency type tachometers, Ignition type tachometers, Stroboscopic tachometers, Pneumatic type speed transmitting elements, Measurement of Speed, Frequency and Short Time Intervals by direct application

of frequency standards by comparative methods.

[C] PROCESS PARAMETERS MEASUREMENTS:

Measurement of Humidity, Specific gravity and Viscosity, Measurement of pH & conductivity.

[D] STRAIN MEASUREMENT:

Introduction, Factors affecting strain measurements, Types of strain gauges, Theory of operation of resistance strain gauges, Types of electrical strain gauges, Materials for strain gauges, Gauging techniques and other factors, Strain gauge circuits, Temperature compensation, Applications

[E] VIBRATION MEASUREMENT:

Introduction, Characteristics of vibration, Analysis of vibration sensing devices, Vibration sensing devices, Signal conditioners, Shock measurements, System characteristics, Vibration exciters, Calibration

[F] BASICS OF ANALYTICAL INSTRUMENTS:

Basic elements of analytical instruments, Basic Introduction mass Spectrometers, IR Spectrophotometers and UV Spectrophotometers, Introduction of chromatography – Gas Chromatography

C. LEARNING OUTCOMES

After successful completion of this course, student shall be able to:

- state and select instrumentation measurement systems based on given data
- explain and select suitable analytical parameter measurement instrument(s)
- list, identify and apply application specific suitable measurement instruments for physical and industrial process parameter measurements

D. RECOMMENDED TEXTBOOKS

1. Instrumentation Devices & Systems by Rangan, Sharma & Mani, 2nd edition-2005
2. Mechanical & Industrial Measurement by: R.K. JAIN, 11h Edition- 2004
3. Handbook of Analytical Instruments by: RS Khandpur, 16th reprint -2005
4. Instrumentation Measurement & Analysis by: B.C. NAKRA & K. K. CHAUDHRY,3rd edition-2013

E. REFERENCE BOOKS AND STUDY MATERIAL

1. Practical Instrumentation Transducers by: OLIVER
2. Mechanical & Industrial Measurement by: R.K. JAIN, 11th Edition-2004
3. Handbook of Analytical Instruments by: R. S. KHANDPUR
4. Instrumentation devices & systems by RANGAN, SHARMA & MANI
5. Industrial Instrumentation Fundamentals by: A.E.FRIBANCE

F. LIST OF EXPERIMENTS

1. To study the characteristics of Linear Variable Displacement Transformer
2. To study the characteristics of Light Dependent Resistor
3. To study the characteristics of Strain Gauge
4. To study the characteristics of Inductive Pick-up
5. To study the characteristics of Capacitive Pick-up
6. To study the characteristics of Piezoelectric Pick-up
7. To study the characteristics of Proximity Switch
8. To study the pH measurement & to measure the pH of different solutions
9. To study the digital conductivity meter
10. To study the Gas Chromatography

Department of Instrumentation and Control Engineering

Faculty of Technology, D.D.Universitry, Nadiad.

B.Tech. - III, Semester - V (IC)

Syllabus and Scheme

Subject: Microprocessor & Microcontroller (IC-5XX)

Teaching Scheme (Hours)			Examination Scheme (Marks)					Credit Structure			
Lect	Tut	Prac	Ext	Sess	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

- To prepare the students to gain application level knowledge about microprocessor & microcontroller

B. DETAILED SYLLABUS

[A] INTRODUCTION TO MICROPROCESSOR & MICROCONTROLLER

Introduction to Microprocessors, Basic information about Instruction Set & Assemble Language, Introduction to CISC & RISC Architecture, Difference between Microprocessor & Microcontroller and Example Application Discussion

[B] MICROPROCESSOR 8085 ARCHITECTURE, MEMORY & I/O DEVICES INTERFACING

Microprocessor Architecture & Its Operation, Memory Devices, I/O Devices, Logic Devices for Interfacing, Memory Interfacing, I/O Interfacing, Timing diagram & Applications

[C] AVR Architecture & Assembly Language Programming

Architecture, Memory Map & Registers of AVR, Assembly Programming, Data Move Instructions and I/O Port Programming, Branch & Call Operations, Arithmetic Instructions and Programs

[D] AVR Timer, Interrupt

Programming Timers 0, 1 and 2, Counter Programming, Timer Programming in C, AVR Interrupts, Programming of Timer & External Hardware Interrupts, Interrupt Priority, Interrupt Programming in C, Serial Port Connection of ATMEGA & Programming in C and Assembly Language

[E] Serial Port, SPI & I2C Bus

Serial Port of ATMEGA32 & Programming using Assembly & C
SPI Bus Protocol and Programming
I^2C Bus Protocol and Programming

C. LEARNING OUTCOMES

At the completion of the course, students will be able to

- Explain basic operation and architectural difference between of microprocessor & microcontroller
- Integrate memory devices & Input output devices with 8085
- Explain timing diagram of various instructions of 8085
- Do basic programming of 8085 in Assembly language
- Utilize various features of AVR microcontroller for building up various applications
- Do basic & application level of programming of AVR Controller in Assembly & C Language
- Develop basics application using AVR microcontroller

D. RECOMMENDED TEXTBOOKS

1. Microprocessor Architecture, Programming and Applications with the 8085, by R. S. Gaonkar, Penaram International Publishing (India) Private Limited
2. The AVR Microcontroller & Embedded Systems, by Mahuammad Ali Mazidi, Sarmad Naimi, Sepehr Naimi, Pearson Publication
3. Embedded Systems, by B. Kanta Ra, PHI

E. REFERENCE BOOKS AND STUDY MATERIAL

1. Microprocessor Application in Control & Instrumentation by Bibbero
2. Programming and Customizing the AVR Microcontroller by Dhananjay Gadre

F. LIST OF EXPERIMENTS

1. Importance of Microprocessor & Microcontroller
2. Architecture of 8085 & Interfacing of Memory Devices, Input Devices & Logic Devices with 8085
3. Interrupts & Timing Diagram of 8085
4. Basic 8085 Assembly Programming
5. AVR Architecture
6. Getting Started with AVR Studio (Free Version) for programming of AVR Controller
7. Simulation of Data Move Instructions and I/O Port Programming, Branch & Call Operations, Arithmetic Instructions using AVR Studio in Assembly & C
8. AVR Timer Programming & Simulation using AVR Studio
9. AVR Interrupt Programming & Simulation using AVR Studio
10. AVR Serial Port Programming & Simulation using AVR Studio
11. Mini Project Part-1 using AVR Microcontroller (Shall be demonstrated in practical exam)

Department of Instrumentation & Control Engineering

Faculty of Technology, D. D. University, Nadiad

B.Tech. – III, Semester – V (IC)

Syllabus and Scheme

Subject: Process Measurement (IC-5XX)

Teaching Scheme (Hours)			Examination Scheme (Marks)					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

To prepare the students to gain knowledge about the standards, principle, working and applications of process sensors and transducers

B. DETAILED SYLLABUS

[A] PRESSURE MEASUREMENT:

Manometers, Elastic type – Bourdon tube, diaphragm, bellows elements, Bell gauges, Solid State, Piezo- elastic and vibrating element type pressure transducer, Vacuum gauges Mechanical and electric types, differential pressure transmitter.

[B] FLOW MEASUREMENT:

Theory of flow system, Reynold's number, Variable pressure (Head) type meters-orifice, Orifice calculations and installation, Venturi tube, Pilot tube, Flow nozzle. Variable Area meters-rotameter, Open channel meters, Mass flow meters, Velocity meters, Quantity meters, Electomagnetic flow meter, turbine flow meters, Ultrasonic flow meters, Vortex flow, Anemometers, Flow markers, Laser anemometers, Flow measurement for solid materials.

[C] LEVEL MEASUREMENT:

Theory of level measurement, Float gauges, Differential pressure type level measurement technique, Level measurement by weighing, bubbler technique, thermal effect type, Capacitance type, Ultrasonic and radiation type level measurement techniques, level measurement in open vessels and pressure vessels, Measurement of interface levels, Measurement of level of dry material.

[D] TEMPERATURE MEASUREMENT:

Liquid Gas and Vapour filled thermometers, Bimetal thermometers, Resistance Thermometers RTD, Thermisters, Thermo electric temperature measurement technique Thermocouples and thermopiles Radiation thermometers optical and electrical pyrometers Accuracy and response characteristic of different devices, Differential Temperature measurement.

C. TEXT BOOKS:

1. Industrial Instrumentation
   By: D.P. Eckman. , CBS Publishers and Distributers
2. Principles of industrial instrumentation
   By: D Patranabis, Tata Mc Graw Hill
3. Instrumentation Devices and system
   By: Rangan, Sharma, Mani, McGraw Hill Education

D. REFERENCE BOOKS:

1. Instrumentation, Measurement and Analysis
   By: B.C. Nakra & K. K. Chaudhary , McGraw Hill
2. Mechanical And Industrial Measurements
   By: R. K. Jain, Khanna Publishers
3. Industrial Instrumentation Fundamentals
   By: Austin Fribance, Tata McGraw Hill publication
4. Industrial Flow Measurement, 3rd Edition,
   By: David W. Spitzer, ISA
5. Flow measurement methods and applications
   By: Jim E.Hardy, Jim O. Hylton, Tim E. McKnight, Carl J. Remenyik, Francis R. Ruppel, Wiley-Blackwell,
6. Temperature Measurement, 2nd Edition
   By: L Michalski, K Eckersdrof, J Kucharski, J McGhee, Wiley
7. Modern Sensors Handbook,
   By: Pavel Ripka, Wiley
8. Industrial Instrumentation- Principles & Design
   By: Tattamangalam R.Padmanabham, Springer
9. Instrumentation and Process Measurement
   By:W.Bolten, Universities Press
10. Instrumentation Measurement and Control
    By A.K. Ghosh, PHI
11. ANSI/ISA-5.1-2009, Instrumentation Symbols and Identification

E. LEARNING OUTCOMES:

After completing this course students should be able to:

- Describe standards for process measurements
- Explain various sensors used for measurement of Temperature for industrial applications
- Explain various sensors used for measurement of Pressure for industrial applications
- Explain various sensors used for measurement of Flow for industrial applications
- Explain various sensors used for measurement of Level for industrial applications

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

List of laboratory experiments:

1 To find out input output characteristic of RTD
2 To find out time constant of given RTD
3 To find out input output characteristic of Thermocouple
4 To find out time constant of given Thermocouple
5 To find out characteristic of Thermistor
6 To measure temperature of an object using non contact thermometer
7 To find out characteristics of given strain gauge pressure transducer
8 To find out characteristics of given piezoelectric pressure transducer
9 To measure flow using orifice plate
10 To measure flow using Venturi tube
11 To measure level in a tank using hydrostatic level sensor
12 To measure level in a tank using Ultrasonic level sensor

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Department of Instrumentation and Control Engineering

Faculty of Technology, D.D.University, Nadiad.

B.Tech. - III, Semester – V (IC)

Syllabus and Scheme

Subject: Simulation Tools (IC-5XX)

Teaching Scheme (Hours)			Examination Scheme (Marks)					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

- To develop the ability in students for use of simulation tools in order to apply for better theoretical understanding.
- To apply use of such tools to experiments, projects etc. for implementation and detailed analysis of the same.

B. DETAILED SYLLABUS

COMPUTING WITH SCILAB

[A] INTRODUCTION TO SCILAB

Basics of Scilab, Numbers, Constants, Syntax

[B] MATRICES & MATRIX ALGEBRA

Entering Matrices, Subscripts, The Colon Operator, Concatenation, Special Matrices, Size of a Matrix ,Transpose, Adding and Subtracting Matrices, Multiplication and Powers of Matrices, The Dot Operator, Mathematical Functions

[C] PROGRAMMING & WORKING WITH FILES IN SCILAB

FOR loops, Functions, Returning Multiple Values, Local and Global Variables, Comparison and Logical Operators, WHILE Loops, IF Statements, Graphs, Simple Graphs, Styles, Multiple Curves, Multiple Plots, Other Features, 3D Curves, Histograms Function Files, Script Files, Exporting Data, Importing Data

VIRTUAL INSTRUMENTATION USING LABVIEW

[D] INTRODUCTION TO VIRTUAL INSTRUMENTATION

What is VI?, How to use Computer in VI?, LABVIEW & Virtual Instrumentation

Conventional & Graphical Programming

Components of LABVIEW, Tools & other Pallets, Color coding Code debugging, Creating sub – VIs

[E] PROGRAMMING & FILE I/O

The FOR & WHILE loop, Loop Behavior & Inter loop communication, Local & Global Sequence structures, Case structures, Formula Nodes, Arrays, Clusters, Inter conversions of Arrays & Clusters, Wave form charts, Resetting plots, Use of cursors, X-Y graphs ,What is a state machine, A simple state machine, Event structures, Full state machine , String functions, LABVIEW string formats, Parsing of strings, Examples , File formats, File I/O functions, Path functions, File WRITE and READ

[F] DATA ACQUISITION

Classification of signals, Real world signals, Analog interfacing, Connecting the signal to the board, Measurement & Automation Explorer, The wave form data type, Use of simple VIs & DAQmx, Intermediate Vis, Express VI's-DAQ assistant, Analysis, Instrumentation, RS 232 vs. GPIB – Handshaking, GPIB Interfacing, RS232c/RS485 Interfacing, VISA

C. LEARNING OUTCOMES

At the completion of the course, students will be able to:

- perform computational and numerical calculations using simulation tools
- acquire, analyze and present data
- programmatically log data
- perform file level operations

D. RECOMMENDED TEXTBOOKS

[1] Virtual Instrumentation using LabVIEW, Jovitha Jerome, Prentice Hall India

[2] Programming in Scilab 4.1 By- Vinu V.Das, Newage publication

E. REFERENCE BOOKS & NOTES

[1] Notes on Scilab, Gary Bunting

[2] Introduction to Scilab, Michael Baudin, Scilab Consortium

[3] Virtual Instrumentation using LabVIEW, Sanjay Gupta & Joseph John, Tata McGraw Hill

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

List of laboratory experiments:

1. Introduction to LabVIEW
2. Using loops in LabVIEW
3. Arrays and Clusters in LabVIEW
4. Decision Making using Case Structures in LabVIEW
5. File Handling in LabVIEW
6. Introduction to Scilab
7. Matrix Algebra in Scilab
8. Using loops, logical operators in Scilab
9. Graphical data presentation in Scilab
10. File Handling in Scilab

Department of Instrumentation and Control Engineering

Faculty of Technology, D.D.Universitry, Nadiad.

B.Tech. - III, Semester - VI (IC)

Syllabus and Scheme

Subject: Analytical Instrumentation (IC-6XX)

Teaching Scheme (Hours)			Examination Scheme (Marks)					Credit Structure			
Lect	Tut	Prac	Ext	Sess	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

To make the students

- Aware about importance of different instruments in Analysis & Testing field which are used for the measurement of different parameters along with classification and terminologies of techniques.
- State and explain about specifications, selection criteria and characteristics of different analytical instruments for Analysis & Testing.
- Explain various analytical instruments with their principle, working, types & its applications in various fields.
- State and explain about Steam & Water Analysis System (SWAS).

B. DETAILED SYLLABUS

[A] Spectrophotometers: UV - VIS – IR

Electromagnetic radiation, beer-Lambert law, Absorption Instruments, Colorimeters, Spectrophotometers, Sources of error in Spectrophotometric Measurement, Calibration.

[B] Spectrophotometers: IR, Raman & Photo acoustic and photo thermal

Infrared Spectroscopy, Basic Components of Infrared Spectrophotometer, Sample Handling Technique Fourier Transform Infrared Spectroscopy, Calibration, Attenuated Total Reflection Technique, Raman Spectrometers, Photo acoustic and photo thermal Spectrometers.

[C] Gas Chromatograph, Liquid Chromatograph & Mass Spectrometers:

Chromatography, Basic Parts of a Gas Chromatograph, Methods of Measurements of Peak Areas, Liquid chromatography, types of LC, Amino Acid Analysers. Basic Mass

Spectrometers, Types of Mass Spectrometry, Components of Mass Spectrometers, Resolution, Application of Mass Spectrometry.

[D] Flame Photometers & X-Ray Spectrometers:

Principle, Constructional Details of Flame Photometers, Clinical Flame Photometers, Accessories for Flame Photometers, Interferences in Flame Photometry, Procedure for Determination.

X-ray Spectrum, X-Ray Spectrometry, X-Ray Diffractometer, Electron probe micro analyzer.

[E] Electron and Ion Spectroscopy:

Surface Spectroscopic Techniques, Electron Spectroscopy, Instrumentation for Electron Spectroscopy, Ion Spectroscopy, Instrumentation for Ion Spectroscopy, Radiochemical Instruments, Automated Biomedical Analysis Systems.

[F] Blood Gas Analyzer & Industrial Gas Analyzers

Blood pH measurement, pCO2 & pO2 Analyzer, gas analyzers, paramagnetic O2 analyzer, magnetic wind analyzer, IR gas analyzer.

Overview of Steam & Water Analysis System (SWAS) : Sample Conditioning, Components, Philosophy & importance of monitoring Boiler parameters, Chiller.

C. LEARNING OUTCOMES

After successful completion of this course, student shall be able to:

- develop awareness about needs of different Analytical instruments for measuring different parameters for analysis and testing of the products, classification and associated technical terminologies.
- learn specifications and salient characteristics based choice making of analytical instruments.
- learn methods and applications in the field of Analytical instrumentation & Steam & Water Analysis System (SWAS).
- develop awareness of measuring different strategies with analytical instruments and acquired the knowledge about its importance for the analysis and testing of any product/material with the help of different analytical instruments.

D. RECOMMENDED TEXTBOOKS

[1] Handbook of Analytical Instruments by: R. S. KHANDPUR
[2] Instrumentation methods by B. K. Sharma

E. REFERENCE BOOKS

[1] Analytical Instrumentation by Bela G. Liptak

[2] Laboratory Instrumentation by Mary C. Haven (Author), Gregory A. Tetrault (Author), Jerald R. Schenken (Author)

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

List of laboratory experiments:

1. Gas Chromatograph.
2. UV Spectrometer.
3. Visible Spectrometer.
4. Liquid Chromatograph.
5. IR Spectrometer.
6. X-Ray Spectrometer.
7. Atomic Force Microscope.
8. Scanning Electron Microscope.
9. Transmission Electron Microscope.
10. Ion Chromatograph.

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Department of Instrumentation & Control Engineering

Faculty of Technology, D. D. University, Nadiad

B.Tech. – III, Semester – VI (IC)

Syllabus and Scheme

Subject: Automation System Integration (IC-6XX)

Teaching Scheme (Hours)			Examination Scheme (Marks)					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

- To make the students aware about the concept of Automation, parts of automation system and their applications for developing automation application using PLC and SCADA

B. DETAILED SYLLABUS

[A] Programmable Logic Controller

- The PLC: A Over all look :-Introduction, Manufacturing and assembly process , PLC advantages and Disadvantages, Overall PLC system , CPU and Programmers , PLC Input/Output modules, Solid state memory
- General PLC programming Procedures
- Devices connected with PLC I/O modules :-Input/output on/off switching devices , Input/output Analog devices
- Programming on/off inputs to produce on/off outputs
- Relation to digital gate logic to contact/coil logic
- Creating ladder diagrams from process control descriptions
- PLC Basic functions :-PLC timer, counter, arithmetic functions
- PLC Intermediate functions :-PLC Number comparison functions , Numbering systems and PLC number conversion functions
- Data Handling Functions :-PLC skip and master control relay functions, JUMP functions, PLC data moves.
- PLC functions working with bits:- Digital bits, Sequential, controlling a robot with PLC, Matrix functions
- Advanced PLC functions :- Analog PLC operations, PID control of continuous process, networking of PLCs
- PLC Installation, Trouble shooting and maintenance
- PLC Auxiliary Commands and Functions Monitor Mode function, Force mode function, functions for different programming formats, print functions, Selection of PLC, Industrial control and rise of PLC, PLC versus PC, factors to consider in selecting a PLC
- PLC Installation Practices Installation Practices, Consideration of the operating environment, receiving check, testing and assembly, electrical connections,

grounding and suppression considerations, circuit protection and wiring, troubleshooting PLC malfunctions, PLC maintenance

[B] Principles of Data Acquisition

Introduction of Data Acquisition system, sampling concept, digital to analog converters, analog to digital converters, Block diagram, Protections in DAS, Isolation in DAS, Data Acquisition Configuration

[C] System Integrity Level in Automation Systems :

Conceptual design stage, ISA conceptual design stage, IEC 615108 on conceptual design, skills and resources, basic SIS configuration, shared functions, technology choices, pneumatics relays, safety relay, solid state systems

[D] Safety PLC:

Programmable systems for the logic solver, upgrading of PLCs for safety applications, characteristics of safety PLCs, hardware characteristics of safety PLC, software characteristics of safety PLC, design of safety PLC, Triple Modular Redundant (TMR) systems, safety PLC with 1oo3 architecture, communication features of safety controllers, classification and certification , SIS architecture conventions

[E] Introduction and basics of SCADA and SCADA Configuration

Advance configuration of WONDERWARE SCADA, Detail study of SCADA configuration building blocks

C. <u>LEARNING OUTCOMES</u>

After completing this course students should be able to:

- Describe the features of Automation system
- Develop program for PLC and SCADA Systems and make small automation applications

D. Text Books:

1. Programming Logic Controllers- Principles and applications,
   By John W. Webb & Ronald Reis, PHI, fifth Edition (2006)
2. PC based Instrumentation – Concepts and practice
   By N.Mathivanan, PHI, 2007 Edition
3. Practical Industrial safety, Risk Assessment and Shutdown Systems
   By- Dave Macdonald, Elsevier science technology,

E. Reference Books:

1. User manual for Wonderware InTouch SCADA development software
2. Programming Logic Controllers- Programming methods and applications
   By John R. Hackworth & Frederick D. Hackworth Jr. , Pearson Education, Low Price Edition
3. Programming Logic Controllers and Industrial Automation – An Introduction,
   By Madhu chhanda, Samarjit sen Gupta, Tata Mc Graw Hill
4. Process Control Instrumentation

By C. D. Johnson, Pearson Education Ltd
5. Digital measurement techniques, by- T. S. Rathore, Narosa, New Delhi, CRC Press
6. Instrument Engineers Handbook, third edition, volume-III, Process Software and Digital Networks, by- Bela G.Liptake, CRC Press,
7. Field bus Technology : Industrial network standards for real time distributed control By Nitaigour Premchand Mahalik ,Springer (2008)
8. Modicon MODBUS protocol reference guide, Modicon
9. Statement list Allen Bradley Micro logix 1000 & 1200 – Ref Manual-pdf

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT

List of laboratory experiments:

1 Introduction to Wonderware InTouch SCADA
2 Study of basic features of SCADA
3 Study of Advanced features of SCADA
4 Programming in SCADA using scripts
5 Study RSLogix 500 software.
6 Development of ladder program using bit instructions
7 Development of ladder program using Timer Functions
8 Development of ladder program using counter and compare Functions
9 Development of ladder program using Advance (Arithmetic) Functions
10 Development of ladder program using Advance (Analog) Functions
11 Development of ladder program using Advance (Program control and Sequencer) Functions
12 Project Development

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Department of Instrumentation and Control Engineering

Faculty of Technology, D.D.Universitry, Nadiad.

B.Tech. - III, Semester - VI (IC)

Syllabus and Scheme

Subject: Instrumentation Systems (IC-6XX)

Teaching Scheme (Hours)			Examination Scheme (Marks)					Credit Structure			
Lect	Tut	Prac	Ext	Sess	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

To make the students

- describe modern concepts of industrial automation systems, with special example of Distributed Control System (DCS) design and implementation
- state and explain hierarchical advancements in industrial automation systems
- identify, examine, evaluate and design instrumentation documents and drawings
- describe and apply industrial safety and hazard classification as and when required
- explain industrial automation and communication technologies with application of suitable communication protocols and standards

B. DETAILED SYLLABUS

[A] INTRODUCTION & SYMBOLS:

Introduction to instrumentation system, Standard instrumentation system symbols, Symbols for Distributed Control Systems, Standard P & I diagrams for typical instrumentation systems.

[B] CONTROL ROOM SUPPLY:

Uninterrupted Power Supply, Area classifications & safety standards, intrinsic safety.

[C] DISTRIBUTED CONTROL SYSTEMS:

Introduction, History, Architecture of DCS, Architecture of DCS components – like Process Control Units, Single Loop & Multi Loop Controllers, Man-Machine Interface, Key-board units, Engineering unit etc., Typical graphics display used in DCS, Generalized architecture of DCS

Computer networking fundamentals and standards, Communication protocols, Concept of open architecture, Introduction to OLE and OPC

[D] INSTALLATION PRACTICE:

Installation practice for commissioning, maintenance & renovation of a plant. Documents required for installation of instrumentation systems. Testing of different instruments. Industry Standards & Recommended Practices for the installation & maintenance of various Instruments.

[E] SAFETY DEVICES:

Pressure relief valves, Rupturing disc, Flame-arrester, and Pressure switch.

[F] INDUSTRIAL NETWORKING:

An introduction to networking in process automation, Serial Communication, communication formats, error checking, encoding, communication modes, Serial interface standards, Rs-232, Rs-422, Rs-485, USB, IEEE1394, HART network

C. LEARNING OUTCOMES

After successful completion of this course, student shall be able to:

- explain industrial automation systems, with special focus on design and implementation of Distributed Control System (DCS)
- describe step-by-step hierarchical advancements in industrial automation systems
- select, infer, assess and plan instrumentation documents and drawings
- explain and apply necessary levels of industrial safety and hazard classification
- describe industrial automation and communication technologies and apply best-fit communication protocols and standards

D. RECOMMENDED TEXTBOOKS

1. Instrument Engineer's Handbook, Vol. I, II and III by B. G. Liptak
2. Computer based industrial control, by Krishnakant, 1997 edition
3. PC based Instrumentation – Concepts and Practices by N. Mathivanan, PHI, 2007 Edition
4. Applied Instrumentation in Process Industries, Vol. I & II, by Andrews & Williams

E. REFERENCE BOOKS AND STUDY MATERIAL

1. Mechanical & Industrial Measurements, 8th Edition, by R. K. Jain
2. Applied Instrumentation in Process Industries, Vol. III, by Andrews & Williams
3. Field Bus Technology: Industrial network standards for real time distributed control by Nitaigour Premchand Mahalik, Springer (2008)
4. Foundation field bus overview, National Instruments (May 2003)
5. Foundation field bus system engineering guidelines (Foundation field bus)

F. LIST OF EXPERIMENTS

1. Instrumentation symbols, coding, diagrams and graphics and their interpretation
2. Instrument Air Supply System
3. Compressor
4. Pressure Switch
5. Air Filter Regulator
6. Strip chart recorder
7. Interfacing of strip chart recorder with RTD
8. Current-to-Pressure Transducer (I/P Convertor)
9. Pressure-to-Current Transducer (P/I Convertor)
10. HART Protocol and Smart Transmitter
11. Interfacing of Smart DP Transmitter with Digital Flow Indicating Totalizer
12. Single Loop Programmable Controller (SLPC)
13. Supervisory Control And Data Acquisition (SCADA)
14. Distributed Control System (DCS)

Department of Instrumentation and Control Engineering

Faculty of Technology, D.D.Universitry, Nadiad.

B.Tech. - III, Semester - VI (IC)

Syllabus and Scheme

Subject: Microcontroller Applications (IC-6XX)

Teaching Scheme (Hours)			Examination Scheme (Marks)					Credit Structure			
Lect	Tut	Prac	Ext	Sess	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

- To prepare the students to design & develop microcontroller based applications using 8-bit AVR controllers

B. DETAILED SYLLABUS

[A] AN AVR MICROCONTROLLER DESIGN

A microcontroller Design, Testing the Design, Timing Subroutine, Lookup Tables Concept & Serial Data Communication

[B] BASIC APPLICATIONS & PROGRAMMING

Different types of Keyboard Interfacing & programming, Seven Segment Display interfacing & programming, LCD Interfacing & Programming, ADC Programming Keyboard, Internal ADC Programming & Sensor Interface, External Serial ADC & DAC , Relay, Optoisolator & Stepper Motor Interfacing & Programming, Input Capture & Wave Generation in AVR, PWM Programming & DC Motor Speed Control, MAX7221 Display Interface using SPI, DS1307 RTC Interface using I^2C, RS232 & RS485 Bus Communication applications using UART

[C] INDUSTRIAL APPLICATICATIONS

MEASUREMENT OF ELECTRICAL QUANTITIES & PROTECTION:

Frequency, AC voltage, AC current, DC Voltage, DC Current, phase angle, power factor, AC Power, Over Current Relay

MEASUREMENT & CONTROL OF PROCESS PARAMETER:

Temperature, Pressure, Level & Flow

APPLICATION CASE STUDIES:

Traffic Control, Firing angle control of SCR, Process Controller, Machine Tool Control, Distributed Computer Control System, Industrial Control Boards

C. LEARNING OUTCOMES

At the completion of the course, students will be able to

- integrate & test Microcontroller based system
- write different application programs using Lookup table, Timing subroutine & Serial data subroutine
- interface & build applications using key board, LED Display, LCD Display, ADC, DAC , RTC with AVR Controllers
- use Serial Communications applications for networking applications
- build Industrial Applications using AVR Controller

D. RECOMMENDED TEXTBOOKS

1. The AVR Microcontroller & Embedded Systems, by Mahuammad Ali Mazidi, Sarmad Naimi, Sepehr Naimi, Pearson Publication
2. Embedded Systems, by B. Kanta Ra, PHI
3. Fundamentals of Microprocessors & Microcomputers ,b y B. Ram, Dhanpat Rai Publications

E. REFERENCE BOOKS AND STUDY MATERIAL

1. Microprocessor Application in Control & Instrumentation by Bibbero
2. Programming and Customizing the AVR Microcontroller by Dhananjay Gadre

F. LIST OF EXPERIMENTS

1. Study of AVR Studio & Getting started with Embedded C Programming
2. Time Delay Subroutine
3. Measurement & Generation of Frequency
4. Internal ADC Programming
5. Interfacing of External DAC & Waveform generation
6. Different type of Keyboard Interfacing & Programming
7. Seven Segment Display Interfacing & Programming
8. LCD Interfacing & Programming
9. Serial Port UART Programming
10. RTD Interfacing & Programming
11. Mini Project Part-2 using AVR Microcontroller (Shall be demonstrated in practical exam)

Department of Instrumentation & Control Engineering

Faculty of Technology, D. D. University, Nadiad

B.Tech. – III, Semester – VI (IC)

Syllabus and Scheme

Subject: Process Instrumentation and Control (IC-6XX)

Teaching Scheme (Hours)			Examination Scheme (Marks)					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

- To make students acquire knowledge about the concept of controller principles, algorithms and tuning methods, different types of pneumatic control valve construction, applications, selection and valve sizing
- To prepare students to analyze and design discrete and continuous controllers

DETAILED SYLLABUS

[A] P/I AND P/I CONVERTERS: Manometric transducers, Torque balance design, Oscillator type, electro pneumatic transducers, Transducer positioners, magnetic converters, differential transformer converters

[B] CONTROLLER PRINCIPLES : Introduction, process characteristics, control system parameters, discontinuous controller modes, continuous controller modes, composite control modes

[C] CONTROL LOOP CHARACTERISTICS: Introduction, control system configuration, Single and multivariable control systems, Control system quality, Stability, Process loop tuning

[D] PNEUMATIC CONTROL VALVE AND ACTUATORS: Introduction, operating mechanism of control valves, direction control valves, construction and working of control valves, Pneumatic Actuators, Selection of control valves and actuators

[E] CONTROL VALVE CHARACTERISTICS: Characteristics of control valves, rangeability, control valve selection, Sizing of control valves

B. Text Books :

1. Process Control Instrumentation Technology,
   By: C. D. Johnson, Pearson Education Ltd
2. Industrial Instrumentation Fundamentals
   By: Austin Fribance, Tata McGraw Hill publication
3. Applied Instrumentation in Process Industries, Vol. II,
   By: W.G. Andrews/H.B.Williams, Gulf Publication Company
4. Control system components
   By: M.D.Desai, Pearson Prentice Hall, Inc

Reference Books :

1. Measurement systems : Applications & Design
   By: Ernest Doeblin, McGraw Hill
2. Instrumentation measurement & analysis
   By: B.C. Nakra & K. K. Chaudhary , McGraw Hill
3. Mechanical & Industrial Measurement,
   By: R. K. Jain, Khanna Publishers
4. Transducers & Instrumentation,
   By: D. V. S. Moorty, PHI Learning Pvt.Ltd
5. Instrumentation - Devices & Systems,
   By Rangan, Sharma & Mani, Tata McGraw Hill publication

C. LEARNING OUTCOMES:

After completing this course students will be able to:

- Explain different P/I and I/P converters
- Design and analyze P, PI, PD, PID Controllers
- Select and size appropriate pneumatic control valve based upon various selection parameters

D. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT

List of laboratory experiments:

1 Response of P Controller

2 Response of PI Controller

3 Response of PD Controller

4 Response of PID Controller

5 Study of control calve cut sections

6 To study pneumatic system components

7 To find out characteristics of I/P converter

8 To find out characteristics of P/I converter

9 Study of control valve characteristics

10 Instrumentation Amplifier characteristics

Prof. Ashish Patel
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Department of Instrumentation and Control Engineering

Faculty of Technology, D. D. University, Nadiad.

B.Tech.-III Semester-VI (IC)

Syllabus and scheme

Subject: Power Plant Automation (IC-6XX)

Teaching Scheme (Hours)			Examination Scheme (Marks)					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	0	2	60	40	25	25	150	4	0	2	5

A. OBJECTIVES OF THE COURSE

- To make students to acquire knowledge for various types of power plants, different control techniques for boiler and turbine, measurement of related parameters for control of various power plant and renewable energy sources for solar & wind power generation.

B. DETAILED SYLLABUS

[A] Introduction to Power Plant:

Plant overview, Role of Control and instrumentation in power plant, Classification of power plants: thermal, hydro, combined cycle and nuclear.

[B] Boiler & Turbine Supervisory Control:

Introduction, Operation, Drum level control, Combustion control, Turbovisory system, Measurement and analysis of gas, Super-heated steam temperature, Level, Pressure and Flow. Coordinated controls of boiler and turbine.

[C] Power Plant Process:

Boiler process, Turbine process, Fuel Handling Plant, Air Compressor, etc.

[D] Power Plant Subsystem Automation:

Control of mill throughput, Mill temperature control, Forced draught control, Feed pump control, Boiler-following-turbine load control, Advanced Gas Cooled Reactors (AGRs).

[E] Electrical Instruments and Metering:

Recorders and Industrial Displays, Electrical Instruments and Metering Working of meters, Meter calibration.

[F]Renewable Energy Sources for power Generation:

Solar power Generation, Small home power plant Design & Automation.

Wind power Generation & wind turbine Design & Automation.

C. LEARNING OUTCOMES

After completion of the course students should be able to:

- Classify various power plants and understand the role of control and Instrumentation in power plant.
- To apply supervisory control techniques for boiler and turbine.
- Learn different power plant processes, viz. Turbine process, boiler process, etc.
- Describe various recorders, Industrial Displays, working of meters and Meter calibration.
- Describe wind turbine control parameter for power generation.
- Describe turbine interlock and protections for generators.

D. RECOMMENDED TEXTBOOKS

1. Modern Power Station Practice: Incorporating Modern Power System Practice: Vol - F Control and Instrumentation. / by British Electricity International.
2. Instrumentation Engg's Handbook on Process Control - Bela G. Liptak.
3. Powerplant Engineering – P.K.Nag, Mc Graw Hill, 3rd edition
4. Solar PV Power: A Global Perspective by Suneel Deambi.

E. REFERENCE BOOKS& NOTES

1. Power plant instrumentation and control handbook – Swapan Basu and Ajaykumar Debnath, Academic Press, 1st edition
2. Standard Handbook of Powerplant Engineering – Thomas C. Elliot, Mc Graw Hill
3. Energy and Power Generation Handbook – K.R.Rao, ASME Press,
4. Wind power plants: fundamentals, Design, construction & operation. By Springer.

A. LIST OF EXPERIMENTS

1. Study of General layout of thermal power plant.
2. Study of Turbovisory system
3. Study of fuel handling system in coal based power plant.
4. Study of Control techniques for power plant process.
5. Study of drum level water control and swell and shrink phenomenon.
6. Study of air pollution by a thermal power plant.
7. Study of water pollution by a thermal power plant.
8. Study of various combustion process control.
9. Study of wireless monitoring of energy measurement.
10. Study of small low power solar power plant for home application.

Department of Instrumentation and Control Engineering

Faculty of Technology, D.D.Universitry, Nadiad.

B.Tech. - III, Semester - VI (IC)

Syllabus and Scheme

Subject: Smart Instruments (IC-6XX)

Teaching Scheme (Hours)			Examination Scheme (Marks)					Credit Structure			
Lect	Tut	Prac	Ext	Sess	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

To make the students

- describe about classification, fabrication of sensor technologies; identify wired-wireless networking techniques; state and analyze sensor networking solutions for smart sensor network development
- explain relevant standards, protocols and technologies for wireless sensor networks along with IEEE 1451 family of standards aimed at development of smart transducers
- describe concepts of smart factory technology using IoT and IIoT

B. DETAILED SYLLABUS

[A] SMART SENSORS:

Sensors and their classification, Sensor fabrication techniques, Sensors fabrication process details and latest trends in sensor fabrication, some special types of sensors: Fiber optic sensors, Chemical sensors, Bio-sensors

Characterization of sensors

[B] SENSOR DYNAMICS:

Basic concepts, Sensor networking, industrial networking, sensor networking solutions, ISO/OSI model of 7-layers, Smart Sensors, Smart Sensor manufacturing technologies, Smart transducers and smart valve actuators

[C] LAN: TECHNOLOGIES, PROTOCOLS AND TOPOLOGIES:

Wired and wireless networking, Various topologies, Wired network protocols, wireless network protocols

[D] WIRELESS SENSOR NETWORKS AND THEIR APPLICATIONS:

Basic concepts, purposes, usage, Factors and considerations for applications, Practical implementation issues, WSN standard IEEE 802.15.4, WSN applications in emerging areas

[E] IEEE 1451 FAMILY OF STANDARDS:

Brief discussions on IEEE 1451.0 standard, IEEE 1451.1 standard, IEEE 1451.2 standard, IEEE 1451.3 standard, IEEE 1451.4 standard, IEEE 1451.5 standard, IEEE 1451.6 standard and IEEE 1451.7 standard

[F] SMART FACTORY TECHNOLOGY USING IOT AND IIOT:

The Industry 4.0 standard, design considerations, challenges, impacts, vision, intelligent and flexible production system, Asynchronous manufacturing, Historical perspective, Smart manufacturing, Internet of Things (IoT), Industrial Internet of Things (IIoT), smart features such as self-diagnostics, self-healing, self-calibration, etc., Smart factory technology

C. LEARNING OUTCOMES

After successful completion of this course, student shall be able to:

- explain manufacturing of smart sensors; identify and analyze suitable technologies for smart sensor network development
- explain relevant standards, protocols and technologies for wireless sensor networks and describe concepts of smart factory technology using IoT and IIoT

D. RECOMMENDED TEXTBOOKS

1. Understanding Smart Sensors by R. Frank, 2000, Artech House
2. Smart Material Systems and MEMS: Design and Development Methodologies: Vijay K. Varadan, K. J. Vinoy, S. Gopalakrishnan , John Wiley & Sons Ltd.
3. Data and computer communication by William Stallings, 8th Edition, 2004, Pearson
4. Wireless Sensor Networks – Architecture and Protocols, by Edger H. Callaway, 2004, CRC Press
5. Industry 4.0: The Industrial Internet of Things, by Alasdair Gilchrist, Apres publications, Springer Science, USA

6. Measurement and Instrumentation: Theory and Application, by AS Morris, R Langari and Butterworth-Heinemann, 2nd Edition, Elsevier
7. Intelligent Instrumentation, by G. Barney, 1985, PHI
8. Chemical Sensors and Bio-Sensors, by Brayan Eggins, 2003, John Wiley & Sons.
9. Fiber Optic Sensors, by Eric Udd, 1991, Wiley
10. Smart Sensors, by Chapman P., 1995, ISA Publications

E. REFERENCE BOOKS AND STUDY MATERIAL

1. John G. Webster, Editor-in-chief, "Measurement, Instrumentation, and Sensors Handbook", CRC Press (1999).
2. Jacob Fraden, "Handbook of modern Sensors", AIP Press, Woodbury (1997).
3. Sabrie Soloman, "Sensors Handbook", McGraw-Hill , 1999
4. Sensors and Transducers by D. Patranabis, Prentice Hall of India (PHI), 2003.
5. Deshpande P.B and Ash R.H, Elements of Process Control Applications, ISA Press, New York, 1995.
6. Sensors and Signal Conditioning by John Wiley, (2001).
7. Electronic Instruments and Instrumentation Technology by MMS Anand, 2004, Prentice Hall of India (PHI).
8. Microprocessors and Interfacing: Programming and Hardware by DV Hall, 1992, Tata McGraw Hill
9. Microprocessors: Architecture, Programming and Applications by Ramesh S. Gaonkar, 2003, Wiley Eastern.

F. LIST OF EXPERIMENTS (PROJECT BASED LABORATORY covering following topics)

1. Review of Smart Instrumentation, Smart Sensors and Smart Networks concepts
2. Smart Sensors Manufacturing Processes
3. Special types of sensors and their characteristics
4. Sensor Networking: Concepts, Design and Implementation of ISO/OSI Model
5. Smart Transducers and Smart Actuators
6. Design Tutorial: Wired Networking Technologies for smart sensor networking
7. Design Tutorial: Wireless Networking Technologies for smart sensor networking
8. IEEE 1451 Family of Standards and Design of Smart Transducers
9. Smart features of smart instruments
10. Review of Industry 4.0 standard and its salient features

Department of Instrumentation and Control Engineering

Faculty of Technology, D. D. University, Nadiad.

B.Tech.-IV, Semester-VII (IC)

Syllabus and scheme

Subject: Advance Control Theory and System Design (IC-7XX)

Teaching Scheme (Hours)			Examination Scheme (Marks)					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
3	1	2	60	40	25	25	150	3	1	1	5

A. OBJECTIVES OF THE COURSE

- To make students acquire knowledge about various state space models of control systems, different compensation design techniques for control systems in time and frequency domain, Passive network synthesis and Adaptive control Schemes.

B. DETAILED SYLLABUS

[A] STATE VARIABLE ANALYSIS

Introduction, State modes of linear continuous-time systems, Diagonalization, Solutions of state equations, Concept of controllability & Observability

[B] OPTIMAL CONTROL SYSTEMS

Introduction, Performance indices, Parameter optimization: Servomechanisms

[C] SYSTEM COMPENSATION

Introduction to system compensation, Time domain compensation technique using root locus, Frequency domain compensation Techniques using Bode Plots, Minor-loop Design of Control System

[D] NETWORK SYNTHESIS

Introduction, Positive Real Function, Synthesis of One Port LC, RC, RL and RLC passive networks

[E] ADVANCED PROCESS CONTROL:

Introduction to Advance Control Systems – Adaptive Control, Model Reference Adaptive Control (MRAC), Internal Model control

C. LEARNING OUTCOMES

After completion of the course students will be able to:

- Define State variables, build state model and learn state variable analysis techniques
- Solve Parameter optimization control problems
- Design and compensate a control system for given specifications using root locus technique and Bode plot.
- Synthesize a system network based on the driving point impedance functions.
- Describe positive real functions and their characteristics.

D. RECOMMENDED TEXTBOOKS

1. Control system engineering

   By I. J. Nagrath & M. Gopal, New Age International Publishers
2. Introduction to Modern Network Synthesis

   By Van Valkenburg, John Wiley & Sons

E. REFERENCE BOOKS & NOTES

1. Modern control Theory

   By: K. Ogata, Prentice Hall
2. Modern control theory

   By: J. T. Tou, McGraw Hill
3. Modern control system theory

   By: M. Gopal, New Age International
4. Linear Control System (Analysis & Design conventional & Modern)

   By: D'azzo & Houpis, Marcel Dekker
5. Design of Feedback System

   By: Thaler G. J., John Wiley & sons
6. Control system principles and design

   By M. Gopal, Mc Graw Hill
7. Adaptive Internal Model Control

   By Aniruddha Datta, Springer-Verlag London Ltd.

F. LIST OF EXPERIMENTS

1. Introduction to state space models of control systems
2. State model Controllability and Observability
3. State model analysis
4. Response of system
5. Introduction to Optimal control systems
6. Introduction to compensation in control systems
7. Compensation in Time domain
8. Compensation in Frequency domain
9. Testing driving point functions
10. Passive network synthesis

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Department of Instrumentation and Control Engineering

Faculty of Technology, D.D.Universitry, Nadiad.

B.Tech. - III, Semester - VII (IC)

Syllabus and Scheme

Subject: Biomedical Instrumentation (IC-7XX)

Teaching Scheme (Hours)			Examination Scheme (Marks)					Credit Structure			
Lect	Tut	Prac	Ext	Sess	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

To make the students

- Aware about importance of different instruments in Medical field which are used for the measurement of different parameters of human body along with classification and terminologies of measurement Techniques.
- State & explain about specifications, selection criteria and characteristics of instrumentation measurement systems of different Biomedical signals in Medical field.
- Explain various Imaging techniques for different applications in biomedical field.
- Utilize biomedical instruments for diagnostic purpose.

B. DETAILED SYLLABUS

[A] Measurement, Recording and Monitoring:

Fundamentals of Medical Instrumentation:
Anatomy and Physiology, Physiological system of Body, Sources of Biomedical Signals, Basic Medical Instrumentation System, Performance requirement of Medical Instrument system, General Constraints of Medical Instrument system, Regulations of Medical Devices.

Bioelectric signals and Electrodes:
Origin of Bioelectric signals, Recording Electrodes, Electrodes for ECG,EEG,EMG, Electrical conductivity of electrodes jellies and creams, Microelectrodes, Skin surface electrodes and needle electrodes.

Recording systems :
Basic recording system,General considerations for signal conditioners, Preamplifiers, Sources of noise in low level measurement,Biomedical signal analysis techniques, Signal processing techniques, The main amplifier and driver stage,Different types of recorders, VCG,PCG,EEG,EMG,ECG.

Patient monitoring Systems:

System concepts, Cardiac monitor,Bedside Patient Monitoring system,Central Monitors, Measurement of Heart Rate,Measurement of Blood Flow, Measurement of Pulse Rate, Blood Pressure Measurement, Measurement of Temperature, Measurement of Respiration rate ,Catherization lab instrumentation.

[B] Modern Imaging Systems:

X-Ray Machines and Digital Radiography:

X-Rays, X-Rays Machine, X-Ray Computed Tomography,Nuclear Medical Imaging Systems, Emission Computed Tomography (ECT),Single Photon Emission Computed Tomography (SPECT),Positron Emission Tomography (PET), Magnetic Resonance Imaging (MRI)

Ultrasonic Imaging Systems:

Diagnostic Ultrasound, Physics of Ultrasonic waves, Medical Ultrasound, Basic Pulse echo apparatus, A- scan, Echocardiograph, Real time Ultrasonic Imaging Systems, Biological effects of ultrasound

[C] Therapeutic Equipments:

Cardiac Pacemakers:

Need for Cardiac Pacemakers, External Pacemakers, Implantable Pacemakers, Recent Development in Pacemakers.

Cardiac Difibrillators:

Need for Cardiac defibrillator, DC Defibrillator, Implantable Defibrillator, Pacer-Cardioverter-Defibrillator.

Instruments for Surgery:

Surgical Diathermy, Surgical Diathermy Machine, Safety aspects in Surgical Diathermy machine, Surgical Diathermy Analyzers.

LASER Application in Biomedical Engineering:

What is LASER ? ,Different types of LASER,Effects of Tissues and related issues, Selection of LASER for surgery, Application in different areas,Safety Aspects.

Physiotherapy and Electrotherapy Equipments:

Shortwave Diathermy, Microwave Diathermy ,Ultrasonic Diathermy, Pain relief through Electrical Stimulation.

Haemodialysis machine:

Function of Kidneys, Artificial Kidneys, Dialyzer, Haemodialysis machine.

Electrical Safety of Medical Equipment:

Physiological effect of electrical current, Shock hazard form electric equipment, Methods of accident prevention.

Latest Issues in BME:

Biomaterials, Telemedicine, Artificial heart ….

C. LEARNING OUTCOMES

After successful completion of this course, student shall be able to:

- develop awareness about needs of different biomedical instruments for measuring different bioelectric signals along with their design-development, classification and associated technical terminologies.
- learn specifications and salient characteristics based choice making of biomedical instrumentation measurement systems
- learn methods and applications in the field of Biomedical instrumentation.
- develop awareness of measuring different body parameters and acquired the knowledge about its importance for body with the help of different biomedical instruments.

D. RECOMMENDED TEXTBOOKS

[1] Hand book of Biomedical Instrumentation by R. S. Khandpur.

[2] Biomedical Instrumentation and measurement by Cromwell, Weibell & Preiffer.

E. REFERENCE BOOKS

[1] Introduction to Biomaterials- by Sujata Bhatt (Narosa Publishing House)

[2] Introduction to Biomedical Equipment Technology- Joseph Carr and John Brown (Pearson Education)

[3] Biomedical Digital signal Processors- Wills J. Tompkins (PHI)

[4] Medical Instrumentation- Application and Design- John G. Webster (Wiley Student edition)

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

List of laboratory experiments:

1. Blood Pressure Measurement.
2. Blood Flow Measurement.
3. Respiration Rate Meter.
4. Phonocardiograph System.
5. D.C. Defibrillator.
6. Heart Rate Indicator.
7. Single channel ECG Machine.
8. Medical Telemetry Machine.
9. Multi-parameter Monitor.
10. Tread Mill Tester.
11. External Pacemaker.

Submitted By:

[Prof. C. S. Dalal] **Associate Professor,** **IC Department.**	**[Prof. Ashish G. Patel]** **Assistant Professor,** **IC Department.**	**[Prof. H. R. Patel]** **Assistant Professor,** **IC Department.**

Department of Instrumentation and Control Engineering

Faculty of Technology, D.D.Universitry, Nadiad.

B.Tech. - IV, Semester - VII (IC)

Syllabus and Scheme

Subject: Digital Signal Processing (IC-7XX)

Teaching Scheme (Hours)			Examination Scheme (Marks)					Credit Structure			
Lect	Tut	Prac	Ext	Sess	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

To make the students

- list and state core concepts of signal, its properties and importance of signal processing in digital domain
- describe, identify and characterize systems based on time and frequency domains
- identify and apply application specific transforms as signal processing tools
- select and design application specific different digital filters; and analyze and evaluate their performance; apply necessary design modifications
- list, state and apply signal conversion/condition processes

B. DETAILED SYLLABUS

[A] INTRODUCTION TO DISCRETE LINEAR SYSTEMS:

Discrete time signals, special sequences, shift invariance, stability and causality, impulse response.

[B] DISCRETE TIME FOURIER TRANSFORMS AND LINEAR TIME INVARIENT SYSTEMS:

Transform definitions, theorems, Frequency response of linear time invariant systems, phase and group delays.

[C] THE Z-TRANSFORMS:

Z-transforms by summation of left, right and two-sided sequences, Regions of convergence and z-transform properties, inverse z-transforms

[D] PROPERTIES OF DIGITAL FILTERS:

Group delay, linear phase, all-pass, minimum phase

Averaging filter, Recursive smoother, First-order unity gain resonator, All-pass filters, comb filters, equalization filters, Group delay, linear phase, all-pass, minimum phase.

[E] FOURIER TRANSFORMS AND SAMPLING-PART I:

Fourier transform review, sampling continuous-time signals, the sampling theorem, Aliasing, Re-sampling digital signals, Midterm review.

[F] FOURIER TRANSFORMS AND SAMPLING-PART Ii:

A/D conversion and quantization, D/A conversion, Polyphase decomposition, Polyphase DFT filter banks, Bandpass sampling

[G] THE DISCRETE FOURIER TRANSFORMS:

Definition of DFT and relation to z-transform, properties of the DFT, Linear and periodic convolution using the DFT, Zero padding, spectral leakage, resolution and windowing in the DFT

[H] FAST FOURIER TRANSFORMS:

Decimation in time FFT, Decimation in frequency FFT

C. LEARNING OUTCOMES

After successful completion of this course, student shall be able to:

- describe and explain signal, its properties and its processing in digital domain
- make choice of systems based on time and frequency domains
- select signal processing transforms for given application
- select and design digital filters; and assess their performance with required modifications in design
- describe and apply signal conversion/condition processes

D. RECOMMENDED TEXTBOOKS

1. Analog and Digital Signal Processing by Ashok Ambardar, THOMSON Books/Ole
2. Digital Signal Processing: Principles, Algorithms and Applications, J. Proakis, D. Manolakis, Prentice-Hall, 2006 (4-th edition)
3. Digital Filters – Analysis, Design & Applications by Andreas Antoniou, Tata McGrow Hill, 2nd Edition

E. REFERENCE BOOKS AND STUDY MATERIAL

1. Digital Signal Processing: A Computer-Based Approach, S. K. Mitra, McGraw-Hill, Third edition, 2006.
2. Discrete-Time Signal Processing by A. V. Oppenheim and R. W. Shafer, PHI,2/E, 2000
3. Digital Signal Processing Using MATLAB (r), V. Ingle, J. Proakis, Brooks/Cole Pub. Co., 1999.
4. A Course in Digital Signal Processing, B. Porat, J. Wiley and Sons, 1996: This is an excellent DSP book – It has been used by Prof. Leahy as a course text, but according to Prof. Leahy.
5. Understanding Digital Signal Processing, R. Lyons, Prentice-Hall, 1996: Excellent reference book with lots of interesting DSP "tricks."

F. LIST OF EXPERIMENTS

1. Introduction to signals, systems, signal and their classification
2. Z-transforms and their applications in digital signal processing
3. Design of first order hold circuit
4. Design of ADC and DAC
5. Filters: classification, design specifications and applications
6. Fourier Transforms, Fast Fourier Transforms and their applications in digital signal processing
7. Design of Butterworth filters and applications
8. Design of Chebyshev filters and applications
9. Design of All pass, Band pass and Band reject filters and applications
10. Design of Averaging filters and applications

IC7XX – Embedded Systems

SEM-VII (B.Tech , 4th Year)

Department of Instrumentation & Control Engineering

Faculty of Technology, Dharmsinh Desai University

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

To prepare the students to design & develop Embedded Systems Applications using ARM Cortex M0/M0+ & Family

B. DETAILED SYLLABUS

[A] Introduction to Embedded Systems
Importance of ARM Cortex M0 Processor, Applications of Cortex M0 Processors, Background of ARM Processors, Cortex M0 Processor Specifications & Architecture,

[B] ARM Cortex-M0 Architecture
Overview, Programming Model, Memory System, Stack Memory Operations, Exceptions & Interrupts, Nested Vectored Interrupt Controller, System Control Block

[C] Introduction to Cortex M0 programming
Introduction to Embedded System Programming, Designing Embedded Programs, Inputs and Outputs, Development Flow, C Programming & Assembly Programming, Program Image, Cortex Microcontroller Software Interface Standard

[D] Instruction Set, Basic Examples & Programming Using Embedded C
Assembly Basics, Exception related Instructions & basic assemble examples, Detail overview of Embedded C

[E] Memory Systems, Exceptions and Interrupts
Memory Map & Register Boundary Addresses, Program Memory, Boot Loader, and Memory Remapping, Introduction to Exceptions & Interrupts, Exception Types of Cortex M0 , Exception Priority Definition & Vector Table

[F] Interrupt & System Control
Overview of the NVIC and System Control Block Features,Interrupt Control,Exception Masking Register,Interrupt Inputs and Pending Behaviour, System Control Registers

[G] Introduction to Cortex M0 Peripherals
Power Control, Reset & Clock Control, System Configuration Controller, General Purpose Digital I/O, Watch Dog Timer, Basic Timer, General Purpose Timers, Advanced Control Timers, Real Time Clock, Analog to Digital Converter, PWM & DMA Controller

[H] Introduction to Cortex M0 Serial Peripherals
UART, SPI, I2C & USB

[I] **Getting Started with Integrated Development Environment& Application Programming

** Only for Laboratory Purpose

C. LEARNING OUTCOMES

At the completion of the course, students will be able to

- To explain ARM Processor Architecture& various features of Cortex M0 Processor
- To do programming of Cortex M0 Processor using Embedded C
- To build various applications by exploring strong peripherals like Watch DogTimer,16/32 bits Timers, ADC, DMA Controller, SPI, I2C , UART & USB

D. RECOMMENDED TEXTBOOKS

[1] The Defective Guide to the ARM Cortex M0
By: Joseph Yiu, Elsevier
[2] STM32F030x4/x6/x8/xC and STM32F070x6/xB advanced ARM^{R}-based 32-bit MCUs
By: Reference Manual by ST Semiconductor

E. REFERENCE BOOKS

[1] Mastering STM32 ,A step-by-step guide to the most complete ARM Cortex-M platform, using a free and powerful development environment based on Eclipse and GCC
By: Carmine Noviello
[2] Embedded Systems
By: B. Kanta Rao , PHI Learning Private Limited

F. LIST OF EXPERIMENTS

1 Getting Started with Integrated Development Environment
2 System Clock &Configuration Programming
3 Digital I/O Programming
4 General Purpose Timer & Time Delay Applications in C
5 Advanced Timer Applications Programming in C
6 DMA Application Programming in C
ADC Application Programming in C
7 UART Application Programming in C

8 SPI & I2C Programming in C
9 Temperature Monitoring & Control Application
10 System Monitoring & Control using IOT Library

Important Note:

- In Examination (Theory & Practical) Registers Map of Peripherals of Cortex M0 with sufficient information shall be given to students.

Department of Instrumentation and Control Engineering

Faculty of Technology, D. D. University, Nadiad.

B.Tech.-IV, Semester-VIII (IC)

Syllabus and scheme

Subject: Industrial Exposure & Practice (IC-716)

Teaching Scheme (Hours)			Examination Scheme (Marks)					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
0	0	6	--	--	25	25	100	0	0	3	3

Department of Instrumentation and Control Engineering

Faculty of Technology, D.D.Universitry, Nadiad.

B.Tech. - IV, Semester - VII (IC)

Syllabus and Scheme

Subject: Modeling, Simulation and Evolutionary Techniques (IC-7XX)

Teaching Scheme (Hours)			Examination Scheme (Marks)					Credit Structure			
Lect	Tut	Prac	Ext	Sess	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

To make the students

- describe importance and fundamental concepts, terminologies and applications of modeling, simulation and evolutionary techniques
- list and select system models, sets and fractals as per behavioral characteristics
- design and apply Fuzzy Logic Controller(s) (FLC), evaluate their performance and modify their design suitably as necessary
- describe simulation study, state and apply its step wise procedures, and analyze-select best-feasible models and study techniques
- explain Artificial Neural Network(s) (ANN), Genetic Algorithms (GA); and state and apply step wise procedures for controller optimization

B. DETAILED SYLLABUS

[A] INTRODUCTION:

Introduction, Objectives of the course, Overview of the course, Classification of Systems, Models, Purposes of Modeling, Classification of Models, Modeling Techniques, System Variables.

[B] SYSTEMS AND MODELING:

Fractals, Types of Fractals, The Sierpinski Triangle, Fractal and Scaling Similarity, Self-Similarity Dimension, Cantor Set, The Mandelbrot Set, Julia Set, Examples of The Mandelbrot Set, Julia Set and Fractals, The Chaos Theory, Basic Observations,

Governing Rules of Chaos Theory, Chaotic Behavior of Logistic Equation, Example of Chaotic Behavior, Chaos and Fractals.

[C] FUZZY LOGIC CONTROL (FLC):

Introduction, Fuzzification and Defuzzification of models, Fuzzy sets and set operations, Elementary Fuzzy Operators, Step-wise Procedure for Design of FLC using Matlab, Detailed Explanation of Matlab Fuzzy Logic Toolbox and its usage, Design of Fuzzy Controller, Design of Fuzzy Logic based PID Controller

[D] SIMULATION:

Explanations of System, Modeling and Simulation, Classification of System Models, Step-wise Procedure for Simulation Study, Advantages and Disadvantages of Simulation, Basic Flow Chart for Simulation Study

Monte-Carlo Simulation Technique, Step-wise Procedure for Monte-Carlo Simulation Technique, Verification and Validation of Simulation Models, Various techniques of model validation.

[E] ARTIFICIAL NEURAL NETWORKS (ANN):

Architecture#ntroduction to ANN, ADALIN, Learning method Delta Rule, MSE based Training to ADALIN, Adaptive Filtering, Tapped Delay Line, Adaptive Filter, Basic ANFIS, ANFIS Learning Algorithms, Step-wise Procedure to setup ANFIS using Matlab Takagi-Sugeno FIS, Mamdani FIS, Mamdani v/s Sugeno

[F] EVOLUTIONARY TECHNIQUES:

Introduction to Genetic Algorithms (GA), Darwin's Observation, Darwin's Theory – Natural Selection, Terminology of GA, Applications of GA, PID controller optimization using GA, Kohonon's Self Organizing Map (SOM), Hopfield Neural Network

C. LEARNING OUTCOMES

After successful completion of this course, student shall be able to:

- explain and apply various modeling, simulation and evolutionary techniques
- state and choose system models, sets and fractals as per behavioral characteristics
- design and apply Fuzzy Logic Controller(s) (FLC), evaluate their performance and modify their design suitably as necessary
- describe simulation study, state and apply its step wise procedures, and examine-choose best-suitable models and study techniques

- describe Artificial Neural Network(s) (ANN), Genetic Algorithms (GA); and list and apply step wise procedures for controller optimization

D. RECOMMENDED TEXTBOOKS

1. Process Control–Principles and Applications by Surekha Bhanot, Publisher: Oxford University Press (2008), India.
2. Introduction to Artificial Neural Systems by Jacek M. Zurada, West Publishing Company, USA.
3. Advanced Control Engineering by Ronald S. Burns, Butterworth-Heinemann Publishers, USA.
4. Process Control and Optimization, Instrument Engineer's Handbook, Volume II by Bela G. Liptak, 2006 Edition, Taylor and Francis, CRC Press, USA.
5. Optimization of PID controller using Ant Colony and Genetic Algorithms by Unal, Tpuz and Erdal, 2013 edition, Springer
6. Design of Fuzzy Controllers by Jan Jantzen, Tutorial Paper, Department of Automation, Technical University of Denmark, Denmark.
7. Class Notes and Discussions in Theory and Laboratory Sessions

E. REFERENCE BOOKS AND STUDY MATERIAL

1. G. D. Sousa, B. K. Bose, "A Fuzzy Set Theory based Control of a Phase-controlled Convertor DC Machine Drive", IEEE Trans., Vol. IA – 30, no. I, pp. 34-44.
2. M. Godoy Simoes, Bimal K. Bose and Ronald J. Spiegel, "Fuzzy Logic based intelligent control of a variable speed cage machine wind generation system", IEEE Trans. on Power Electronics, Vol. 12, pp. 87-95, Jan. 1997.
3. Denn M. M., "Process Modeling", Longman, 1986.
4. Holland C. D., "Fundamentals and Modeling of Separation Processes", Prentice Hall., 1975.
5. Luyben W. L., "Process Modeling Simulation and Control for Chemical Engineers", 2nd Ed., McGraw Hill, 1990.
6. Najim K., "Process Modeling and Control in Chemical Engineering", CRC, 1990.
7. Aris R., "Mathematical Modeling, Vol. 1: A Chemical Engineering Perspective (Process System Engineering)", Academic Press, 1999.

F. LIST OF EXPERIMENTS

1. Introduction to Modeling and Simulation
2. Modeling of simple process control systems
3. Evolutionary techniques, classification and application criteria
4. Fuzzy Logic: Concepts, terminologies and application development
5. Fuzzy logic: Design and Implementation
6. Genetic Algorithms: Concepts, terminologies and application development
7. Genetic Algorithms: Design and Implementation
8. Artificial Intelligence and Neural Networks: Concepts, design and application development
9. Adaptive system design and tuning approaches
10. Comparative study of PID controller tuning using classical, Fuzzy logic, Genetic Algorithms and ANFIS

Department of Instrumentation and Control Engineering

Faculty of Technology, D.D.Universitry, Nadiad.

B.Tech. - IV, Semester - VII (IC)

Syllabus and Scheme

Subject: Process Control (IC-7XX)

Teaching Scheme (Hours)			Examination Scheme (Marks)					Credit Structure			
Lect	Tut	Prac	Ext	Sess	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

To make the students

- describe fundamental concepts of industrial process control, relevant terminology and control loop configuration for simple and complex control loops
- deduce, analyze and evaluate open and closed loop response of control systems and effects of P, PI, PD and PID control algorithms on the transient response of control systems
- explain process details, identify critical parameters, interaction among critical parameters as well as design of recommended control schemes for most widely utilized industrial process units using boiler, distillation column, steam turbine, compressor and heat exchanger as case study examples
- apply and evaluate impacts of different controller turning methods and conclude the best-fit approach
- identify limitations of basic PID control and necessities of control strategies for solving process control problems; and also to assess-apply various control strategies such as Ratio, Cascade, Feed Forward, Split-range, Inverse derivative, Selector, etc. in problem-solution methodology

B. DETAILED SYLLABUS

[A] INTRODUCTION TO PROCESS CONTROL AND FUNDAMENTAL CONCEPTS:

Introduction to process control, Evolution of process control, Laplace transforms in process control, open loop v/s closed loop systems, open loop response, feedback v/s feed forward control configuration

[B] OPEN LOOP RESPONSE OF SYSTEM AND ANALYSIS:

Introduction to process control, Closed loop and open loop control system, Basic control actions-ON/OFF control, Proportional action, Integral action, Derivation action, Stability problem, Laplace transforms, Response of thermometer bulb, Concentration response of stirred tank, Temperature response of stirred tank, Response of Pressure system, Response of non-interacting first order elements in series, Response of interacting elements in series, Response of distributed systems

[C] TRANSIENT RESPONSE OF SYSTEM AND CONTROL DYNAMICS:

Servo operation v/s Regulator operation, General equations for transient response, Proportional control of single capacity process, Proportional control of two capacity process, Proportional control of three capacity process, Integral control, Proportional Integral control, Derivative control, Effect of measurement lag, Effect of time delay, Level – A major variable, Averaging control, Tank dynamics, Measurement Lag

[D] CONTROL OF UNIT OPERATIONS:

Boiler controls: Introduction, construction, operation and process, variants-classification-applications, critical parameters, combustion control schemes-series, parallel, calorimetric, fuel cut-back relay based schemes, Drum level control schemes – single element, two elements, three elements drum level control schemes, Steam temperature control schemes – using burner tilt, using desuperheating water, using bypass dampers

Distillation column controls: Introduction, construction, operation and process, variants-classification-applications, critical parameters, feed control loops, temperature control schemes, column pressure control schemes, Vacuum control schemes, High speed column pressure control scheme, Reboiler controls, Thermosyphen reboiler controls, Reflux controls, cascaded distillation columns controls, Application of analytical instruments in distillation column control

Compressor controls: Introduction, construction, variants-classification-applications, operation and process, critical parameters, Microprocessor based compressor control, Lube and seal systems and their applications in compressor control

Steam turbine controls: Introduction, construction, variants-classification-applications, operation and process, critical parameters, MISO type steam turbine control, Microprocessor based steam turbine control, Lube and seal systems and their applications in steam turbine control, Turbine health monitoring system

Heat exchanger controls: Introduction, construction, variants-classification-applications, operation and process, Degrees of freedom, critical parameters, Heater control schemes, Cooler control schemes, 3-way valves and their applications in heat exchanger control, Pumping traps, Level traps, Applications of pumping and level traps in heat exchanger control

[E] CONTROL SCHEMES:

Introduction to control schemes, Comparative analysis of Control System v/s Control algorithm v/s Control scheme, Problem-solution methodology of automation design, Ratio control, Example of combustion control using ratio control, Comparative analysis of Disturbance v/s Transient, Load change as disturbance, Cascade control, Feed-forward control, Selector control, Requirements of slow startups in batch processes, Inverse-derivative control, Controlling a parameter using counter balancing, Split range control

[F] CONTROLLER TUNING METHODS:

An introduction to controller tuning and its significance, Criteria for good control-ISE, IAE and ITAE, Open loop tuning, Process reaction curve, Ziegler-Nichols method, Reaction Curve method, Cohen-Coon method, Integral criteria tuning, Lambda tuning, Comparison of different PID tuning methods, Comparison of closed loop and open loop tuning

C. LEARNING OUTCOMES

After successful completion of this course, student shall be able to:

- explain fundamental concepts of industrial process control, relevant terminology and control loop configuration for simple and complex control loops
- assess, analyze and evaluate open and closed loop response of control systems and effects of P, PI, PD and PID control algorithms on the transient response of control systems

- describe process details, identify critical parameters, interaction among critical parameters as well as design of recommended control schemes for most widely utilized industrial process units using boiler, distillation column, steam turbine, compressor and heat exchanger as case study examples
- apply and assess impacts of different controller turning methods and conclude the best-fit approach
- identify limitations of basic PID control and necessities of control strategies for solving process control problems; and also to assess-apply various control strategies such as Ratio, Cascade, Feed Forward, Split-range, Inverse derivative, Selector, etc. in problem-solution methodology

D. RECOMMENDED TEXTBOOKS

1. Process Control, by Peter Harriot
2. Principles of Process Control, by Patranabis
3. Automatic Control of Power & Process, by Manifold
4. Instrument Engineer's Handbook (Process Control), by BG Liptak (Vol. II)
5. Applied Instrumentation in Process Industries, Vo. I & II, by Andrews & Williams
6. Process Control-Principles and Applications, by Surekha Bhanot

E. REFERENCE BOOKS AND STUDY MATERIAL

1. Chemical Process Control, by Stephanopoulos
2. Process Control, by Pollard
3. Principal of Industrial Measurements, by Patranabis
4. Applied Instrumentation in Process Industries Vol. II, by Andrews & Williams
5. Chemical Process Control, by Shinskey
6. Chemical Process Control, by Coughnour & Copel
7. Process Modeling, Simulation & Control for Chemical Engineers, by W. Luyben

F. LIST OF EXPERIMENTS

1. Performance of Ratio Control Scheme (Laboratory setup board based)
2. Simulation of Ratio Control Scheme and comparison with practical performance

3. To study the response of Cascade Control Scheme
4. Performance of Feed Forward Control Scheme (Laboratory setup board based)
5. Simulation of Feed Forward Control Scheme and comparison with practical performance
6. Simulation of First order Mixing Process response and its analysis
7. Simulation of Single Tank system subjected to level control response and its analysis
8. Simulation of Two Tank system subjected to level control response and its analysis
9. Simulation of Three Tank system subjected to level control response and its analysis
10. To study the response of Transportation Lag
11. Simulation of Jacketed Reactor system subjected to temperature response and its analysis
12. Simulation of Stirred Tank Reactor system subjected to concentration response and its analysis
13. Simulation of Pressure system subjected to pressure control response and its analysis
14. Simulation of PID Tuning using Ziegler-Nichols method and its optimization-analysis
15. Simulation of PID Tuning using Cohen-Coon method and its optimization-analysis
16. Simulation of PID Tuning using Ziegler-Nichols method and its optimization-analysis
17. Comparative simulation analysis of PID Tuning methods and derivation of comparison criteria for good control

Department of Instrumentation and Control Engineering

Faculty of Technology, D.D.Universitry, Nadiad.

B.Tech. - IV, Semester - VIII (IC)

Syllabus and Scheme

Subject: Computer Numerical Control (IC-8XX)

Teaching Scheme (Hours)			Examination Scheme (Marks)					Credit Structure			
Lect	Tut	Prac	Ext	Sess	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

To make students

- describe fundamental concepts of computer based numerical control for automation of manufacturing facilities, along with structure-factors-sequence and components of process planning
- list different variants and identify best-fit CNC system and associated tools using selection criteria and checklist
- apply part and full CNC programming with application case study examples

B. DETAILED SYLLABUS

[A] FUNDAMENTALS OF PROCESS PLANNING:

Introduction, Process planning, Structure of process plan, factors influencing process plan, Sequence of operation of process plan, Components of numeric control system.

(Page no. 01-23, B S Pabla and M Adithan)

[B] CNC SYSTEMS:

CAM, NC, CNC and DNC, Selection criteria for CNC machines, Adaptive control, Classification of numerical control machine.

(Page no. 24-35, B S Pabla and M Adithan)

[C] CONSTRUCTIONAL FEATURES OF CNC MACHINE:

Classifications of CNC Machine, Modes of operation of CNC, Working of Machine Structure, Slideways, Spindle drive, Axis drive, Re-circulating ball screw feedback devices (transducers, encoders, etc.) **(Page no. 37-47, B S Pabla and M Adithan)**

[D] CNC PART PROGRAMMING:

Axes Identification in CNC turning and Machining centers, Machine zero, home position, work piece zero, programme zero, Introduction of CNC part programming Programming format and Structure of part programming Instruments

(Page no. 48-97, B S Pabla and M Adithan)

[E] TOOLING FOR CNC MACHINE:

Cutting tools, Work holding devices in CNC, Multi-pallet machine, Daily checklist, and Problems related to mechanical systems **(Page no. 98-103, B S Pabla and M Adithan)**

[F] INDUSTRIAL NETWORKING:

An introduction to networking in process automation, HART network

C. LEARNING OUTCOMES

After successful completion of this course, student shall be able to:

- explain CNC based automation of manufacturing facilities
- classify different variants and select best-fit CNC system and associated tools
- solve problems applying CNC programming

D. RECOMMENDED TEXTBOOKS

1. CNC Machines, by B S Pabla and M Adithan, 2014, New Age Int. New Delhi
2. Introduction to NC/CNC Machines, by SK Vishal, 2009, Kataria & Sons, New Delhi
3. Industrial Engineering, by OP Khanna, 2012, Dhanpat Rai Publishers, New Delhi

E. REFERENCE BOOKS AND STUDY MATERIAL

1. Computer Numerical Control-turning and machining centers, by Robert Quesada, 2004, PHI Learning, New Delhi
2. Computer Aided Manufacturing, PN Tiwari and NK Kundra, 2014, Tata McGraw Hill, New Delhi

F. LIST OF EXPERIMENTS

1. Study of Computer Integrated System: Basics, Types of Manufacturing, role of management and CIM wheel
2. Study of NC/CNC technology: Definition, Classification, Specification, Construction details, Sensors and Actuators, and different controllers
3. CNC part Programming: Lathe and Milling jobs
4. Exercise on PLC for Simple problems
5. Problems on GT and Industrial case problems on coding
6. Problems on CAPP and Industrial case problems
7. Study of Flexible Manufacturing system
8. Study of Robotics Technology
9. Study of MRP-I and MRP-II
10. Study of Expert System in Manufacturing and MIS

IC8XX – MOTION CONTROL

SEM-VIII (4th Year)

Department of Instrumentation & Control Engineering

Faculty of Technology, Dharmsinh Desai University

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

To prepare students to acquire knowledge about principal components, types and control techniques of motion control system

B. DETAILED SYLLABUS

[A]Incremental Motion Control:

Introduction Mathematical Modeling Of Mechanical System Elements, Analysis Of Mechanical Systems, Incremental Motion, A Typical Incremental Motion Control Problem

[B]D.C. Motors In Incremental Motion Systems:

Introduction, Operation Principle, Basic Classes of D.C. Motors, Selection Criteria For Incremental Motion Applications, Conclusion.

[C]Torsional Resonance in High- Performance Incremental Motion Systems:

Introduction, The Effects Of Torsional Resonance On The System Response, Torsional Resonance In Two-Body Structures, Torsional Resonance In Three- Body Structures, Effects Of Torsional Resonance On System Stability, Techniques For Minimizing Resonance Effects.

[D]Linear D.C. Servo Amplifiers:

Introduction, Uni-directional Servo Amplifiers, Bi-directional Servo Amplifiers, Power Amplifier Design Considerations, Cross-over Distortion In Power Amplifiers, Current Limiting Techniques, Input-Output Relationships in Linear Amplifiers, Conclusions

[E]Pulse-Width Modulated Amplifier For D.C. Servo Systems:

Introduction, Modes Of Operation, Bi-Polar PWM Amplifiers, Uni-Polar PWM Amplifiers, Limited Uni-Polar PWM Amplifiers, Special Features, Summery

[G]Velocity Control Systems:

Introduction, System Block Diagram, System Design And Analysis, Velocity Variation

[G]Position Control System:

Introduction, Position Control System With Tachometer Feedback, Position Control Systems Without Tachometer Feedback

[H]Phase-Locked Servo Systems:

Introduction, System Model, System Analysis, System Design

[I]Optimal Design Of Incremental Motion Servo Systems:

Introduction, design Objectives, Control Selection, Component Selection, Conclusions.

[J]Step Motor & Selection:

Introduction, Step angle Resolution, Torque Requirements, Pulling Rate versus Load inertia characteristics, Damp response time versus Load inertia characteristics, Step angle accuracy, Power input Limitation, Temperature Limitation, Heat dissipation Limitation, Environmental Factors, Space Limitation, Cost considerations, Mounting Provisions, Selecting Gearing for use with Step Motors

[K]Closed Loop Control of Step Motors

Introduction, The Encoder, The Switching angle of the Lead angle, Direction sensing, effect of Lead angle in Closed loop control of Step Motor, Effect of Switching angle and pulse injections on the closed loop response of four phase step motors, Closed loop control of Step Motor with time Delayed feedback, Experimental result on close loop Step Motor Control, A close loop point to point controller with encoder feedback

[L]Closed Loop Control by Current Sensing

Introduction, Typical Current waveforms and Current peak detectors, Current Detection lead angles, Dynamic equations of a variable Reluctance Step Motors, Characteristics of the ON phase current waveform, Characteristics of the OFF phase current waveform, Design consideration for effective Current detection, Closed Loop Control by Current Sensing, Computer simulation of closed loop step motor operation with current detection, A complete Closed loop point to point controller with current sensing.

[M]Speed Control of Step Motors

Introduction, Description of the Fixed unit time delay speed control system, Description

C. LEARNING OUTCOMES

At the completion of the course, students will be able to

- Explain Incremental motion control systems
- Explain servo systems and their applications
- Explain step motor systems, their control strategies and develop applications

D. RECOMMENDED TEXTBOOKS

1. Incremental Motion Control
   By:B. C. Kuo, SRL Publishing Company – III
2. Industrial Electronics
   By: Thomas E. Kissell, Prentice – Hall Publication

E. REFERENCE BOOKS

1. Industrial Motion Control: Motor Selection, Drives, Controller Tuning, Applications
   By: Dr.Hakan Gurocak, Wiley publication
2. Precision Motion Control
   By: Tan Kok Kiong, Lee Tong Heng, Huang Sunan, Springer

F. LIST OF EXPERIMENTS

1. Study of encoders
2. Control of DC Motors
3. Control of DC Servomotors
4. PLL Control
5. Speed Control by Current Sensing
6. Study of Stepper Motors
7. Close loop control of Stepper Motor
8. Effect of PI Control In Motion Control
9. Effect of PID Control in Motion Control
10. Case Study & Mini Project

Department of Instrumentation and Control Engineering

Faculty of Technology, D. D. University, Nadiad.

B.Tech.-IV, Semester-VIII (IC)

Syllabus and scheme

Subject: Project and Industrial Training (AF-801)

Teaching Scheme (Hours)			Examination Scheme (Marks)					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
0	0	28	--	--	100	300	400	0	0	14	14

The students will undertake project work for the period of one semester. They should design/develop & fabricate the project. They are supposed to prepared and submit a project report as a part of their term-work for the project and give seminars on their project work. The students may be sent to the industry for their project and they are to timely report to the department regarding monitoring and necessary guidance. They should arrange for demonstration of the project work at the time of examination they are to be examined based on viva and/or demonstration.

B.Tech.-IV, Semester-VIII (IC)

Syllabus and scheme

Subject: Seminar (AF-802)

Teaching Scheme (Hours)			Examination Scheme (Marks)					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
0	0	8	--	--	100	--	100	0	0	4	4

Internal Examiner List for
Instrumentation and Control Department
Faculty of Technology, D. D. University

No.	Name of faculty	Highest Qualification	Total Teaching Experience in years	Email Id	Contact No.	Approved For Subjects of B.Tech	Approved For Subjects of M.Tech
1	SHAH VIPUL A.	Ph.D	21	vashah.ic@ddu.ac.in	+919925833707	1. Micro Controller Applications 2. Control Theory 3. Micro Processor and Micro Controller 4. Instrumentation Systems 5. Advanced Control Theory & System Design 6. Embedded Systems 7. Robotics Engineering 8. Final Semester Project	1. Advanced Microprocessor and Micro Controller 2. Neural Network and Fuzzy Logic Control 3. Final Year Dissertation
2	DALAL CHIRAG S.	M.Tech., Ph.D*	24	chiragsdalal@ddu.ac.in	+919998046511	1. Power Electronics 2. Industrial Electronics & Drives 3. Communication Techniques 4. Power Plant Automation 5. Biomedical Instrumentation	1. Power Electronics System Design 2. Advanced Power Electronics 3. Final Year Dissertation

						6. Motion Control 7. Final Semester Project	
3	BHATT JIGNESH G.	M.Tech., Ph.D*	17	jigneshgbhatt.ic@ddu.ac.in	+919426703566	1. Simulation Tools 2. Measurement Techniques 3. Instrumentation System 4. Measurement Technique 5. Smart Instrument 6. Analytical Instrumentation 7. Process Instrumentation 8. Modeling, Simulation and Evolutionary Techniques 9. Process Control 10. Computer Numerical Control 11. Final Semester Project	1. Digital Control Systems 2. Nano Technology And Nano Sensor 3. Process Sensors and Controller
4	PATEL ASHISH G.	M.Tech.	10	ashishpatel.ic@ddu.ac.in	+919427183266	1. Control Theory 2. Control Technology: Components and Systems 3. Analytical Instrumentation 4. Biomedical Instrumentation 5. Digital Signal	1. Biomedical System Design 2. Advanced Digital Signal Processing 3. Final Year Dissertation

						Processing 6. Robotics Engineering 7. Final Semester Project	
5	SHAH SHASHANK P.	M.Tech.	10	spshah.ic@ddu.ac.in	+919428151884	1. Control Technology: Components and Systems 2. Micro Processor and Micro Controller 3. Communication Technique 4. Micro Controller Applications 5. Process Instrumentation 6. Embedded Systems 7. Motion Control 8. Final Semester Project	1. Advanced Process Instrumentation 2. Advanced Microprocessor and Micro Controller 3. Process Sensors and Controller
6	GAUR SHWETA P.	M.Tech.	9	shwetagaur.ic@ddu.ac.in	+919427428343	1. Control Technology: Components and Systems 2. Process Measurement 3. Process Instrumentation 4. Automation systems Integration, 5. Digital Signal	1. Advanced Process Instrumentation 2. Nano Technology And Nano Sensor 3. Process Sensors and Controller

						Processing 6. Final Semester Project	
7	PATEL HIMANSHU R.	M.Tech. Ph.D *	4	himanshupatel.ic@ddu.ac.in	+917698308667	1. Control Technology: Components and Systems 2. Micro Processor and Micro Controller 3. Measurement Techniques, Micro Controller Applications 4. Instrumentation Systems 5. Biomedical Instrumentation 6. Advanced Control Theory & System Design, Process Control 7. Final Semester Project	1. Digital Control Systems 2. Biomedical System Design 3. Advanced Digital Signal Processing
8	PATEL TIGMANSHU J.	M.Tech. Ph.D *	4.5	tigmanshupatel.ic@ddu.ac.in	+919033059251	1. Power Electronics 2. Micro Processor and Micro Controller 3. Simulation Tools 4. Communication Techniques 5. Micro Controller Application	1. Virtual Instrumentation 2. Robotics Engineering

						6. Smart Instruments, Modeling 7. Simulation and Evolutionary Techniques 8. Embedded Systems	
9	MISTRY RINAL V.	M.Tech.	8	rinalmistry.ic@ddu.ac.in	+919274715022	1. Control Theory 2. Power Plant Automation Program Elective 3. Advanced Control Theory & System Design 4. Robotics Engineering	1. Digital Control Systems 2. Virtual Instrumentation
10	SHAH HETA S.	M.Tech.	2	hetashah.ic@gmail.com	+919426422835	1. Control Theory 2. Power Electronics 3. Industrial Electronics & Drives 4. Measurement Techniques, Instrumentation Systems 5. Analytical Instrumentation 6. Power Plant Automation	1. Digital Control Systems 2. Neural Network and Fuzzy Logic Control 3. Advanced Power Electronics

						7. Automation systems Integration 8. Computer Numerical Control	
11	SHAH VRUNDA R.	M.Tech.	1.5	vrundashah.ic@ddu.ac.in	+919408150853	1. Power Electronics 2. Industrial Electronics & Drives 3. Communication Techniques 4. Motion Control	1. Advanced Process Instrumentation 2. Power Electronics System Design

Note: * Indicates pursuing

Note: Internal Faculty members may be allotted any subjects of B.Tech and/or M.Tech on need basics prior intimation will be given to them.

External Examiner's List for
Instrumentation and Control Department
Faculty of Technology, D. D. University

No.	Name of faculty	Highest Qualification	Total Teaching Experience in years	Institute	Email Id	Contact No.	Approved For Subjects of B.Tech	Approved For Subjects of M.Tech
1	Prof. J. R. Patel	M.E	40	Vishnagar	Jrpatel.ee@spcevng.ac.in	+919879560244	1. Instrumentation System 2. Process Control	1. Advanced Process Instrumentation
2	Prof. M. B. Hingu	M.Tech	17	GEC, Rajkot	hingumukesh@gmail.com	+919426928807	1. Control Theory 2. Control Technology: Components and Systems 3. Digital Signal Processing	1. Digital Control System 2. Advanced Process Instrumentation
3	Prof. Rakesh Patel	Ph.D	14	SVIT, Vasad	Patel98258@gmail.com	+919898662771	1. System Design 2. Advanced Control Theory 3. Computer Numerical Control	1. Digital Control System 2. Advanced Digital Signal Processing
4	Prof. Krupa Narveker	M.Tech., Ph.D*	11	SVIT, Vasad	krupanarwekar.ic@svitvasad.ac.in	+919898363628	1. Advanced Control Theory 2. Modeling, Simulation and Evolutionary 3. Techniques	1. Power Electronics System Design
5	Prof. Druv Patel	M.Tech.	5.5	SVIT, Vasad	dmpatelic@gmail.com	+919714987874	1. Measurement Technique 2. Smart Instruments	--
6	Prof. Utpal Pandya	Ph.D	18	SCET, Surat	utpandya@radiff.com	--	1. System Design 2. Process Control 3. Motion Control	1. Neural Network and Fuzzy

								Logic Control 2. Biomedical Systems and Design
7	Dr. Dipak Adhyaru	Ph.D	22	Nirma University, Ahmedabad	dipak.adhyaru@nirmauni.ac.in	+919016805104	1. Advanced Control Theory & System Design 2. Final Semester Project	1. Neural Network and Fuzzy Logic Control 2. Final Year Dissertation
8	Dr. J. B. Patel	Ph.D	21	Nirma University, Ahmedabad	jbpatel@nirmauni.ac.in	+919825994296	1. Process Control 2. Process Instrumentation, Power Plant Automation	1. Digital Control System 2. Process Sensors and Controller 3. Final Year Dissertation
9	Prof. H. K. Patel	M.Tech., Ph.D*	24	Nirma University, Ahmedabad	hkpatel@nirmauni.ac.in	+919825291978	1. Power Electronics 2. Industrial Electronics 3. Analytical Instrumentation	1. Nano Sensor, Process Sensors and Controller 2. Power Electronics System Design
10	Prof. Harsh Kapadiya	M.Tech., Ph.D*	5	Nirma University, Ahmedabad	harsh.kapadia@nirmauni.ac.in	9974415116	1. Industrial Management 2. Advanced System Integration	1. Digital Control Systems, 2. Virtual Instrumentation 3.

11	Prof. N. G. Mishra	Ph.D.	29	BVM Engineering College, V.V.Nagar	nidhish57@yahoo.co.in	--	1. Power Electronics, 2. Industrial Electronics	1. Power Electronics System Design 2. Advanced Power Electronics
12	Prof. Nimit Shah	M.Tech	5	CUShah College of Engg., Wadhwan	Shshnimit.82@gmail.com	+919898933918	1. Biomedical Instrumentation, 2. Smart Instrumentation	1. Virtual Instrumentation, 2. Neural Network and Fuzzy Logic Control
13	Prof. Devang Shah	B.Tech MBA	5	ADIT, V.V.Nagar	--	--	1. Industrial Management	--
14	Prof. N. M. Patel	Ph.D.	23	BVM Engineering College, V.V.Nagar	--	--	1. Modeling, Simulation and Evolutionary 2. Techniques 3. Embedded Systems	1. Neural Network and Fuzzy Logic Control
15	Prof. Maulin Joshi	Ph.D.	17	SCET, Surat	maulin_joshi@yahoo.com	+919426855841	1. Embedded Systems 2. Digital Signal Processing	1. Advanced Digital Signal Processing 2. Digital Control System
16	Prof. Tejal Joshi	M.Tech., Ph.D*	15	SCET, Surat	tejuadave@yahoo.com	+919429864592	1. Process Control, 2. Robotics Engineering	1. Advanced Process Instrumentation 2. Virtual Instrumentation
17	Dr. Chetan Bhatt	Ph.D.	21	Principal ,GMCA, Maninagar	Chetan_bhatt@yahoo.com	+919427624727	1. Robotics Engineering 2. Advanced Control Theory & System	1. Process Sensors And Controller

							Design	2. Advanced Microprocessor and Micro Controller
18	Prof. Bhavesh Katharia	M.Tech.	08	LDCE, Ahmedabad	--	--	1. Power Plant Automation 2. Analytical Instrumentation	--
19	Prof. D. D. Vyas	Ph.D.	17	Atmiya College, Rajkot	vyasdd@yahoo.com	+919879599686	1. Smart Instruments 2. Automation systems Integration, 3. Process Instrumentation	1. Advanced Process Instrumentation, 2. Virtual Instrumentation
20	Prof. Kunal Bhoyania	M.Tech.	23	LDCE, Ahmedabad	kbbld@yahoo.com	+919723762949	1. Micro Controller Applications 2. Biomedical Instrumentation	1. Biomedical Systems and Control
21	Prof. Mitul B. Patel	M.Tech., Ph.D*	07	GECG – Sector 28 Gandhinagar	Mitul1985@gmail.com	--	1. Micro Controller Applications 2. Embedded System	1. Biomedical Systems and Control
22	Prof. Raksha Patel	M.Tech., Ph.D*	10	UVPCE, Mehsana	raksha1499@gmail.com	+919974019570	1. Biomedical Instrumentation 2. Power Plant Automation	1. Biomedical Systems and Control 2. Virtual Instrumentation
23	Dr. B. R. Parekh	Ph.D.	28	BVM Engineering College, V.V.Nagar	brparekh@bvmengineering.ac.in	--	1. Industrial Electronics 2. Power Electronics	1. Power Electronics System Design 2. Advanced Power Electronics
24	Prof. I. U. Ajmeri	M.Tech	19	SSCE, Bhavnagar	Isub.ajmeri@yahoo.com	--	1. Communication Techniques 2. Process Measurement	1. Digital Control System

25	Prof. Chintan P Shah	M.Tech., Ph.D*	07	GECG – Sector 28 Gandhinagar	Chintanshah.710@gmail.com	--	1. Communication Techniques 2. Industrial Electronics & Drives	1. Biomedical Systems and Control
26	Prof. K. C. Dave	M.Tech.	15	IIT-RAM, Khokhra,Ahmedabad	kcdave@iitram.ac.in	079-67775403	1. Micro Controller Applications 2. Micro Processor and Micro Controller 3. Embedded Systems	1. Advanced Microprocessor and Micro Controller
27	Shri. J. V. Patel	B.E	31	Semitronics, GIDC, Ahmedabad	--	+919925184524	1. Final Semester Project	--
28	Shri. Jagdsih Shukla	B.E	25	Servelink Systems Pvt. Ltd	jagdishshukla1994@yahoo.com	+919978914206	1. Final Semester Project	1. Final Year Dissertation
29	Shri. Ketan Manvar	B.E	14	Touch Control, Vadodara	--	--	1. Final Semester Project	--
30	Shri. Gunjan Shah	B.E	17	Ahmedabad	--	--	1. Process Measurement	1. Advanced Process Instrumentation
31	Shri. K. D. Shah	M.Tech.	18	Mamta Ind. Ahmedabad	--	--	1. Micro Controller Applications 2. Micro Processor and Micro Controller 3. Embedded Systems	1. Advanced Microprocessor and Micro Controller
32	Shri. Sanjeev Chakraborthy	B.E	25		sanjeevchakraborty@yahoo.com	+919879107949	1. Final Semester Project	--

Note: * Indicates pursuing

Note: Internal Faculty members may be allotted any subjects of B.Tech and/or M.Tech on need basics prior intimation will be given to them.

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B.Tech- Civil Engineering
External Examiners

SEMESTER-I

SUBJECT CODE	SUBJECT NAME	INTERNAL EXAMINER	EXTERNAL EXAMINER
AF114	ENGG. MECHANICS	Prof. B.C .Patel Prof. S.P. Parmar Prof. A.D. Parekh Prof. C.A. Ka.Patel Prof. J.K. Pandya Prof. R.K.Sheth Prof. A.K.Yadav Prof. J.P.Prajapati Prof. A.J.Gondliya Prof. M.D.Shah Prof. A.K.Sheth	Pinal C Patel M.S. Patel Department of Civil Engineering, CSPIT, CHARUSAT Campus, Changa -388421 E-Mail ID: pinalpatel.cv@charusat.ac.in Contact No: 9979975075
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* Add-on by Department, consent not received from the faculty.

SEMESTER-II

SUBJECT CODE	SUBJECT NAME	INTERNAL EXAMINER	EXTERNAL EXAMINER
AF204	MECHANICS OF SOLIDS	Prof. B.C .Patel Prof. S.P. Parmar Prof. A.D. Parekh Prof. C.A. Ka.Patel Prof. J.K. Pandya Prof. R.K.Sheth Prof. A.K.Yadav Prof. J.P.Prajapati Prof. A.J.Gondliya Prof. M.D.Shah Prof. A.K.Sheth	Pinal C Patel M.S. Patel Department of Civil Engineering, CSPIT, CHARUSAT Campus, Changa -388421 E-Mail ID: pinalpatel.cv@charusat.ac.in Contact No: 9979975075
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SEMESTER-III

SUBJECT CODE	SUBJECT NAME	INTERNAL EXAMINER	EXTERNAL EXAMINER
CL303	STRUCTURAL ANALYSIS -I	Prof. K. N. Sheth Prof. B.C .Patel Prof. S.P. Parmar Prof. A.D. Parekh Prof. C.A. Ka.Patel Prof. R.K.Sheth Prof. A.K.Yadav Prof. J.P.Prajapati Prof. M.D.Shah Prof. A.K.Sheth	Neha H Chauhan CSPIT, CHARUSAT, Changa Address for Travel purpose: B-2 Kalyan Nagar, Near Sabari School, Vasna Road, Vadodara E-Mail ID: nehachauhan.cv@charusat.ac.in Contact No: 9099027974
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CL304	SURVEYING -I	Prof. J.B. Ranpura Prof. A.J.Gondliya Prof. S.S. Khandelwal Prof. A.R.Shah Prof. S.P. Parmar	Rathod Sandip C L. D. college of engineering ahmedabad 901, D1 type quarters, vastrapur sarkari vasahat, behind gurukul temple, memnagar, ahmedabad 380053 E-Mail ID: scrathod@gmail.com Contact No: 9427445559
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CL304 contd.	SURVEYING –I contd.		P. J. Shah * Civil Department BVM Engineering College V. V. Nagar-388 120, Di: Anand E-Mail ID: pjshah@bvmengineering.ac.in Contact No: 9408398556
CL307	FLUID MECHANICS-I	Prof. S.S. Khandelwal Prof. A.J.Gondliya Prof. J.B. Ranpura Prof. A.R.Shah	Prof.S.D.Dhiman BVM Engineering College V. V. Nagar-388 120, Di: Anand Email : sddhiman@bvmengineering.ac.in Contact : 9879691428
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CL312	CONSTRUCTION TECHNOLOGY - I	Prof. J.K. Pandya Prof. A.J.Gondliya Prof. A.R.Shah Prof. S.P. Parmar Prof. J.B. Ranpura	J.J.Bhavsar Civil Department BVM Engineering College V. V. Nagar-388 120, Di: Anand E-Mail ID: jjbhavsar@bvmengineering.ac.in Contact No: 9825017869
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CL311	ENGINEERING MATERIALS	Prof. J.K. Pandya Prof. A.J.Gondliya Prof. S.S. Khandelwal Prof. A.R.Shah Prof. J.B. Ranpura Prof. S.P. Parmar	Jayesh Pitroda Bvm Engineering College, 57/1, //Ram// Bunglow, Opp. Purohit Dining Hall, V V.Nagar-388120 E-Mail Id: jayesh.pitroda@bvmengineering.ac.in Contact No: 9904164187
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SEMESTER-IV

SUBJECT CODE	SUBJECT NAME	INTERNAL EXAMINER	EXTERNAL EXAMINER
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CL406	STRUCTURAL ANALYSIS -II	Prof. K. N. Sheth Prof. B.C .Patel Prof. S.P. Parmar Prof. A.D. Parekh Prof. C.A. Ka.Patel Prof. R.K.Sheth Prof. A.K.Yadav Prof. J.P.Prajapati Prof. M.D.Shah Prof. A.K.Sheth	Vimlesh Agrawal Structural Engineering Department BVM Engineering College V. V. Nagar-388 120, Di: Anand E-Mail ID: vvagrawal@bvmengineering.ac.in Contact No: 9426272636, 9925650007
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CL408	FLUID MECHANICS - II	Prof. S.S. Khandelwal Prof. A.R.Shah Prof. J.B. Ranpura Prof. A.J.Gondliya	Prof.S.D.Dhiman BVM Engineering College V. V. Nagar-388 120, Di: Anand Email : sddhiman@bvmengineering.ac.in Contact : 9879691428
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CL410	RAILWAY ENGINEERING AND TOWN PLANING	Prof. J.B. Ranpura Prof. S.S. Khandelwal Prof. S.P. Parmar Prof. A.R.Shah Prof. A.J.Gondliya	Rathod Sandip C L. D. College Of Engineering Ahmedabad 901, D1 Type Quarters, Vastrapur Sarkari Vasahat, Behind Gurukul Temple, Memnagar, Ahmedabad 380053 E-Mail Id: Scrathod@Gmail.Com Contact No: 9427445559
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SEMESTER-V

SUBJECT CODE	SUBJECT NAME	INTERNAL EXAMINER	EXTERNAL EXAMINER
CL501	GEOTECHNIQUES & APPLIED GEOLOGY	Prof.M.R.Bhavsar Prof. K. N. Sheth Prof. A.D. Parekh Prof. S.P. Parmar Prof. A.K.Sheth	B. R. Dalwadi Structural Engineering Department BVM Engineering College V. V. Nagar-388 120, Di: Anand E-Mail ID:brdalwadi@bvmengineering.ac.in Contact No: 9978918351
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CL501 contd.	GEOTECHNIQUES & APPLIED GEOLOGY contd.		Saraswati Patharia* M. S. Patel Department of Civil Engineering, CSPIT, CHARUSAT Campus, Changa – 388421 E-Mail ID: saraswatipathariya.cv@charusat.ac.in Contact No: 02697-265098
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CL511	ENVIRONMENTAL ENGINEERING -I	Prof. M.A.Patel Prof. J.K. Pandya Prof. A.R.Shah Prof. A.J.Gondliya	Dr. D. S. Vyas Shivashish 17 Gitapark DR. Kurien Enclave V.V. Nagar Email : d4dipakvyas@yahoo.co.in Contact: 9824026980
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CL507	STRUCTURAL ANALYSIS -III	Prof. K. N. Sheth Prof. B.C .Patel Prof. C.A. Ka.Patel Prof. R.K.Sheth Prof. A.K.Yadav Prof. J.P.Prajapati Prof. M.D.Shah Prof. A.D. Parekh Prof. A.K.Sheth	Neha H Chauhan CSPIT, CHARUSAT, Changa B-2 Kalyan Nagar, Near Sabari School, Vasna Road, Vadodara E-Mail ID: nehachauhan.cv@charusat.ac.in Contact No: 9099027974
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CL508	PLANNING & ARCHITECTURE	Prof. S.P. Parmar Prof. A.R.Shah Prof. A.J.Gondliya Prof. S.S. Khandelwal Prof. J.B. Ranpura	Gargi Ray M. S. Patel Department of Civil Engineering, CSPIT, CHARUSAT Campus, Changa – 388421 E-Mail ID: gargisojitra.cv@charusat.ac.in Contact No: 8238042155
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CL509	WATER RESOURCES ENGINEERING	Prof. S.S. Khandelwal Prof. A.R.Shah Prof. A.J.Gondliya Prof. J.K. Pandya Prof. J.B. Ranpura	Prof.S.D.Dhiman BVM Engineering College V. V. Nagar-388 120, Di: Anand Email : sddhiman@bvmengineering.ac.in Contact : 9879691428
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CL510	DESIGN OF STRUCTURE - I	Prof. K. N. Sheth Prof. B.C .Patel Prof. C.A. Ka.Patel Prof. R.K.Sheth Prof. A.K.Yadav Prof. J.P.Prajapati Prof. M.D.Shah Prof. A.D. Parekh Prof. A.K.Sheth	Mohammad h. jinyawala b-67,om,nalanda society, ddu road, Nadiad-387001,gujarat. e-mail id: mohammadjinyawala.cv@charusat.ac.in contact no: 99985 86905
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SEMESTER-VI

SUBJECT CODE	SUBJECT NAME	INTERNAL EXAMINER	EXTERNAL EXAMINER
CL601	SOIL MECHANICS	Prof. K. N. Sheth Prof. A.D. Parekh Prof. S.P. Parmar Prof. A.K.Sheth	B. R. Dalwadi Structural Engineering Department BVM Engineering College V. V. Nagar-388 120, Di: Anand E-Mail ID: brdalwadi@bvmengineering.ac.in Contact No: 9978918351
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CL603	ENVIRONMENTAL ENGINEERING -II	Prof. M.A.Patel Prof. J.K. Pandya Prof. A.R.Shah Prof. A.J.Gondliya	Dr. D. S. Vyas Shivashish17 Gitapark DR. Kurien Enclave V.V. Nagar Email : d4dipakvyas@yahoo.co.in Contact: 9824026980
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CL612	CONSTRUCTION TECHNOLOGY -II	Prof. J.K. Pandya Prof. A.R.Shah Prof. S.P. Parmar Prof. A.J.Gondliya Prof. J.B. Ranpura	Rathod Sandip C L. D. college of engineering ahmedabad 901, D1 type quarters, vastrapur sarkari vasahat, behind gurukul temple, memnagar, ahmedabad 380053 E-Mail ID: scrathod@gmail.com Contact No: 9427445559
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CL608	CONCRETE TECHNOLOGY	Prof. J.K. Pandya Prof. A.J.Gondliya Prof. A.R.Shah Prof. S.P. Parmar Prof. R.K.Sheth Prof. A.K.Yadav Prof. J.P.Prajapati Prof. M.D.Shah	Mohammad h. jinyawala b-67,om,nalanda society, ddu road, Nadiad-387001,gujarat. e-mail id: mohammadjinyawala.cv@charusat.ac.in contact no: 99985 86905
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CL609	DESIGN OF STRUCTURE - II	Prof. K. N. Sheth Prof.D.G.Panchal Prof. B.C .Patel Prof. C.A. Ka.Patel Prof. R.K.Sheth Prof. A.K.Yadav Prof. J.P.Prajapati Prof. M.D.Shah	Mohammad h. jinyawala b-67, om, nalanda society, ddu road, Nadiad-387001,gujarat. e-mail id: mohammadjinyawala.cv@charusat.ac.in contact no: 99985 86905

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	ELECTIVE-1		
CL610	FINITE ELEMENT METHODS IN CIVIL ENGINEERING	Prof. K. N. Sheth Prof. C.A. Ka.Patel Prof. R.K.Sheth Prof. A.D. Parekh Prof. A.K.Sheth	Dipali Y.Patel* Department of Civil Engineering, Chandubhai S. Patel Institute of Technology, CHARUSAT, Changa - 388 421, Email : dipalipatel.cv@charusat.ac.in Contact No: 9924999774
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SEMESTER-VII

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CL701	IRRIGATION ENGINEERING	Prof. S.S. Khandelwal Prof. A.R.Shah Prof. A.J.Gondliya Prof.J.B.Ranpura	P.D.Vyas MS University Email : NIL Contact : 9327784141
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CL703	PROFESSIONAL PRACTICE AND VALUATION	Prof. S.P. Parmar Prof. A.R.Shah Prof. B.C .Patel Prof. A.J.Gondliya	Gargi Ray M. S. Patel Department of Civil Engineering, CSPIT, CHARUSAT Campus, Changa – 388421 E-Mail ID: gargisojitra.cv@charusat.ac.in Contact No: 8238042155
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CL704	FOUNDATION ENGINEERING	Prof. K. N. Sheth Prof. A.D. Parekh Prof. S.P. Parmar Prof.R.K.Sheth Prof. A.K.Sheth	B. R. Dalwadi Structural Engineering Department BVM Engineering College V. V. Nagar-388 120, Di: Anand E-Mail ID:brdalwadi@bvmengineering.ac.in Contact No: 9978918351
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CL707	HIGHWAY ENGINEERING	Prof. A.J.Gondliya Prof. J.B. Ranpura Prof. J.K. Pandya Prof. A.R.Shah Prof. S.P. Parmar	Devang Patel CSPIT, Changa. 303/A, Himalaya Heights, 100 foot road, Near Indira Gandhi Statue, Anand -388001 E-Mail ID: devangpatel.cv@charusat.ac.in Contact No: +91 9624560973
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CL708	EARTH QUAKE ENGINEERING	Prof. D.G.Panchal Prof. K. N. Sheth Prof. R.K.Sheth Prof. A.K.Yadav Prof. C.A. Ka.Patel Prof. J.P.Prajapati Prof. M.D.Shah	Neha H Chauhan CSPIT, CHARUSAT, Changa B-2 Kalyan Nagar, Near Sabari School, Vasna Road, Vadodara E-Mail ID: nehachauhan.cv@charusat.ac.in Contact No: 9099027974
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SEMESTER-VIII

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CL 801	INDUSTRIAL TRAINING	Prof. B.C .Patel Prof. J.B. Ranpura Prof. S.P. Parmar Prof. A.D. Parekh Prof. C.A. Ka.Patel Prof. J.K. Pandya Prof. R.K.Sheth Prof. A.K.Yadav Prof. J.P.Prajapati Prof. A.J.Gondliya Prof. M.D.Shah Prof. A.K.Sheth	Rathod Sandip C L. D. College Of Engineering Ahmedabad 901, D1 Type Quarters, Vastrapur Sarkari Vasahat, Behind Gurukul Temple, Memnagar, Ahmedabad 380053 e-mail id: scrathod@gmail.com contact no: 9427445559
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SEMESTER-I

SUBJECT CODE	SUBJECT NAME	INTERNAL EXAMINER	EXTERNAL EXAMINER
MG105	Soil Engineering – I	Prof. K. N. Sheth Prof. A.D. Parekh Prof. S.P. Parmar Prof. A.K.Sheth	A.K. Verma* Structural Engineering Department BVM Engineering College V. V. Nagar-388 120, Di: Anand E-Mail ID: akverma@bvmengineering.ac.in Contact No: 9426583464
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MS 139	Advanced Foundation Engineering	Prof. K. N. Sheth Prof. R.K.Sheth Prof. A.D. Parekh Prof. S.P. Parmar Prof. A.K.Sheth	A.K. Verma* Structural Engineering Department BVM Engineering College V. V. Nagar-388 120, Di: Anand E-Mail ID: akverma@bvmengineering.ac.in Contact No: 9426583464

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MG 107	Num. Methods & Applications to Geotechnical Engg.	Prof. R.K.Sheth Prof. J.P.Prajapati Prof. M.D.Shah Prof. A.D. Parekh Prof. S.P. Parmar Prof. A.K.Sheth	D.P.Soni* SVIT Vasad, E-Mail ID: hod.civil@svitvasad.ac.in Contact No:9879399106
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MG 217	Soil Dynamics & EQ Geotechnical Engg.	Prof. R.K.Sheth Prof. J.P.Prajapati Prof. M.D.Shah	Jaykumar Shukla* L & T Knowledge City, Vadodara E-Mail ID: shukla@lntsnl.com Contact: 9726080908
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MG 221	Reinforced Earth and Geotextiles	Prof. A.D. Parekh Prof. S.P. Parmar Prof. A.K.Sheth	A.K. Verma* Structural Engineering Department BVM Engineering College V. V. Nagar-388 120, Di: Anand E-Mail ID: akverma@bvmengineering.ac.in Contact No: 9426583464
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MG 221 Contd.	Reinforced Earth and Geotextiles contd.		Mehulkumar P. Katakiya * CSPIT, Changa C/20, Akshardham Flat, OPP. D Mart, LBS Road, Bapunagar, Ahmedabad. PIN: 382345 E-Mail ID: katakiyamehul@gmail.com Contact No: 8000669363
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MG 243	Soil Structure Interaction	Prof. K. N. Sheth Prof. R.K.Sheth Prof. A.D. Parekh Prof. S.P. Parmar Prof. A.K.Sheth	Neha H Chauhan M S Patel Department of Civil Engineering, Chandubhai S Patel Institute of Technology, CHARUSAT, Changa Address for Travel purpose: B-2 Kalyan Nagar, Near Sabari School, Vasna Road, Vadodara E-Mail ID: nehachauhan.cv@charusat.ac.in Contact No: 9099027974
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MG 218/219/220/214	Elective-1	Prof. K. N. Sheth Prof. R.K.Sheth Prof. A.D. Parekh Prof. S.P. Parmar Prof. A.K.Sheth	A.K. Verma* Structural Engineering Department BVM Engineering College V. V. Nagar-388 120, Di: Anand E-Mail ID: akverma@bvmengineering.ac.in Contact No: 9426583464
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External Examiners
M. TECH (STRUCTURE)

SEMESTER-I

SUBJECT CODE	SUBJECT NAME	INTERNAL EXAMINER	EXTERNAL EXAMINER
MS 137	Num. Methods & Applications to Structural Engg.	Prof. K. N. Sheth Prof. B.C .Patel Prof. R.K.Sheth Prof. A.K.Yadav Prof. J.P.Prajapati Prof. M.D.Shah	Dipali Y.Patel* Department of Civil Engineering, Chandubhai S. Patel Institute of Technology, CHARUSAT, Changa - 388 421, Email : dipalipatel.cv@charusat.ac.in Contact No: 9924999774
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			V R Panchal* CSPIT, Changa E-Mail ID: vijaypanchal.cv@charusat.ac.in Contact No:02697-265081
MS 140	Finite Element Methods	Prof. K. N. Sheth Prof D.G. Panchal Prof. B.C .Patel Prof. C.A. Ka.Patel Prof. R.K.Sheth Prof. A.K.Yadav Prof. J.P.Prajapati Prof. M.D.Shah	Prof. Atul N. Desai Structural Engineering Department BVM Engineering College V. V. Nagar-388 120, Di: Anand E-Mail ID: andesai@ bvmengineering.ac.in Contact : 9428434858
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MS 138	Structural Design Practice – I	Prof. K. N. Sheth Prof D.G. Panchal Prof. B.C .Patel Prof. C.A. Ka.Patel Prof. R.K.Sheth Prof. A.K.Yadav Prof. J.P.Prajapati Prof. M.D.Shah	Mohammad H. Jinyawala B-67,OM,nalanda society, ddu road, NADIAD-387001,GUJARAT. E-Mail ID: mohammadjinyawala.cv@charusat.ac.in Contact No: 99985 86905
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MS 138 contd.	Structural Design Practice – I contd.		D.P.Soni* SVIT Vasad, E-Mail ID: hod.civil@svitvasad.ac.in Contact No:9879399106
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MS134	Advanced Structural Mechanics	Prof D.G. Panchal Prof. K. N. Sheth Prof. B.C .Patel Prof. C.A. Ka.Patel Prof. R.K.Sheth Prof. J.P.Prajapati Prof. M.D.Shah	Prof. Atul N. Desai* Structural Engineering Department BVM Engineering College V. V. Nagar-388 120, Di: Anand E-Mail ID: andesai@ bvmengineering.ac.in Contact : 9428434858
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MS134 contd	Advanced Structural Mechanics contd.		Neha H Chauhan* CSPIT, Changa B-2 Kalyan Nagar, Near Sabari School, Vasna Road, Vadodara E-Mail ID: nehachauhan.cv@charusat.ac.in Contact No: 9099027974
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MS 139	Advanced Foundation engg.	Prof. K. N. Sheth Prof. R.K.Sheth Prof. A.D. Parekh Prof. S.P. Parmar Prof. A.K.Sheth	A.K. Verma Structural Engineering Department BVM Engineering College V. V. Nagar-388 120, Di: Anand E-Mail ID: akverma@bvmengineering.ac.in Contact No: 9426583464
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SEMESTER-II

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MS 238	Applications of Plates and Shell & Str. Stability.	Prof D.G. Panchal Prof. K. N. Sheth Prof. B.C .Patel Prof. C.A. Ka.Patel Prof. R.K.Sheth Prof. J.P.Prajapati Prof. M.D.Shah	Prof. Atul N. Desai * Structural Engineering Department BVM Engineering College V. V. Nagar-388 120, Di: Anand E-Mail ID: andesai@ bvmengineering.ac.in Contact: 9428434858
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MS 238 contd.	Applications of Plates and Shell & Str. Stability. Contd.		J A Amin* SVIT Vasad E-Mail ID: jigneshamin.civil@svitvasad.ac.in Contact No:9925543275
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MS 234	Dynamics and EQ Engineering	Prof. K. N. Sheth Prof D.G. Panchal Prof. B.C .Patel Prof. C.A. Ka.Patel Prof. R.K.Sheth Prof. A.K.Yadav Prof. J.P.Prajapati Prof. M.D.Shah	Prof. Atul N. Desai* Structural Engineering Department BVM Engineering College V. V. Nagar-388 120, Di: Anand E-Mail ID: andesai@ bvmengineering.ac.in Contact : 9428434858
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MS243	Soil Structure Interaction	Prof. K. N. Sheth Prof. R.K.Sheth Prof. A.D. Parekh Prof. S.P. Parmar Prof. A.K.Sheth	D.P.Soni* SVIT Vasad, E-Mail ID: hod.civil@svitvasad.ac.in Contact No:9879399106
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Dharmsinh Desai University

Faculty of Technology

Department of Information Technology

W.E.F - Dec - 2017

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		Yogendra patel			Years				
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		Sandeep Suthar							
		Hardik Maheta							
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		Archna Vyas							
		Deepak Vegda							
		Jayesh Malviya							
		Viral Patel							
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	COMPUTER GRAPHICS (Elective-1 , sem 6)	R.S.Chhajed	Jalpesh Vasa	M.Tech(I.T.)	7Years	Assistant Profess	CITC, Changa		jalpeshvasa.it@charusat.ac.in
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		Jayesh Malviya							
		Viral Patel							
		Sunil Vithlani							
		Viranchi Patel							
	DIGITAL SWITCHING SYSTEM (Elective-1 , sem 6)	R.S.Chhajed	Prof. B. S. Parekh	M.S USA	34Years	Professor	M S University	2652434188	
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	DIGITAL IMAGE PROCESSING (Elective-1 , sem 7)	R.S.Chhajed	Dippal Israni	M.Tech. C.E. | PhD Pursuing	Years	Assistant Profess	CITC, Changa		Dippalisrani.Ce@Charusat.Ac.In
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W.E.F - April 2012

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		Prof. Sharul Agrawal									

13	Information & Network Security	Prof. M M Goswami	Kalpesh patel	ME(CE)	11	Asst.Prof.	LDCE ,Ahemdabad		kalpeshpatel11@yahoo.com		
		Prof. Y L Patel	Ritesh Patel	M.E.(C.E.),Phd. Pursuin	9years	asso. Pro.	CITC, Changa		riteshpatel.ce@charusat.ac.in		
		Prof. V K Dabhi	Dr. Hemal Shah	ME, PHD	15	Professor	UVPCE, Kherwa	+91 2762 286650	hemal.shah@ganpatuniversity.ac.in		
		Prof. H B Prajapati	Prof. S K Vij	PhD.	35 yrs		SVIT	9825343410	vijsanjay@gmail.com		
		Prof. N P Desai	Dr. Amit Thakkar	M.E.(C.E.), Ph.D.	10	Asso. Prof.	CITC,Changa		amitthakkar.it@charusat.ac.in		
		Prof.Archna Vyas	Prof. Uttam Chauhan	ME(CE)	5	Ass. Prof	GEC-Chandkheda	9824897671	Ug_chauhan@gtu.edu.in		
		Prof. Deepak Vegda	Lathigra Amit	ME CE ,PHD	12.5 years	Asso. Prof.	MEFGI -Rajkot		amit.lathigara@marwadieducation.edu.in		
		Prof. Sharul Agrawal	Mahesh Titia	ME CE	8 year	Ass. Prof	CE Dept.- GEC Rajkot	9978287873	gec_raj_2004@yahoo.co.in		
			Mehul Parikh	ME CE	10 years		CE Dept. GEC- Modasa				
			Prof. Parth Shah	M.E.(C.E.), Pursuing Ph	10	Head, IT	CITC, Changa		parthshah.ce@charusat.ac.in		
14	Introduction to NLP	Prof. N P Desai	Prof. H B Dave	M.Tech	40 yrs						
		Prof. B S Bhatt	Dr. Ketan Kotecha	PhD.	21 yrs	Provost	Parul University	(02668)260 355	provost@paruluniversity.ac.in		
		Prof. V K Dabhi	Prof. S N Pradhan	PhD.	35 yrs		Nirma Uni.	9825041254	snpradhan@nirmauni.ac.in		
		Prof. H B Prajapati	Dr. Majumder Prasenjit	PhD.	25 yrs		DAIICT	(+91) 79-30510605	p_majumder@daiict.ac.in		
		Prof. M M Goswami	Ashwin Makwana	M.E. C.E. | Phd. Pursui	12	Asst. Prof.	CITC,Changa		ashwinmakwana.ce@charusat.ac.in		
		Prof. Y L Patel									
		Prof.Archna Vyas									
		Prof. Deepak Vegda									
		Prof. Sharul Agrawal									
15	Evolutionary Computing	Prof. M M Goswami	Dr. Apurva Shah	ME(CE) , PHD	15	Asso. Prof.	M.S. Univerisity , Baroda	+91 9428173727	apurva.shah-cse@msubaroda.ac.in amshah76@gmail.com		
		Prof. V K Dabhi	Dr. Ahalpara	PhD.	30 yrs		DDU-MCA	9825048520	dilip@ipr.res.in		
		Prof. V.A. Shah	Prof. Harikrishna Jethva	ME(CE)	10 yrs		Govt. Engg.-Patan	9998816300			
		Prof. M. S. Rao	Dr. T P Patalia	ME(CE) , PHD	12 yrs	Asso. Prof. & I	VVP-Rajkot	9898188052	pataliatejas@rediffmail.com		
		Prof. H B Prajapati	Prof. Sarita Visavalia	ME(CE)			CITC-Changa		saritavisavalia.it@charusat.ac.in		
		Prof. N P Desai	Dr. Suman Kumar Mitra	PhD CS	10	Dean Academ	DAICT, Gandhinagar	(91)(79) 30510584	suman_mitra@daiict.ac.in mitrasumank@gmail.com		
		Prof. Y L Patel	Gaurang Panchal	M.E. C.E. | Phd.	10	Asst.Prof.	CITC, Changa		gaurangpanchal.ce@charusat.ac.in		
		Prof.Archna Vyas	Ashwin Makwana	M.E. C.E. | Phd. Pursui	12	Asst. Prof.	CITC,Changa		ashwinmakwana.ce@charusat.ac.in		
		Prof. Deepak Vegda	**H. B. Jethava**	ME CE	10 years		LDCE				
		Prof. Sharul Agrawal	Dr. Vipul Vekariya	Ph.D.(CE), M.E.(CE)	12	HOD & Associ	Noble Group of Institutions ,Juna	9909459540			
			Dr. Vimal Vaghela	ME(CE) , PHD	13	Asst. Prof.	LDCE		vimalvaghela@gmail.com		
			Dr. Amit Ganatra	Ph.D.	15years	Dean	CITC, Changa		amitganatra.ce@charusat.ac.in		
16	Grid Computing	Prof. V K Dabhi	Dr. Haresh Bhatt	PhD.			ISRO, Ahmedabad		haresh@sac.isro.gov.in		
		Prof. H. B. Prajapati	Dr. sanjay Chaudhary	PhD CS	20		Associate Dean, School of Engin	91 79 61911115	sanjay.chaudhary@ahduni.edu.in		
		Prof. N P Desai	Dr. Maduri Bhavsar	PhD.	24	Professor & H	Nirma University	7930642213	madhuri.bhavsar@nirmauni.ac.in		
		Prof. M M Goswami	Dr. S. N. Pradhan	PhD.	35 yrs		Nirma, A'bad		snpradhan@nirmauni.ac.in		
		Prof. Y L Patel									
		Prof.Archna Vyas									
		Prof. Deepak Vegda									
		Prof. Sharul Agrawal									
17	Research Methodology	Prof. V K Dabhi									
		Prof. H. B. Prajapati	Dr. S K Vij	PhD.	35 yrs		VIT	9825343410	vijsanjay@gmail.com		
		Prof. N P Desai	Dr. S. N. Pradhan	PhD.	35 yrs		Nirma, A'bad		snpradhan@nirmauni.ac.in		
		Prof. M M Goswami	Dr. A R Dasgupta	PhD.	35 yrs		BISAG -Dir	9825329382			
		Dr. P A Joshi	Dr. Darshan Choksi	PhD.	20 yrs		S. P Uni.)				
		Dr. M S Rao	Dr. Haresh Bhatt	PhD.	20 yrs		ISRO, Ahmedabad		haresh@sac.isro.gov.in		
		Dr. Ahalpara	Dr. sanjay Chaudhary	PhD CS	20		Associate Dean, School of Engin	91 79 61911115	sanjay.chaudhary@ahduni.edu.in		

		Prof.Archna Vyas	Dr. Apurva Shah	ME(CE) , PHD	15	Asso. Prof.	M.S. Univerisity , Baroda	+91 9428173727	apurva.shah-cse@msubaroda.ac.in amshah76@gmail.com		
		Prof. Deepak Vegda	Prof. H B Dave	M.Tech	40 yrs						
		Prof. Sharul Agrawal	Dr. Ketan Kotecha	PhD.	21 yrs	Provost	Parul University	(02668)260 355	provost@paruluniversity.ac.in		
			Mr. B C Dharmani	ME(EC)	7 yrs		DAIICT	9879483444			
			Dr. Mukesh Zaveri	PhD.	25 yrs	Asso. Prof.	SVNIT-Surat	+91-9427581925	mazaveri@coed.svnit.ac.in, mazaveri@iitb.ac.in		
			Prof. D. G. Thakore	M Tech , PHD	25	Professor & H	Birla Engineering College VV Nagar		dgthakore@bvmengineering.ac.in		
			Dr. Madhuri Bhavsar	M.E.,PhD	24	Professor & H	Nirma Institute of technology	7930642213	madhuri.bhavsar@nirmauni.ac.in		
			Dr. K.H.Wandra	M.E. PhD	20	Director	BITS , Vadodra	0265-2303991	kalpeshwandra.ce@bitseducampus.ac.in		
			Dr. Hemal Shah	ME, PHD	15	Professor	UVPCE, Kherwa	+91 2762 286650	hemal.shah@ganpatuniversity.ac.in		
			Dr. Amit Ganatra	Ph.D.	15years	Dean	CITC, Changa		amitganatra.ce@charusat.ac.in		
			Prof. P. B. Swadas	M.Tech	27 yrs	Asso. Prof.	BVM CE Dept		PBSWADAS@BVMENGINEERING.AC.IN		
			Dr. Sanjay Garg	PhD.	29	Prof. & Head	Nirma University	7930642212	sgarg@nirmauni.ac.in gargsv@gmail.com		
			Dr. Suman Kumar Mitra	PhD CS	10	Dean Academ	DAIICT, Gandhinagar	(91)(79) 30510584	suman_mitra@daiict.ac.in mitrasumank@gmail.com		
			Dr. Mehul Raval	PhD			DAIICT				
			Dr. Amit Thakkar	M.E.(C.E.), Ph.D.	10	Asso. Prof.	CITC,Changa		amitthakkar.it@charusat.ac.in		
18	Dessertation-I & II	Prof. R S Chhajed									
			Dr. S K Vij	PhD.	35 yrs		SVIT	9825343410	vijsanjay@gmail.com		
		Prof. V K Dabhi	Dr. S. N. Pradhan	PhD.	35 yrs		Nirma, A'bad		snpradhan@nirmauni.ac.in		
		Prof. H B Prajapati	Dr. A R Dasgupta	PhD.	35 yrs		ISAG -Dir	9825329382			
		Prof. N P Desai	Dr. Darshan Choksi	PhD.	20 yrs		S. P Uni.				
		Prof. M M Goswami	Dr. Haresh Bhatt	PhD.	20 yrs		ISRO, Ahmedabad		haresh@sac.isro.gov.in		
		Dr. Ahalpara	Dr. sanjay Chaudhary	PhD CS	20		Associate Dean, School of Engin	91 79 61911115	sanjay.chaudhary@ahduni.edu.in		
		Prof.Archna Vyas	Dr. Apurva Shah	ME(CE) , PHD	15	Asso. Prof.	M.S. Univerisity , Baroda	+91 9428173727	apurva.shah-cse@msubaroda.ac.in amshah76@gmail.com		
		Prof. Deepak Vegda	Prof. H B Dave	M.Tech	40 yrs						
		Prof. Sharul Agrawal	Dr. Ketan Kotecha	PhD.	21 yrs	Provost	Parul University	(02668)260 355	provost@paruluniversity.ac.in		
			Mr. B C Dharmani	ME(EC)	7 yrs		DAIICT	9879483444			
			Dr. Mukesh Zaveri	PhD.	25 yrs	Asso. Prof.	SVNIT-Surat	+91-9427581925	mazaveri@coed.svnit.ac.in, mazaveri@iitb.ac.in		
			Prof. D. G. Thakore	M Tech , PHD	25	Professor & H	Birla Engineering College VV Nagar		dgthakore@bvmengineering.ac.in		
			Dr. Maduri Bhavsar	PhD.	24	Professor & H	Nirma University	7930642213	madhuri.bhavsar@nirmauni.ac.in		
			Dr. K.H.Wandra	M.E. PhD	20	Director	BITS , Vadodra	0265-2303991	kalpeshwandra.ce@bitseducampus.ac.in		
			Dr. Hemal Shah	ME, PHD	15	Professor	UVPCE, Kherwa	+91 2762 286650	hemal.shah@ganpatuniversity.ac.in		
			Dr. Amit Ganatra	Ph.D.	15years	Dean	CITC, Changa		amitganatra.ce@charusat.ac.in		
			Prof. P. B. Swadas	M.Tech	27 yrs	Asso. Prof.	BVM CE Dept		PBSWADAS@BVMENGINEERING.AC.IN		
			Dr. Sanjay Garg	PhD.	29	Prof. & Head	Nirma University	7930642212	sgarg@nirmauni.ac.in gargsv@gmail.com		
			Dr. Mehul Raval	PhD			DAIICT				
			Dr. Manik Lal Das	PhD, IT	19	Professor	DAICT, Gandhinagar	91-79-30510617	maniklal_das@daiict.ac.in		
			Dr. Asim Banerjee	PhD	18		DAICT, Gandhinagar	(+91) 079-30510554	asim_banerjee@daiict.ac.in		
			Dr. Sourish Dasgupta	PhD CS	15	Professor	DAICT, Gandhinagar	(+91) 079-30510624	sourish_dasgupta@daiict.ac.in		
			Dr. H S Mazumdar	Ph.D.CS	35 years		DD University				
			Dr. Bijal J Talati	Ph. D	18	HOD-CE	SVIT Vasad	9375331945	bijaltalati.comp@svitvasad.ac.in		
			Dr. Saurabh Shah	ME(CE) , PHD	15.2yrs	Ass. Prof & De	BIT, Vadodara	9426536106	saurabhshah.ce@bitseducampus.ac.in		
			Dr. Amit Thakkar	M.E.(C.E.), Ph.D.	10	Asso. Prof.	CITC,Changa		amitthakkar.it@charusat.ac.in		
			Prof. Parth Shah	M.E.(C.E.), Pursuing Ph	10	Head, IT	CITC, Changa		parthshah.ce@charusat.ac.in		
			Dr. Majumder Prasenjit	PhD.	25 yrs		DAIICT	(+91) 79-30510605	p_majumder@daiict.ac.in		
			Ritesh Patel	M.E.(C.E.),Phd. Pursuin	9years	asso. Pro.	CITC, Changa		riteshpatel.ce@charusat.ac.in		
			Dr. Narendra Chauhan	**PhD**	**12 years**	**Professor & H**	**ADIT- V V Nagar**	**9377559385**	narendracchauhan@gmail.com		
			Dr. Ramji Mackwana	**PhD**	**10 years**		**ADIT- V V Nagar**		**head.cp@adit.ac.in**		
			Dr. Tatu Aditya	PhD	12		DAIICT, Gandhinagar	(+91) 079-30510540	aditya_tatu@daiict.ac.in		

Annexure : VI

CENTRE FOR MANAGEMENT STUDIES
Faculty of Information Science
DHARMSINH DESAI UNIVERSITY, NADIAD

CHOICE BASED CREDIT SYSTEM (CBCS)

Approved Choice Based Credit System for M B A Course : W E F 2018-19

SEMESTER - I

Sr.No	Course code	Course Title	Course category	Credit
1		Introduction to Management	General - University Core Course	4
2		Quantitative Techniques	Program Core Course	4
3		Financial Accounting for Managers	Program Core Course	4
4		Managerial Economics	Program Core Course	4
5		Organizational Behavior	Program Core Course	4
6		Technology in Management	Program Core Course	4
7		Program Elective – I*	Program Elective Course	4
8		University Elective – I – Advanced Critical Thinking & Logic	University Elective Course	2
		Total Credits per semester		**30**

*For Program Elective- I, students are required to opt for any ONE subject of their choice from the following offered subjects –

1) Managerial Communication
2) Managerial Effectiveness
3) Knowledge Management

SEMESTER - II

Sr.No	Course code	Course Title	Course category	Credit
1		Indian Business Environment	Program Core Course	4
2		Cost & Management Accounting	Program Core Course	4
3		Marketing Management	Program Core Course	4
4		Financial Management	Program Core Course	4
5		Production & Operation Management	Program Core Course	4
6		Human Resources Management	Program Core Course	4
7		Program Elective - II *	Program Elective Course	4
8		University Elective – II – Academic Research & Writing	University Elective Course	2
		Total Credits per semester		**30**

*For Program Elective- II, students are required to opt for any ONE subject of their choice from the following offered subjects –

1) Business Research Methodology
2) Business Policy
3) Diversity Management

SEMESTER – III

In Semester III, students are required to opt for any THREE discipline specific elective subjects of their choice from the offered group of subjects-

Sr.No	Course code	Course Title	Course category	Credit
1		Ethics, Values and Stress Management	General - University Core Course	4
2		Strategic Management	Program Core Course	4
3		Legal Aspects of Business	Program Core Course	4
4		New Enterprise Management	Program Core Course	4
5		Summer Internship Program	Program Core Course	8
Sr.No	**Course code**	**Marketing Specialization**		
1		Advertising and Sales Promotion Management	Discipline specific – Program Elective Course	4
2		Consumer Behavior	Discipline specific – Program Elective Course	4
3		Strategic Brand Management	Discipline specific – Program Elective Course	4
4		Integrated Marketing Communications*	Discipline specific – Program Elective Course	4
5		Rural Marketing*	Discipline specific – Program Elective Course	4
Sr.No	**Course code**	**Finance Specialization**		
1		Merger, Acquisition and Risk Management	Discipline specific – Program Elective Course	4
2		Indian Financial System	Discipline specific – Program Elective Course	4
3		Security Analysis and Portfolio Management	Discipline specific – Program Elective Course	4
4		Financial Decision Analysis*	Discipline specific – Program Elective Course	4
5		Financial Reporting & Corporate Governance*	Discipline specific – Program Elective Course	4
Sr.No	**Course code**	**HR Specialization**		
1		Strategic Human Resource Management	Discipline specific – Program Elective Course	4
2		Performance Management and Appraisal	Discipline specific – Program Elective Course	4

3		Labor Legislation	Discipline specific – Program Elective Course	4
4		Change Management and Organizational Development*	Discipline specific – Program Elective Course	4
5		Human Resource Information Systems*	Discipline specific – Program Elective Course	4
		Total Credits per semester		**36**

*will be offered only if minimum requirement of enrolment is met

SEMESTER – IV

In Semester IV, students are required to opt for any THREE discipline specific elective subjects of their choice from the offered group of subjects-

Sr.No	**Course code**	**Course Title**	**Course category**	**Credit**
1		Management Control Systems	Program Core Course	4
2		Contemporary Issues in Management	Program Core Course	4
3		Management Research Project	Program Core Course	8
Sr.No	**Course code**	**Marketing Specialization**		
1		Sales and Distribution Management	Discipline specific – Program Elective Course	4
2		Industrial and Services Management	Discipline specific – Program Elective Course	4
3		International Marketing	Discipline specific – Program Elective Course	4
4		Digital and Social Media Marketing*	Discipline specific – Program Elective Course	4
5		Retail Management* / Supply Chain Management*	Discipline specific – Program Elective Course	4
Sr.No	**Course code**	**Finance Specialization**		
1		Corporate Tax Planning	Discipline specific – Program Elective Course	4
2		International Financial Management	Discipline specific – Program Elective Course	4
3		Strategic Financial Management	Discipline specific – Program Elective Course	4
4		Banking and Insurance*	Discipline specific – Program Elective Course	4
5		Project Financing*	Discipline specific – Program Elective Course	4
Sr.No	**Course code**	**HR Specialization**		
1		Management of Industrial Relations	Discipline specific – Program Elective Course	4
2		Human Resource Development	Discipline specific – Program Elective Course	4
3		Compensation Management	Discipline specific – Program Elective Course	4

4		International Human Resource Management*	Discipline specific – Program Elective Course	4
5		Counseling skills for Managers*	Discipline specific – Program Elective Course	4
		Total Credits per semester		**28**

*will be offered only if minimum requirement of enrolment is met

Total Credits of the Program = 30+ 30 + 36 + 28 = <u>124 Credits</u>

Semester wise Credit Distribution under CBCS

Semesters	**Core Courses**	**Elective Courses**	**Total Credits per semester**
SemI	(6x4) = 24	(1x4) +(1x2) = 6	30
Sem II	(6x4) = 24	(1x4) +(1x2) = 6	30
SemIII	(4x4) + (1x8) = 24	(3x4) = 12	36
Sem IV	(2x4) + (1x8) = 16	(3x4) = 12	28
		Total Credits for Program	**124 credits**

Teaching Scheme (2018) Annexure VII

Master of Computer Applications

Approved Choice Based Credit System (w e f 2018-19)

FC - FOUNDATION CORE, CC - CORE CONCEPT, PC - PROFESSIONAL CORE, PE - PROFESSIONAL ELECTIVE , EEC - EMPLOYABILITY ENHANCEMENT COURSE

Year No	Sem	Subject Code	Subject Name	Credit	Teaching Scheme			Examination Scheme				Type	Department
					T	P	S/Tut	S	T	P	TW		
I	I		Computer Programming with 'C'	5	4	2		36	60	25	25	FC	MCA
			Logical Organization of Computer	4	4	0		36	60	0	25	CC	EC
			Linux Environment	5	4	2		36	60	25	25	CC	MCA
			Data Communication and Networking	4	4	0		36	60	0	25	CC	EC/CE
			Elective I	4	4			36	60		0	FC	
			Discrete Mathematical Structure										MATHS
			Financial Management & ERP										MANAGEMENT
			Managerial economics										MANAGEMENT
			Management Information System										MANAGEMENT
I	II		Data Structure using 'C'	5	4	2		36	60	25	25	CC	MCA
			Database Management System.	5	4	2		36	60	25	25	CC	MCA
			Computer Oriented Numerical & Statistical Methods	5	4	2		36	60	25	25	FC	MATHS
			Advance Programming Technique – I [C++]	5	4	2		36	60	25	25	CC	MCA
			Elective 2	4	4	0		36	60	0	25	CC	MCA
			System Analysis & Design										
			Software Engineering										
			Software Architechture and UI Design										
			Software Project Management										

II	III		Enterprise Content Management	5	4	2		36	60	25	25	CC	MCA
			Core Java	5	4	2		36	60	25	25	CC	MCA
			Introduction to Systems Programming	5	4	2		36	60	25	25	CC	CE
			Operations Research	5	4	2		36	60	25	25	FC	MATHS
			Elective 3	4	4	0		36	60	0	25	PE	MCA
			Cryptography & Network Security										
			Electronic commerce										
			Cyber Laws & Intellectual Property Rights										
			Digital forensics										
II	IV		Object Oriented System Development	4	4	0		36	60	0	25	CC	MCA
			Data Mining	5	4	2		36	60	25	25	PC	MCA
			Advanced Java	5	4	2		36	60	25	25	PC	MCA
			Elective 4	5	4	2		36	60	25	25	PE	MCA
			Recent Trends in ICT										
			Cloud computing										
			Advanced Web Development										
			Advance Programming Technique – II [.Net]										
			Elective 5	5	4	2		36	60	25	25	PE	MCA
			Advanced Database Management Systems										
			Analysis and design of algorithm										
			Information Retrieval										
			Database Administration										
III	V		Software Testing	5	4	2		36	60	25	25	CC	MCA

			Mobile Application Development	5	4	2		36	60	25	25	CC	MCA/IT
			Elective 6	5	4	2		36	60	25	25	PE	
			Service Oriented Architecture										MCA
			Intelligent Systems										CE
			Internet of Things										IT
			Game Programming										MCA & MATHS
			Elective 7	5	4	2		36	60	25	25	PE	
			Image Processing										CE/EC
			Remote Sensing and GIS										MCA
			Big Data Analytics										CE
			Computer Graphics										CE
			Project	3	0	6		0	0	100	50	EEC	MCA
			Project-Seminar	1	0	2		0	0	50	0	EEC	MCA
III	VI		Project	12		24		0	0	300	100	EEC	MCA
			Project-Seminar	3		6		0	0	100	0	EEC	MCA

Exam Panel					Annexure VIII		
				BCA Department			
Sem	Subject Name	Internal Examinar	External Examiner	Address	Qualification	Experience	Contact No
I	Communicative English – I	Prof. Anjali Thakur	Anjali Thakur	D.D. University Nadiad	M.Phil	20 Years	9429184329
			Prof. R. K. Jain	Opp. 3, Narendra Park, Opp.Civil Hospital Tank			
				Civil Hospital Road, Nadiad.			
			S. P. Chandravkar	C. B. Patel Arts College,	M.A.	20 Years	
				College Road, Nadiad.			
			Asutosh Yagnik	Anand Arts College	M.A.	5	
	Programming in 'C'	Prof. Chirag Patel	Chetan Dudhagra	BCA Dept.,N V Patel College of Pure & Applied Science, Nr. Post office, Mota bazar V. V. Nagar-388120	MCA	10	
		Prof. Shefali Gandhi	Prof. Sunil Shah	CE Department B & B Institute of Technology	ME	7	9979224824
			Prof. Raina Gahawar	Devshila bunglows, o/p pappaji tirth mogari gana road mogri / g h patel depart ment of computer science nana bazar nr jain derasarv v nagar	mca	3	8866363708
			Prof. Purvi Prajapati	Assistant Professor, IT Department, CIT,Charusat University, Changa	BE(IT), MTech(CE)		9879753987
	Advanced Mathematics – I	Prof. B.M.Patel	Prof. Mukesh Joshi	G. H. Patel College of Engg. & Technology, Bakrol Road. V.V. Nagar.388120	M.Sc.,M. Phil		9428672532
		Prof. Mitali J.Doshi	Dhiren Pandit	C-9, Madhav Appt.,Maniyasa Soc.,Maninagar(E),Ahmedabad	M.Sc.	4	9925569719
			Rahul Mehta	SVIT VASAD	M.Sc.		9898066500
			Prof. Bijal S. Khamar	G. H. Patel College of Engg. & Technology, Bakrol Road. V.V. Nagar.388120	M.Sc.,M. Phil		9879857825
	Digital Computer Organization	Prof. Shefali Gandhi	Prof. Sunil Shah	CE Department B & B Institute of Technology	ME	7	9979224824
		Prof. Chirag G. Patel	Chetan Dudhagra	BCA Dept.,N V Patel College of Pure & Applied Science, Nr. Post office, Mota bazar V. V. Nagar-388120	MCA	3	
		Prof. Dhruti P Desai	Sachin Darji	B & B Polytechnic, V V Nagar, Anand	BE EC	4	9925556284
	Computer Fundamentals & App.	Prof. Chirag G. Patel	Prof. Ashish Joshi	NVPAS V V Nagar	MCA	5	9879460459
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		Prof. S.B.Adhiya	Hashmukh Patel	BCA Dept.,N V Patel College of Pure & Applied Science, V. V. Nagar	MCA	3	9913073570
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	Advanced Mathematics – II	Prof. Mitali J Doshi	Prof. Bijal S. Khamar	Maths Dept, GCET College of engg & Technology Bakrol Road V.V.Nagar	M.Sc.		9879857825
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		Prof. Dhruti P Desai	Prof. Mayur Patel	BCA Dept.,N V Patel College of Pure & Applied Science, V. V. Nagar	MCA	4.5	9879460459
			Prof. Romesh Bhavshar	6,Paramhans Soc.,B/h. Kidney Hospital,Petlad Road,Nadiad	ME,CE	15	9824596800

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		Prof. Chirag G. Patel	Prof. Bimal Patel	CIT,Charusat University, Changa	B.E. IT	4.5	9909428681
		Prof. Kinjal Acharya					
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		Prof. S.B.Adhiya	Prof. Amit Chaudhari	IT Department, SVIT, Vasad	Mtech	4	9537799421
		Prof. Kinjal Acharya	Prof. Nehal Zala	Assistant professor SEMCOM Vallabh Vidyanagar	MCA	4	9825167484
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		Prof. K.U.Acharya	Prof. Bimal Patel	CIT,Charusat University, Changa	B.E. IT	4.5	9909428681
			Prof. Shreya Bhavshar	BCA Dept.,N V Patel College of Pure & Applied Science, V. V. Nagar	MCA	4	9924838187
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			Prof. Hashmukh Patel	BCA Dept.,N V Patel College of Pure & Applied Science, V. V. Nagar	MCA	3	9913073570
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			Asutosh Yagnik
	Programming in 'C'	Prof. Shefali Gandhi	Prof. Sunil Shah
		Prof. Chirag Patel	Prof. Raina Gahawar
			Prof. Purvi Prajapati
	Advanced Mathematics – I	Prof. Mitali J.Doshi	Prof. Bijal S. Khamar
			Dhiren Pandit
			Rahul Mehta
	Digital Computer Organization	Prof. Shefali Gandhi	Prof. Sunil Shah
		Prof. Chirag G. Patel	Chetan Dudhagra
		Prof. Dhruti P Desai	Sachin Darji
	Computer Fundamentals & App.	Prof. Chirag G. Patel	Prof. Ashish Joshi
		Prof. Minaz Shaikh	Ghanshyam Parmar
II	**Data Structure**	Prof. Chirag G. Patel	Chetan Dudhagra
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			Prof. Purvi Prajapati
	Advanced Mathematics – II	Prof. Mitali J Doshi	Prof. Bijal S. Khamar
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			Prof. Bhailal Patel
	Intro. To Internet & HTML	Prof. Minaz M.Shaikh	Prof. Hasmukhbhai B Patel
		Prof. Dhruti P Desai	Prof. Mayur Patel
			Prof. Romesh Bhavshar
	Business Data Processing	Prof. Minaz M Shaikh	Prof. Mayur M Patel
		Prof. Chirag G. Patel	Prof. Bimal Patel
		Prof. Kinjal Acharya	
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			Prof. Asutosh Yagnik
III	**Fin. Acc. & Management**	Prof. J.C. Jani	Prof. Kinchit Pareshbhai Shah
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	System Analysis & Design	Prof. Kinjal Acharya	Prof. Nehal Zala
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		Prof. S.B.Adhiya	Prof. Amit Chaudhari
	Self Development	Prof. Anjali Thakur	Prof. R. K. Jain
		Prof. R. K. Jain	Prof. S. P. Chandravkar
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	Object Oriented Programming	Prof. M.M.Shaikh	Prof. Mayur Patel
		Prof. K.U.Acharya	Prof. Bimal Patel
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IV	**Operating System**	Prof. Shefali Gandhi	Sunil Shah
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			Mayur Patel
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	Database Management System	Prof. Kinjal Acharya	Prof. Purvi Prajapati
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		Prof. Krunal Khurana	Prof. Paresh Tank
			Prof. Hashmukh Patel

	Java Programming	Prof. Dhruti P.Desai	Prof. Sunit n parmar
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			Prof. Mittal Desai
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			Prof. Mayank Ganatra
			Prof. Mittal Desai
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		Prof. Kinjal Acharya	PROF. HASMUKHBHAI B PATEL
			Prof. Bimal Patel
			Prof. Purvi Prajapati
	Intro. To Web Tech.	Prof. Dhruti P.Desai	Prof. Hardik Mandora
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CSPIT Changa Charusat U & PUPatel Dept of Computer engg			8401964330	
Assistant Professor, IT Department, CIT,Charusat University, Changa	BE(IT), MTech(CE)		9879753987	
CSPIT Changa Charusat U & PUPATE Depat of Computer eng			9723390288	
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Purvi Prajapati changa

Mital Bhatt Parul University

Dharmsinh Desai University, Nadiad-387001.

Minutes for Academic Council Meeting
26th April 2018 at 11.30 am

Following members were present in the meeting:

1)Dr H M Desai 2)Prof D G Panchal 3) Dr B N Suhagia 4) Dr R N Misra5) Dr P A Joshi 6) Dr N K Patel 7) Dr Hiren Patel 8) Prof R K Jain, Registrar (Member Secretary)

1.It was resolved to consider the Minutes of the last meeting held on 26th December 2017 at 12.00 noon approved since there was no written dissent received.

2.The Academic Council members discussed, deliberated and resolved to take on record the following agenda and proposals from those received from various Board of Studies :

2.1 Faculty of Technology :

2.1.1 Department of Information Technology (Refer Annexure-I(IT) for details)

2.1.1.1B.Tech:

It was resolved to approve the update in the subjects and Introduction of new subject as under:
1)the content at Sem IV in "Communication Systems" and change of prescribed textbook 2) Sem IV Introduction of new elective "Embedded System Design" at Sem V 3) Sem VI in subjects "Software Engineering" & "Advanced Java Technology"4) Introduction of Group Electives " Cloud Computing" & "Mobile Applications Development at Sem VII.

2.1.2 Department of Mechanical Engineering (Refer Annexure–II(MH) for details)

2.1.2.1 B.Tech:

It was resolved to approve the teaching scheme from Sem I to Sem VIII under CBCS along with the detailed syllabus of subjects in Sem V and VI

2.1.3 Department of Civil Engineering (Refer Annexure–III (CL)for details)

2.1.3.1 B.Tech:

It was resolved to approve Teaching Scheme from Sem I to Sem VIII under CBCS along with detailed syllabus of subjects in Sem V and VI.

2.1.4 Department of Electronics & Communication (Refer Annexure–IV(EC) for details)

2.1.4.1 B.Tech:

It was resolved to update the content at Sem VII in subject "Wireless Communication" and detailed Syllabus for " Embedded Systems" for Sem VII

2.1.5 Department of English (Refer Annexure–V for details)

2.1.5.1 B.Tech(Sem V & VI ALL BRANCH))

It was resolved to approve syllabus of Professional Communication-I in Sem V & VI

2.1.6 Department of Chemical Engineering (Refer Annexure–IX(CH) for details)

2.1.6.1 B Tech :

It was resolved to approve modifications in the syllabus of various subjects like- Instrumentation and Process control of Sem VI .Chemical reaction Engg.–II, Process Equipment Design & Drawing, Optimization Techniques of Sem VII . The detail syllabus is as per Annexure IX(CH).

2.2 Faculty of Information and Science:

2.2.1 Master of Business Management :

It was resolved to modify syllabus in MBA Sem I :Organizational Behaviour and M B A Sem IV: International Financial Management subjects as per **Annexure VI(MBA)**

2.2.2 Master of Computer Applications :

It was resolved to approve course structure for M C A program under CBCS Scheme w.e.f. from the year 2018-19 academic year .

Course Structure:Existing

Semester I

Subject	Credits
Computer Programming with 'C'	5
Discrete Mathematical Structure.	4
Logical Organization of Computer	5
Linux Environment	5
Financial Management & ERP	4
Semester II	
Data Structure using 'C'	5
Database Management System.	5
Computer Oriented Numerical & Statistical Methods	5
Advance Programming Technique – I	5
System Analysis & Design	5

Approved Course Structure

Semester I

Subject	*Credits*
Computer Programming with 'C'	*5*
Logical Organization of Computer	*4*
Linux Environment	*5*
*Data Communication and Networking***	*4*
Elective I	*4*
Discrete Mathematical Structure	
Financial Management & ERP	
Managerial economics	
Management Information System	
Semester II	
Data Structure using 'C'	*5*
Database Management System.	*5*
Computer Oriented Numerical & Statistical Methods	*5*
Advance Programming Technique – I [C++]	*5*
Elective 2	*4*
System Analysis & Design	
Software Engineering	
Software Architecture and UI Design	
Software Project Management	

Approved Syllabus as per **Annexure VII (MCA)**

2.2.3 B B A (Hotel Management) :

It was resolved to approve the change in syllabus for three subjects of B B A (Hotel Management) Semester V as per Annexure **VIII(BBA(HM)**

2.3. Faculty of Pharmacy :

2.3.1 Bachelor of Pharmacy : It was resolved to approve Course structure and details of syllabus for B Pharm course Semester III and IV as recommended by Pharmcy Council of India as per Annexure X (B Pharm)

Table-III: Course of study for semester III

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP301T	Pharmaceutical Organic Chemistry II – Theory	3	1	4
BP302T	Physical Pharmaceutics I – Theory	3	1	4
BP303T	Pharmaceutical Microbiology – Theory	3	1	4
BP304T	Pharmaceutical Engineering – Theory	3	1	4
BP305P	Pharmaceutical Organic Chemistry II – Practical	4	-	2
BP306P	Physical Pharmaceutics I – Practical	4	-	2
BP307P	Pharmaceutical Microbiology – Practical	4	-	2
BP 308P	Pharmaceutical Engineering –Practical	4	-	2
	Total	**28**	**4**	**24**

Table-IV: Course of study for semester IV

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP401T	Pharmaceutical Organic Chemistry III– Theory	3	1	4
BP402T	Medicinal Chemistry I – Theory	3	1	4
BP403T	Physical Pharmaceutics II – Theory	3	1	4
BP404T	Pharmacology I – Theory	3	1	4
BP405T	Pharmacognosy and Phytochemistry I– Theory	3	1	4
BP406P	Medicinal Chemistry I – Practical	4	-	2
BP407P	Physical Pharmaceutics II – Practical	4		2
BP408P	Pharmacology I – Practical	4	-	2
BP409P	Pharmacognosy and Phytochemistry I – Practical	4	-	2
	Total	**31**	**5**	**28**

2.3.2 Master of Pharmacy : It was resolved to approve Course structure and details of syllabus for M Pharm course Semester III and IV as recommended by Pharmcy Council of India as per Annexure XI (M Pharm)

Table – 12: Course of study for M. Pharm. III Semester
(Common for All Specializations)

Course Code	Course	Credit Hours	Credit Points
MRM 301T	Research Methodology and Biostatistics*	4	4
-	Journal club	1	1
-	Discussion / Presentation (Proposal Presentation)	2	2
-	Research Work	28	14
Total		**35**	**21**

* Non University Exam

Table – 13: Course of study for M. Pharm. IV Semester
(Common for All Specializations)

Course Code	Course	Credit Hours	Credit Points
-	Journal Club	1	1
-	Research Work	31	16
-	Discussion/Final Presentation	3	3
Total		**35**	**20**

Table – 14: Semester wise credits distribution

Semester	Credit Points
I	26
II	26
III	21
IV	20
Co-curricular Activities (Attending Conference, Scientific Presentations and Other Scholarly Activities)	Minimum=02 Maximum=07*
Total Credit Points	Minimum=95 Maximum=100*

*Credit Points for Co-curricular Activities

2.3.3 It was resolved to approve Panel of Examiners for B Pharm and M Pharm Course as Annexure XII

3.0 Research Program (Ph D): It was resolved to approve the award Ph D degree on recommendations of all the three referees to the following students:

1 .Name of Research Scholar :Mr. Patel Minal Parimalbhai (ID No.11PH09)
Thesis Title: Performance Modeling and Optimization of Live Migration of Virtual Machines
Name of Guide: Dr Sanjay Chaudhary, Professor and Associate Dean, School of Engineering and Applied Sciences, Ahmedabad University, Ahmedabad

2. Name of Research Scholar : Carol Pradipkumar Macwan(12PH07)
Thesis Title: Pharmacognostical Studies and Anticancer Activity of some Corchorus Species
Name of Guide: Dr N M Patel , Principal, A One College of Pharmacy, Ahmedabad

3.Name of Research Scholar: Patel Nileshkumar Mohanlal (10PH07)
Thesis Title: A Study on Interorganizational Knowledge Sharing Practices in Context of Supply Chain Performances of selected Organised Retail Chain in India
Name of Guide: Prof (Dr) Naresh K Patel, Professor and Dean , Faculty of Management and Information System, Dharmsinh Desai University, Nadiad

4.Name of Research Scholar: Patel Krutagn Harikrishna (13PH02)
Thesis Title: Development and Evaluation of Silver Nanoparticles loaded Topical Formulation for Fungal Nail Infection
Name of Guide: Dr Tejal Soni, Professor, Faculty of Pharmacy, Dharmsinh Desai University, Nadiad

4.0 The chair thanked all the members for their participation and valuable contribution.

Department of Information Technology, Faculty of Technology, Dharmsinh Desai University

B. TECH. (IT) COURSE STRUCTURE with CBCS and without CBCS

Level	Semester	Subject Code	Course Title (**with CBCS**)	Course Title (existing subjects) (**without CBCS**)
I	I	AF 111	MATHEMATICS - I	MATHEMATICS - I
		AF 122	BASIC ELECTRICAL & ELECTRONICS ENGINEERING	BASIC ELECTRICAL & ELECTRONICS ENGINEERING
		CT 116	ELEMENTS OF LINUX OS & C PROGRAMMING I	ELEMENTS OF LINUX OS & C PROGRAMMING I
		AF 115	ENGINEERING GRAPHICS	ENGINEERING GRAPHICS
		AF 124	ENGINEERING MECHANICS	ENGINEERING MECHANICS
		AF 126	WORKSHOP-1	WORKSHOP-1
		ES 110	ENVIRONMENTAL SCIENCES	---
		AF 120	---	COMMUNICATION SKILLS - I
	II	AF 201	MATHEMATICS - II	MATHEMATICS - II
		AF 212	ELECTRONICS PRINCIPLES	ELECTRONICS PRINCIPLES
		CT 215	C PROGRAMMING II	C PROGRAMMING II
		AF 214	MECHANICS OF SOLIDS	MECHANICS OF SOLIDS
		AF 215	HEAT POWER	HEAT POWER
		AM 210	ENGG. ECONOMICS & PRINCIPLES OF MANAGEMENT	----
		CT 216	ELECTRONICS WORKSHOP	ELECTRONICS WORKSHOP
		AF 220	----	COMMUNICATION SKILLS - II

II	III	AF 301	MATHEMATICS - III	MATHEMATICS - III
		IT 304	DISCRETE MATHEMATICS	DISCRETE MATHEMATICS
		IT 303	OBJECT ORI. PROGRAMMING	OBJECT ORI. PROGRAMMING
		IT 305	COMMUNICATION SYSTEMS	COMMUNICATION SYSTEMS
		IT 301	DESIGN OF DIGITAL CIRCUITS	DESIGN OF DIGITAL CIRCUITS
		IT 302	COMPUTER PERIPHERALS	COMPUTER PERIPHERALS
	IV	AF 401 (AF 411)	MATHEMATICS - IV	MATHEMATICS - IV
		IT 407	COMPUTER AND COMMUNICATION NETWORKS	COMPUTER AND COMMUNICATION NETWORKS
		IT 406	DATA STRUCTURES AND ALGORITHMS	DATA STRUCTURES AND ALGORITHMS
		IT 402	COMPUTER ORGANISATION	COMPUTER ORGANISATION
		IT 403	MICROPROCESSORS ARCHITECTURE PROG. AND INTERFACING	MICROPROCESSORS ARCHITECTURE PROG. AND INTERFACING

		AF 410	FINANCIAL AND MANAGERIAL ACCOUNTING	----
		CT 416	-----	INTRODUCTION TO YOGA
III	V	IT 509	DESIGN & ANAL. OF ALGORITHM	DESIGN & ANAL. OF ALGORITHM
		IT 510	CORE JAVA TECHNOLOGY	CORE JAVA TECHNOLOGY
		IT 511	THEORY OF AUTO.&FORMAL LAN	THEORY OF AUTO.&FORMAL LAN
		IT 502	DATABASE MANAGEMENT SYSTEM	DATABASE MANAGEMENT SYSTEM
		IT 506	ELECTIVE-1(ADVANCE MICROPROCESSOR ARCHITECTURE, EMBEDED SYSTEM)	ADVANCE MICROPROCESSOR ARCHITECTURE
			PROFESSIONAL COMMUNICATION - I	----
		CT 516	----	SELF DEVELOPMENT
	VI	IT 608	LANGUAGE TRANSLATOR	LANGUAGE TRANSLATOR
		IT 607	APPLIED OPERATING SYSTEM	APPLIED OPERATING SYSTEM
		CT 616	SOFTWARE ENGINEERING	SOFTWARE ENGINEERING
		IT 617	ADVANCE JAVA TECHNOLOGY	ADVANCE JAVA TECHNOLOGY
		IT 618	ELECTIVE-1 (APPLIED DESIGN PATTERN AND APPLICATION FRAMEWORK, MOBILE COMPUTING, COMPUTER GRAPHICS, DIGITAL SWITCHING SYSTEM)	ELECTIVE-I (APPLIED DESIGN PATTERN AND APPLICATION FRAMEWORK, COMPUTER GRAPHICS, DIGITAL SWITCHING SYSTEM, MOBILE COMPUTING)
			PROFESSIONAL COMMUNICATION - II	----

IV	VII	IT 715	DISTRIBUTED COMPUTING	DISTRIBUTED COMPUTING
		IT 704	DATA ANALYSIS & INFORMATION EXTRACTION	DATA ANALYSIS & INFORMATION EXTRACTION
		IT 716	WEB TECHNOLOGY	WEB TECHNOLOGY
		IT 707	SYSTEM DESIGN PRACTICE	SYSTEM DESIGN PRACTICE
		IT 714	KNOWLEDGE SYSTEM	ELECTIVE – I (E-COMMERCE AND E-SECURITY, INTRODUCTION TO NEURAL NETWORKS)
		IT 710	ELECTIVE- 1 (E-COMMERCE AND E-SECURITY, INTRODUCTION TO NEURAL NETWORKS , DIGITAL IMAGE PROCESSING, CLOUD COMPUTING, MOBILE APP. DEVELOPMENT)	ELECTIVE- II (DIGITAL IMAGE PROCESSING, KNOWLEDGE SYSTEM)
	VIII	AF801	PROJECT/INDUSRIAL TRAINING	PROJECT/INDUSRIAL TRAINING

DHARMSINH DESAI UNIVERSITY

FACULTY OF TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOGY

Changes Proposed in B.Tech. (IT)

Semester – III Subject – Communication System

Sem.	Subject:	Proposed Changes in Subjects:	Justification
B.Tech. IV (IT)	Communication System	**Change of Text Book**	• As per the feedback received from the stakeholders, it conveys that the current topics and the book of the subject gives depth knowledge which is good for EC students. However, for IT students, different treatment and orientation of the subject with inclusion of essential and important concepts and applications of the concepts is sufficient. Existing text book namely "Modern Digital & Analog Communication System By: B. P Lathi" should be replaced with a text book "Electronic Communication By: Dennis Roddy & John Coolen.
		Inclusion of Topics: Introduction to Information Theory, Source Encoding	• Because of dilution of topics in existing syllabus, topics helpful to the IT branch may be included in the subject.

New Syllabus

Effective from July 2018

IT-305 – COMMUNICATION SYSTEMS

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	**0**	**2**	**60**	**40**	**25**	**25**	**150**	**4**	**0**	**1**	**5**

A. OBJECTIVES OF THE COURSE

To provide an understanding and in-depth knowledge of the main concepts, techniques and performance criteria used in the analysis of various signal operations (time domain and frequency domain), and design of analog and digital communication systems so as to correlate the concepts of Information Theory in context to their branch.

B. DETAILED SYLLABUS:

[1] WAVEFORM SPECTRA: Introduction, Sinusoidal Waveform, General Periodic Waveforms Trigonometric Fourier Series for a Periodic Waveforms, Fourier Coefficients, Spectrum for the Trigonometric Fourier Series, Rectangular Waves, Sawtooth Waveform, Pulse Train, Some General Properties of Periodic Waveforms, Exponential Fourier Series, Approximate Formulas for the Fourier Coefficients, Energy Signals for Fourier Transform, Filtering of Signals, Power Signals, Bandwidth Requirements for Analog Information Signals

[2] DIGITAL LINE WAVEFORMS: Symbols, Binits, Bits And Bauds, Functional notations for Pulses, Line codes and Waveforms, M ary Encoding, Inter Symbol Interference

[3] AMPLITUDE MODULATION:

Introduction, Amplitude Modulation, Amplitude Modulated Transmitters, AM Receivers.

[4] SINGLE SIDEBAND MODULATION: Introduction, Single Sideband Principles, The Balanced Modulator SSB Generation, SSB Reception, Modified SSB Systems.

[5] ANGLE MODULATION: Introduction, Frequency Modulation, Phase Modulation, Equivalence between FM and PM, Angle Modulator Circuits, Angle Modulation Detectors.

[6] PULSE MODULATION: Pulse Amplitude Modulation, Pulse Code Modulation, Pulse Frequency Modulation, Pulse Time Modulation, Pulse Position Modulation, Pulse Width Modulation

[7] DIGITAL COMMUNICATION: Synchronization, Asynchronous Transmission, Probability of Bit Error in Baseband Transmission, Matched Filters, Optimum Terminal Filters, Bit Timing Recovery,

Eye Diagram, Digital Carrier System, Carrier Recovery Circuit, DPSK, Hard and Soft Decision, Error Control Coding

[8] INTRODUCTION TO INFORMATION THEORY: Measure of Information, Source Encoding

C. LEARNING OUTCOMES:

At the completion of course, Students will be able to,

1. Understand the various blocks that constitute an analog and digital communication system and understand how they interrelate.
2. Students will be able carry out various signal operations in time domain and frequency Domain analysis.
3. Students will be able to qualitatively and quantitatively analyse and evaluate analog as well as digital Communication systems.
4. Recognize the broad applicability of analog and digital communication systems in real world scenario.

D. RECOMMENDED TEXTBOOKS

1. Electronic Communication (Fourth Edition)
Author : Dennis Roddy & John Coolen
Publication : Pearson education edition

E. REFERENCE BOOKS

1. Modern Digital & Analog Communication Systems (Third Edition)
Author : B. P. Lathi
Publication : OXFORD

2. Electronic Communications, (Fourth Edition)
Author: George Kennedy
Publication: Tata McGraw Hill

F. LIST OF EXPERIMENTS:

1. To study and perform Crystal Oscillator and observe output waveform and measure its frequency.
2. To set up communication link with the help of AM transmitter and receiver kits and observe output for standard AM, DSB-SC and SSB-SC modulations.
3. Perform Amplitude Demodulator using peak detector circuit.
4. To build and test additive mixer circuit for down conversion.
5. To study Frequency Modulation and Demodulation test bed.
6. Perform Pulse Amplitude Modulation and Demodulation.
7. Perform Pulse Width Modulation and Demodulation.
8. Perform Pulse Position Modulation and Demodulation.
9. Perform Pulse Code Modulation and Demodulation.

10. To study and perform various types of line codes and digital carrier systems.

Old Syllabus

IT-305 – COMMUNICATION SYSTEMS

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

A. OBJECTIVES OF THE COURSE

To provide an understanding and in-depth knowledge of the main concepts, techniques and performance criteria used in the analysis of various signal operations (time domain and frequency domain), and design of analog and digital communication systems so as to correlate the concepts of Information Theory in context to their branch.

B. DETAILED SYLLABUS

1. INTRODUCTION

1.1 Communication System
1.2 Analog and Digital Messages
1.3 Signal-to-Noise Ratio, Channel Bandwidth, and the Rate of Communication
1.4 Modulation
1.5 Randomness, Redundancy, and Coding

2. INTRODUCTION TO SIGNALS

2.1 Size of a Signal
2.2 Classification of Signals
2.3 Some Useful Signal Operations
2.4 Unit Impulse Function
2.8 Trigonometric Fourier series
2.9 Exponential Fourier series

3. ANALYSIS AND TRANSMISSION OF SIGNALS

3.1 A periodic Signal Representation by Fourier Integral
3.2 Transforms of Some Useful Functions
3.3 Some Properties of the Fourier Transform
3.4 Signal Transmission through a Linear System
3.5 Ideal and Practical Filters
3.6 Signal Distortion over a Communication Channel
3.7 Signal Energy and Energy Spectral Density
3.8 Signal Power and Power Spectral Density
3.9 Numerical Computation of Fourier Transform: The DFT

4. AMPLITUDE (LINEAR) MODULATION

4.1 Base band and Carrier Communication
4.2 Amplitude Modulation: Double Sideband (DSB)
4.3 Amplitude Modulation (AM)
4.4 Quadrature Amplitude Modulation (QAM)
4.5 Amplitude Modulation: Single Sideband (SSB)
4.6 Amplitude Modulation: Vestigial Sideband (VSB)
4.7 Carrier Acquisition

5. ANGLE (EXPONENTIAL) MODULATION

5.1 Concept of Instantaneous Frequency
5.2 Bandwidth of Angle-Modulated Waves
5.3 Generation of FM Waves
5.4 Demodulation of FM
5.5 Interference in Angle-Modulated Systems
5.6 FM Receiver

6. SAMPLING AND PULSE CODE MODULATION

6.1 Sampling Theorem
6.2 Pulse-Code Modulation (PCM)
6.3 Differential Pulse Code Modulation (DPCM)
6.4 Delta Modulation

7. PRINCIPLES OF DIGITAL DATA TRANSMISSION

7.1 A Digital Communication System
7.2 Line Coding
7.3 Pulse Shaping
7.4 Scrambling
7.5 Regenerative Repeater
7.6 Detection-Error Probability
7.7 M-ary Communication
7.8 Digital Carrier Systems
7.9 Digital Multiplexing

C. LEARNING OUTCOMES

At the completion of course, Students will be able to,

- Understand the various blocks that constitute an analog and digital communication system and understand how they interrelate.
- Students will be able carry out various signal operations in time domain and frequency Domain analysis.
- Students will be able to qualitatively and quantitatively analyse and evaluate analog as well as digital Communication systems.
- Recognise the broad applicability of analog and digital communication systems in real world scenario.

D. RECOMMENDED TEXTBOOKS

1. Modern Digital & Analog Communication Systems (Third Edition)
   Author : B. P. Lathi
   Publication : OXFORD

E. REFERENCE BOOKS

1. Digital Communications
   Author: Banard Sklar
   Publication: Pearson education edition

2. Communication System
   Author: Bruce Carlson
   Publication: Tata McGraw Hill)

F. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

1. To observe the effect of the following scenario, on Sampling and Reconstruction of Signal.
   a) Different Types of Sampling.
   b) Effect of Sampling Frequency.
   c) Effect of the order of the filter.
2. To understand the concept of TDM using Analog Signal Time Division Multiplexing and Demultiplexing trainer kit.
3. To implement the Pulse Amplitude Modulation & Demodulation.
4. To implement the Pulse Width Modulation & Demodulation.
5. To implement the Pulse Position Modulation & Demodulation.
6. To understand the concept of Pulse Code Modulation & Demodulation and also Observe the effect of various channels on the demodulated output.
7. To observe the effect of slope overload in Delta Modulation & Demodulation.
8. To implement the Adaptive Delta Modulation & Demodulation.
9. To observe and compare various types of line coding using Data Formatting & Reformatting trainer kit.
10. To examine the effect of modulation index on Amplitude Modulated and Demodulated output
11. To observe the effect of modulating signal amplitude variation on the Frequency Modulated and Demodulated output.

Effective from July 2018

B.Tech. (IT)

Subject : Embedded System Design Semester - V

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	0	2	60	40	25	25	150	4	0	1	5

Pre-requisites : Computer Organization, Basics of Microprocessors, Digital Electronics

A. OBJECTIVES OF THE COURSE

Embedded systems are generally part of complex systems. An embedded system carries out the Computational subtasks of the main system. The computing systems within home appliances and Automobiles are examples of such systems. This course will cover the process of embedded system design under mainly cost, power, performance and several system- specific restrictions. Course being a practical oriented, the Arduino UNO development board which is a widely used and most popular open-source microcontroller board based on the ATmega328P microcontroller is chosen to teach the embedded system design concepts. It will provide the platform to students who would like to enter into IoT.

To provide an understanding and in-depth knowledge of the main concepts, techniques and performance criteria used in the analysis of various signal operations (time domain and frequency domain), and design of analog and digital communication systems so as to correlate the concepts of Information Theory in context to their branch.

B. OUTLINE OF THE COURSE:

1. Introduction to Embedded Systems

2 Typical Embedded Systems

3 RISC microcontrollers

4 Embedded product development life cycle

C. DETAILED SYLLABUS:

1 Introduction to Embedded Systems 7 Hrs

1.1 History of embedded systems

1.2 Classification of embedded systems

1.3 Major application area of embedded systems

1.4 Purpose of embedded systems

1.5 Fundamental issues in hardware software co-design

1.6 Introduction to unified modeling language (UML)

2 Typical Embedded Systems 14 Hrs

2.1 Core of the Embedded Systems

2.2 Memory

2.3 Sensors and actuators

2.4 Communication interface

2.5 Embedded firmware

3 RISC microcontrollers 16 Hrs

3.1 RISC and CISC architectures

3.2 AVR microcontroller family architecture and pin functions

3.3 Arduino board specifications

3.3 Arduino programming in C

3.4 I/O interfacing: LED, multiplexed 7-segment, LCD, GLCD, sensors, keypad, relay, buzzer

3.5 Arduino interrupt programming in C

3.6 Arduino serial programming in C

3.7 Communication protocol: I2C protocol and RTC interfacing, SPI protocol and max7221 interfacing

3.8 WiFi shield for internet

4 Embedded product development life cycle 3 Hrs

4.1 Objective of EDLC

4.2 Different phases of EDLC

4.3 Approaches (Modeling the EDLC)

D. Recommended Study Material:

*** Text Books:**

1. Introduction to Embedded Systems by shibu K V mcgraw hill

2. The AVR microcontroller and Embedded Systems by muhammad Ali Mazidi, SarmadNaimi, SepehrNaimi

3. Arduino Cookbook by Michael Margolis Published by O'Reiliy Media, Inc..

*** Reference Books:**

1. System Design: A Unified Hardware/Software Introduction by Frank Vahid and Tony D. Givargis, Addison Wesley, 2002.

2. Computers as Components by Wayne Wolf, Morgan Kaufmann, 2001

3. Embedded C programming and the ATMEL AVR by Barnett, cox and o'cull, Thomson

E. LEARNING OUTCOMES:

At the completion of course, Students will be able to,

1. Define what an embedded system is in terms of its interface
2. Enumerate and describe the components of an embedded system
3. Embedded System Design constraints
4. Describe the interactions of embedded systems with the physical world
5. Take IoT course.

DHARMSINH DESAI UNIVERSITY
FACULTY OF TECHNOLOGY
DEPARTMENT OF INFORMATION TECHNOLOGY

Changes Proposed in B.Tech. (IT)
Semester – VI Subject – Software Engineering

- **As seminar conducted by TCS under faculty development program. The topic found very useful and important in current trends of software development and thus wants to add it in our curriculum.**

Semester	Subject name and Code	Existing topic required to be updated	Proposed change in the subject	Justification
B.Tech. (IT) Semester-VI				
	Software Engineering (CT-616)	Software Process Models	Agile Methodology Topic to be added	Most of the software companies use Agile model for software development. Like:- Amazon, Google, Microsoft, pinterest,etc.

New Syllabus
Effective from December 2018

CT-616 – SOFTWARE ENGINEERING

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	--	2	60	40	25	25	150	4	--	1	5

A. COURSE PRE-REQUISITES

The knowledge of programming languages (C,C++) and the concepts of object oriented programming are required.

B. OBJECTIVES OF THE COURSE

This subject is required to learn the various phases of the life cycle of the software development. Apart from that the maintenance and testing should be covered which can be useful to the students in the industry job.

C. DETAILED SYLLABUS

1. Phases in Software Development Project

- Overview, Need, Coverage of topics Project feasibility analysis
- Software Process Models
  - Incremental Process Models, Evolutionary Process Models, Component based development Model, **Rapid Application Development Model**, Unified Process, **Agile Methodology (Agile Process Model).**
- Software Project management
- Cost Estimation
- Loc based estimation
- FP- based Estimation
- COCOMO II
- Project Scheduling Timeline charts Earned value analysis Risk Management
- Risk identification
- Risk assessment & refinement

- Risk mitigation, monitoring & management
- RMMM plan
- Change Management
- Software configuration management
- Software configuration process

2. Requirement engineering

- Requirement engineering tasks
- Initiating the requirement engineering Process
- Eliciting requirements
- System Engineering
- System analysis: SRS , Use cases

3. System design

- Design concepts and principles
- Architectural design User interface design Component level design Object oriented design

4. Software Testing

- Software Testing strategies Software Testing techniques White box testing
- Basis path testing Control structure testing Black box testing
- Object oriented testing

5. Software Quality Assurance

- ISO CMM

6. Software reliability

D. LEARNING OUTCOMES

After learning this subject the student can learn the software development process (that covers the different life cycle models, design, testing, maintainance etc.) can be learned. The students can also learn the UML for the design purpose. Apart from that the software project management and the various quality standards such as ISO, CMM, Sixsigma etc. can be learned.

E. RECOMMENDED TEXTBOOKS

Software Engineering - A practitioner's Approach by Roger S. Pressman, McGraw Hill Pub.

F. REFERENCE BOOKS

(1) Fundamentals if software engineering by Rajib Mall, II ed.Prentice Hall, Indian

(2) Software Engineering by Ian Sommerville, 6 ed., Pearson Edu.

(3) UML Distilled : A brief guide to the standard object modeling language by Flower and Scott

(4) SOFTWARE ENGINEERING: Principles and Practice by Waman S Jawadekar, Tata Mcgraw hill

(5) Object-oriented Analysis and Design with Applications by Grady Booch; II ed., Pearson Edu.

(6) Object oriented Analysis and Design by Andrew Haigh, Tata McGraw-Hill

G. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

1. Phases in software development project, overview, need and coverage of topics

2. To assign the requirement engineering tasks

3. To perform the system analysis: Requirement analysis, SRS

4. To perform the function oriented design: DFD and structured chart

5. To perform the user's view analysis: Use-case diagram

6. To draw the structural view diagram: Class diagram and object diagram

7. To draw the behavioral view diagram: Sequence diagram and collaboration diagram

8. To draw the behavioral view diagram: State-chart diagram and activity diagram

9. To draw the implementation view diagram: Component diagram

10. To draw the environmental view diagram: Deployment diagram

11. To perform the various techniques for testing using the testing tool: Unit testing and Integration testing

Old Syllabus

CT-616 – SOFTWARE ENGINEERING

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	--	2	60	40	25	25	150	4	--	1	5

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This subject is required to learn the various phases of the life cycle of the software development. Apart from that the maintenance and testing should be covered which can be useful to the students in the industry job.

C. DETAILED SYLLABUS

1. Phases in Software Development Project

- Overview, Need, Coverage of topics Project feasibility analysis
- Software Process Models
- Incremental Process Models Evolutionary Process Models Component based development Model Unified Process
- Software Project management
- Cost Estimation
- Loc based estimation
- FP- based Estimation
- COCOMO II
- Project Scheduling Timeline charts Earned value analysis Risk Management
- Risk identification
- Risk assessment & refinement
- Risk mitigation, monitoring & management
- RMMM plan

- Change Management
- Software configuration management
- Software configuration process

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After learning this subject the student can learn the software development process (that covers the different life cycle models, design, testing, maintainance etc.) can be learned. The students can also learn the UML for the design purpose. Apart from that the software project management and the various quality standards such as ISO, CMM, Sixsigma etc. can be learned.

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(4) SOFTWARE ENGINEERING: Principles and Practice by Waman S Jawadekar, Tata Mcgraw hill

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(6) Object oriented Analysis and Design by Andrew Haigh, Tata McGraw-Hill

G. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

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3. To perform the system analysis: Requirement analysis, SRS
4. To perform the function oriented design: DFD and structured chart
5. To perform the user's view analysis: Use-case diagram
6. To draw the structural view diagram: Class diagram and object diagram
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8. To draw the behavioral view diagram: State-chart diagram and activity diagram
9. To draw the implementation view diagram: Component diagram
10. To draw the environmental view diagram: Deployment diagram
11. To perform the various techniques for testing using the testing tool: Unit testing and Integration testing

Changes proposed in B.Tech.(IT)

Semester – VI

Subject : Advanced JAVA Technology

Semester	Existing subject name	Proposed Subject name	Proposed change in the subject	Justification
VI	IT-617 – ADVANCED JAVA TECHNOLOGY	No Change	Drop Topic: "Networking and concurrency mechanism"	It is covered in Core Java Technology, Sem-V
			Drop Topic : JNI	The focus of this subject is kept on JEE architecture. Therefore, to allow inclusion of other important topics of Java Enterprise Edition (JEE) architecture, it is removed. Furthermore, JNI is not falling under JEE.
			Drop Sub Topic: "EJB Entity bean"	JPA based entities are preferred instead of Entity bean in the industry. Moreover, EJB Entity bean has become obsolete in the industry. Furthermore, we cover "JPA and its implementation"

				under Hibernate topic in the subject "Design Pattern & Application Framework", Sem-VI.
			Added two topics: (i) Advanced Servlets: Web application Security, (ii) Advanced Servlets: Servlet Filters. **Added a subtopic: "Introduction to EJB Session bean 3.x" under the topic: Enterprise Java Beans**	**The focus of this subject is kept on JEE architecture. Therefore, these important topics are added against the dropped topics mentioned earlier.**

IT-617 – ADVANCED JAVA TECHNOLOGY (New Syllabus)

Effective December 2018

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	Tut	Prac	Ext	Sess.	TW	Prac	Total	Lect	Tut	Prac	Total
4	--	2	60	40	25	25	150	4	--	1	5

A. COURSE PRE-REQUISITES

- Knowledge of Core Java Technologies
- Basic concepts of Core Java such as Collections, Threads, Awt, and Applets.
- Knowledge about Web Servers like Tomcat and Application Servers like Glassfish, JBOSS etc.
- TCP/IP Socket Programming using Java

B. OBJECTIVES OF THE COURSE

- To construct a web application using Servlet and Java Server Pages
- Develop Database Application
- To construct an enterprise application using Java Beans
- Implement Server side programming
- Create Network Based Application like RMI.
- Develop dynamic software components
- Develop well structured Web Application that follows MVC design pattern.
- To deploy web based applications.

C. DETAILED SYLLABUS

1) Introduction to MVC and Java EE components for MVC [1]

- MVC Architecture: JavaBean/EJB as model, servlet as controller and JSP as view

2) JDBC [7]

- JDBC versus ODBC, JDBC driver types, JDBC URL, Drivers
- Two tier versus three tier models
- API: DriverManager, Driver, Connection, Statement, ResultSet
- Operations: Insert, Update, Delete, Create, Select
- Mapping of SQL data types with Java data types
- Scrollable Result Set: Record navigation operations
- Updatable Result Set: Insert, Update, Delete
- Callable Statement, Prepared Statement
- Transaction and Save point mechanism
- Enterprise JDBC (Support from Container): Enterprise Resource, DataSource,

Connection pooling, JNDI
- Introduction to Data Access Object (model)

3) Servlets **[8]**
- Introduction and use of Application server (Sun AS and Apache Tomcat).
- Web application structure (.war), Deployment Descriptor, packaging, development and deployment
- Servlet Life Cycle
- Javax.servlet, Javax.servlet.http packages
- Request, Response concepts and operations
- Variable Scopes: application, session, request
- Using JavaBean in Servlet
- Parameters: Context, Init
- Session Management and Cookies (HttpSession and Cookie objects)
- Handling HTTP requests and responses, Handling GET/POST requests
- Request Dispather
- Status codes, errors, Response headers

4) Advanced Servlets: Web application Security **[4]**
- Introduction to Authentication, Authorization, Confidentiality, and Integrity
- Security realm
- Declarative Security and configuration
- Types of authentication, Implementation of BASIC and FORM based authentication
- Implementation of authorization: Mapping of vendor neutral security-role and vendor specific role, define resource/method constraints using security-constraint, use of web-resource-collection, auth-constraint, and user-data-constraint
- Introduction to Programmatic Security

5) Advanced Servlets: Servlet Filters **[2]**
- Intercepting: processing before request and after request
- Filter API: Filter, FilterChain, FilterConfig
- Filter configuration

6) Remote Objects- Remote Method Invocation **[3]**
- RMI concept
- Stubs and Marshalling
- Interfaces and IDL
- IDL compiler – rmic
- Naming, lookup, RMI registry and client server program deployment
- Introduction and use of RMI security manager, policy files, Downloading of RMI stub files, Distributed Garbage Collection, Remote Callbacks

7) Enterprise Java Beans (2.x Session) **[4]**

- What is EJB, EJB architecture, Bean type
- Component and Container architecture
- Javax.ejb package: Remote and local interfaces and bean class: Home, Object and bean class
- EJB structure(ejb.jar), packaging, development, deployment
- Life cycle of Session(stateless and stateful)
- Session bean (stateful and stateless) development and client development
- Introduction to EJB Session bean 3.x

8) Java Server Pages [11]

- Syntax and semantics of: Standard action, expression, processing elements, Comments, scriptlets
- JSP life-cycle, and Phases of JSP life-cycle
- Collection and map management
- Using JavaBean in JSP
- EL expressions
- JSTL
  i. Introduction to JSTL concepts: taglib, uri, tld
  ii. Core: set, out, redirect, url, import, param, control structures: if, forEach, forToken, choose, array, collection and map management
  iii. Databse: setDataSource, query, update, param, transaction
- Custom tag Development
  i. Tag library structure
  ii. Tag interface hierarchy
  iii. Life cycle of SimpleTag, IterationTag and BodyTag.
  iv. Tag development using SimpleTag, IterationTag and BodyTag. Tag attributes, body handling and manipulation,
  v. Introduction to tag files.

D. LEARNING OUTCOMES

- Java/J2EE to build scalable n-tiered web applications.
- Covers servlets, servlet security, servlet filter, JSP, JDBC database connectivity, Enterprise JavaBeans, and RMI Technologies.
- Develop distributed applications by applying the concept of RMI.
- Session management in Web Application.
- Intercepting requests
- Apply authentication and authorization on Web-application's resources
- Describe how servlets and Java Server Pages (JSP) fit into a Java-based web application architecture.
- Design reusable web application components using JavaBeans.
- Develop and deploy MVC based application.

E. RECOMMENDED TEXTBOOKS

JSP and Servlets: A Comprehensive Study
By: Mahesh P. Matha, Publisher: PHI

F. REFERENCE BOOKS

J2EE Complete Reference
By : Keogh, James, Publisher : McGraw-Hill

Head First Servlets & JSP, 2nd Edition
By: Bryan Basham, Kathy Sierra, Bert Bates, Publication: O-reilly

Java Servlet & JSP Cookbook
By Bruce W. Perry, Publisher: O'Reilly

G. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

1. Create a GUI based application which can demonstrate the use of JDBC for Database Connectivity.
2. Create a GUI based application which can use for database modification using JDBC
3. Create a RMI based client-server application.
4. Create user registration functionality for student using Servlet.
5. Create a web application that demonstrates the use of session management.
6. Create a web application that demonstrates the use of servlet filters.
7. Create a JSP based Web application which allows the user to edit his/her database information.
8. Write a web application which demonstrates custom tag handling.
9. Create a web application that demonstrates the use of web-application security.
10. Write a web application for income-tax calculation using session bean.

Old Syllabus

IT-617 – ADVANCED JAVA TECHNOLOGY

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	--	2	60	40	25	25	150	4	--	1	5

A. COURSE PRE-REQUISITES

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- Basic concepts of Core Java such as Collections, Threads, Awt, and Applets.
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B. OBJECTIVES OF THE COURSE

- To construct a web application using Servlet and Java Server Pages
- Develop Database Application
- To construct an enterprise application using Java Beans
- Implement Server side programming
- Create Network Based Application like RMI.
- Develop dynamic software components
- Develop well structured Web Application that follows MVC design pattern.
- To deploy web based applications.

C. DETAILED SYLLABUS

1) Networking and concurrency mechanism

- Multithreading
- Sockets
- Service
- Handling Connection with remote site
- Echo server-client
- E-Mail sender

2) JDBC

- JDBC versus ODBC, JDBC driver types, JDBC URL, Drivers
- Two tier versus three tier models
- API: DriverManager, Driver, Connection, Statement, ResultSet
- Operations: Insert, Update, Delete, Create, Select
- Mapping of SQL data types with Java data types
- Scrollable Result Set: Record navigation operations

- Updatable Result Set: Insert, Update, Delete
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- Transaction and Save point mechanism
- Enterprise JDBC (Support from Container): Enterprise Resource, DataSource, Connection pooling, JNDI

3) Servlets

- Introduction and use of Application server (Sun AS and Apache Tomcat).
- Web application structure (.war), Deployment Descriptor, packaging, development and deployment
- Servlet Life Cycle
- Javax.servlet, Javax.servlet.http packages
- Request, Response concepts and operations
- Variable Scopes: application, session, request
- Parameters: Context, Init
- Session Management and Cookies (HttpSession and Cookie objects)
- Handling HTTP requests and responses, Handling GET/POST requests
- Request Dispather
- Status codes, errors, Response headers

4) Remote Objects- Remote Method Invocation

- RMI concept
- Stubs and Marshalling
- Interfaces and IDL
- IDL compiler – rmic
- Naming, lookup, RMI registry and client server program deployment
- Introduction and use of RMI security manager, policy files, Downloading of RMI stub files, Distributed Garbage Collection, Remote Callbacks

5) JNI – Java Native Methods

- JNI concept
- Use of javah
- Using c functions from java code, generation of library (DLL), and its loading
- Development Steps for JNI based program on Windows and Linux

6) Java Beans

- Bean Properties, Introspection
- Using JavaBean in Servlet and JSP: useBean, setter, getter
- MVC architecture, Data Access Object

7) Enterprise Java Beans 2.x(Session, Entity)

- What is EJB, EJB architecture, Bean type
- Component and Container architecture
- Javax.ejb package: Remote and local interfaces and bean class: Home, Object and bean class
- EJB structure(ejb.jar), packaging, development, deployment
- Life cycle of Session(stateless and stateful) and entity(CMP and BMP) beans

- Session bean(stateful and stateless) development and client development
- Entity bean(CMP and BMP) development and client development: finder methods, getter/setter methods, EJB-QL, primarykey, etc.

8) Java Server Pages

- Syntax and semantics of: Standard action, expression, processing elements, Comments, scriptlets
- JSP life-cycle, and Phases of JSP life-cycle
- Collection and map management
- EL expressions
- JSTL
  i. Introduction to JSTL concepts: taglib, uri, tld
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D. LEARNING OUTCOMES

- Java/J2EE to build scalable n-tiered web applications.
- Covers servlets, JSP, JDBC database connectivity, Enterprise JavaBeans, and RMI Technologies.
- Develop distributed applications by applying the concept of RMI.
- Session management in Web Application.
- Describe how servlets and Java Server Pages (JSP) fit into a Java-based web application architecture.
- Design reusable web application components using JavaBeans.
- Develop and deploy MVC based application.

E. RECOMMENDED TEXTBOOKS

Core Java2, VOL-II, Advanced Features, Edition Vth
By : Cay Horstmann, Gary, Cornell Publication : Sun Micro System

F. REFERENCE BOOKS

J2EE Complete Reference
By : Keogh, James Publication : McGraw-Hill

G. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

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4. Create user registration functionality for student using Servlet.
5. Write a program that demonstrates the use of session management.
6. Write a program that demonstrates the use of session management.
7. Create a JSP based Web application which allows the user to edit his/her database information.
8. Write a web application which demonstrates custom tag handling.
9. Write a program that demonstrates the use of JNI.
10. Write a web application for income-tax calculation using session bean.
11. Write a web application which create and use CMP entity bean.

Subject: Cloud Computing

Effective from July 2018

Semester -VII

Teaching Scheme			Exam Scheme (Marks)				
Lectures	**Tutorials**	**Practical**	**Theory (3 Hrs.)**	**Sessional (1.15 Hrs.)**	**Practical**	**T/W**	**Total**
4	**--**	**2**	**60**	**40**	**25**	**25**	**150**

Prerequisites:
Basics of Computer Networking
Basics of Operating System
Basic understanding about Storage System
Basic understanding about Distributed Computing

Unit - I	Overview of cloud computing	What is a cloud computing, Definition of cloud computing, characteristics of cloud computing , Driving factors towards cloud computing, Comparing grid with cloud and other computing systems, workload patterns for the cloud, Benefits and drawbacks of cloud computing
	Cloud computing concepts	Elasticity and scalability, Virtualization, Characteristics of virtualization, Benefits of virtualization, Virtualization in cloud computing, Hypervisors, Multitenancy, Types of tenancy, Billing and metering of services
	Cloud service delivery	Infrastructure as a service (IaaS) architecture, Platform as a service (PaaS) architecture, Software as a service (SaaS) architecture. Examples of IaaS, Paas and SaaS applications. SLA Management in Cloud Computing, Service providers- Google App Engine, Amazon EC2, Microsoft Azure, Sales force.
	Cloud deployment scenarios	Cloud deployment models, Private Cloud, Public cloud, Hybrid cloud, Community Cloud, Virtual private cloud, Economics of choosing a Cloud platform for an organization based on application requirements, economic constraints and business needs (e.g Amazon, Microsoft, Google, Salesforce.com, Ubuntu and Redhat), Benefits and drawbacks of each deployment model.
Unit - II	Server Virtualization	Basics of Virtual Machines , Process Virtual Machines, System Virtual Machines, Taxonomy of Virtual Machines; Virtualization Management; Hypervisor, Types of Hypervisors, Examples of Hypervisors, Full Virtualization, Para-virtualization, Hardware Assisted Virtualization. Virtual Machines Provisioning and Manageability, Virtual Machine Migration Services. Hypervisors – Xen, KVM , VMWare, Virtual Box, Hyper-V.

	Network Virtualization	Understanding the role of Network Virtualization, Virtualization of NIC, VMware NSX, Microsoft Hyper V Network Virtualization, Open VSwitch (KVM)
	Storage Virtualization	Architecture of storage, analysis and planning. Storage network design considerations; NAS and SAN, hybrid storage networking technologies (iSCSI, FCIP, FCoE), Global storage management locations, scalability, operational efficiency
Unit - III	Data Centre Design	Design for flexibility, scalability, environmental control, electrical power, flooring, fire protection, security, network infrastructure. Energy use and greenhouse gas emissions. Requirements for modern data centers. Data Centre Architectures : ToR, EoR.
	Programming Model	Introduction to Hadoop Framework –HDFS and Mapreduce, Input splitting, map and reduce functions, specifying input and output parameters, configuring and running a job – Design of Hadoop file system
	Cloud Economics	Metering, Monitoring and Pricing, Viability of Cloud.
	Cloud Programming	Cloud programming frameworks, cloud interfaces, Interoperability and standards
	Security in Cloud	Security Architecture Design, Identity and access management architecture, Isolation of users/VMs from each other, Data Security, Application Security, Virtual Machine Security, Virtualization System-Specific Attacks: Guest hopping, attacks on the VM (delete the VM, attack on the control of the VM, code or file injection into the virtualized file structure), VM migration attack, hyperjacking
Unit - IV	Case Study	Eucalyptus, Open Nebula, Open Stack and others.

Objectives:

1. To understand and analyze the components of cloud computing.
2. To introduce the various levels of services that can be achieved through cloud computing.
3. To understand the concept of Virtualization and cloud data storage.
4. To analyze the case studies to derive the best practice model to apply when developing and deploying cloud based applications.

Course Outcome:

1. Understanding of different layers of cloud computing and the various deployment and service models of Cloud Computing.

2. To provide insights into the virtualization technologies: Hypervisor, emulation, and application VM. Platform virtualization, storage virtualization, and network virtualization.
3. To understand security concerns of Cloud Computing
4. To develop ability to create cloud computing environments.

List of Experiments:

1) Study of Logical Volume Manager (LVM)
2) Study and Installation of Virtualization Software and its components
   Installation of KVM, VMWare, Oracle Virtualbox software
3) Study of Virtual Network and its types (Bridge Networking, Host Networking, Private Networking)
4) Study and installation of Storage as Service cloud computing environment (using FreeNAS/ownCloud).
5) User Management in SAAS Cloud Computing Environment (using ownCloud)
6) Private cloud Installation (OpenStack)
7) Private cloud Administration (OpenStack: IP Address configuration, Image Management, Security groups, Firewall)
8) Usage of private cloud (OpenStack)
9) Web Application Development and Testing in IAAS cloud environment (using putty, filezilla, SCP)
10) Study and Installation of Hadoop and its components
11) Case study on Amazon EC2 / Microsoft Azure / Google's App Engine

Text Books:

1) "Cloud Computing Principles and Paradigms" by Rajkumar Buyya, James Broberg, Andrzej Goscinski, Wiley.
2) "Cloud Computing: Implementation, Management, and Security" by John W. Rittinghouse and James F. Ransome, CRC Press.
3) "Mastering Cloud Computing" by Rajkumar Buyya, Christian Vecchiola, and Thamarai Selvi, Tata McGraw Hill.
4) "Virtualization: A Beginner's Guide" by Danielle Ruest and Nelson Ruest, McGraw Hill.
5) "Cloud computing Black Book" by Kailash Jayaswal, Jagannath Kallakurchi, Donald J. Houde, Deven Shah, Dreamtech Publication.
6) "Cloud Computing Bible" by Barrie Sosinsky, Wiley.
7) "Enterprise Cloud Computing" by Gautam Shroff, Cambridge.

Effective from July 2018

B.Tech. (IT)

Subject : MOBILE APP. DEVELOPMENT Semester - VII

Teaching Scheme (Hours)			Marks					Credit Structure			
Lect	**Tut**	**Prac**	**Ext**	**Sess.**	**TW**	**Prac**	**Total**	**Lect**	**Tut**	**Prac**	**Total**
4	--	2	60	40	25	25	150	4	--	1	5

A. COURSE PRE-REQUISITES

- Java Programming
- Database Management System
- Computer Network

B. OBJECTIVES OF THE COURSE

- Learn application development for android platform using core android components, asynchronous communication, and other features.
- Learn creating android apps interacting with various external services
- Manage user data and multimedia on a mobile device via the Android framework libraries.
- Use the sensors available on mobile devices to enhance user interaction and feedback

C. DETAILED SYLLABUS

Unit 1: Android OS and Application Development Environment [7]

- Architecture of Android OS [4]
  - Linux Kernel and processes
    - Display driver, keyboard driver, WiFi driver, Flash memory driver, Audio driver, Camera driver, Power management
  - Android OS & GUI architecture
  - Android Runtime, Android API and Java Interface
  - Android boot process, safe mode, recovery mode
- Application Development Environment [3]
  - Android SDK and components
  - Emulator

    - Android Studio
    - Gradle build
    - Android Project structure and files

Unit 2: Building basic interactive application [5]

- Activity and Lifecycle
- Resources
- Basic User Interface
    - Layouts
        - Relative, Linear, Grid
    - Layout configuration parameter and units
    - GUI widgets
    - Event handling
- Async tasks, multithreading, splash screen, etc.

Unit 3: Advanced GUI Handling [12]

- Menus [2]
- Data organization using Views and Adapters [2]
    - List View
    - Grid View
    - Adapters
- Modular design using Fragments [2]
    - Fragment lifecycle
    - Various fragments
    - Layout
- Other interaction Components [3]
    - Action bars
    - Activity, Intent, and Application Navigation
    - Tabs
    - Dialog boxes
- Android Services [3]
    - Log
    - Toast messages
    - Notification

Unit 4: Data Persistence: File, Database [3]

- Database [2]
    - SQLite
- Storage of user data [1]
    - Read/write files (internal storage, SD card)
    - Preferences

Unit 5: Graphics, Image, and Multimedia [5]

- Graphics [3]
    - Canvas and 2D drawing
    - Manipulating Graphics
    - Animation
- Image & Video handling handling [2]
    - Open resource using Intent
    - Access Camera

- Create and Play image files
- Play audio file
- Create and Play video files

Unit 6: Use of devices and sensors [2]

- GPS, Accelerometer, Compass
- WiFi, Bluetooth

Unit 7: External Services [6]

- Barcode, QR code reading
- GET, POST, Services, RESTful Web Services, JSON data, Single-Sign on
- Maps
- Email, SMS
- USB Debugging, Android Debug Bridge (adb)
- App deployment on playstore

D. LEARNING OUTCOMES

- Knowledge of (Android Studio) and Android Software Development Kit (SDK) for implementing Android applications.
- Understanding of lifecycle methods of Android application components, use of Components, and event handling.
- Understanding of graphics and multimedia support in Android.
- Understanding of how to interact with external devices and services.

E. RECOMMENDED TEXTBOOKS

1. Head First Android Development, by Dawn Griffiths and David Griffiths
2. Beginning Android Programming with Android Studio, by J F DiMarzio, Wrox, Wiley Brand

F. REFERENCE BOOKS

1. https://developer.android.com/training/index.html

G. LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

1. Installation, configuration, and study of android development environment and its required dependency components/software
2. Implement an app to demonstrate use of basic GUI widgets and event handling
3. Implement an app to demonstrate data organization using Views and Adapters

4. Implement an app to demonstrate use of fragments, application navigation, and toast messages
5. Implement an app to demonstrate use of SQLite and Preferences
6. Implement an app to demonstrate use of Graphics API, Camera access, and Gallery Intent
7. Implement an app to demonstrate use of splash screen, audio file, and Async task
8. Implement an app to demonstrate use of GPS and WiFi devices
9. Implement an app to demonstrate use of Web Service using JSON data format
10. Perform debugging using Android Debug Bridge

B.TECH SEM V (ALL)

PROFESSIONAL COMMUNICATION-I

Teaching Scheme (hours/week)			Examination Scheme (Marks)				
Lectures	Tutorial	Practical	Theory	Sessional	Practical	Term Work	Total
1	0	2	50	0	50	-	100

(A) Professional Communication

i. Introduction
ii. Methods & Manners
iii. Objectives

(B) Communication

i. Communication Process
ii. Barriers and their solutions to communication
iii. Main problems in Communication
iv. Verbal Communication:
   - Effective Communication
   - Listening Process
v. Nonverbal Communication:
   - Body Language
   - Paralanguage

(C) Language Proficiency

i. Grammar
ii. Vocabulary
iii. Usages of Language

(D) Communication: LSRW

i. Listening: Listening criticism
ii. Speaking: Elements of Speaking Skills: Vowels & Consonants, Pronunciation, Speech Art
iii. Reading: Skimming, Scanning, Intensive Reading, Levels of Comprehension (Literal and Inferential)
iv. Writing: Developing Basic writing skill, letter & e-mail writing

Text Books

1. Provided by the Language Lab Software
2. Will be specially designed for the target students

References

Title	Effective Technical Communication
Author	M Ashraf Rizvi
Publisher	Tata McGraw-Hill Education, 2005
ISBN	1259082512, 9781259082511
Length	545 pages

Title	Effective Business Communication
Author	Asha Kaul
Edition	2, illustrated
Publisher	PHI Learning Pvt. Ltd., 2014
ISBN	8120350723, 9788120350724
Length	248 pages

Methodology

Academic brilliance and technical expertise along with effective communication and polished soft skills make a student employable. The observation says that in the technical and professional courses, the core subject teachers opine and believe that 'the English language learning and English Communication Skills will automatically take place while learning the core subjects.' It rarely happens in our classrooms because the objective of teaching is to make the students have a clear understanding of the 'technical concepts' for which the teachers use local language so that the students understand the 'concepts.' Even the time constraint of completing the syllabus before examination does not allow these teachers to focus and attend the language and communication skills development in their classes.

So, to develop the desired competency of English Communication, the TBLT (Task-Based Language Teaching) and OCT (Oral Communicative Tasks) are intensively planned with the support of Motivational Strategies. TBLT approach focuses on communication and conveying a message, it encourages the students to use the English language 'fluently' and 'effectively.' In TBLT classes students perform in the English Language using 'pre-decided communicative tasks. The language, being a human element, any language learning is more effective if carried out with encouragement and motivations to the students. The belief behind this method and approach is task-based learning is most effective when encourage by motivating the students.

Outcomes

Engineering students are enabled to acquire spoken English proficiency and effective communication skills for their academic purposes and better employability so that they can have better scope and growth in their professional career.

B.TECH SEM VI (ALL)

PROFESSIONAL COMMUNICATION-II

Teaching Scheme (hours/week)			Examination Scheme (Marks)				
Lectures	Tutorial	Practical	Theory	Sessional	Practical	Term Work	Total
1	0	2	50	0	50	0	100

(A) Communication Skills

i. Inter and Intrapersonal communication
ii. Developing Positive Attitude
iii. Importance of empathy in communication
iv. Psychological dealings in communication

(B) Team Spirit

i. Skills and Qualities
ii. Techniques to be a team member

(C) Effective Self Presentation through LSRW

i. Listening: Active Listening
ii. Reading: Speed Reading, Reading Practice, Levels of Comprehension (Evaluative and Applied), Comprehension Practice
iii. Writing: minutes, notice, proposal, report writing
iv. Speaking: Indianisms, Presentation

Text Books

1. Provided by the Language Lab Software
2. Will be specially designed for the target students

References

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So, to develop the desired competency of English Communication, the TBLT (Task-Based Language Teaching) and OCT (Oral Communicative Tasks) are intensively planned with the support of Motivational Strategies. TBLT approach focuses on communication and conveying a message, it encourages the students to use the English language 'fluently' and 'effectively.' In TBLT classes students perform in the English Language using 'pre-decided communicative tasks. The language, being a human element, any language learning is more effective if carried out with encouragement and motivations to the students. The belief behind this method and approach is task-based learning is most effective when encourage by motivating the students.

Outcomes

Engineering students are enabled to acquire spoken English proficiency and effective communication skills for their academic purposes and better employability so that they can have better scope and growth in their professional career.

Dharmsinh Desai University, Nadiad-387001.

Minutes for Academic Council Meeting
27th December 2018 at 11.00 am

Following members were present in the meeting:

1)Dr H M Desai 2)Prof D G Panchal 3) Dr B N Suhagia 4) Dr P A Joshi6) Dr N K Patel 7) Dr Hiren Patel 8) Dr J G Buch 9)Prof R K Jain, Registrar (Member Secretary)

1.It was resolved to consider the Minutes of the last meeting held on 26th April 2018 at 11.00 am approved since there was no written dissent received.

2.The Academic Council members discussed, deliberated and resolved to take on record the following agenda and proposals from those received from various Board of Studies :

2.1 Faculty of Technology :

2.1.1 Department of Computer Engineering (Refer Annexure-I(CE) for details)

2.1.1.1 B.Tech:

It was resolved to approve the update in the subjects and Introduction of new subject as under:

1)Updating of content of "Java Technology" subject of B Tech Sem IV (CE)
2)Updating the content of "Web Development in .Net" subject of B Tech Sem V(CE)
3)Introduction of 'Big Data Analytics" subject as an elective in B Tech Sem VII(CE)
4)Introduction of "Machine Learning" subject as an elective in B Tech Sem VII(CE).

M Tech:

It was resolved to approve the update in the subjects , Introduction of new subject , removal of a subject and addition of Laboratory hours in the subject as under:

1)Updating the content of "Soft Computing" subject of M Tech SemII(CE) and Introducing Practical laboratory work.
2)Removal of the subject "Object Oriented Analysis and Design" and Introduction of new Subject "Machine Learning" at M Tech Sem I (CE)
3) Addition of Practical /Laboratory work in the teaching scheme of "Digital Image Processing" subject of M Tech Sem I (CE)
4) Addition of Practical /Laboratory work in the teaching scheme of "Advanced Software Processing" subject of M Tech Sem I (CE)
5) Addition of Practical /Laboratory work in the teaching scheme of "Distributed Computing subject of **M Tech Sem II** (CE)

Details are given in ANNEXURE I(CE)

2.1.1.2 Department of Chemical Engineering**(Refer Annexure-II(CH) for details)**

It was resolved to approve Panel of Examiners for B Tech and M Tech program.
Details are given in ANNEXURE II(CH)

2.1.1.3 Department of Electronics and Communication(**Refer Annexure-III(EC) for details)**

1) **It was resolved to approve the** syllabi of the subjects of B Tech Sem VII(EC) as per CBCS.
2) It was resolved to continue with the existing 1 Credit for Term Project Head at B Tech Sem V,VI,VII and M Tech Sem I and II ..

Sr. No.	Sem.	Subject Name	Present Credits	Approved Credit	Academic Council Recommendation
1	B.Tech. SEM-V	Term Project (Electronic Ckts)	1	1	To continue with the existing credit system in line with the Term Projects of other departments in the Faculty of Technology
2	B.Tech. SEM -VI	Term Project (Microcontroller)	1	1	
3	B.Tech. SEM-VII	Term Project (Software)	1	1	
4	M.Tech. SEM-I	Term Project (Programming)	1	1	
5	M.Tech. SEM-II	Term Project (Simulation)	1	1	

3) Introduction of Laboratory subject "Mathematical Computing Laboratory" at B Tech SemIII(EC) is approved.
4) Introduction of new experiments in the laboratory subject" Applied Mathematics Laboratory" at B Tech Sem IV(EC) is approved.
5) New edition of Text Book on " Digital Image Processing" introduced at B Tech Sem VII(EC) is approved.
6) It was resolved to approve Panel of Examiners for B Tech and M Tech program

Details are given in ANNEXURE III(EC)

2.1.1.4 Department of Instrument and Control Engineering (**Refer Annexure-IV(IC) for details)**

1) It was resolved to approve updating the content and renaming the subject "Advanced Microprocessor and Microcontroller" as Advanced Microprocessor Engineering at M Tech Sem I (IC)
2) It was resolved to approve the replacement of existing Seminar I at M Tech Sem I with the subject "Research Skills"
3) It was resolved to approve updated Panel of Examiners for B Tech and M Tech programs.

Details are given in ANNEXURE IV(IC)

2.2 Faculty of Information and Science:

2.2.1 Master of Computer Applications : (**Refer Annexure-V(MCA) for details)**

It was resolved to approve course structure for M C A Semester III and IV under CBCS scheme which is going to be implemented from the year 2019-20 academic year .

Existing

Semester III

Subject	Credits
Data Communication and Networking	4
Electronic Commerce	5
Software Engineering	5
Core Java	5
Introduction to Systems Programming	5

Semester IV

Object Oriented System Development	5
Operations Research	5
Recent Trends in ICT *	5
Advance Programming Technique – II	5
Advanced Database Management Systems	5

Approved under CBCS scheme

Semester III

Subject	Credits
Recent Trends in ICT *	5
Core Java	5
Introduction to Systems Programming	5
Operations Research	5
Elective 3	4
Cryptography and Network Security	
Electronic Commerce	
Cyber Laws and Intellectual Property Rights	
Digital Forensics	

Semester IV

Object Oriented System Development	4
Data Mining	5
Advanced Java	5
Elective 4	5
Cloud Computing	
Advanced Web Development	
Advanced Programming Technique – II [.Net]	
Enterprise Content Management	
Elective 5	5
Advanced Database Management Systems	
Analysis and Design of Algorithm	
Information Retrieval	
Database Administration	

Details are given in ANNEXURE V(MCA)

2.2.2 Bachelor of Computer Applications : (**Refer Annexure-VI(BCA) for details)**

1) It was resolved to approve the removal of the subjects of Introduction of Yoga & Self Developments and addition of new subject Multi Media and Graphic Design at B C A Sem III.
2) It was resolved to approve the addition of subject Android Programming at B C A Sem V.
3) It was resolved to approve the removal of subject Visual Programming of BCA IV and shifting of the subject Introduction to Web Development at BCA Sem IV from B C A V.
4) It was resolved to change Exam Scheme of the subject Environmental Studies at BCA Sem II from Existing theory :75 marks to Theory :60 marks and Term Work :25 marks to Term Work :40marks.

Details are given in ANNEXURE VI(BCA)

2.2.3 Bachelor of Business Administration(Hotel Management) (**Refer Annexure-VII for details)**

It was resolved to approve Changes in the syllabus of following subjects of the B B A (HM) Semester VI

HM 601	Front Office - V
HM 602	Housekeeping – V
HM 605	Hotel Law
HM 606	Engineering and Maintenance

Details are given in ANNEXURE VII

2.2.4 : Faculty of Dental Sciences (**Refer Annexure-VIII MDS for details)**

It was resolved to approve the updated University Rules and Regulations for the Master of Dental Surgery Post Graduate Degree program is mandated subsequent to the new Gazette Notification of the dental Council of India, Master of Dental Surgery Course Regulations, 2017 dated 5th November 2017 for Approval.

Details are given in ANNEXURE VIII (MDS)

3.0 Research Program (Ph D): It was resolved to approve the award of Ph D degree on recommendations of all the three referees to the following students:

1 .Name of Research Scholar :Ms Shah Vidhi Vijaykumar (ID No. 15PH01)
Thesis Title:Designing Soft Nanostructures for Drug Delivery Applications: Correlation of Morphology and Kinematics
Name of Guide: Dr Bhavesh Bharatiya,SSCSSN, D D University, Nadiad

2. Name of Research Scholar : Ms Basu Roy Srabayeeta (ID No.11PH08)
Thesis Title: Biocomposite of Polypropylene and Potato Starch
Name of Guide: Dr Premal Shukla, Former Professor, Chemical Engineering Department, D D University , Nadiad

3.Name of Research Scholar: Mr Limachia Miteshkumar Jethabhai (14PH19)
Thesis Title: FinFET Based High Performance SRAM BIT-CELL and Peripheral Circuitry
Name of Guide: Prof (Dr) Nikhil Kothari, Professor and Head Electronics & Communication Engineering Department, Dharmsinh Desai University, Nadiad

4.Name of Research Scholar: Mrs Rupinder Bhinder (07PH06)
Thesis Title: Justice Variable and Intention to Quit
Name of Guide: Dr Sunil Kumar Maheshwari, Professor, Indian Institute of Management Ahmedabad

5.Name of Research Scholar: Mr Mahesh Titiya (ID No. 10PH23)
Thesis Title: Building Crop Pest Ontology for Farmers
Name of Guide: Dr V A Shah, Professor & Head IC Department, D D University, Nadiad

4.0 The chair thanked all the members for their participation and valuable contribution.

Dharmsinh Desai University, Nadiad-387001.

Minutes for Academic Council Meeting
25th April 2019 at 11.00 am

Following members were present in the meeting:

1)Dr H M Desai 2)Prof D G Panchal 3) Dr B N Suhagia 4) Dr R N Misra 5) Dr Ravindra Dholakia 6) Dr N K Patel 7) Dr Hiren Patel 8) Dr J G Buch 9)Prof R K Jain, Registrar (Member Secretary)

1.It was resolved to consider the Minutes of the last meeting held on 27th December 2018 at 11.00 am approved since there was no written dissent received.

2.The Academic Council members discussed, deliberated and resolved to take on record the following agenda and proposals from those received from various Board of Studies :

2.1. **Faculty of Technology** :

2.1.1.1 Department of Chemical Engineering

B.Tech. :

1) It was resolved to update the content of "Chemical Engineering Material and Safety " subject of Semester VII and renaming the subject as "Chemical Process Safety"
2) It was resolved to approve Panel of examiners for B Tech and M Tech program.

M.Tech. :

1) It was resolved to approve introducing new subject "Research Methodology and Professional Communication" at MTech Semester III as per AICTE Guidelines.

Details given in Annexure- I

2.1.1.2 Department of Civil Engineering

B.Tech. :

1) It was resolved to approve detailed and updated syllabus for Semester VII as per CBCS.

2) It was resolved that the Industrial Training Program remains unaltered at Semester VIII

Details given in Annexure-II

2.1.1.3 Department of Electronics and Communication

B.Tech. :

1) It was resolved to shift laboratory hours of Audio Video Engineering subject (lab) from Semester VI to Semester IV
2) It was resolved to approve introduction of new subject Automated Electronics at Semester VI

Details given in Annexure - III

2.1.1.4 Department of Instrument & Control

M.Tech. :

1)It was resolved to approve detailed Syllabus of subject "Digital Control System" at Semester-I Which was introduced in place of Advanced Digital Signal Processing subject as per approval in previous AC meeting.

2)It was resolved to approve introduction of "Pedagogic Practice" at M Tech Semester-II

3)It was resolved to approve introduction of new audit courses as per AICTE Guidelines.

Details given in Annexure-IV

2.1.1.5 Department of Information Technology

B.Tech. :

1) It was resolved to approve changes in the list of Experiments to be performed at Semester III in the subject "Computer Peripherals"

2) It was resolved to approve updating of topics and changes in the list of Experiments to be performed at Semester VII in the subject "E-Commerce & E-Security"

3) It was resolved to approve updating of topics and changes in the list of Experiments to be performed at Semester VII in the subject "Distributed Computing"

4) It was resolved to approve changes in the list of Experiments to be performed at Semester VII in the subject "Data Analysis and Information Extraction"

Details given in Annexure-V

2.1.1.6 Department of Mechanical Engineering

B.Tech. :

1) It was resolved to offer two different subjects of Mechanical engineering department at B Tech Sem I(CH/CL/MH/IC) and B Tech Sem I (EC/CE/IT) as under:

	B Tech (CH/CL/MH/IC)	B Tech (EC/CE/IT)
Semester I	Elements of Mechanical Engg	Engineering Graphics
Semester II	Engineering Graphics	Elements of Mechanical Engg

2)It was resolved to approve change of name of subject Heat Power to Elements of Mechanical Engineering B Tech First Year program

3)It was resolved to approve shifting of subjects as under:

Two subjects Production Technology and Mechanical Vibrations are shifted from Semester VI to Semester VII.

4)It It was resolved to approve introduction of new subject "production Planning and Control" at B Tech Semester VII

5)It It was resolved to approve teaching scheme for all subjects at Semester VII made 3 Lectures/ week instead of 4 Lectures/week

6)It It was resolved to approve Course Structure of Elective III & IV 3-0-2 (Lectures-Tutorial-Practical)

M.Tech. :

1) It was resolved to approve introduction of subject Research Methodology & IPR at Semester I
2) It was resolved to exclude Laboratory Hours at Semester I in the subject "Advanced Machine Design" laboratory part is excluded.
3) It was resolved to approve change in teaching scheme at Semester I in the subject "Computer Aided Production Management" teaching scheme changed from 4-0-0 to 3-0-2

Details given in Annexure-VI

2.2 Faculty of Management & Information and Sciences:

2,2,1 Master of Computer Applications : (Refer Annexure VII for Details)

1. It was resolved approve new as well as revised syllabus for M C A in following Subjects Batch 2018-10 wef 2020 21
   - MCA Sem.-V : Software Testing
   - MCA Sem.-V : Mobile Application Development
   - MCA Sem.-V : Intelligent Systems
   - MCA Sem.-V : Service Oriented Architecture
   - MCA Sem.-V : Remote Sensing and GIS
   - MCA Sem.-V : Image Processing
   - MCA-Semester-II: Computer Graphics
   - Introduction of New subject Agile Methodology and Python Programming at MCA-Semester-III: Batch 2018-19 wef 2019-20

- Proposed modifications in syllabus contents of following subjects (teaching scheme w.e.f. 2018-19) were found suitable:
  - MCA-Semester-I: Linux Environment
  - MCA-Semester-I: Data Communication and Networking
- Approved modification in Teaching Scheme of 2018-19

Sr.	Semester	Subject	Semester
1	III	Operations Research	Semester – III
2	III	Agile Methodology and Python Programming	N/A (new subject)
3	V	Machine Learning	N/A (new subject)
4	V	Image Processing	Semester – V
5	V	Software Architecture and UI Design	Semester – V

- It was resolved to approve following Names of External Examiners in the Panel of Examiners:
  1. Mr Sandeep Kumar Das – Project Manager, Samyak Infotech Pvt. Ltd., Ahmedabad.
  2. Mr Shailesh Patel – IT Consultant, Ahmedabad.

2.3 Faculty of Pharmacy:

2.3.1 It was resolved to approve teaching scheme and syllabus for B Pharm semester V and VI as recommended by Pharmacy Council of India (Refer Annexure VIII for Details)

B. PHARM SEMESTER-V

Table-V: Course of study for semester V

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP501T	Medicinal Chemistry II – Theory	3	1	4
BP502T	Industrial PharmacyI– Theory	3	1	4
BP503T	Pharmacology II – Theory	3	1	4
BP504T	Pharmacognosy and Phytochemistry II– Theory	3	1	4
BP505T	Pharmaceutical Jurisprudence – Theory	3	1	4
BP506P	Industrial PharmacyI – Practical	4	-	2
BP507P	Pharmacology II – Practical	4	-	2
BP508P	Pharmacognosy and Phytochemistry II – Practical	4	-	2
	Total	**27**	**5**	**26**

B. PHARM SEMESTER-VI

Table-VI: Course of study for semester VI

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP601T	Medicinal Chemistry III – Theory	3	1	4
BP602T	Pharmacology III – Theory	3	1	4
BP603T	Herbal Drug Technology – Theory	3	1	4
BP604T	Biopharmaceutics and Pharmacokinetics – Theory	3	1	4
BP605T	Pharmaceutical Biotechnology – Theory	3	1	4
BP606T	Quality Assurance –Theory	3	1	4
BP607P	Medicinal chemistry III – Practical	4	-	2
BP608P	Pharmacology III – Practical	4	-	2
BP609P	Herbal Drug Technology – Practical	4	-	2
	Total	**30**	**6**	**30**

2.3.2 It was resolved to approve the Panel of Examiners for B Pharm and M Pharm program.(AnnexureIX)

2.4 Faculty of Medical Sciences and Research:

2.4.1 It was resolved to approve Rules and Regulations for ensuing M B B S Program from Academic Year 2019-20 as under:

ACADEMIC RULES AND REGULATIONS: M.B.B.S.

[Note: These rules are based on GME Notifications of MCI up to May-2018 and will require amendment in case the GME is amended]

RMBBS 1.

Admission, selection, counseling, migration and training of MBBS students shall be in accordance with the "Regulations on Graduate Medical Education, 1987" and its amendments from time to time and Admission Rules of Govt. of Gujarat.

RMBBS 2.

Training period and time distribution:

(1) Every student shall undergo aperiod of certified study extending over 4½academic years divided into 9 semesters, (i.e.of 6months each from the date of commencement of his study for the subjects comprising the medical curriculum to the date of completion of the examination and followed by one year compulsory rotating internship. Each semester will consist of approximately 120 teaching day so 8hours each college working time including one hour of lunch.

(2) Theperiodof4½ years is divided into three phases as follows:-

a) **Phase-1**(two semesters) –consisting of Pre-clinical subjects (Human Anatomy, Physiology including Bio-Physics, Bio- chemistry and introduction to Community Medicine including Humanities).

b) **Phase-II** (3 semesters) -consisting of para-clinical/clinical subjects.
During this phase teaching of para-clinical and clinical subjects shall be done concurrently.

The para-clinical subjects shall consist of Pathology, Pharmacology, Microbiology, Forensic Medicine Toxicology and part of Community Medicine.
TheclinicalsubjectsshallconsistofallthosedetailedbelowinPhaseIII.

c) **Phase-III** (Continuation of study of clinical subjects for seven semesters after passing Phase-I)

The clinical subjects to be taught during Phase II &III are Medicine and its allied specialties, Surgery and its allied specialties, Obstetrics and Gynaecology and Community Medicine.

The Medicine and its allied specialties training will include General Medicine, Paediatrics, Tuberculosis and Chest, Skin and Sexually Transmitted Diseases, Psychiatry, Radio-diagnosis, Infectious diseases etc. The Surgery and its allied specialties training will include General Surgery, Orthopaedic Surgery including Physio-therapy and Rehabilitation, Ophthalmology, Otorhinolaryngology, Anaesthesia, Dentistry, Radio-therapy etc. The Obstetrics &Gynaecology training will include family medicine, family welfare planning etc.

RMBBS 3.

(a) Passing in Ist Professional is compulsory before proceeding to Phase II training.
(b) A student who fails in the II nd professional examination is allowed to continue studies in 3rd MBBS, however he is not allowed to appear IIIrd Professional Part I examination unless he passes all subjects of II nd Professional examination.
(c) Passing in III rd Professional(Part I) examination is not compulsory before entering for 8th &9th semester training, however passing of III rd Professional (Part I) is compulsory for being eligible for III rd Professional (Part II) examination.

RMBBS 4.

Prescribed Teaching Hours:-

Pre-Clinical Subjects:(Phase-1-FirstandSecondSemester)

Anatomy	650 Hrs.
Physiology	480Hrs.
Biochemistry	240 Hrs.
Community Medicine	60Hrs.

RMBBS 5.

ATTENDANCE: 75% attendance in a subject for appearing in the examination is compulsory inclusive of attendance in non-lecture teaching i.e. seminars, group discussions, tutorials, demonstrations, practical , hospital (Tertiary Secondary, Primary) posting and bedside clinics etc."

RMBBS 6.

Internal Assessment:

(i)It shall be based on day to day assessment, evaluation of student assignment, preparation for seminar, clinical case presentation etc.
(ii)Regular periodical examinations shall be conducted throughout the course. The questions of number of examinations is left to the Institution.
(iii) Day to day records should be given importance during internal assessment
(iv)Weightage for the internal assessment shall be 20% of the total marks in each subject
(v)student must secure at least 35% marks of the total marks fixed for internal assessment in a particular subject in order to be eligible to appear in final university examination of that subject."

RMBBS 7.

DISTRIBUTIONOFMARKS:

(A) First Professional examination:(Pre- clinical Subjects):

(a) **Anatomy**:

Theory-Two papers of 50markseach
(One applied question of 10marks in each paper) 100marks.

Oral(Viva) 20marks
Practical 40marks

Internal Assessment
(Theory-20;Practical-20) 40marks
Total 200marks

Details of Internal Assessment Marks Calculation:		
	Theory (Total 20)	Practical (Total 20)
1st Terminal Exam	5	5
Preliminary Exam	7.5	7.5
Day to Day Evaluation	7.5	7.5
TOTAL	20	20
Details of Day to Day Evaluation Calculation:		
1stPart Ending Test	1	1
2ndPart Ending Test	1	1
3rdPart Ending Test	1	1
4thPart Ending Test	1	1
5thPart Ending Test	1	1
6thPart Ending Test	1	1
Attendance, Seminar, Quiz etc	1.5	-
Attendance, Journal, Viva	-	1.5

(b) **Physiology including Biophysics**

Theory-Two papers of 50 marks each
(One applied question of 10marks in each paper) 100marks
Oral(Viva) 20marks
Practical 40marks
Internal Assessment
(Theory-20;Practical-20) 40marks
Total 200marks

Details of Internal Assessment Marks Calculation:		
	Theory (Total 20)	Practical (Total 20)
1st Terminal Exam	5	5
Preliminary Exam	7.5	7.5
Day to Day Evaluation	7.5	7.5
TOTAL	20	20
Details of Day to Day Evaluation Calculation:		
1st Periodic Test	1.5	1.5
2nd Periodic Test	1.5	1.5
3rd Periodic Test	1.5	1.5
4th Periodic Test	1.5	1.5
Attendance, Seminar, Quiz etc	1.5	-
Attendance, Journal, Viva	-	1.5

(c) **Biochemistry**:

Theory- Two papers of 50marks each
(One applied question of 10marks in each paper) 100marks
Oral(Viva) 20 marks
Practical 40marks
Internal Assessment
(Theory-20;Practical-20) 40marks
Total 200marks

Details of Internal Assessment Marks Calculation:		
	Theory (Total 20)	Practical (Total 20)
1st Terminal Exam	5	5
Preliminary Exam	7.5	7.5
Day to Day Evaluation	7.5	7.5
TOTAL	20	20

Details of Day to Day Evaluation Calculation:		
1st Periodic Test	1.5	1.5
2nd Periodic Test	1.5	1.5
3rd Periodic Test	1.5	1.5
4th Periodic Test	1.5	1.5
Attendance, Seminar, Quiz etc	1.5	-
Attendance, Journal, Viva	-	1.5

2.4.2 It was resolved to approve curriculum for First Year M B B S program based on GME Notifications of MCI up to May-2018 and will require amendment in case the GME is amended (Annexure x)

3.0 Research Program (Ph D): It was resolved to award Ph D degree on recommendations of all the three referees to the following student:

1 .Name of Research Scholar : Ms Reshu Gupta
Thesis Title: Development and Characterization of Carbonic Anhydrase Inhibitor based Opthalmic Nanoemulsion for Treatment of Ocular Hypertension.
Name of Guide: Dr Tejal G Soni,Professor, Faculty of Pharmacy D D University, Nadiad

4.0 The chair thanked all the members for their participation and valuable contribution.

Dharmsinh Desai University, Nadiad-387001.

Minutes for Academic Council Meeting
28th December 2019 at 11.30 am

Following members were present in the meeting:

1)Dr H M Desai 2)Prof D G Panchal 3) Dr B N Suhagia 4) Dr R N Misra 5) Dr N K Patel 6) Dr Hiren Patel 7) Dr J G Buch 8) Dr P A Joshi 9)Prof R K Jain, Registrar (Member Secretary)

1.It was resolved to consider the Minutes of the last meeting held on 25th April 2019 at 11.00 am approved since there was no written dissent received.

2.The Academic Council members discussed, deliberated and resolved to take on record the following agenda and proposals from those received from various Board of Studies :

2.1. **Faculty of Technology** :

2.1.1.1 Department of Information and Technology

1) **It was resolved to approve change in Teaching Scheme of "Web Technology" subject in B.Tech. (IT) semester VII (w.e.f. July 2020).**

Old Scheme:

Teaching Scheme			Credit Structure			Exam Scheme				
Lecture	**Tutorial**	**Practical**	**L+T**	**P**	**Total**	**The.**	**Sess.**	**Prac.**	**T/W**	**Total**
2	2	2	4	1	5	60	40	25	25	150

New Scheme:

Teaching Scheme			Credit Structure			Exam Scheme				
Lecture	**Tutorial**	**Practical**	**L+T**	**P**	**Total**	**The.**	**Sess.**	**Prac.**	**T/W**	**Total**
4	--	2	4	1	5	60	40	25	25	150

Justification : In the subject Web Technology (IT 716), ASP.Net 4.0 with language C# is covered. This is a trending and dynamic technology that is changing rapidly and to incorporate those changes in the curriculum by distributing across the tutorials would be difficult as these tutorials are conducted in Laboratories instead of Class rooms. Moreover, when the subject was introduced, the ICT resources like projectors and laptops were not available in sufficient number in the department. So, it was compulsory to teach the concepts in Laboratories only. Today, with help of such ICT resources this can be better demonstrated in the classroom.

2) **It was resolved to approve shifting of the subject "System Design Practice" from semester VII to semester VI (w.e.f. December 2020)**
The curriculum of BTech Information Technology is modified according to needs. Many new subjects have been introduced. As per the current curriculum, the students learn basic and advance concepts on programming, web-application, database, and software design by their 6th semester. Therefore, this subject SYSTEM DESIGN PRACTICE can be offered to them in their 6th semester. Moreover, students can also present/discuss the developed project during their campus interview, which generally happens in their 7th semester.

3) It was resolved to approve Panel Of Examiners for B Tech & M Tech program as per Annexure IA&1B

2.1.1.2 Department of Electronics & Communications

It was resolved to approve Panel Of Examiners for B Tech & M Tech program as per Annexure II

2.1.2 Review of Professional Communication Course:

As prescribed by AICTE model curriculum 2018 it was approved to introduce HSMC101-English in B Tech Sem II and HSMC201-Humanities I (Effective Technical Communication) in B Tech Sem III across all branches from Academic Year 2020-21 instead of Professional Communication I and Professional Communication II currently being offered in B Tech Sem V and VI. Detailed syllabus is given as Annexure VII

2.2 Faculty of Management & Information and Sciences:

2.1.1 Master of Computer Applications :

1. It was resolved to approve revised syllabus of following subjects (teaching scheme w.e.f. 2018-19) of M C A program Annexure – III
   - MCA Sem.-V :Internet of Things
   - MCA Sem.-V : Game Programming
   - MCA Sem.-V : Machine Learning
   - MCA Sem.-V : Big Data Analytics
   - MCA Sem.-V : Software Architecture and Design
   - It was resolved to approve introduction of New subject Agile Methodology and Python Programming at MCA-Semester-III: Batch 2018-19 wef 2019-20
2. It was resolved to approve modifications in existing syllabus contents of following subjects (w.e.f. 2020-21) :
   - MCA-Semester-I: Computer Programming with C (Annexure – B)
   - MCA-Semester-II: Advanced Programming Technique-I [C++] (Annexure – C)
3. It was resolved to approve Panel Of Examiners for B Tech & M Tech program as per Annexure IV

2.3 Faculty of Medical Sciences and Research:

2.3.1 It was resolved to approve amendment in the rules approved by this Academic Council meeting held on 25/04/2019. In the aforesaid Academic Council Meeting held on 25/04/2019, Academic Rules and Regulations for MBBS Program was approved wide Agenda Item no. 2.4.1. These Rules and Regulations were framed to be commensurate with GME Notifications of the MCI as on that date. Subsequently, Amendment Notification dated 4/11/2019 has been issued which is applicable for students admitted from Academic year 2019-20 onwards.

Following Amendments were approved for **ACADEMIC RULES AND REGULATIONS: M.B.B.S.:**

RMBBS 2. It was resolved to approve replacement of this Rule by the following:

2.1.Every learner shall undergo a period of certified study extending over 4½ academic years, divided in to nine semesters from the date of commencement of course to the date of completion of examination which shall be followed by one year of compulsory rotating internship.

2.2.Each academic year will have at least 240 teaching days with a minimum of eight hours of working on each day including one hour as lunch break.

2.3.The period of 4½ years is divided as follows:

2.3.1Pre-Clinical Phase[(Phase I)-First Professional phase of 13 months preceded by Foundation Course of one month]: will consist of preclinical subjects–Human

Anatomy, Physiology, Biochemistry, Introduction to Community Medicine, Humanities, Professional development including Attitude, Ethics & Communication (AETCOM) module and early clinical exposure, ensuring both horizontal and vertical integration.

2.3.2Para-clinicalphase[(Phase II)-Second Professional(12months)]: will consist of Para-clinical subjects namely Pathology, Pharmacology, Microbiology, Community Medicine, Forensic Medicine and Toxicology, Professional development including Attitude, Ethics& Communication (AETCOM) module and introduction to clinical subjects ensuring both horizontal and vertical integration. Apart of training during clinical postings should take place at the *primary level* of healthcare. It is desirable to provide learning experiences in secondary healthcare, wherever possible**.** This will involve:

(a)Experience in recognizing and managing common problems seen in outpatient, inpatient and emergency settings,

(b)Involvement in patient care as a team member,

(c)Involvement in patient management and performance of basic procedures.

2.3.3ClinicalPhase–[(Phase III) Third Professional(28months)]

(a)Part I (13months)-The clinical subjects include General Medicine, General Surgery, Obstetrics & Gynaecology, Pediatrics, Orthopaedics, Dermatology, Otorhinolaryngology, Ophthalmology, Community Medicine, Forensic Medicine and Toxicology, Psychiatry, Respiratory Medicine, Radiodiagnosis & Radiotherapy and Anaesthesiology &Professional development including AETCOM module.

(b)Electives(2months)-To provide learners with opportunity for diverse learning experiences, to do research/community projects.

(c)Part II(13months)-Clinical subjects include:

i.Medicine and allied specialties (General Medicine, Psychiatry, Dermatology Venereology and Leprosy (DVL), Respiratory Medicine including Tuberculosis)

ii.Surgery and allied specialties (General Surgery, Orthopedics [includingtrauma]), Dentistry, Physical Medicine and rehabilitation, Anaesthesiology and Radiodiagnosis)

iii.Obstetrics and Gynecology (includingFamilyWelfare)

iv.Pediatrics

v.AETCOM module

RMBBS 3 It was resolved to approve replacement of this Rule by the following:

3.1 No more than four attempts shall be allowed for a candidate to pass the first Professional examination. The total period for successful completion of first Professional course shall not exceed four(4) years. Partial attendance of examination in any subject shall be counted as an attempt.

3.2 A learner, who fails in the second Professional examination, shall not be allowed to appear in third Professional Part I examination unless she/he passes all subjects of second Professional examination.

3.3Passing in third Professional (Part I) examination is not compulsory before starting part II training; however passing of third Professional (Part I) is compulsory for being eligible for third Professional (Part II) examination.

RMBBS 4 It was resolved to approve replacement of this Rule by the following:

4.1Time distribution of the MBBS programme shall be as given inTable1.

Table1:Time distribution of MBBS Programme&Examination Schedule

<table>
<tr><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>Jun</th><th>Jul</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Foundation Course</td><td colspan="3">IMBBS</td></tr>
<tr><td colspan="8">IMBBS

IIMBBS</td><td>Exam I MBBS

Exam II MBBS</td><td colspan="2">IIMBBS

IIIMBBS</td></tr>
<tr><td colspan="8">III MBBS Part I</td><td colspan="2">Exam IIIMBBS Part I</td><td>Electives& Skills</td></tr>
<tr><td colspan="12">III MBBS Part II</td></tr>
<tr><td>Exam III MBBS Part II</td><td colspan="11">Internship</td></tr>
<tr><td colspan="2">Internship</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

One month is provided at the end of every professional year for completion of examination and declaration of results.

4.2Distribution of subjects by Professional Phase-wise is given in Table2.

Table2:Distribution of subjects by Professional Phase

Phase & year of MBBS	Subjects & New Teaching Elements	Duration#	University examination

First Professional MBBS	Foundation Course(1month) (Table-3) Human Anatomy, Physiology & Biochemistry, introduction to Community Medicine, Humanities Attitude, Ethics, and Communication Module (AETCOM)	1+13months	I Professional
Second Professional MBBS Third Professional MBBS Part I	Pathology, Microbiology, Pharmacology, Forensic Medicine and Toxicology, Introduction to clinical subjects including Community Medicine Clinical postings General Medicine,General Surgery, Obstetrics & Gynecology, Pediatrics, Orthopedics, Dermatology, Psychiatry, Otorhinolaryngology Ophthalmology, Community Medicine, Forensic Medicine and Toxicology, Respiratory medicine, Radiodiagnosis & Radiotherapy, Anesthesiology	12months 13months	II Professional III Professional (Part I)
Electives Third Professional MBBS Part II	Electives, Skills and assessment* General Medicine, Pediatrics, General Surgery, Orthopedics, Obstetrics and Gynecology including Family welfare and allied specialties Clinical postings/subjects Attitude, Ethics & Communication Module (AETCOM)	2 months 13months	III Professional (Part II)

*Assessment of electives shall be included in Internal Assessment.

Table3:Foundation Course(one month)

Subjects/Contents	**Teaching hours**	**Self Directed Learning (hours)**	**Totalhours**
Orientation	30	0	30
Skills Module	35	0	35
Field visit to Community Health Center	8	0	8
Introduction to Professional Development &AETCOM module	-	-	40
Sports and extra curricular activities	22	0	22
Enhancemen to language/computer skills[3]	40	0	40
	-	-	175

Teaching of Foundation Course will be organized by pre-clinical departments.

4.3Minimum teaching hours prescribed in various disciplines are as under Tables4-7.

Table 4:First Professional teaching hours

Subjects	**Lectures (hours)**	**Small Group Teaching/Tutorials/ Integrated learning/Practical(hours)**	**Self directed learning (hours)**	**Total (hours)**
Human Anatomy	220	415	40	675
Physiology*	160	310	25	495
Biochemistry	80	150	20	250
Early Clinical Exposure**	90	-	0	90
Community Medicine	20	27	5	52
Attitude,Ethics& Communication Module(AETCOM)***	-	26	8	34
Sports and extra curricular activities	-	-	-	60
Formative assessment and Term examinations	-	-	-	80
Total	-	-	-	1736

* including Molecular Biology.

**Early clinical exposure hours to be divided equally in all three subjects.

***AETCOM module shall be a longitudinal programme.

Table5:Second Professional teaching hours

Subjects	**Lectures (hours)**	**Small group learning(Tutorials/Seminars)/ Integrated learning(hours)**	**Clinical Postings (hours)***	**Self-Directed Learning (hours)**	**Total(hours)**
Pathology	80	138	-	12	230
Pharmacology	80	138	-	12	230
Microbiology	70	110	-	10	190
Community Medicine	20	30	-	10	60

Forensic Medicine and Toxicology	15	30	-	5	50
Clinical Subjects	75**	-	540***		615
Attitude, Ethics& Communication Module(AETCOM)		29	-	8	37
Sports and extracurricular activities	-	-	-	28	28
Total	-	-	-	-	1440

* At least 3hours of clinical instruction each week must be allotted to training in clinical and procedural skill laboratories. Hours may be distributed weekly or as a block in each posting based on institutional logistics.

**25hours each for Medicine, Surgery and Gynecology &Obstetrics.

***The clinical postings in the second professional shall be 15 hours per week(3hrs per day from Monday to Friday).

Table 6: Third Professional Part I teaching hours

Subjects	Teaching Hours	Tutorials/Seminars/Integrated Teaching(hours)	Self-Directed Learning(hours)	Total (hours)
General Medicine	25	35	5	65
General Surgery	25	35	5	65
Obstetrics and Gynecology	25	35	5	65
Pediatrics	20	30	5	55
Orthopaedics	15	20	5	40
Forensic Medicine and Toxicology	25	45	5	75
Community Medicine	40	60	5	105
Dermatology	20	5	5	30
Psychiatry	25	10	5	40
Respiratory Medicine	10	8	2	20
Otorhinolaryngology	25	40	5	70
Ophthalmology	30	60	10	100
Radiodiagnosis and Radiotherapy	10	8	2	20
Anesthesiology	8	10	2	20
Clinical Postings*	-	-	-	756
Attitude, Ethics & Communication Module(AETCOM)		19	06	25

Total	303	401	66	1551

**The clinical postings in the third professional part I shall be 18 hours per week (3hrs per day from Monday to Saturday).*

Table7:Third Professional Part II teaching hours

Subjects	TeachingHours	Tutorials/Seminars/Integrated Teaching(hours)	Self-Directed Learning(hours)	Total(hours)
General Medicine	70	125	15	210
General Surgery	70	125	15	210
Obstetrics and Gynecology	70	125	15	210
Pediatrics	20	35	10	65
Orthopaedics	20	25	5	50
Clinical Postings**				792
Attitude,Ethics& Communication Module (AETCOM)***	28		16	43
Electives				200
Total	250	435	60	1780

***The clinical postings in the third professional part II shall be 18 hours per week (3hrs per day from Monday to Saturday).*

***Hours from clinical postings can also be used for AETCOM modules.

Table8: Clinical postings

Subjects	Period of training in weeks			Total weeks
	II MBBS	IIIMBBS PartI	IIIMBBS PartII	
Electives	-	-	8*(4regularclinicalposting)	4
General Medicine[1]	4	4	8+4	20
General Surgery	4	4	8+4	20
Obstetrics&Gynaecology[2]	4	4	8+4	20
Pediatrics	2	4	4	10
Community Medicine	4	6	-	10
Orthopedics-includingTrauma[3]	2	4	2	8

Otorhinolaryngology	4	4	-	8
Ophthalmology	4	4	-	8
Respiratory Medicine	2	-	-	2
Psychiatry	2	2	-	4
Radiodiagnosis[4]	2	-	-	2
Dermatology,Venereology&Leprosy	2	2	2	6
Dentistry&Anesthesia	-	2	-	2
Casualty	-	2	-	2
	36	42	48	126

*In four of the eight weeks of electives, regular clinical postings shall be accommodated.

[1]This posting includes Laboratory Medicine(Para-clinical)& Infectious Diseases Phase III Part I).

[2]This includes maternity training and family welfare(including Family Planning).

[3]This posting includes Physical Medicine and Rehabilitation.

[4]This posting includes Radiotherapy, wherever available.

Notes:

(1) Duration of clinical postings will be:

Second Professional :36 weeks of clinical posting (Three hours per day-five days per week: Total 540hours)

Third Professional part I: 42 weeks of clinical posting (Three hours perday-six days per week:Total756hours)

Third Professional part II: 44 weeks of clinical posting (Three hours perday-six days per week: Total 792hours)

(2) Time allotted exclude time reserved for internal/University examinations, and vacation.

(3) Second professional clinical postings shall commence before/after declaration ofresultsof the first professional phase examinations, as decided by the institution/University.Third Professional parts I and part II clinical postings shall start no later than two weeks after the completion of the previous professional examination.

RMBBS 5 It was resolved to approve replacement of this Rule by the following:

Attendance

1.Attendance requirements are 75% in theory and 80% in practical/clinical for eligibility to appear for the examinations in that subject. In subjects that are taught in more than one phase–the learner must have 75% attendance in theory and 80% in practical in each phase of instruction in that subject.

2.If an examination comprises more than one subject (for e.g., General Surgery and allied branches), the candidate must have 75% attendance in each subject and 80% attendance in each clinical posting.

3.Learners who do not have at least 75% attendance in the electives will not be eligible for the Third Professional-Part II examination.

RMBBS 6 It waresolved to approve replacement of this Rule by the following:

Internal Assessment:

1. There shall be no less than three internal assessment examinations in each Preclinical/Para-clinical subject and no less than two examinations in each clinical subject in a professional year. An end of posting clinical assessment shall be conducted for each clinical posting in each professional year.
2. When subjects are taught in more than one phase, the internal assessment must be done in each phase and must contribut proportionately to final assessment. For example, General Medicine must be assessed in second Professional, third Professional Part I and third Professional Part II, independently.
3. Day to day records and logbook(including required skill certifications) should be given importance in internal assessment.
4. The final internal assessment in a broad clinical specialty (e.g., Surgery and allied specialties etc.) shall comprise of marks from all the constituent specialties. The proportion of the marks for each constituent specialty shall be determined by the time of instruction allotted to each.
5. Learners must secure at least 50% marks of the total marks (combined in theory and practical/clinical; not less than 40% marks in theory and practical separately) assigned for internal assessment in a particular subject in order to be eligible for appearing at the final University examination of that subject. Internal assessment marks will reflect as separate head of passing at the summative examination.

RMBBS 7 It was resolved to approve replacement of this Rule by the following:

7.1 Nature of questions will include different types such as structured essays (Long Answer Questions -LAQ, Short Answer Questions -SAQ and Multiple Choice Questions -MCQ). Marks for each part should be indicated separately. MCQs shall be accorded a weightage of not more than 20% of the total theory marks. In subjects that have two papers, the learner must secure at least 40% marks in each of the papers with minimum 50% marks in aggregate (both papers together) to pass.

7.2 There shall be one main examination in an academic year and a supplementary to be held not later than 90day safter the declaration of the results of the main examination.

7.3 A learner shall not be entitled to graduate after 10 years of his/her joining of the first part of the MBBS course.

7.4 University Examinations shall be held as under:

(a)First Professional

1.The first Professional examination shall be held at the end of first Professional training (1+12months), in the subjects of Human Anatomy, Physiology and Biochemistry.

2.A maximum number of four permissible attempts would be available to clear the first Professional University examination, where by the first Professional course will have to be cleared within 4years of admission to the said course. Partial attendance at any University examination shall be counted as an availed attempt.

(b)Second Professional

1.The second Professional examination shall be held at the end of second professional training (11months), in the subjects of Pathology, Microbiology, and Pharmacology.

(c)Third Professional

1.Third Professional Part I shall be held at end of third Professional part 1 of training (12months) in the subjects of Ophthalmology, Otorhinolaryngology, Community Medicine and Forensic Medicine and Toxicology

2.Third Professional Part II-(Final Professional) examination shall be at the end of training (14months including 2months of electives) in the subjects of General Medicine, General Surgery, Obstetrics & Gynecology and Pediatrics. The discipline of Orthopedics, Anesthesiology, Dentistry and Radiodiagnosis will constitute 25% of the total theory marks in corporate as a separate section in paper II of General Surgery.

3.The discipline of Psychiatry and Dermatology, Venereology and Leprosy (DVL), Respiratory Medicine including Tuberculosis will constitute 25% of the total theory marks in General Medicine incorporated as a separate section in paper II of General Medicine.

(d) Marks distribution is in Table9.

Table -9

Phase of Course	**Written-Theory–Total**	Practicals /Orals/ Clinicals	Pass Criteria
First Professional			Internal Assessment: 50% combined in theory and practical (not less than40% in each)for eligibility for appearing
HumanAnatomy-2papers	200	100	
Physiology-2papers	200	100	

Biochemistry -2papers	200	100	for University Examinations <u>University Examination</u> Mandatory 50% marks separately in theory and practical (practical=practical/clinical +viva)
Second Professional			
Pharmacology-2Papers	200	100	
Pathology-2papers	200	100	
Microbiology -2papers	200	100	
Third Professional Part–I			
ForensicMedicine&Toxicology-1paper	100	100	
Ophthalmology–1paper	100	100	
Otorhinolaryngology–1paper	100	100	
Community Medicine-2papers	200	100	
ThirdProfessionalPart–II			
GeneralMedicine-2papers	200	200	
GeneralSurgery-2papers	200	200	
Pediatrics–1paper	100	100	
Obstetrics&Gynaecology-2papers	200	200	

Note: At least one question in each paper of the clinical specialties should test knowledge-competencies acquired during the professional development programme (AETCOM module); Skills competencies acquired during the Professional Development programme (AETCOM module) must be tested during clinical, practical and viva.

In subjects that have two papers, the learner must secure at least 40% marks in each of the papers with minimum 50% of marks in aggregate (both papers together) to pass in the said subject.

7.5**Criteria for passing in a subject**: A candidate shall obtain 50% marks in University examination separately in Theory and Practical (practical includes: practical/clinical and viva voce) in order to be declared as passed in that subject.

7.6 Supplementary examinations shall not be conducted later than 90 days from the date of declaration of the results of the main examination, so that the learners who pass can join the main batch for progression and the remainder would appear for the examination in the subsequent year.

7.7 The grace marks up to a maximum of five marks may be awarded at the discretion of the University to a learner for clearing the examination as a whole but not for clearing a subject resulting in exemption

It was resolved to add Following Rule as RMBBS8:

RMBBS8.

Appointment of Examiners

(a) Person appointed as an examiner in the particular subject must have at least four years of total teaching experience as assistant professor after obtaining postgraduate degree in the subject in a college affiliated to a recognized/approved/permitted medical college.

(b) For the Practical/Clinical examinations, there shall be at least four examiners for 100 learners, out of whom not less than 50% must be external examiners. The senior-most internal examiner will act as the Chairman and coordinator of the whole examination programme. Where candidates appearing are more than 100, two additional examiners (one external & one internal) for every additional 50 or part there of candidates appearing, be appointed.

(c) In case of non-availability of medical teachers, approved teachers without a medical degree (engaged in the teaching of MBBS students as whole-time teachers in a recognized medical college), may be appointed examiners in their concerned subjects provided they possess requisite doctorate qualifications and four years teaching experience (as assistant professors) of MBBS students. Provided further that the 50% of the examiners (Internal & External) are from the medical qualification stream.

(d) External examiners may not be from the same University.

(e) There shall be a Chairman of the Board of paper-setters who shall be an internal examiner and shall moderate the questions.

All theory paper assessment should be done as central assessment program (CAP) of concerned University.

2.3.2 It was resolved to approve curriculum for First Year M B B S program based on GME Notifications of MCI up to May-2018 and will require amendment in case the GME is amended (Annexure V)

3.0 Research Program (Ph D): It was resolved to approve award of Ph D degree on recommendations of all the three referees to the following students:

1 .Name of Research Scholar : Khandelwal Suresh Suvalal(ID No. 10PH21)
Thesis Title: Optimal Allocation of Land and Water Resources for Maximum Net Return from Command Area
Name of Guide: Dr S D Dhiman ,Associate Professor, Department of Civil Engineering, B V M V V Nagar

2. Name of Research Scholar : Ms Palmi Viral Modi(ID No 14PH06)
Thesis Title: Molecular Modeling Studies , synthesis and Biological Evaluation of some Novel Pyrazole Derivatives as Anti- tubercular Agents
Name of Guide: Dr M T Chhabria, Principal , L M College of Pharmacy, Ahmedabad

3. Name of Research Scholar : Mr Chirag Patel (ID No 11PH10)
Thesis Title : Issues and Challenges for Machine Translation of Gujarati to English Language
Name of Guide: Dr Dilip Ahalpara, Former Professor & Head, M C A Department, Dharmsinh Desai University, Nadiad

4. Name of Research Scholar : Mr Falgun Bhuva (ID No 13PH05)
Thesis Title : Studies on Formulation , Development and Evaluation of Nasal Delivery System of Xylometazoline
Name of Guide: Dr L D Patel, Former Professor & Dean, Faculty of Pharmacy, Dharmsinh Desai University, Nadiad

4.0 The agenda regarding Pre Registration Course work as made mandatory by UGC for the Ph D scholar wide letter No. F-1-1/2018 in the month of December,2019 was proposed by Chair for the discussion.
It was resolved to approve pre registration course work entitled Research and Publication Ethics for Ph D scholars from Academic session 2020-21 as Annexure VI

5.0 The chair thanked all the members for their participation and valuable contribution.

Dharmsinh Desai University, Nadiad-387001.

Minutes for Academic Council Meeting
08th August 2020 (Virtual Through Mail)

Following members gave their concurrence and comments in the meeting:
1)Dr H M Desai 2)Prof D G Panchal 3) Dr B N Suhagia 4) Dr Ravindra Dholakia 5) Dr N K Patel
6) Dr Hiren Patel 7) Dr J G Buch 8) Dr P A Joshi 9)Prof R K Jain, Registrar (Member Secretary)

1.It was resolved to consider the Minutes of the last meeting held on 28th December 2019 at 11.00 am as approved since there was no written dissent received.

2.The Academic Council members discussed, deliberated and resolved to take on record the following agenda and proposals from those received from various Board of Studies :

2.1. **Faculty of Technology** :

2.1.1.1 Department of Computer Engineering

1.B Tech Sem III(CE): It was resolved to replace existing subject Object oriented Programming with Java by subject Object oriented Programming with C+++.

2.B Tech Se IV(CE): It was resolved to update syllabus of Java Technologies subject and teaching scheme of Java Technologies subject should remained unchanged as 4(L)-0(T)-2(P)

3.B Tech Sem IV(CE):It was resolved to remove subject Computer Peripherals as content is covered in B Tech Sem II Workshop II.

4.B Tech Sem IV:It was resolved to replace subject Software Engineering by the subject Software Engineering: Principles and Practices.

5.B Tech Sem VI(CE):It was resolved to remove subject Object Oriented Software Engineering. Shifting of subject Machine Learning from B Tech Sem VII to B Tech Sem VI.

6.B Tech Sem VII(CE): It was resolved to approve introduction of subject Cloud Computing and IoT as an elective subject.

Details for above matter is as per **Annexure I**

2.1.2 Department of Instrumentation & Control Engineering

1.It was resolved to approve change of names of some subjects at B Tech and M Tech program as per **Annexure II**

2.It was resolved to approve Panel of Examiners for B Tech and M Tech program as per **Annexure III**.

2.2 Faculty of Management & Information and Sciences:

2.2.1 Master of Computer Applications :

1.It was resolved to approve change in the duration of M C A program from three years to Two years As per clause 5.9 Sr.no.-iv in the AICTE Approval Process Handbook-2020-21

2.It was resolved to approve teaching scheme and syllabus for Two years M C A course.

Annexure IV,V and VI.

2.3 Faculty of Pharmacy:

2.3.1. It was resolved to approve B Pharm Sem VII and B Pharm Sem VIII course structure and detailed syllabus as recommended by Pharmacy Council of India as per **Annexure VII**

2. It was resolved to approve Panel of Examiners for B Pharm and M Pharm program as per **Annexure VIII**.

2.4 Faculty of Medical Science and Research:

It was resolved to approve panel of Examiners for subjects of First Year M B B S as per Annexure:IX

3.0 Research Program (Ph D): It was resolved to award Ph D degree on recommendations of all the three referees to the following students:

1 .Name of Research Scholar : Ms Pallavi G Darji (ID No. 10PH24)
Thesis Title: Current Steering Digital to Analog Converters: Architectures and Calibration Techniques
Name of Guide: Dr Chetan D Parikh ,Professor, Internation Institute of Information Technology, Banglore

4.0 The chair thanked all the members for their participation and valuable contribution.

Dharmsinh Desai University, Nadiad-387001.

Minutes for Academic Council Meeting
27th April 2021 (Virtual Through Mail)

Following members gave their concurrence and comments in the meeting:
1)Dr H M Desai 2)Prof K N Sheth 3) Dr B N Suhagia 4) Dr Ravindra Dholakia 5)Dr R N Misra 6) Dr N K Patel 7) Dr Hiren Patel 8) Dr J G Buch 9) Dr P A Joshi 10)Prof R K Jain, Registrar (Member Secretary)

1.It was resolved to consider the Minutes of the last meeting held on 08th August 2020 at 11.00 am as approved since there was no written dissent received.

2.The Academic Council members discussed, deliberated and resolved to take on record the following agenda and proposals from those received from various Board of Studies :

2.1. **Faculty of Technology** :

2.1.1It was resolved to approve revised course structure for ICT Group (EC/CE/IT) and Non ICT Group (CH/CL/IC/MH)
It was resolved to approve revised course structure and Curriculum for B Tech First year (Sem I and II) as per the details are given as Annexure I

2.1.2 It was resolved to approve Syllabus of subjects for ICT Group (EC/CE/IT) as per revised course structure. It was resolved to approve common curriculum for "Software Workshop" and "Hardware Workshop" for ICT Branches as recommended by honorable member as per details given in Revised Annexure II

2.1.3 It was resolved to approve Syllabus of subjects for Non ICT Group (CH/CL/IC/MH)as per revised course structure as per details given in Annexure III

2.2. Computer Engineering Department:

2.2.1B Tech Program: It was resolved to approve New Course Structure and Syllabus of the subjects for B Tech Sem III and IV with effect from 2021-22 as per the details given in Annexure IV

2.2.2M Tech Program: It was resolved to approve Course Structure for M Tech Program as per the details given in Annexure V

2.3 Civil Engineering Department:

2.3.1M Tech Program: It was resolved to approve Course Structure and syllabus for M Tech (Civil- Geotech) Program and M Tech (Civil- Structure) Program and syllabus as per the details given in Annexure VI

2.4 Electronics & Communications Engineering Department:

2.4.1B Tech Program: It was resolved to approve shifting of some subjects and introduction of new subjects At different level in B Tech program as per the details given in Annexure: VII

2.4.2M Tech Program: It was resolved to approve Revised Course structure and syllabus for M Tech (Electronics& Communication Systems) Program as per the details given in Annexure: VII

2.5 B Tech Program:

2.5.1Overall proposed Provisional Course Structure of B Tech program except First year for reference purpose as per Annexure VIII was noted and approval process would be consider gradually along with syllabus of subjects and detailed curriculum in the forthcoming AC.

3.1 **Faculty of Management & Information Science:**

3.1.1M C A department: It was resolved to approve subjects and syllabus of Bridge Course for M C A program as per the annexure :IX

3.2.1B C A Program: It was resolved to approve modification made in syllabus of subject Data Communication & Network at B C A Sem V as per Annexure X

4.1 **Faculty of Dental Science:**

4.1.1Dental Council Notification dated 30th December 2020 incorporating changes in Academic Schedule suggested due to COVID 19 pandemic till Academic Year 2026 was approved as per details given in Annexure XI

5.1.1UGC Notification :UGC Regulations 2016(Minimum standard and procedure for Awards of M Phil and Ph D Degree) dated 5th May 2016 Details was approved as per Annexure XII

5.1.2UGC Notification: UGC Regulations 2018 Promotion of Academic Integrity and Prevention of Plagiarism in Higher Education Institutions dated 2018 was approved as per details given in Annexure XIII

6.0 Research Program (Ph D): It was resolved to award Ph D degree on recommendations of all the three referees to the following students:

1 .Name of Research Scholar : Ms Khushbu Rajnikant Chauhan (ID No. 11PH07)
Thesis Title: Cardio Protective Effect of $P2Y_{12}$ Receptor Inhibitors in Experimentally Induced Myocardial Infarction
Name of Guide: Dr Tejal R Gandhi, Professor & Principal, Anand Pharmacy College, Anand

2 .Name of Research Scholar :Donga Gautamkumar Ghanshyambhai (ID No.14PH24)
Thesis Title: A Study on Nutrition Label and Consumers' Choice Across Gujarat region
Name of Guide: Dr N K Patel, Professor & Dean, Faculty of Management and Information Science,Dharmsinh Desai University, Nadiad

3.Name of Research Scholar : Kailash M. Patil (ID No.14PH20)
Thesis Title: Some Contributions to the Theory of Matrices and Coupled Matrices- Rhotrices
Name of Guide: Dr H P Singh, Retired Professor ,Mathematics Department, Faculty of Technology, Dharmsinh Desai University , Nadiad

4.Name of Research Scholar : Brijeshkumar Ishvarlal Shah (ID No.14PH05)
Thesis Title: Design Approaches for Energy Efficient LTE Access Network
Name of Guide: Dr Nikhil J Kothari, Professor , Electronics & Communication Department, Faculty of Technology, Dharmsinh Desai University , Nadiad

7.0 The chair thanked all the members for their participation and valuable contribution.

DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY

COURSE STRUCTURE REVISION FOR B. TECH. PROGRAM

1. NEED FOR REVISION OF COURSE STRUCTURE FOR B. TECH. PROGRAM

a. AICTE has directed to revise in curriculum for the B. Tech. Program. It has provided detailed guidelines in the form Model Curriculum for all branches.
b. Current CBCS course structure at FoT-DDU has been adopted based on previous AICTE/UGC guidelines. It has 220 credits and 32-34 hours per week of contact hours. However, it was felt that CBCS format allowed less room to students for peripheral developmental activities.
c. FoT-DDU dropped the exercise of revision of curriculum undertaken in May-2020 because of New Education Policy (NEP) introduced by Government of India.
d. Time line for NEP is not defined. Therefore, a revised course structure is proposed to remain update in present context This will also help to incorporate the advantages of AICTE guidelines judiciously to fulfill the Vision and Mission set by DDU.

2. GUIDELINES FOR REVISON PROCESS:

Desciption	CBSE-FoT-DDU	AICTE Guideline	Adopted Guidelines
Total Credit	215-220	160	180-185
Contact Hrs/Week	32-34	24-28	26-30
First Year Course Structure	Uniform All Branches	Branch Specific	Two Groups ICT and Non-ICT
Basic Sc. And Humanities	To be updated keeping Infra structure and HR in view.		

a. Credit allocation as per AICTE guidelines. Lecture and Tutorials 1 credit per hour and practical 0.50 credit per Hr.
b. There is no practical exam for subjects of first year. Instead, it shall be considered as Term-work including Viva (Total 50 marks).
c. Internal exams are considered for subjects with credit ≥ 4.
d. External Assessment shall be considered for Semester 5 onwards.
e. It is proposed to develop and organize computing and networking facility to conduct online exams for internal and/or one section of external examination.

3. METHODOLOGY

A course structure revision committee is formed with following members for Initial development of B. Tech. First Year course structure grouped for ICT and Non-ICT branches.

Coordinator:
Prof. K. N. Sheth - Dean, FoT
Members:
CE: Dr. C. K. Bhensdadia, Dr. B. S. Bhatt
CH: Dr. M. S. Rao, and Prof. M. P. Shah
CL: Dr. R. K. Sheth, Prof.(Ms) A. D. Parekh
EC: Dr. P. D. Dalal, Dr. V. M. Thummar
IC: Dr. V. A. Shah, Prof. H. R. Patel, Prof. T. J. Patel
IT: Dr. V. K. Dabhi, Dr. H. B. Prajapati
MH: Dr. G. D. Bassan, Prof. R. M. Joshi

Departments shall evolve proposed overall course structure of the program while defining course structure for first year.

4. CONCLUSION AND RECOMMENDATIONS

A concluding meeting was held at the office of the Dean, FoT on date 19-02-2021. Based on the accepted guidelines, the committee has unanimously arrived at the course structure for first year B. Tech. ICT (CE, EC and IT) programs as well as B. Tech. Non-ICT (CH, CL, IC and MH) programs, the same is attached as appendix.

Based on this, Departments shall develop overall course structure through their Boards of Studies and submit to the Academic Council for approval.

B. Tech. (CE) program has already introduced a new course structure from 2020-21. The same has been adopted for ICT programs. The syllabus part for some subjects in B. Tech. Sem II is to some extent altered to fit common needs. It shall also be implemented w. e. from even semester 2020-21 in anticipation, having approval from the Vice Chancellor.

All other B. Tech. Program to implement the new course structure w. e. from year 2021-22.

(Prof. K. N. Sheth)
Dean, FoT

Submitted to:
The Vice Chancellor for approval

approved
20/2/21

ICT: final Course Stm B.Tech. first year.

Dharmsinh Desai University, Nadiad

Faculty of Technology,

Course Structure for B. Tech. Sem I & II (for ICT Programs)

Sem	Course Title	Subject Category	AICTE Code (Ref)	Parent Dept.	Teaching Scheme				Credit	Examination Scheme			
					Th	Tut	Prac	Total		Th Ext	Th Int	TW+Viv	Total
I	Mathematics I	BSC	BSC102	Maths	3	1	0	4	4.0	60	40	-	100
	Basic Electrical Engineering	ESC	ESC101	EC	3	1	2	6	5.0	60	40	50	150
	Programming for Problem Solving I	ESC	ESC201	Dept.	4	0	3	7	5.5	60	40	50	150
	Engineering Graphics & Design	ESC	ESC102	MECH	1	0	4	5	3.0	-	-	100	100
	Software Workshop	ESC	ESC202	Dept.	0	0	2	2	1.0	-	-	50	50
					11	**2**	**11**	**24**	**18.5**	**180**	**120**	**250**	**550**
II	Mathematics II	BSC	BSC301	Maths	3	1	0	4	4.0	60	40	-	100
	Programming for Problem Solving II	ESC	ESC201	Dept	4	0	3	7	5.5	60	40	50	150
	Physics	BSC	BSC101	Dept	3	1	2	6	5.0	60	40	50	150
	Hardware Workshop	ESC	ESC202	Dept	0	0	4	4	2.0	-	-	100	100
	English	HMSS	HSMC201	English	2	0	2	4	3.0	40	-	50	90
	Environmental Studies	ndatory Cou	MC-II	Chem	2	0	0	2	0.0	40	-	-	40
					14	**2**	**11**	**27**	**19.5**	**260**	**120**	**250**	**630**

EXTERNAL EXAM MARKS/DURATION :
THEORY 3 HRS OR MORE 60 MARKS WITH 3 HRS DURATION
THEORY 2 HRS 40 MARKS WITH 2 HRS DURATION
THEORY 1 HR : No Theory Exam

BSC : Basic Science
ESC : Engineering Science
HMSS : Humanity and Social Science

(P. D. Dalal)
EC

19/2/2021
IT Dept.

19/12/21

19/2/21.

Final Course Struct - Non IC
B.Tech First Year

Dharmsinh Desai University, Nadiad

Faculty of Technology,

Course Structure for B. Tech. Sem I & II (Non-ICT Programs)

Sem.	Course Title	Subject Category	AICTE Code	Parent Dept.	Teaching Scheme					Examination Scheme			
					Th	Tut	Prac	Total	Credits	Th Ext	Th Int	TW+Viva	Total
I	Mathematics -I	Basic Sc.- Core	BSC103	Maths	3	1	0	4	4.0	60	40	0	100
	Thermodynamics	Engg Sc. - Core	ESC209	Mech	3	0	2	5	4.0	60	40	50	150
	Elements of Electrical Engg.	Basic Sc.- Core	ESC101	EC	3	0	2	5	4.0	60	40	50	150
	Mechanics	Basic Sc.- Core	BSC101	Civil	3	1	0	4	4.0	60	40	0	100
	Computer Programming	Engg Sc. - Core	ESC103	Dept.	2	0	3	5	3.5	40	0	50	90
	Environmental Studies	Mandatory Course	MC-II	Chem	2	0	0	2	0.0	40	0	0	40
	Workshop Practice - I	Engg Sc. - Core	ESC104a	Mech	0	0	2	2	1.0	0	0	50	50
					16	**2**	**9**	**27**	**20.5**	**320**	**160**	**200**	**680**
II	Mathematics-II	Basic Sc.- Core	BSC104	Maths	3	1	0	4	4.0	60	40	0	100
	Engineering Graphics	Engg Sc. - Core	ESC102	Mech	3	0	3	6	4.5	60	40	50	150
	Basic Electronics	Engg Sc. - Core	ESC201	EC	3	0	2	5	4.0	60	40	50	150
	Mechanics of Solids	Engg Sc. - Core		Civil	3	0	2	5	4.0	60	40	50	150
	Chemistry	Basic Sc.- Core	BSC102	Chem	3	0	0	3	3.0	60	0	0	60
	Workshop Practice - II	Engg Sc. - Core	ESC104b	Mech	0	0	3	3	1.5	0	0	50	50
					15	**1**	**10**	**26**	**21**	**300**	**160**	**200**	**660**

EXTERNAL EXAM MARKS/DURATION :

THEORY 3 HRS OR MORE 60 MARKS WITH 3 HRS DURATION

THEORY 2 HRS 40 MARKS WITH 2 HRS DURATION

THEORY 1 HR : No Theory Exam

19/12/2021

19/02/2021

19/12/2021

19/12/21

COURSE STRUCTURE
AND
CURRICULUM FOR FIRST YEAR COURSES
FOR
UNDERGRADUATE DEGREE PROGRAMS

BACHELOR OF TECHNOLOGY

COMPUTER ENGINEERING

ELECTRONICS & COMMUNICATION ENGINGINEERING

INFORMATION TECHNOLOGY

(w.e. from Academic Year 2021-22)

Faculty of Technology
DHARMSINH DESAI UNIVERSITY, NADIAD – 387001
(www.ddu.ac.in)

DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY

COURSE STRUCTURE FOR B.TECH. (EC, CE and IT) SEMESTER- I & II (w.e. from 2021-22)

Sem.	Course Title	Subject Category	Reference AICTE Code	Parent Dept.	Teaching Scheme					Examination Scheme			
					Th	Tut	Prac	Total	Credits	Th Ext	Th Int	TW+ Viva	Total
I	Mathematics -I	Basic Sc.- Core	BSC102	Maths	3	1	0	4	4.0	60	40	0	100
	Basic Electrical Engineering	Engg Sc. - Core	ESC101	EC	3	1	2	6	5.0	60	40	50	150
	Programming for Problem solving I	Engg Sc. - Core	ESC201	Dept	4	0	3	7	5.5	60	40	50	150
	Engineering Graphics & Design	Engg Sc. - Core	ESC102	Mech	1	0	4	5	3.0	0	0	100	100
	Software Workshop	Engg Sc. - Core	ESC202	Dept	0	0	2	2	1.0	0	0	50	50
					11	**2**	**11**	**24**	**18.5**	**180**	**120**	**250**	**550**
II	Mathematics-II	Basic Sc.- Core	BSC301	Maths	3	1	0	4	4.0	60	40	0	100
	Programming for Problem solving II	Engg Sc. - Core	ESC201	Dept	4	0	3	7	5.5	60	40	50	150
	Physics	Basic Sc.- Core	BSC101	Dept	3	1	2	6	5.0	60	40	50	150
	Hardware Workshop	Engg Sc. - Core	ESC202	Dept	0	0	4	4	2.0	0	0	100	100
	English	Humanity & Social Sc.	HSMC201	English	2	0	2	4	3.0	40	0	50	90
	Environmental Studies	Mandatory Courses	MC-II	Chem	2	0	0	2	0.0	40	0	0	40
					14	**2**	**11**	**27**	**19.5**	**260**	**120**	**250**	**630**

B. TECH. SEMESTER – I (EC/CE/IT)
SUBJECT: MATHEMATICS - I

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
3	1	0	4	4	60	40	-	-	100

Reference Code BSC102

A. DETAILED SYLLABUS

1 CALCULUS

Evolutes and involutes, Evaluation of definite and improper integrals; Beta and Gamma functions and their properties, Applications of definite integrals to evaluate surface areas and volumes of revolutions.

Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; Indeterminate forms and L'Hospital's rule, Maxima and minima.

2 MATRICES

Matrices, Vectors: addition and scalar multiplication, matrix multiplication; Rank of a Matrix, Linear systems of equations, Determinants, Cramer's Rule, Inverse of a matrix, Gauss Elimination and Gauss Jordan method.

3 VECTOR SPACES

Eigenvalues, Eigenvectors, Symmetric, Skew-symmetric, and Orthogonal Matrices, Linear Independence of vectors, Diagonalization.

4 MULTIVARIABLE CALCULUS (DIFFERENTIATION)

Limit, Continuity and Partial derivatives, Directional derivatives, Total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Vector Differential Calculus; Gradient, curl and divergence.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2007.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
3. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
4. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
5. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
6. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
7. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
8. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East–West press, Reprint 2005.

B. TECH. SEMESTER – I (EC/CE/IT)
SUBJECT: BASIC ELECTRICAL ENGINEERING

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
3	1	2	6	5	60	40	50*	-	150

Reference Code ESC101

*TW Marks includes Viva based on TW

A. DETAILED SYLLABUS

1 DC CIRCUITS

Electrical circuit elements (R, L and C), impact of temperature, voltage and current sources, Kirchhoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first order RL and RC circuits.

2 AC CIRCUITS

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three-phase balanced circuits, voltage and current relations in star and delta connections

3 ELECTRO-MAGNETIC INDUCTION

Introduction, Magnetic effect of electric current, Current carrying conductor in magnetic field, Law of electromagnetic induction, Induced emf, Self-Inductance (L), Mutual Inductance (M), and Coupling coefficient between two magnetically coupled circuits (K), Inductances in series and parallel.

4 MAGNETIC CIRCUITS

Introduction, Definition of Magnetic quantities, Magnetic circuit, Leakage flux, Fringing effect, Comparison between magnetic and electric circuits

5 TRANSFORMERS

Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections

6 ELECTRICAL MACHINES

Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited DC motor. Construction and working of synchronous generators, Construction, Principles and working theory and Types of DC Motors & Generators, 1-Ph & 3-Ph Induction Motor, AC Generator

B. RECOMMENDED TEXTBOOK/ REFERENCE BOOKS

1. Basic Electrical, Electronics and Computer Engineering,
   R. Muthu Subramanian, S. Salvahanan, K. A. Muraleedharan, 2nd Edition, Tata McGraw Hill
2. Electronics Principles, Albert Paul Malvino, 6th Edition, Tata McGraw Hill
3. Electrical Technology (Vol: II), B. L. Theraja , A. K. Theraja, 23rd Edition,
   S. Chand & Company
4. Basic Electrical Engineering, D.P. Kothari, I. J. Nagrath, 3rd Edition, Tata McGraw Hill
5. Introduction to VLSI Circuit & Systems, John P. Uyemura, 1st Edition,
   John Willey & Sons Inc.
6. Basic Electrical Engineering, D.C. Kulshreshtha, 1st Edition, Tata McGraw Hill
7. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson
8. Electrical Engineering Fundamentals, V.D. Toro, 2nd Edition, Prentice Hall India
9. Fundamentals of Electrical Engineering, L.S. Bobrow, , Oxford University Press

B.TECH. SEMESTER – I (EC/CE/IT)
SUBJECT: PROGRAMMING FOR PROBLEM SOLVING - I

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
4	0	3	7	5.5	60	40	50*	-	150

Reference Code ESC201

*TW Marks includes Viva based on TW

A. DETAILED SYLLABUS

1 OVERVIEW OF C

Basic structure of C program, compiling and running C program

2 CONSTANTS, VARIABLES AND DATA TYPES

Types of constants, basic data types, identifier, variable, enum, symbolic constant, typedef, keywords, overflow and underflow

3 OPERATORS AND EXPRESSIONS

Arithmetic, relational, logical, assignment, bitwise, and sizeof() operators, operator precedence and associativity, expression evaluation

4 MANAGING INPUT OUTPUT OPERATIONS

getchar() and putchar() functions, formatted I/O using printf() and scanf()

5 DECISION MAKING AND BRANCHING

if and if...else statement, nested and ladder if...else, conditional operator, switch statement, goto statement with warning

6 DECISION MAKING AND LOOPING

while, do...while, and for loops, nested loops, break and continue statements

7 ARRAYS AND STRINGS

Introduction to arrays, declaration, initialization and access of one-dimensional and two-dimensional arrays, Introduction to multi-dimensional and variable length arrays, declaration and initialization of strings, printing and scanning strings to/from standard I/O, string handling functions, list of strings

8 USER-DEFINED FUNCTIONS

Function prototype and function declaration, function definition, function call, actual and formal parameters/arguments, return type and return statement, Nested function call, recursion, scope, visibility, and lifetime of variables.

9 STRUCTURES AND UNIONS

Defining structure, declaring and initializing structure variables, typedef, accessing structure members, copying and comparing structure variables, nested structures, arrays and structures, structures and functions, unions

10 POINTERS

Introduction, accessing address of a variable, declaration and initialization of pointer variables, Accessing variable using pointer, chain of pointers, scale factor and pointer expressions, pointers and arrays, pointer to array Vs array of pointers, passing arrays and strings to the function, array of pointers, pointers and functions, pointers and structures, const pointer vs pointer to const

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Programming in ANSI C by Balagurusamy, 8th Ed., Tata McGraw Hil
2. Programming with C by Byron Gottfried, 3rd Ed., McGraw Hill Education
3. The C Programming Language by Kernighan and Ritchie, 2nd Ed., PHI Learning
4. Expert C Programming: Deep C Secrets by Peter Van Der Linden, Pearson Education
5. Let Us C by Yashvant Kanetkar, 12th Ed., BPB Publication
6. Programming in C by Ashok N. Kamthane, 2nd Ed., Pearson Education

B. TECH. SEMESTER – I (EC/CE/IT)
SUBJECT: ENGINEERING GRAPHICS AND DESIGN

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
1	0	4	5	3	-	-	100*	-	100

Reference Code ESC102

*TW Marks includes Viva based on TW

A. DETAILED SYLLABUS

1 Introduction to Engineering Drawing Covering, Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales –Plain, Diagonal and Vernier Scales;

2 Orthographic Projections Covering, Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes - Auxiliary Planes;

3 Projections of Regular Solids Covering, those inclined to both the Planes- Auxiliary Views; Draw simple annotation, dimensioning and scale. Floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc.

4 Sections and Sectional Views of Right Angular Solids Covering, Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; Draw the sectional orthographic views of geometrical solids, objects from industry and dwellings (foundation to slab only)

5 Isometric Projections Covering, Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions;

6 Overview of Computer Graphics Covering, listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software.

7 Customization & CAD Drawing consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerancing; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles;

8 Annotations, layering & other Functions Covering applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic

projection techniques; Drawing sectional views of composite right regular geometric solids and project the true shape of the sectioned surface; Drawing annotation, Computer-aided design (CAD) software modeling of parts and assemblies. Parametric and non-parametric solid, surface, and wire frame models. Part editing and two-dimensional documentation of models. Planar projection theory, including sketching of perspective, isometric, multi view, auxiliary, and section views. Spatial visualization exercises. Dimensioning guidelines, tolerancing techniques; dimensioning and scale multi views of dwelling;

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
3. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
4. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
5. (Corresponding set of) CAD Software Theory and User Manuals

B. TECH. SEMESTER – I (EC/CE/IT)
SUBJECT: SOFTWARE WORKSHOP

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
0	0	2	2	1	-	-	50*	-	50

Reference Code ESC202

*TW Marks includes Viva based on TW

A. DETAILED SYLLABUS

1 OPERATING SYSTEM BASICS

Introduction to Operating System and Linux Architecture

2 SOFTWARE INSTALLATION

Installation of open source/freeware software using package manager for programming/simulation.

3 SHELL COMMANDS

Linux usage, commands & shell scripting. Command structure and general purpose utility

4 FILE HANDLING

basic of file handling. The file system, Handling ordinary files, File attributes and permission, file system details

5 SHELL SCRIPTING

Basic Shell commands, Looping and Branching,

6 SHELL UTILITIES

Find command and shell, simple filters, advance filters.

7 EDITORS

VI editor for basic text editing, LATEX for scientific documents and report writing.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Unix : Concepts and Applications, Sumitabha Das, 4th Edition, Tata McGraw Hill

B. TECH. SEMESTER II (EC/CE/IT)
SUBJECT: MATHEMATICS-II

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
3	1	0	4	4	60	40	0	0	100

Reference Code BSC301

A. DETAILED SYLLABUS

1 FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS AND INTRODUCTION TO HIGHER ORDER DIFFERENTIAL EQUATIONS

Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type, second order linear differential equations with variable coefficients, Method of variation of parameters, Cauchy-Euler equation.

2 NUMERICAL METHODS

Ordinary differential equations: Taylor's series, Euler and modified Euler's methods, Runge-Kutta method of fourth order for solving first order equations, Solution of algebraic and transcendental equations: Newton Raphson's Method, Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8 rules.

3 MULTIVARIABLE CALCULUS (INTEGRATION)

Multiple Integration: Double integrals (Cartesian), Change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Triple integrals (Cartesian), Scalar line integrals,Vector line integrals, Scalar surface integrals, Vector surface integrals, Theorems of Green, Gauss and Stoke's.

4 LAPLACE TRANSFORM

Laplace Transform, Properties of Laplace Transform, Laplace transform of periodic functions, Finding inverse Laplace transform by different methods, Convolution theorem. Evaluation of integrals by Laplace transform, Solving ODE by Laplace Transform method.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2007.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Ed.,Pearson, 2002.
3. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
4. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009.
5. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
6. E. A. Coddington, An Intro. to Ordinary Differential Equations, Prentice Hall India, 1995.
7. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., Mc- Graw Hill, 2004.
8. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

B. TECH. SEMESTER – II (EC/CE/IT)
SUBJECT: PROGRAMMING FOR PROBLEM SOLVING - II

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
4	0	3	7	5.5	60	40	50*	-	150

Reference Code ESC201

*TW Marks includes Viva based on TW

A. DETAILED SYLLABUS

1 BASICS OF C++

Overview, Program structure, keywords, identifiers, constants, data types, symbolic constants, declaration of variables, operators, namespaces, control structures, dynamic memory – C style – malloc(), calloc(), realloc() and free() Vs C++ style - new and delete keywords, reference and pointer

2 FUNCTIONS IN C++

main function (variations in signature), function prototype, inline functions, call and return by reference, default parameters, function overloading

3 INTRODUCTION TO OBJECT ORIENTED PROGRAMMING

Procedural Vs Object Oriented Programming, Principles of OOP, Benefits and applications of OOP

4 CLASSES AND OBJECTS – ENCAPSULATION AND ABSTRACTION

Introduction, private and public members, Defining member functions, static members, Objects as function arguments and return type, friend functions, const member functions, Constructors and their types, Destructor, Operator overloading, type conversion

5 INTRODUCTION TO C++ STRING CLASS

6 INHERITANCE

Introduction, types of inheritance – single, multiple, multilevel, hierarchical, and hybrid inheritance, Protected members, overriding, virtual base class

7 POLYMORPHISM

Introduction, Pointers and Objects, this pointer, pointer to derived classes, virtual and pure virtual functions, dynamic binding

8 INPUT/OUTPUT

Introduction to streams, standard I/O stream objects, stream classes, unformatted and formatted I/O, manipulators

9 EXCEPTION HANDLING

Basics of exception handling, try-catch-throw, rethrowing exceptions, user defined exceptions

10 TEMPLATES

Basics of class templates and function templates

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Object-Oriented programming with C++, Seventh Ed., by E Balagurusamy, TMH publication
2. The C++ Programming Language, Fourth Ed., by Bjarne Stroustrup, Addison-Wesley publication
3. Object-Oriented Programming in C++, Fourth Edition, by Robert Lafore, SAMS publication
4. Accelerated C++: Practical Programming by Example, First Edition, by Andrew Koenig and Barbara E. Moo, Addison-Wesley publication
5. C++ Black Book, First edition, by Steven Holzner, Paraglyph Press
6. C++: The Complete Reference, Fourth Edition, by Herbert Schildt, McGraw Hill Education

B. TECH. SEMESTER II (EC/CE/IT)
SUBJECT: PHYSICS

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
3	1	2	6	5	60	40	50*	-	150

Reference Code BSC101

*TW Marks includes Viva based on TW

A. DETAILED SYLLABUS

1 SEMICONDUCTORS

Intrinsic and extrinsic semiconductors, Carrier generation and recombination, Carrier transport: diffusion and drift, p-n junction, Metal-semiconductor junction (Ohmic and Schottky), Semiconductor materials of interest for optoelectronic & other devices.

2 DIODE

Introduction to P-N junction Diode and V-I characteristics, Half wave and Full-wave rectifiers, capacitor filter. Zener diode and its characteristics, Zener diode as voltage regulator, Special purpose diodes.

3 LIGHT-SEMICONDUCTOR INTERACTION

Radiative transitions and optical absorption, LED and LASER, Photo detectors.

4 ACTIVE COMPONENTS AND APPLICATIONS

BJT: Structure and input-output characteristics of a BJT, The Unbiased Transistor, Transistor Currents , Biased Transistor, a single stage voltage divider biasing, Emitter Bias, The CE Connections, The Base Curve, Collector curve, Transistor approximation Variation in current Gain, The Load Line, The Operating point, Recognizing Saturation, BJT as a switch & Amplifiers, LED Drivers.

5 OSCILLATORS

General form of oscillator, Sinusoidal oscillator, phase shift oscillator, Crystal Oscillator.

6 MOSFET

MOS physics and mode of operations, nFET current-voltage relationship, MOS pass characteristics and CMOS inverter, Dynamic RAM (DRAM) 1T bit-cell.

7 FIBER OPTICS

Fiber Optics and Optoelectronics, Historical Developments, A Fiber-Optic Communication System, Advantages of Fiber-Optic Systems, Ray Propagation in Optical Fibers, Fundamental Laws of Optics, Ray Propagation in Step-Index Fibers, Ray Propagation in Graded-Index Fibers

8 COMMUNICATION SYSTEMS

Communication system components, Analog modulation- AM, FM,PM. Digital modulation- ASK, FSK, PSK

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Electronics Principles, Albert Paul Malvino, 6th Edition, Tata McGraw Hill
2. David Griffiths, Introduction to Electrodynamics
3. S. M. Sze, Semiconductor Devices: Physics and Technology, Wiley (2008).
4. R.P Khare, Fiber Optics and Optoelectronics, Oxford University Press
5. Sanjay Sharma, Communication Systems: Analog and Digital
6. Halliday and Resnick, Physics
7. W. Saslow, Electricity, magnetism and light
8. Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-Hill Inc. (1995).
9. B. E. A. Saleh and M. C. Teich, Fundamentals of Photonics, John Wiley & Sons, Inc., (2007).
10. Yariv and P. Yeh, Photonics: Optical Electronics in Modern Communications, Oxford University Press, New York (2007).
11. P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997)
12. Behrouz A. Forouzan, Data communication and networking.
13. B. P lathi, Modern Digital and Analog Communication Systems, Third edition.

B. TECH. SEMESTER II (EC/CE/IT)
SUBJECT: HARDWARE WORKSHOP

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
0	0	4	4	2	-	-	100*	-	100

Reference Code ESC202

*TW Marks includes Viva based on TW

A. DETAILED SYLLABUS

1 ELECTRONIC COMPONENTS

Digital Multi-meter, Power Supply, Function Generator, Cathode Ray Oscilloscope, Digital Oscilloscope, Measurement of Phase Difference in single phase circuit, Various Electrical and Electronics component like LED, LDR, Photo-diode, MOSFET, MCB and Relay.

2 COMPUTER HARDWARE

Introduction to a personal computer and its basic peripherals, installation of Operating System Software and the required device drivers. Students are suggested to perform similar tasks on the Laptop scenario wherever possible.

3 PERIPHERALS

Programming of Computer Ports & Interfacing of Electronic Components, Cables and Connectors like RJ45, RS232 and CRO probe.

4 INTERNET

Introduction to Internet & World Wide Web modules, Making a PC Internet ready: Introduction to Internet and TCP/IP, Ethernet Connection, WiFi connection, configure TCP/IP (IP, Gateway, DNS, and Proxy), and use of ping command, Information sharing and data transfer over Local Area Network and Internet.

5 WEB INFRASTRUCTURE

Basic Components of Web Sites, Front end & back end tools and technology. HTML & CSS, Developing, Configuring and deploying a website.

6 IOT BOARDS AND CIRCUIT SIMULATION

Introduction to IOT boards like Arduino, Raspberry Pie etc. Interfacing, Circuit designing and PCB designing.

7 MINI PROJECT

Student will develop a mini project related to the topics listed above.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Electronic Components and Materials Principles, Dr. Madhuri A Joshi, 2nd Edition, Shroff Publishers & Distributors PVT. LTD.
2. A Textbook of Computer Hardware and Networking, Jyotika Deshmukh, D J Publications
3. Learning Web Design, Jennifer Robbins, 4th edition, O'Reilly Media

B.TECH. SEMESTER II (EC/CE/IT)
SUBJECT: ENGLISH

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
2	0	2	4	3	40	-	50*	-	90

Reference Code HSMC201

*TW Marks includes Viva based on TW

A. DETAILED SYLLABUS

1 VOCABULARY BUILDING

The concept of Word Formation, Root words from foreign languages and their use in English, Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives, Synonyms, antonyms, and standard abbreviations.

2 BASIC WRITING SKILLS

Sentence Structures, Use of phrases and clauses in sentences, Importance of proper punctuation, Creating coherence, Organizing principles of paragraphs in documents, Techniques for writing precisely

3 IDENTIFYING COMMON ERRORS IN WRITING

Subject-verb agreement, Noun-pronoun agreement, Misplaced modifiers, Articles, Prepositions, Redundancies, Clichés

4 NATURE AND STYLE OF SENSIBLE WRITING

Describing, Defining, Classifying, Providing examples or evidence, Writing introduction and conclusion

5 WRITING PRACTICES

Comprehension, Précis Writing, Essay Writing

6 ORAL COMMUNICATION

(This unit involves interactive practice sessions in Language Lab) Listening Comprehension, Pronunciation, Intonation, Stress and Rhythm, Common, Everyday Situations: Conversations and Dialogues, Communication at Workplace, Interviews, Formal Presentations

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper Resource Book. 2001
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
5. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
6. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

B. TECH. SEMESTER – II (EC/CE/IT)
SUBJECT: ENVIRONMENTAL STUDIES

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
2	0	0	2	0	40	--	--	--	40

Reference Code MC-II

A. DETAILED SYLLABUS

1 THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, scope and importance & Need for public awareness

2 NATURAL RESOURCES

Renewable and non-renewable resource: Natural resources and associated problems**,** Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams, and their effects on forests and tribal people ,Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefit and problems, Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies, Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies, Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies, Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification, Role of an individual in conservation of natural resources. Equitable use of resources of sustainable lifestyles

3 ECOSYSTEMS

Concept of an ecosystem, Structure and function of an ecosystem, producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids, Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem and Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries)

4 BIODIVERSITY AND ITS CONSERVATION

Introduction definition: Genetic, species and ecosystem diversity, Bio-geographical classification of India, Value of biodiversity: Consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, national and local levels, India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity, habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity

5 ENVIRONMENTAL POLLUTION

Definition, Causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste management, causes, effects and control measures of urban and industrial wastes, Role of an individual in prevention of pollution, Pollution case studies, Disaster management: floods, earthquake, cyclone and landslides

6 SOCIAL ISSUES AND THE ENVIRONMENT

From unsustainable to sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people: its problems and concerns. Case studies, Environmental ethics: Issues and possible solutions, Climate change: Global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Case studies, Wasteland reclamation, Consumerism and waste products, Environment Protection Act: Air (Prevention and Control of Pollution) Act, Water (Prevention &Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness

7 HUMAN POPULATION AND THE ENVIRONMENT

Population growth, variation among nations, population explosion, Family Welfare Program, environment and human health, human rights, Value education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environmental and human health, Case studies

8 FIELD WORK

Visit to a local area to document environmental assets (river/forest/grassland/hill/mountain), Visit to a local polluted site - Urban/Rural/Industrial/Agricultural, Study of common plants, insects, birds, Study of simple ecosystems – pond, river, hill, slopes etc.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Erach Bharucha Textbook of Environmental Studies; Second Edition, Universities Press: Hyderabad, 2013.
2. Rajagopalan, R. Environmental Studies; Oxford University Press: India, 2015.
3. Varandani, N. S. Basics of Environmental studies; Lambert Academic Publishing: Germany, 2013.
4. Rao, C. S. Environmental Pollution Control Engineering; Wiley publishers: New Delhi, 2006.
5. Clark, R. S. Marine Pollution; Clanderson Press Oxford: Bath, 2001.
6. Cunningham, W.P.; Cooper; Gorhani, T. H. E.; Hepworth, M.T., Environmental Encyclopedia; Jaico Publ. House: Mumbai, 2001.
7. De, A. K. Environmental Chemistry; Wiley Eastern: New Delhi, 2006.

COURSE STRUCTURE
AND
CURRICULUM FOR FIRST YEAR COURSES
FOR
UNDERGRADUATE DEGREE PROGRAMS

BACHELOR OF TECHNOLOGY

CHEMICAL ENGINEERING

CIVIL ENGINGINEERING

INSTRUEMNETATION & CONTROL ENGINGINEERING

MECHANICAL ENGINGINEERING

(w.e. from Academic Year 2021-22)

Faculty of Technology
DHARMSINH DESAI UNIVERSITY, NADIAD – 387001
(www.ddu.ac.in)

DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY

COURSE STRUCTURE FOR B.TECH. (CH, CL, IC and MH) SEMESTER- I & II (w.e. from 2021-22)

Sem.	Course Title	Subject Category	Reference AICTE Code	Parent Dept.	Teaching Scheme					Examination Scheme			
					Th	Tut	Pract.	Total	Credits	Th Ext	Th Int	TW+ Viva	Total
I	Mathematics -I	Basic Sc.- Core	BSC103	Maths	3	1	0	4	4.0	60	40	0	100
	Thermodynamics	Engg Sc. - Core	ESC209	MH	3	0	2	5	4.0	60	40	50	150
	Elements of Electrical Engineering	Engg Sc. - Core	ESC101	EC	3	0	2	5	4.0	60	40	50	150
	Mechanics	Engg Sc. - Core	ESC205	CL	3	1	0	4	4.0	60	40	0	100
	Computer Programming	Engg Sc. - Core	ESC103	Dept	2	0	3	5	3.5	40	0	50	90
	Environmental Studies	Mandatory Course	MC-II	CH	2	0	0	2	0.0	40	0	0	40
	Workshop Practice - I	Engg Sc. - Core	ESC104a	MH	0	0	2	2	1.0	0	0	50	50
					16	**2**	**9**	**27**	**20.5**	**320**	**160**	**200**	**680**
II	Mathematics-II	Basic Sc.- Core	BSC104	Maths	3	1	0	4	4.0	60	40	0	100
	Engineering Graphics	Engg Sc. - Core	ESC102	MH	3	0	3	6	4.5	60	40	50	150
	Basic Electronics	Engg Sc. - Core	ESC201	EC	3	0	2	5	4.0	60	40	50	150
	Mechanics of Solids	Basic Sc.- Core	BSC101	CL	3	0	2	5	4.0	60	40	50	150
	Chemistry	Basic Sc.- Core	BSC102	CH	3	0	0	3	3.0	60	0	0	60
	Workshop Practice - II	Engg Sc. - Core	ESC104b	MH	0	0	3	3	1.5	0	0	50	50
					15	**1**	**10**	**26**	**21**	**300**	**160**	**200**	**660**

B. TECH. SEMESTER – I (MH/IC/CH/CL)
SUBJECT: MATHEMATICS I

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	prac	Total
3	1	0	4	4	60	40	-	-	100

Reference Code BSC103

A. DETAILED SYLLABUS

1 CALCULUS: INTEGRAL CALCULUS

Evolutes and involutes, Applications of definite integrals to evaluate surface areas and volumes of revolutions.

2 CALCULUS

Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; Indeterminate forms and L'Hospital's rule, Maxima and minima.

3 LINEAR ALGEBRA MATRICES, VECTORS, DETERMINANTS, LINEAR SYSTEMS

Matrices, Vectors: Addition and Scalar Multiplication, Matrix Multiplication, Rank of a matrix, Solutions of Linear Systems: Existence, Uniqueness, Determinants, Cramer's Rule, Inverse of a matrix, Eigenvalues, Eigenvectors, Symmetric, Skew-symmetric, Linear Independence of vectors, Diagonalization.

4 SEQUENCE AND SERIES

Convergence of sequence and series, Introduction to tests for convergence; Power series, Series for exponential, Trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

5 MULTIVARIABLE CALCULUS (DIFFERENTIATION)

Partial derivatives, Total derivative; Tangent plane and normal line; Taylor series expansion for function of two variables, Jacobians, Maxima, minima and saddle points; Method of Lagrange multipliers, Introduction to Vector Differential Calculus; Directional derivatives, Gradient, Curl and divergence.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2007.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Ed. Pearson, 2002.
3. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
4. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
5. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
6. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 2010.
7. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
8. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East–West press, Reprint 2005.

B. TECH. SEMESTER – I (MH/IC/CH/CL)
SUBJECT: THERMODYNAMICS

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	0	2	5	4	60	40	50*	-	150

Reference Code ESC209

*TW Marks includes Viva based on TW

A. DETAILED SYLLABUS

1 INTRODUCTION

Macroscopic versus microscopic view point, thermodynamic systems and control volume, thermodynamic properties, processes and cycles, homogeneous and heterogeneous systems, thermodynamic equilibrium, quasi-static process, pure substance, concept of continuum, temperature and zeroth law of thermodynamics, ideal gas and gas laws.

2 ENERGY AND ENERGY TRANSFER

Forms of energy, energy transfer by heat and work, mechanical forms of work, first law of thermodynamics, energy conversion efficiencies

3 PROPERTIES OF PURE SUBSTANCES

Pure substance, phases and phase change process, thermodynamic properties, property diagrams, ideal gas equation of state, van der waal equation, virial equation of state

4 ENERGY ANALYSIS OF A CLOSED SYSTEM

PdV work in various quasi-static processes, energy balance, specific heats, internal energy, enthalpy and specific heats of solids, liquids and ideal gases

5 ENERGY ANALYSIS OF A OPEN SYSTEM

Conservation of mass, flow work and energy of a flowing fluid, energy analysis of steady and unsteady flow systems.

6 SECOND LAW OF THERMODYNAMICS

Introduction to second law, thermal energy reservoir, heat engine, refrigerator and heat pump, Clausis and Kelvin-Plank statement, perpetual motion machines, reversible and irreversible processes, Carnot and reversed Carnot cycle, , entropy principle and isentropic process, Tds and Maxwell relation

7 SEAM BOILERS

Introduction, classification, mountings and accessories, classification and comparison of boiler draught systems

8 APPLICATIONS OF THERMODYNAMICS

Construction and working of pumps, compressors, IC engine- Otto and Diesel engines, vapour compression refrigeration system, vapour absorption refrigeration system.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Yunus A. Cengel, Michael A. Boles., "Thermodynamics- An engineering approach", Tata McGraw Hill publishing co. ltd.
2. Nag P.K., "Engineering Thermodynamics", Tata McGraw Hill publishing co. ltd.
3. Smith J.M., Van Ness H.C., Abbott M.M, "Introduction to chemical engineering thermodynamics", McGraw Hill publishing co. Ltd.
4. Sonntag. R.E., Borgnakke, C. and Van Wylen G.J., "Fundamental of thermodynamics", John Wiley and Sons.
5. Moran M.J. and Shapiro H.N., "Fundamentals of engineering thermodynamics", John Wiley and Sons.

B. TECH. SEMESTER – I (MH/IC/CH/CL)
SUBJECT: ELEMENTS OF ELECTRICAL ENGINEERING

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	prac	Total
3	0	2	5	4	60	40	50*	-	150

Reference Code ESC101

*TW Marks includes Viva based on TW

A. DETAILED SYLLABUS

1 DC CIRCUITS

Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first- order RL and RC circuits

2 AC CIRCUITS

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three-phase balanced circuits, voltage and current relations in star and delta connections.

3 TRANSFORMERS

Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto- transformer and three-phase transformer connections.

4 ELECTRICAL MACHINES

Generation of rotating magnetic fields, Construction and working of a three- phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dc motor. Construction and working of synchronous generators

5 ELECTRICAL INSTALLATIONS

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthling. Elementary calculations for energy consumption, power factor improvement. DC-DC buck and boost converters. Single-phase and three-phase voltage source inverters; sinusoidal modulation.

6 SEMICONDUCTORS, DIODES AND APPLICATIONS

Semiconductor Diode - Ideal versus Practical, Resistance Levels, Diode Equivalent Circuits, Load Line Analysis; Diode as a Switch, Diode as a Rectifier, Half Wave and Full Wave Rectifiers with and without Filters; Breakdown Mechanisms, Zener Diode – Operation and Applications; Opto-Electronic Devices – LEDs, Photo Diode and Applications; Silicon Controlled Rectifier (SCR) in brief

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Basic Electrical, Electronics and Computer Engineering, R. Muthu Subramanian, S. Salivahanan, K. A. Muraleedharan, 2nd Edition, Tata McGraw Hill
2. Principles of Electronics, V. K. Mehta & Rohit Mehta, 11th Edition, S. Chand & Company
3. Electrical Technology (Vol: II), B. L. Theraja , A. K. Theraja, 23rd Edition, S. Chand & Company
4. Basic Electrical Engineering, D.P. Kothari, I. J. Nagrath, 3rd Edition, Tata McGraw Hill

B. TECH. SEMESTER – I (MH/IC/CH/CL)
SUBJECT: MECHANICS

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	prac	Total
3	1	0	4	4	60	40	-	-	100

Reference Code ESC205

A. DETAILED SYLLABUS

1 STATICS

Resultant force for 2D and 3D force system, concept of free body diagrams, equilibrium equations for particles and rigid body subjected to 2D and 3D force system, centroid and center of gravity, moment of inertia.

2 DYNAMICS AND VIBRATIONS

Rotational Transformation of scalers and vectors, Newton's Laws for particle motion, Potential Energy function F= - Grad V, conservative and non-conservative forces, Conservation of momentum, angular momentum, collision, energy equation, free harmonic motion, damped harmonic motion, forced oscillation and resonance, kinematics in a coordinate system rotating and translating in a plane.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Engineering Mechanics, M. K. Harbola, 2nd Edition, Cengage Learning, 2013.
2. Mechanics – J P Den Hartog, Dover Publications, 2003.
3. Mechanical Vibrations - J P Den Hartog, Dover Publications, 1985.
4. Theory of Vibrations with Applications – W. T. Thomson, 5th Edition, Pearson Education, 2008.
5. Engineering Mechanics: Statics (V.1), Dynamics (V.2), J. L. Meriam and L. G. Kraige, 5th Edition, Wiley, 2017.
6. Engineering Mechanics: Statics & Dynamics, Irving H. Shames, 4th Edition, Pearson Education, 2005.
7. Vector Mechanics for Engineers: Statics (V.1), Dynamics (V.2), F. P. Beer and E. R. Johnston, 10th SI edition, McGraw Hill Education, 2017

B. TECH. SEMESTER – I (MH/IC/CH/CL)
SUBJECT: COMPUTER PROGRAMMING

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	prac	Total
2	0	3	5	3.5	40	-	50*	-	90

Reference Code ESC103

*TW Marks includes Viva based on TW

A. DETAILED SYLLABUS

1 INTRODUCTION

Introduction to components of computer system, Idea of algorithm, Introduction to C, Constants, Variables & Data types in C, Managing input and Output operators

2 OPERATORS AND EXPRESSIONS

C Operators: Arithmetic, relational, logical, increment &decrement, assignment and conditional, Arithmetic Expressions & Precedence Rule, Type conversion in C, Mathematical.

3 DECISION MAKING AND BRANCHING

Decision making with If & If...else statements, goto statements.

4 DECISION MAKING AND LOOPING

The while statement, the break statement & the do... while loop, the for loop, Jump within loops - Programs.

5 ARRAYS

Array 1D, 2D, Character Array as String.

6 USER DEFINED FUNCTIONS

Categories of Functions (Including using built in library), Call by Value, Parameter passing to function, Recursion.

7 STRUCTURE

Defining structure, Assigning value to the structure members, Array of structure

8 POINTER

Idea of pointer, declaration and Initialization of pointer, Passing address as function argument, Passing array to function using pointer.

9 FILE HANDLING

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill.
2. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.
3. Yashvant Kanetkar, Let Us C, 12th Edition, BPB Publication.
4. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

B. TECH. SEMESTER – I (MH/IC/CH/CL)
SUBJECT: ENVIRONMENTAL STUDIES

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	prac	Total
2	0	0	2	0	40	-	-	-	40

Reference Code MC-II

A. DETAILED SYLLABUS

1 THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, scope and importance & Need for public awareness

2 NATURAL RESOURCES

Renewable and non-renewable resource: Natural resources and associated problems**,** Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams, and their effects on forests and tribal people ,Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefit and problems, Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies, Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies, Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies, Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification, Role of an individual in conservation of natural resources. Equitable use of resources of sustainable lifestyles

3 ECOSYSTEMS

Concept of an ecosystem, Structure and function of an ecosystem, producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids, Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem and Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries)

4 BIODIVERSITY AND ITS CONSERVATION

Introduction definition: Genetic, species and ecosystem diversity, Bio-geographical classification of India, Value of biodiversity: Consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, national and local levels, India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity, habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity

5 ENVIRONMENTAL POLLUTION

Definition, Causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste management, causes, effects and control measures of urban and industrial wastes, Role of an

individual in prevention of pollution, Pollution case studies, Disaster management: floods, earthquake, cyclone and landslides

6 SOCIAL ISSUES AND THE ENVIRONMENT

From unsustainable to sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people: its problems and concerns. Case studies, Environmental ethics: Issues and possible solutions, Climate change: Global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Case studies, Wasteland reclamation, Consumerism and waste products, Environment Protection Act: Air (Prevention and Control of Pollution) Act, Water (Prevention &Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness

7 HUMAN POPULATION AND THE ENVIRONMENT

Population growth, variation among nations, population explosion, Family Welfare Program, environment and human health, human rights, Value education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environmental and human health, Case studies

8 FIELD WORK

Visit to a local area to document environmental assets (river/forest/grassland/hill/mountain), Visit to a local polluted site - Urban/Rural/Industrial/Agricultural, Study of common plants, insects, birds, Study of simple ecosystems – pond, river, hill, slopes etc.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Erach Bharucha Textbook of Environmental Studies; Second Edition, Universities Press: Hyderabad, 2013.
2. Rajagopalan, R. Environmental Studies; Oxford University Press: India, 2015.
3. Varandani, N. S. Basics of Environmental studies; Lambert Academic Publishing: Germany, 2013.
4. Rao, C. S. Environmental Pollution Control Engineering; Wiley publishers: New Delhi, 2006.
5. Clark, R. S. Marine Pollution; Clanderson Press Oxford: Bath, 2001.
6. Cunningham, W.P.; Cooper; Gorhani, T. H. E.; Hepworth, M.T., Environmental Encyclopedia; Jaico Publ. House: Mumbai, 2001.
7. De, A. K. Environmental Chemistry; Wiley Eastern: New Delhi, 2006.

B. TECH. SEMESTER I (MH/IC/CH/CL)
SUBJECT: WORKSHOP PRACTICE - I

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	prac	Total
0	0	2	2	1	-	-	50*	-	50

Reference Code ESC104

*TW Marks includes Viva based on TW

A. DETAILED SYLLABUS

1 Introduction To Workshop ,Basic Workshop types

2 Safety requirement in workshop, Safety rules

3 To Understand "5S" Concept for Workplace

4 Demonstration of Tin smithy Tools and it's exercise

5 To make job for Tin smithy shop

6 Demonstration of Plumbing tools, It's accessories.

7 To make job for Plumbing shop

8 Introduction to Fabrication shop, Welding Equipment

9 To make job for Fabrication shop

10 Introduction of Machine shop

11 Introduction and Demonstration of Lathe machine

12 Introduction and Demonstration of Milling and Radial Drilling m/c

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Equipment Manuals

B. TECH. SEMESTER II (MH/IC/CH/CL)
SUBJECT: MATHEMATICS-II

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	prac	Total
3	1	0	4	4	60	40	0	0	100

Reference Code BSC104

A. DETAILED SYLLABUS

1 FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS AND INTRODUCTION TO HIGHER ORDER DIFFERENTIAL EQUATIONS

Exact, linear and Bernoulli's equations, Introduction to second order linear differential equations with variable coefficients, Method of variation of parameters, Cauchy-Euler equation.

2 SERIES SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS BY POWER SERIES METHOD

Introduction, Validity of series solution of the equation, General Method, Forms of series solution.

3 PARTIAL DIFFERENTIAL EQUATIONS

Basic Concepts, Classification and Solutions of partial differential equations: Lagrange's linear equation of first order, Non-linear equations of first order- Charpit's method, Homogenous linear equations with constant coefficient to find the complementary functions and the particular integral, Introduction to non-homogenous linear equations with constant coefficients, Method of separation of variables.

4 MULTIVARIABLE CALCULUS (INTEGRATION)

Multiple Integration: Double integrals (Cartesian), Change of order of integration in double integrals, Change of variables (Cartesian to polar), Introduction to Triple integrals (Cartesian), Vector line integrals, Vector surface integrals, Theorems of Green, Gauss and Stoke's.

5 LAPLACE TRANSFORM

Laplace Transform, Properties of Laplace Transform, Laplace transform of periodic functions, Finding inverse Laplace transform by different methods, Convolution theorem, Evaluation of integrals by Laplace transform, Solving ODE by Laplace Transform method.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2007.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Ed. Pearson, 2002.
3. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
4. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009.

5. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
6. E. A. Coddington, An Intro. to Ordinary Differential Equations, Prentice Hall India, 1995.
7. J. W. Brown & R. V. Churchill, Complex Variables and Applications, 7th Ed., Mc-Graw Hill, 2004.
8. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Pub., 2008.

B. TECH. SEMESTER II (MH/IC/CH/CL)
SUBJECT: ENGINEERING GRAPHICS

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	prac	Total
3	0	3	6	4.5	60	40	50*	-	150

Reference Code ESC102

*TW Marks includes Viva based on TW

A. DETAILED SYLLABUS

1 INTRODUCTION TO ENGINEERING DRAWING

Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic section curves (Ellipse, Parabola, Hyperbola), Cycloidal Curves (Cycloid, Epicycloid, Hypocycloid), Involutes; Archemedian Spiral

2 SOLID GEOMETRY

Projection of points, projection of lines and their applications. Projection of regular planes such as square, rectangle, triangle, circle, pentagon, hexagon, rhombus. Projection of right and regular solids inclined to both the planes (prisms, pyramids, cylinder and cone)

3 ORTHOGRAPHIC PROJECTIONS

First angle and third angle projection methods, conversion of pictorial views into Orthographic projections with dimensioning, sectional orthographic projection, special sections

4 SECTION OF SOLIDS AND DEVELOPMENT OF SOLIDS

Sections and Sectional Views of Right Angular Solids Covering, Prism, Cylinder, Pyramid, Cone

5 DEVELOPMENT OF SURFACES

Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone

6 ISOMETRIC PROJECTIONS

Principles of Isometric projection – Isometric Scale, Isometric projection and view, Conversion of orthographic views to isometric projections and views

7 WORKING ENVIRONMENT OF CAD SOFTWARE

Menu bar, Quick access toolbar, Dashboard/Ribbon, Toolbars, Drawing space, Navigation bar (View controls: zoom, pan, orbit,), Command prompt, Status bar, Drawing Area (Background, Crosshairs, Coordinate System), Shortcut Menu, Properties manager

8 DRAWING CUSTOMIZATION

Setting up the drawing sheet (drawing sheet templates, drawing limits, drawing units etc.), Coordinate system (User coordinate system, Absolute and relative coordinates, Cartezian and Polar coordinates), Modes of drawing (Grid, Snap, Ortho, Osnap, Otrack, Polar tracking, Iso draft, etc.) Formatting (colors, line type, line weight, point style etc.)

9 PREPARING COMPUTER AIDED DRAWING

Exploring various commands with exercises of Orthographic drawing views and Isometric drawing views using different drawing tools, modifying tools, dimensioning tools etc.

10 PLOTTING AND EXCHANGING DRAWING

Printing/Plotting the drawing (page setup, plot area, plot scale, drawing orientation, plot options etc.), Drawing standard (DXF), Generating PDF drawing documents, file management.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
3. Shah P. J., (2014) Engineering Graphics, S. Chand Publishing
4. Luzadder W., Duff J., (1992), Fundamentals of Engineering Drawing, Peachpit Press
5. Gill P. S., (2009), Engineering Drawing, S. K. Kataria & Sons
6. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication

B.TECH. SEMESTER – II (MH/IC/CH/CL)
SUBJECT: BASIC ELECTRONICS

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	prac	Total
3	0	2	5	4	60	40	50*	-	150

Reference Code ESC201

*TW Marks includes Viva based on TW

A. DETAILED SYLLABUS

1 TRANSISTOR & CHARACTERISTICS

Bipolar Junction Transistor (BJT) – Construction, Operation, Amplifying Action, Common Base, Common Emitter and Common Collector Configurations, Operating Point, Voltage Divider Bias Configuration

2 FIELD EFFECT TRANSISTOR (FET)

Construction, Characteristics of Junction FET, Depletion and Enhancement type Metal Oxide Semiconductor (MOS) FETs, Introduction to CMOS circuit

3 TRANSISTOR AMPLIFIERS AND OSCILLATORS

Classification, Small Signal Amplifiers – Basic Features, Common Emitter Amplifier, Coupling and Bypass Capacitors, Distortion, AC Equivalent Circuit; Feedback Amplifiers – Principle, Advantages of Negative Feedback, Topologies, Current Series Feedback Amplifiers; Oscillators – Classification, RC Phase Shift

4 OPERATIONAL AMPLIFIERS AND APPLICATIONS

Introduction to operational amplifiers, Op-amp input modes and parameters, Op-amp in open loop configuration, op-amp with negative feedback, study of practical op-amp IC 741, and inverting and non-inverting amplifier applications: summing and difference amplifier, unity gain buffer, comparator, integrator and differentiator, wein bridge oscillator.

5 DIGITAL ELECTRONICS FUNDAMENTALS

Difference between analog and digital signals, Boolean algebra, Basic and Universal Gates, Symbols, Truth tables, logic expressions, Logic simplification, Logic ICs, Implementation of combinational logic - half and full adder/subtractor, multiplexers, de-multiplexers

6 SENSORS & SIGNAL CONDITIONING CIRCUITS

Types of sensors – pneumatic, electromagnetic, electronic, smart sensors. Diaphragm, bellows and bourdon tube, Resistive, Capacitive, Inductive, ultrasonic, LVDT, piezoelectric, optoelectronic transducers, thermocouple, RTD and thermistors, Application of sensors for flow, level, temperature and stress measurement, Bridge Circuit, Differential Amplifier, Instrumentation Amplifier

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Principles of Electronics, 11th Edition By V. K. Mehta & Rohit Mehta Publisher: S. Chand & Company
2. Electrical & Electronic Measurement & Measuring Instruments, 17th Edition By A.K. Sawhney Publisher: Dhanpat rai
3. M. M. Mano, "Digital logic and Computer design", Publisher : Pearson Education India.

B. TECH. SEMESTER – II (MH/IC/CH/CL)
SUBJECT: MECHANICS OF SOLIDS

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	prac	Total
3	0	2	5	4	60	40	50*	-	150

Reference Code BSC101

*TW Marks includes Viva based on TW

A. DETAILED SYLLABUS

1 Concept of stress and strain, elasticity, generalized Hooke's law for 3D, concept of isotropy and homogeneity, plane stress and plane strain idealization, axial, volumetric and thermal stresses and strains

2 Transformation of stress and strain at a point, Principal stresses and strains, Mohr's Circle, strain rossete

3 Mechanical properties of metals – elasticity, plasticity, strain hardening, hardness, toughness, fatigue, strain energy

4 Force-strain-deformation analysis for axial load, flexure, shear and torsion

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Strength of Materials: Part– I and II, Stephen Timoshenko, 3rd Edition, CBS Publisher, 2002.
2. Strength of Materials, Sadhu Singh, 1st Edition, Khanna Book Publishing Company, 2016.
3. Advanced Mechanics of Solid, L. S. Srinath, 3rd Edition, McGraw Hill Publication, 2017.
4. Engineering Mechanics of Solids, E P Popov, 2nd Edition, Prentice Hall India Learning Pvt. Ltd, 2002.

B.TECH. SEMESTER II (MH/IC/CH/CL)
SUBJECT: CHEMISTRY

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	prac	Total
3	0	0	3	3	60	-	-	-	60

Reference Code BSC102

*TW Marks includes Viva based on TW

A. DETAILED SYLLABUS

1 ATOMIC AND MOLECULAR STRUCTURE

Schrodinger equation. Particle in a box solutions and their applications for conjugated molecules and nanoparticles. Forms of the hydrogen atom wave functions and the plots of these functions to explore their spatial variations. Molecular orbitals of diatomic molecules and plots of the multi centre orbitals. Equations for atomic and molecular orbitals. Energy level diagrams of diatomics. Pi-molecular orbitals of butadiene and benzene and aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.

2 SPECTROSCOPIC TECHNIQUES AND APPLICATIONS

Principles of spectroscopy and selection rules. Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules. Applications. Nuclear magnetic resonance and magnetic resonance imaging, surface characterization techniques. Diffraction and scattering.

3 INTERMOLECULAR FORCES AND POTENTIAL ENERGY SURFACES

Ionic, dipolar and van Der Waals interactions. Equations of state of real gases and critical phenomena. Potential energy surfaces of H3, H2F and HCN and trajectories on these surfaces.

4 USE OF FREE ENERGY IN CHEMICAL EQUILIBRIA

Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. Acid base, oxidation reduction and solubility equilibria. Water chemistry. Corrosion. Use of free energy considerations in metallurgy through Ellingham diagrams

5 PERIODIC PROPERTIES

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard soft acids and bases, molecular geometries

6 STEREOCHEMISTRY

Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis. Isomerism in transitional metal compounds.

7 ORGANIC REACTIONS AND SYNTHESIS OF A DRUG MOLECULE

Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings. Synthesis of a commonly used drug molecules.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. University chemistry, by B. H. Mahan
2. Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane
3. Fundamentals of Molecular Spectroscopy, by C. N. Banwell
4. Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S. Krishnan
5. Physical Chemistry, by P. W. Atkins
6. Organic Chemistry: Structure and Function by K. P. C. Volhardt and N. E. Schore, 5th Edition.

B. TECH. SEMESTER II (MH/IC/CH/CL)
SUBJECT: WORKSHOP PRACTICE - II

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac.	Total
0	0	3	3	1.5	-	-	50*	-	50

Reference Code ESC104b

*TW Marks includes Viva based on TW

I. B. TECH. SEM-II : CH, CL AND MH

A. DETAILED SYLLABUS

1 Introduction to Carpentry Shop, Application of various tools, demonstration & making of Job 1 & 2, assignment.

2 Introduction to Black smithy shop, demonstration & making of job

3 Introduction to Fitting shop, application of various tools, demonstration & making of Job, assignment

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Equipment Manuals

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II. B. TECH. SEM-II: IC

A. DETAILED SYLLABUS

- Introduction to Electrical Components: Switches, MCB, ELCB, Tube-light, Bulb, parallel connection of electrical components, wiring in fan and motor
- Introduction to Electronic Components: Active and passive components
- Use of basic source & measuring instruments (Power supply, function generator, CRO, DMM)
- Measure voltage, current, frequency, phase difference, power, power factor for single and three phase supply
- Identify various types of ports, cables and connectors
- Linux installation
- Network cabling and crimping for wired and wireless network
- PCB layout design (like proteus) Software installation and layout design using the same
- Solder and de-solder electronic components on PCB

- Identify and rectify open circuit and short circuit faults in PCB/system.
- Test assembled electronic circuit for various parameters and faults

MINI Project:

Apart from above experiments a group of students has to undertake a mini project. Following are some examples for the same:

- To design a device for charging small battery during door opening and closing.
- To design a mobile charger using solar PC cell panel for offices and house hold.
- To design/develop an electronic weighing machine.
- To design/develop an electronic lock for house in the workshop.
- To design/develop and innovative electrical bell using electronics components

B. RECOMMENDED TEXT / REFERENCE BOOKS

1) Electronic Principles, Albert Malvino and David J. Bates, McGraw Hill (7th Edition)
2) Electronic Devices, Thomas L. Floyed, Pearson (7th Edition)

DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
DEPARTMENT OF COMPUTER ENGINEERING

Minutes of the Board of Studies Meeting - 7h April 2021

Brief Summary

1) Removal of "Object Oriented Programming in C++" from B. Tech. Semester 3.
2) Introduction of a new practical course, "Web Development Workshop", in B. Tech. Semester 3.
3) Introduction of a new elective course "Universal Human Values" in the category of "Humanities and Social Sciences including Management courses" in B. Tech. Semester 3
4) Revision of the syllabus and teaching scheme of "Mathematics III" and renaming it to "Probability and Statistics", in B. Tech. Semester 3.
5) Introduction of a new mandatory course "Essence of Indian Knowledge Tradition" in B. Tech. Semester 3.
6) Removal of Practical and term work from the subject "Discrete Mathematics" in B. Tech. Semester 4.

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Dr. C. K. Bhensdadia
Chairman, B.O.S., Dept. of Computer Engg,
DDU, Nadiad

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Dr. Shashikant Sharma
Senior Scientist,
SAC, ISRO, Ahmedabad

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DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
DEPARTMENT OF COMPUTER ENGINEERING
Minutes of the Board of Studies Meeting (held on 7th April 2021)

Detailed Summary

Sr No	Sem	Existing Subject	Proposed Subject	Proposed Changes	Justification
1	III	Object Oriented Programming in C++	NA	Removal of "Object Oriented Programming in C++"	The subject was shifted to semester II with the title "Programming for Problem Solving II"
2	III	-	Web Development Workshop	Introduction of a new lab course on Web Development Workshop	To provide students more practical exposure and promote project based learning
3	III	-	Universal Human Values	Introducing a new course to promote human values and develop a holistic perspective based on understanding derived from ancient literature	As per AICTE requirement, Introducing the course in the category of "Humanities and Social Sciences including Management courses"
4	III	-	Essence of Indian Knowledge Tradition	The course covers topics on traditional Indian knowledge systems and its relevance in modern society.	A mandatory course as per the AICTE model curriculum
5	III	Mathematics III	Probability and Statistics	The topics of probability and statistics are covered as per AICTE model curriculum for CS	To fulfil the need of common first year syllabus for ICT group, the syllabus of Mathematics I and Mathematics II are revised centrally. The remaining topics of mathematics subject in model curriculum of AICTE are added in the proposed subject
6	IV	Discrete Mathematics	Discrete Mathematics	Practical and lab work is removed from the subject	To meet the contact hours and credit requirements

COURSE STRUCTURE
AND
CURRICULUM FOR SECOND YEAR COURSES
FOR
B. TECH. COMPUTER ENGINEERING

BACHELOR OF TECHNOLOGY

COMPUTER ENGINEERING

(w.e. from Academic Year 2021-22)

Faculty of Technology
DHARMSINH DESAI UNIVERSITY, NADIAD – 387001
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DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY

COURSE STRUCTURE FOR B.TECH. (CE) SEMESTER- III & IV (w.e. from 2021-22)

Sem.	Course Title	Subject Category	Reference AICTE Code	Parent Dept.	Teaching Scheme					Examination Scheme			
					Th	Tut	Prac	Total	Credits	Th Ext	Th Int	TW+ Viva	Total
III	Data Structure and Algorithms	Prof. Course - Core	CS301	CE	4	0	2	6	5.0	60	40	50	150
	Database Management Systems	Prof. Course - Core	CS501	CE	4	0	2	6	5.0	60	40	50	150
	Design of Digital Circuit	Prof. Course – Core	ESC 302	CE	4	0	2	6	5.0	60	40	50	150
	Probabiity and Statistics	Basic Sc.-Core	BSC201	Maths	2	0	0	2	2.0	40	0	0	40
	Universal Human Values/ Financial and Managerial Accounting	Humanities & MS	HSMC301	CE	3	0	0	3	3.0	60	0	0	60
	Essence of Indian Knowledge Tradition	Mandatory Course	MC-II	CE	2	0	0	2	0.0	0	0	0	0
	Web Development Workshop			CE	0	0	2	2	1.0	0	0	50	50
					19	**0**	**8**	**27**	**21.0**	**280**	**120**	**200**	**600**
IV	Discrete Mathematics	Prof. Course - Core	CS401	CE	4	0	0	4	4.0	60	40	0	100
	Design and Analysis of Algorithm	Prof. Course - Core	CS404	CE	4	0	2	6	5.0	60	40	50	150
	Computer System Architecture	Engg Sc.-Core	CS402	CE	4	0	2	6	5.0	60	40	50	150
	Java Technology / Visual Technology	Prof. Course - Core	CS503	CE	4	0	2	6	5.0	60	40	50	150
	Software Engineering Principles and Practices	Prof. Course - Elect	CS-S	CE	4	0	2	6	5.0	60	40	50	150
	Software Project	Project Course	CS601	CE	0	0	2	2	1.0	0	0	50	50
					20	**0**	**10**	**30**	**25.0**	**300**	**200**	**250**	**750**

B. TECH. SEMESTER – III (CE)
SUBJECT: DATA STRUCTURE AND ALGORITHMS

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
4	0	2	6	5	60	40	25	25	150

Reference Code CS301

A. DETAILED SYLLABUS

1 BASIC CONCEPTS

Algorithm specifications.

2 ARRAYS

Array as an abstract data type, representation of Arrays

3 STACKS & QUEUES

Stack as an abstract data type, queue as an abstract type, evaluation of expressions

4 LINKED LIST

Singly linked lists, doubly linked list, circular list, linked stacks and queues, polynomials, generalized lists.

5 TREES

Introduction, binary trees, binary tree traversal and tree iterators, additional binary tree operations, threaded binary trees, heaps, binary search tree, forests, Huffman algorithm.

6 GRAPHS

The graph abstract data type, graph traversal, directed graph, weighted graph, shortest path-Dijkastra's algorithm, minimum spanning tree.

7 SORTING

Insertion sort, quick sort, merge sort, heap sort, shell sort, count sort, sorting on several keys, list and table sort, summary of internal sorting.

8 HASHING

Hash table, hash function, collision, collision resolution techniques.

9 SEARCH TECHNIQUES

Sequential search, Binary search, AVL trees, 2-3 trees, 2-3-4 trees, read-black trees, B-trees, Digital search trees, Tries.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Data Structures and Algorithms in Java (4th edition) by Michael T. Goodrich and Roberto Tamassia Publisher: John Wiley & Sons, Inc
2. Data Structures and Program Design in C, Second Edition, by Robert L. Kruse, Bruce P. Leung, Pearson Education.

3. Data Structures And Algorithms Made Easy In JAVA by Narasimha Karumanchi, Publisher: Careermonk Publications (Sep 2011).
4. An Introduction to Data Structures with Applications, Second Edition, by Tremblay and Sorenson, McGraw Hill.

B. TECH. SEMESTER – III (CE)
SUBJECT: DATABASE MANAGEMENT SYSTEMS

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
4	0	2	6	5	60	40	25	25	150

Reference Code CS501

A. DETAILED SYLLABUS

1 BASIC CONCEPTS

Purpose of database system, View of data, Database abstraction and Models, Database Languages, Transaction management, Storage management, Database administrator, Database users, Overall system structure.

2 ENTITY RELATION MODEL

Entity sets, Relationship sets, Attributes, Constraints, Keys, Entity relationship diagrams, Weak entity sets, Generalization, Specialization, Aggregation, Design of an E-R database schema, Reduction of an E-R schema to tables.

3 RELATIONAL DATABASE MANAGEMENT SYSTEM

Relational Model, Structure of database, Relational algebra, Extended relational algebra operation, tuple relational calculus, Domain relational calculus, Modification of database, Views, Structured Query Language, Background, Basic structure, Integrity Constraints, Domain constraints, Referential integrity, Assertions, Triggers, Functional Dependencies, Database Pitfalls in relational database design, Decomposition, Normalization, I,II,III normal Forms, Normalization using functional dependencies, Normalization using multi valued dependencies, Domain key normal form, Alternative approach to database design

4 FILE SYSTEM STRUCTURE

Indexing & Hashing, File organization, Organization of records in files, Data dictionary storage, Basic concepts of indexing, Order indices, B- Tree index files, B+ -Tree index files, Static hashing & Dynamic Hashing.

5 QUERY PROCESSING

Overview, Catalog information for cost estimation, Measures of query cost, Selection operation, Sorting, Join operation, Other operations, Choice of evaluation plans

6 TRANSACTION PROCESSING

Transaction concepts, Transaction state, Implementation of atomicity & durability, Concurrent executions, Serializability, Conflict serializability, View serializability, Testing of conflict and view serializability.

7 CONCURRENCY CONTROL

Lock based protocols, Time-stamp based protocol, Validation based protocol, Multiple granularity, Multi-version schemes, Deadlock handling, Insert & delete operations, Concurrency in index structures.

8 RECOVERY SYSTEM

Failure classification, Storage structure, Recovery & Atomicity, Log-based recovery,

Shadow paging, Recovery with concurrent transactions, Buffer management, Failure with loss of non-volatile storage, Advance recovery techniques.

9 DISTRIBUTED DATABASE

Security and Integrity of data base

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. "Data Base System Concepts", Henry F. Korth and A. slberschatz 2nd Edition, McGraw-Hill 1991.
2. An Introduction to Database Systems", C.J.Date, Pearson Publication

B. TECH. SEMESTER – III (CE)
SUBJECT: DESIGN OF DIGITAL CIRCUITS

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
4	0	2	6	5	60	40	25	25	150

Reference Code ESC302

A. DETAILED SYLLABUS

1 BINARY SYSTEMS

Introduction to Digital Computers and Digital Systems, Binary Numbers, Number Base Conversion, Octal and Hexadecimal Numbers, complements, binary Codes, Binary Storage and Registers, Binary Logic, Integrated Circuits.

2 BOOLEAN ALGEBRA AND LOGIC GATES

Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates, IC Digital Logic Families.

3 SIMPLIFICATION OF BOOLEAN FUNCTIONS

The Map Method, Two and Three Variable Maps, Four-Variable Map, Five and Six Variable Maps, Product of Sums Simplification, NAND and NOR Implementations, Don't-Care Conditions, The Tabulation Method, Determination of Prime-Implicants, Selection of Prime-implicants, Concluding Remarks.

4 COMBINATIONAL LOGIC

Introduction, Design Procedure, Adders, Subtractors, Code Conversion, Analysis Procedure, Multilevel NAND Circuits, Multilevel NOR Circuits, Exclusive OR and Equivalence Functions.

5 COMBINATIONAL LOGIC WITH MSI AND LSI

Introduction, Binary Parallel Adder, Decimal Adder, Magnitude Comparator, Decoders, Multiplexers, Read-Only Memory (ROM), Programmable Logic Array (PLA), Concluding Remarks.

6 SEQUENTIAL LOGIC

Introduction, Flip-Flops, Triggering of Flip-Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Flip-Flop Excitation Tables, Design Procedure, Design of Counters, Design with State Equations.

7 REGISTER, COUNTERS AND THE MEMORY UNIT

Introduction, Registers, Shift Registers, Ripple Counters, Synchronous Counters, Timing Sequences, The Memory Unit, Examples of Random Access Memories.

8 DIGITAL INTEGRATED CIRCUITS

Introduction, Bipolar Transistor Characteristics, RTL and DTL Circuits, Integrated-Injection Logic, Transistor-Transistor Logic, Emitter-Coupled logic, Metal-Oxide Semiconductor, Complementary MOS.

9 **VERILOG**

Introduction, Overview of Digital Design with Verilog HDL, Gate-level Modeling (full adre, multiplexer, full substractor, comparator, decoder, demultiplexer, Flip-flops)

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Digital Logic and Computer Design, M.Morris Mano
2. VERILOG HDL, Samir Palmitkar, Pearson Education

B. TECH. SEMESTER – III (CE)
SUBJECT: PROBABILITY AND STATISTICS

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
2	0	0	2	2	40	-	-	-	40

Reference Code BSC201

A. DETAILED SYLLABUS

1 BASIC PROBABILITY

Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, the multinomial distribution, Poisson approximation to the binomial distribution, infinite sequences of Bernoulli trials, sums of independent random variables; Expectation of Discrete Random Variables, Moments, Variance of a sum, Correlation coefficient, Chebyshev's Inequality.

2 CONTINUOUS PROBABILITY DISTRIBUTION

Continuous random variables and their properties, distribution functions and densities, normal, exponential and gamma densities.

3 BIVARIATE DISTRIBUTION

Bivariate distributions and their properties, distribution of sums and quotients, conditional densities, Bayes' rule.

4 BASIC STATISTICS

Measures of Central tendency: Moments, skewness and Kurtosis – Probability distributions: Binomial, Poisson and Normal – evaluation of statistical parameters for these three distributions, Correlation and regression – Rank correlation.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 2000.
2. E. Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, 2006.
3. P. G. Hoel, S. C. Port and C. J. Stone, "Introduction to Probability Theory", Universal Book Stall, 2003.
4. S. Ross, "A First Course in Probability", Pearson Education India, 2002.
5. W. Feller, "An Introduction to Probability Theory and its Applications", Vol. 1, Wiley, 1968.
6. N.P. Bali and M. Goyal, "A text book of Engineering Mathematics", Laxmi Publications, 2010.
7. T. Veerarajan, "Engineering Mathematics", Tata McGraw-Hill, New Delhi, 2010.

B. TECH. SEMESTER – III (CE)
SUBJECT: UNIVERSAL HUMAN VALUES

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
3	0	0	3	3	60	-	-	-	60

Reference Code HSMC301

A. DETAILED SYLLABUS

1 COURSE INTRODUCTION

Need, Basic Guidelines, Content and Process for Value Education Self Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration, Continuous Happiness and Prosperity- A look at basic Human Aspirations, Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority, Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario, Method to fulfill the above human aspirations: understanding and living in harmony at various levels

2 UNDERSTANDING HARMONY IN THE HUMAN BEING

Harmony in Myself! Understanding human being as a co-existence of the sentient 'I' and the material 'Body', Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha, Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer), Understanding the characteristics and activities of 'I' and harmony in 'I', Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure Sanyam and Swasthya

3 UNDERSTANDING HARMONY IN THE FAMILY AND SOCIETY

Harmony in Human-Human Relationship Understanding Harmony in the family – the basic unit of human interaction, Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship, Understanding the meaning of Vishwas; Difference between intention and competence, Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship, Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals, Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha)- from family to world family!

4 UNDERSTANDING HARMONY IN THE NATURE AND EXISTENCE

Whole existence as Co-existence : Understanding the harmony in the Nature, Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature, Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence

5 IMPLICATIONS OF THE ABOVE HOLISTIC UNDERSTANDING OF HARMONY ON PROFESSIONAL ETHICS

Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order, Competence in Professional Ethics, Case studies of typical holistic technologies, management models and production systems, Strategy for transition from the present state to Universal Human Order

B. RECOMMENDED TEXTBOOK/ REFERENCE BOOKS

1. R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics, Excel books, New Delhi, 2010, ISBN 978-8-174-46781-2
2. JeevanVidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
3. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J C Kumarappa
8. Bharat Mein Angreji Raj - PanditSunderlal

B. TECH. SEMESTER – III (CE)
SUBJECT: FINANCIAL & MANAGERIAL ACCOUNTING

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
3	0	0	3	3	60	-	-	-	60

Reference Code HSMC401

A. DETAILED SYLLABUS

1 FINANCIAL ACCOUNTING – AN INTRODUCTION

Introduction,,Meaning of Accountancy,,Book-keeping and Accounting, Accounting Process, Objectives for accounting, Differences between book-keeping and accounting, Users of accounting information, Limitations of Accounting, Basic terminologies

2 ACCOUNTING CONCEPTS, PRINCIPLES, BASES AND POLICIES

Introduction, Accounting Concepts, Principles, Policies and Standards, Types of accounting concepts, Business Separate entity concept, Going concern concept, Money measurement concept, Periodicity concept, Accrual concept, Accounting Principles, Principle of Income recognition, Principle of expense, Principle of matching cost and revenue, Principle of Historical costs, Principle of full disclosure, Double aspect principle, Modifying Principle, Principle of materiality, Principle of consistency, Principle of conservatism or prudence, Accounting Policies, Changes in Accounting Policies, Disclosure in case of changes in Accounting Policies, Accounting Standards, Scope and functions of Accounting Standards Board, International Financial Reporting System

3 DOUBLE ENTRY ACCOUNTING

Introduction, Meaning of double entry accounting, Classification of accounts under Traditional approach, Classification of accounts under Accounting Equation approach, Comparison of traditional approach with Modern approach equal approach, Accounting Trail, Transactions and events, Meaning and roles of debit and credit, Accounting equation

4 SECONDARY BOOKS

Introduction, Secondary books, Purchases Book/Purchases Day book, Cash discount, Trade discount, Difference between cash discount and trade discount, Sales Book or Sales Day book, Purchase Returns Book, Sales Returns Book, Bills receivable book, Bills payable book , Cash book, Posting to Ledger accounts

5 TRIAL BALANCE

Introduction, Meaning, Objectives of preparing a trial balance, Methods of preparing a trial balance, Preparation of Trial balance, Adjusting Entries, Errors and their rectification, Errors disclosed by Trial Balance,Errors not disclosed by Trial Balance,Steps to locate the errors

6 FINAL ACCOUNTS

Introduction, Adjustments before preparing final accounts, Depreciation, Bad Debts and accounting treatment of bad debts, Provision for doubtful debts, Reserves for Discount on

Debtors, Reserve for Discount on Creditors, Closing Stock, Trading Account, Profit and Loss Account, Balance Sheet

7 INTRODUCTION TO MANAGEMENT ACCOUNTING

Introduction, Meaning of Management accounting, The Role of Management Accounting, Management Accounting Framework, Functions of Management Accounting, Tools of Management Accounting, The Balanced Scorecard, Cost Management System, Value Added Concept, Merits of Management Accounting, Demerits of Management Accounting, Distinction between Management Accounting and Financial Accounting

8 FINANCIAL STATEMENT ANALYSIS

Introduction, Meaning of Ratio, Steps in Ratio Analysis, Classification of Ratios, Du Pont Chart, Solved Problems, Advantages of Ratio Analysis, Limitation of Ratio analysis

9 CASH FLOW ANALYSIS

Introduction, Meaning of Cash Flow Statement, Purpose of Cash Flow Statement, Preparation of Cash Flow Statement, Format of Cash Flow Statement (AS3: Revised Method), Cash Flow from Operating Activities, Cash Flow Statement under Direct Method, Different between Cash Flow Analysis and Fund Flow Analysis, Uses of Cash Flow Statement

10 MARGINAL COSTING AND BREAK EVEN ANALYSIS

Introduction, Concept of Marginal Costing, Characteristics of Marginal Costing, Difference between Absorption Costing and Marginal Costing, Marginal Cost, Contribution, Cost Volume Profit (CVP) Analysis, Break Even Chart, Break Even Point, Profit Volume ratio or MCSR, Target profit, Margin of Safety, Application of Marginal cost, Limitations of Marginal cost, Solved Problems

11 BASICS OF FINANCIAL MANAGEMENT

Introduction of Financial Management, Objectives of financial management, Role of finance manager, Functions of financial management, Concept of time value of money, Present value, Future value, Annuity concept, Solved problems

B. RECOMMENDED TEXTBOOK/ REFERENCE BOOKS

1. Bhattacharya, S. K.; Dearden, J. Accounting for Management – Text book & cases; Vikash Publishing House: New Delhi, 2009.
2. Kishore, R. M. Advanced Management Accounting; Taxman: New Delhi, 2018.
3. Arora, M. N. A Text Book of Cost Accountancy; Vikas Publishing: Mumbai, 2010.
4. Horngren, C. T.; Foster, S. M.; Datar, G. Cost Accounting – A Managerial Emphasis; Prentice Hall: New Jersey, 1997.
5. Prasad, N. K.; A.K. Prasad Cost Accounting; Book Syndicate: Kolkata, 2016.
6. Edmonds, T. P.; Edmonds, C. D.; Tsay, B,-Y Fundamental Managerial Accounting Concept; Irwin McGraw Hill: Boston, 2013.
7. Bhattacharya, A. Principles and Practice of Cost Accounting; Sultan Chand: New Delhi, 2004.

8. Pillai, R. S. N.; Bhagavati, V. Cost and Management Accounting; Sultan Chand: New Delhi, 2010.
9. Banerjee, B. Cost Accounting – Theory & Practices; Sultan Chand: New Delhi, 2014.
10. Saxena V. K.; Vashist, C. D. Advanced Cost & Management Accounting – Problems & Solutions; Prentice Hall of India: New Delhi, 2015.
11. Maheshwari, S. N. Studies in Cost Management; Sultan Chand & Sons: New Delhi, 2013.
12. Rao, M. E. T. Cost and Management Accounting; New Age International: New Delhi 2004.
13. Rao, M. E. T.Management Accounting; New Age International: New Delhi 2003.

B.TECH. SEMESTER – III (CE)
SUBJECT: ESSENCE OF INDIAN KNOWLEDGE TRADITION

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
2	0	0	2	0	-	-	-	-	-

Reference Code MC-1

A. DETAILED SYLLABUS

1 BASIC STRUCTURE OF INDIAN KNOWLEDGE SYSTEM

Ashtadashvidya, 4 - Ved, 4 - Upved, (Ayurved, dhanurved, gandharvved, sthapatya, etc), 6 – Vedang (shiksha, kalp, nirukti, vyakaran, jyotish, chhand) 4 upang (dharmshastra, mimansa, purana, tarkshastra)

2 MODERN SCIENCE AND INDIAN KNOWLEDGE SYSTEM

Relating modern science with Tradition Indian Indian knowledge, Relevance of Indian Knowledge System

3 YOGA AND HOLISTIC HEALTH

Different types of Yoga, Role of Yoga in building holistic health

4 CASE STUDIES

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. V. Sivaramakrishnan (Ed.), Cultural Heritage of India-course material, Bharatiya Vidya Bhavan, Mumbai. 5 th Edition, 2014
2. Swami Jitatmanand, Modern Physics and Vedant, Bharatiya Vidya Bhavan
3. Swami Jitatmanand, Holistic Science and Vedant, Bharatiya Vidya Bhavan
4. Fritzof Capra, Tao of Physics
5. Fritzof Capra, The Wave of life
6. VN Jha (Eng. Trans.), Tarkasangraha of Annam Bhatta, International Chinmay Foundation, Velliarnad, Arnakulam
7. GN Jha (Eng. Trans.), Ed. RN Jha, Yoga-darshanam with Vyasa Bhashya, Vidyanidhi Prakashan, Delhi 2016
8. RN Jha, Science of Consciousness Psychotherapyand Yoga Practices, Vidyanidhi Prakashan, Delhi 2016
9. P B Sharma (English translation), Shodashang Hridayan

B. TECH. SEMESTER – III (CE)
SUBJECT: WEB DEVELOPMENT WORKSHOP

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
0	0	2	2	1	-	-	25	25	50

Reference Code --

A. DETAILED SYLLABUS

1 JAVASCRIPT

Variable Naming Rules and JavaScript Data Types, let vs var, 'use strict', operators and expressions, Javascript – flow control (branching and looping)

2 JAVASCRIPT FUNCTIONS & ARRAYS

Javascript functions, function expression, and arrow functions. Javascript template literals, and tagged template literals, Javascript arrays, object literals and constructor functions, avascript: spread operator, destructuring arrays and objects, closure

3 DOM & BASIC JQUERY

4 BOOTSTRAP

Introduction to Bootstrap, Bootstrap Grid, Bootstrap Components, Bootstrap Plug-Ins

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Web Design with HTML, CSS, JavaScript and jQuery Set, by John Ducket, Wiley
2. Javascript: The Good Parts, first edition, by Douglas Crockford, O'Reilly
3. Bootstrap 4 quick start, by Jacob D. Lett, Bootstrap Creative

B. TECH. SEMESTER – IV (CE)
SUBJECT: DISCRETE MATHEMATICS

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
4	0	0	4	4	60	40	-	-	100

Reference Code CS 401

A. DETAILED SYLLABUS

1 SETS AND PROPOSITIONS

Combination, finite, uncountably infinite and infinite sets, mathematical induction, principles of inclusion and exclusion, propositions.

2 PERMUTATION, COMBINATION, DISCRETE PROBABILITIES

Rules of sums and products, permutations, combinations, generation, discrete probability, conditional probability, information.

3 RELATION AND FUNCTIONS

Relational model of data bases, properties of binary relations, equivalence relation, partitions, partial ordering, lattices, chains and antichains, functions and pigeon-hole principle.

4 GRAPHS

Basic terminology, multi- and weighted graphs, paths, circuits, shortest path, Eulerian path, Traveling Salesman problem, factors of a graph, planar graphs.

5 TREES

Trees, rooted trees, path length, prefix codes, binary search trees, spanning trees and cut-sets, minimum spanning trees, transport networks.

6 FINITE STATE MACHINE

FSM as models of physical systems, equivalent machines, FSM as language recognizer.

7 COMPUTABILITY AND FORMAL LANGUAGES

Russel's paradox and non-computability, ordered sets, languages, phrase structured grammars, types of grammars and languages.

8 DISCRETE NUMERICAL FUNCTIONS

Manipulations of numerical functions, asymptotic behavior, generating functions, combinatorial problems.

9 GROUP

Groups and sub-groups, generators, evaluation of powers, cosets, Lagrange's theorem, permutation group and Burnsides theorem, group codes, isomorphism, automorphism, homomorphism, normal subgroups, rings, integral domains and fields, ring homomorphism, polynomial rings and cyclic codes.

10 LATTICES AND BOOLEAN ALGEBRA

Lattices and algebraic systems, principle of duality, properties of algebraic systems, distributive lattices, boolean algebras, uniqueness, boolean functions and expressions, propositional calculus.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. "Elements of Discrete Mathematics", C.L. Liu, 2nd Ed., McGraw-Hill
2. "Modern Applied Algebra", Birkoff and Bartee, McGraw-Hill, CBS.
3. "discrete mathematics - a unified approach", stephen a. Wiitala, computer science series, mcgraw-hill.

B. TECH. SEMESTER IV (CE)
SUBJECT: DESIGN & ANALYSIS OF ALGORITHM

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
4	0	2	6	5	60	40	25	25	150

Reference Code CS404

A. DETAILED SYLLABUS

1 **Introduction to algorithms**

2 **Elementary Data structures**

3 **Methods for solving recurrence relation for finding time complexity**

4 **Overview of searching & sorting techniques**

5 **The Greedy Methodology**

6 **Dynamic Programming**

7 **Graph Traversal & Searching**

8 **Backtracking Techniques**

9 **Branch & Bound Techniques**

10 **Lower bound theory**

11 **NP-Hard & NP-Complete problmes**

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Fundamentals of Computer Algorithms by Horowitz, Sahni, Galgotia Pub.
2. Fundamentals of Algorithms by Brassard & Brately, PHI.
3. Introduction to Algorithms by Coreman, Tata McGraw Hill.
4. The art of Computer Programming Vol.I & III, Kunth, AddisionWesley.

B. TECH. SEMESTER – IV (CE)
SUBJECT: COMPUTER SYSTEM ARCHITECTURE

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
4	0	2	6	5	60	40	25	25	150

Reference Code CS402

A. DETAILED SYLLABUS

1 BASIC FUNCTIONAL BLOCKS OF A COMPUTER

CPU, memory, input-output subsystems, control unit, datapath design, interconnection structure, register transfer language, register transfer, bus and memory transfers, arithmetic logic shift unit

2 DATA REPRESENTATION

signed number representation, fixed and floating point representations, character representation, IEEE 754 standard of representation

3 BASIC COMPUTER ORGANIZATION AND DESIGN

Instruction codes, computer registers, computer instructions, timing and control, instruction cycle, memory reference instructions, I/O instructions, design of accumulator logic.

4 DATAPATH DESIGN

Computer arithmetic - integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication - shift-and-add, Booth multiplier, carry save multiplier, etc. Division - non-restoring and restoring techniques, floating point arithmetic

5 CONTROL UNIT DESIGN

Hardwired control, micro programmed control, nano programmed control

6 PROGRAMMING THE BASIC COMPUTER

Introduction, machine language, assembly language, the assembler, program loops, programming arithmetic and logic operations, subroutines, I/O programming.

7 CENTRAL PROCESSING UNIT

Register organization, stack organization, instruction format, addressing mode, data transfer and manipulation, program control, RISC processors.

8 PIPELINING

Basic concepts of pipelining, throughput and speedup, pipeline hazards.

9 INPUT OUTPUT ORGANIZATION

Peripheral devices, I/O interface, asynchronous data transfer, modes of transfer, priority interrupt, DMA, I/O processors, serial communication

10 MEMORY ORGANIZATION

Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs. block size, mapping functions, replacement algorithms, write policy.

11 CASE STUDY : 8085 MICROPROCESSOR

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Computer System Architecture by Morris Mano, 3rd Ed., PHI
2. Computer Architecture and Organization by John P. Hayes, Computer science series, McGRAW-HILL
3. Microprocessor Architecture, Programming and Applications With The 8085 by R.S. Gaonkar 5th Ed., CBS Publisher
4. Computer Organization and Design: The Hardware/Software Interface by David A. Patterson and John L. Hennessy, Elsevier.
5. Computer Organization by Carl Hamachar, Zvonco Vranesic and Safwat Zaky, McGraw Hill.
6. Computer Organization and Architecture: Designing for Performance by William Stallings, Pearson Education.

B. TECH. SEMESTER – IV (CE)
SUBJECT: JAVA TECHNOLOGIES

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
4	0	2	6	5	60	40	25	25	150

Reference Code CS503

A. DETAILED SYLLABUS

1 LANGUAGE FUNDAMENTALS

The Java Environment: Java Program Development, Java Source File Structure, Compilation Executions,Basic Language Elements: Lexical Tokens, Identifiers, Keywords, Literals, Comments, Primitive Data-types, Operators

2 CLASSES & OBJECTS IN JAVA

Class, Object and Object reference, Object Life time and Garbage Collection, Creating and Operating Objects, Constructor and initialization code block, Access Control, Modifiers, Nested class, Inner Class, Anonymous Classes, Abstract Class and Interfaces, Defining Methods, Method Overloading, Dealing with Static Members, Use of “this” reference, Use of Modifiers with Classes & Methods.

3 IMPLEMENTING INHERITANCE & POLYMORPHISM

Types of Inheritance in Java, Inheriting Data Members and Methods, Role of Constructors in inheritance, Overriding Super Class Methods, Use of “super”, Polymorphism in inheritance, Type Compatibility and Conversion, Implementing interfaces.

4 PACKAGE

Organizing Classes and Interfaces in Packages, Package as Access Protection, Defining Package, CLASSPATH Setting for Packages, Making JAR Files for Library Packages, Import and Static Import, Naming Convention for Packages

5 EXCEPTION HANDLING

Exceptions & Errors, Types of Exception, Control Flow In Exceptions, JVM reaction to Exceptions, Use of try, catch, finally, throw, throws in Exception Handling, In-built and User Defined Exceptions, Checked and Unchecked Exceptions

6 ARRAY & STRING HANDLING

Array basics, String Array, String class, StringBuffer and StringBuilder class, String Tokenizer Class and Object Class

7 MULTI-THREADED PROGRAMMING

Understanding Threads, Needs of Multi-Threaded Programming, Thread Life-Cycle, Thread Priorities, Synchronizing Threads, Inter Communication of Threads

8 INPUT/OUTPUT OPERATION IN JAVA

Streams and the new I/O Capabilities, Understanding Streams, The Classes forInput and Output, The Standard Streams, Working with File Object, File I/O Basics, Reading and Writing to Files, Buffer and Buffer Management, Read/Write Operations with File, Channel,

Serializing Objects

9 COLLECTION FRAMEWORK & GENERICS

Collections of objects, Collections: Sets, Sequence, Map, Understanding Hashing, Use of Array List & Vector, Generics Class, Lamda Expression, Functional Reference, Method Reference, Optional Classes, Processing data with streams

10 NEW APIS (JAVA 8) AND JDBC CONCEPTS

Lambda Expressions, Method References, Default method, Stream API, Date Time API

Introduction to Java Database Connectivity(JDBC), Types of JDBC Drivers, Steps to create JDBC Application, JDBC API Classes and Interfaces

11 INTRODUCTION TO JAVAEE

Web Server, N-tier Architecture, Introduction to web Container and Structure of web Application

12 JAVA SERVLETS

A simple Web Application, HTTP Protocol, Servlet Interface, Servlet LifeCycle, Servlet Configuration and Exceptions, Servlet Request and Responses, Session Tracking with JavaServlet, Servlet Context, Servlet Listeners

13 JAVA SERVER PAGES

Introduction to JSP, its lifecycle, Scripting Elements, Comments, Implicit objects, JSP Directives, JSP Standard Actions and JSTL

14 HIBERNATE FRAMEWORK

Introduction to O-R Mapping Hibernate Basics, Hibernate Architecture, Hibernate Configurations, POJO (Plain Old Java Objects) classes and O/R Mapping Object Identifier, Hibernate mapping (One-to-One Association, One-to-Many Association Many-to-One Association, Many-to-Many Association, Collection Mapping, Component mapping), Inheritance Mapping, Hibernate Query Language, Criteria Queries, Hibernate in Web Application.

15 SPRING FRAMEWORK

Introduction, The IoC Container and Beans, The Application Context, Dependency Injection, Data Validation and Type Conversion, Package Dependencies and Build Tool (Maven / Gradle), Spring Boot with Initializer, Test Driven development with Spring Boot, Aspect Oriented Programming, Spring Web MVC, Spring and Persistence, Securing a Web Application

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Core Java Volume I –Fundamentals, 8th Edition by Cay Horstmann and Gray Cornell, Pearson Education
2. Java 8 in Action: Lambdas, Streams, and Functional-style Programming by Raoul-Gabriel Urma, Mario Fusco, and Alan Mycroft, Manning publications
3. Professional Java Server Programming by Subrimanyan & Cedric, SPD Publications
4. Spring in Action , 5th edition , by Craig Walls, MANNING Publications
5. Hibernate in Action by Christian Bauer and Gavin King, MANNING Publications

6. Thinking in Java by Bruce Eckel, 4thEd., Pearson Education.
7. Learning Java by By Patrick Niemeyer and Jonathan Knudsen, 4thEd., O"reilly Media.
8. Head First Servlets and JSP, 2nd edition, by Bert Bates, Kathy Sierra & Bryan Basham, O'Reilly Media.
9. J2EE Complete Reference, James Keogh, TMH.

B. TECH. SEMESTER – IV (CE)
SUBJECT: VISUAL TECHNOLOGY

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
4	0	2	6	5	60	40	25	25	150

Reference Code CS503

A. DETAILED SYLLABUS

1 INTRODUCTION

Introduction to Windows programming, introduction to VC++ IDE

2 WINDOWS GUI PROGRAMMING

Messages (Message passing and handling), GDI Objects (Pen, Brush, etc.), Mouse Handling , Keyboard Handling, Mapping Modes, Menu, Tool bar and Status bar, Scrolling and Splitting views

3 DOCUMENT/VIEW ARCHITECTURE

Serialization (storing and retrieving to and from disk)

4 MULTI-THREADED PROGRAMMING

5 DIALOG BASED APPLICATION

Model and Model-less dialogues, Windows dialog controls, Buttons, Edit box, Check box, Radio Button, combo box, list box, Animation control, spin control, slider control, Tree view control, List view control.

6 ACTIVE X CONTROL

Using Active X control, Creating Active X control

7 DATABASE CONNECTIVITY USING DAO

8 DLL DEVELOPMENT

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Mastering Visual C++ 6.0, By: Michael J. Young.
2. Programming with microsoft visual c++ 6.0, by devid j. kruglicnski, george shepherd., scot wings.

B. TECH. SEMESTER – IV (CE)
SUBJECT: SOFTWARE ENGINEERING PRINCIPLE AND PRACTICES

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess	TW	Prac	Total
4	0	2	6	5	60	40	25	25	150

Reference Code CS-S

A. DETAILED SYLLABUS

1 INTRODUCTION TO SOFTWARE ENGINEERING

2 PROCESS MODELS

Traditional Models, Unified Process models and Agile Models

3 PROCEDURAL MODELING

Requirement engineering: Requirement engineering Process, Eliciting requirements, SRS, Design concepts and principles, Architectural design, User interface design, Component level design, Deployment-level Design Elements

4 OBJECT ORIENTED MODELING

Classes, Object, UML Diagrams: Use case, Sequence, Class, State, Activity, Sequence, Component, and Deployment.

5 TESTING STRATEGY AND TACTICS

Software Testing strategies, White box testing, Basis path testing, Control structure testing, Black box testing, Object oriented testing.

6 AGILE SOFTWARE DEVELOPMENT

Scrum, Xtreme Programming, Continuous Integration and Continuous Delivery, Test driven development.

7 VERSION CONTROL AND SOFTWARE DEVELOPMENT PLATFORM

Version Control and change management, git, introduction to online tools and platforms, GitHub, Jira, DevOps, Azure, and Jenkin

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Software Engineering, Pressman, McGraw-Hill, 1992
2. Object oriented modeling and design with UML, M. Blaha and J. Rumbaugh
3. Agile Software Development with SCRUM, Ken Schwaber and Mike Beedle
4. Grady Booch, Object Oriented Analysis & Design, Benjamin/Cummings, 1994

B. TECH. SEMESTER – IV (CE)
SUBJECT: SOFTWARE PROJECT

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
0	0	2	2	1	-	-	25	25	50

Reference Code CS601

A. DETAILED SYLLABUS

1 PROJECT BASED LEARNING

- Student at the beginning of a semester may be advised by his/her supervisor (s) for recommended courses.
- Students will work together in a team (at most three)
- Students are required to get approval of project definition from the department.
- After approval of project definition students are required to report their project work on weekly basis to the respective internal guide.
- Project will be evaluated at least once per week in laboratory Hours during the semester and final submission will be taken at the end of the semester as a part of continuous evaluation.

B. RECOMMENDED TEXT / REFERENCE BOOKS

NA

DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
DEPARTMENT OF COMPUTER ENGINEERING
M. TECH. COMPUTER ENGINEERING

Minutes of the Board of Studies Meeting - 7h April 2021

Brief Summary

1) Introduction of a new subject, "Research Methodology for Computer Science", in M. Tech. Semester 1
2) Removal of the subject "Seminar" from M. Tech Semester 1
3) Addition of a new elective subject "Advanced Data Structures" in M. Tech. Semester 1
4) Removal of the subject "Mobile Computing" from M. Tech. Semester 2
5) Introduction of a new subject "Mathematical Foundation of Computer Science" in M. Tech. Semester 2
6) Updation of the syllabus and teaching scheme of the subject "Pedagogy Practices" and renaming it to "Pedagogy Studies" in M. Tech. Semester 2

_____

Dr. C. K. Bhensdadia
Chairman, B.O.S., Dept. of Computer Engg,
DDU, Nadiad

_____

Dr. Shashikant Sharma
Senior Scientist,
SAC, ISRO, Ahmedabad

_____

Mr. Nikunj Patel
Director, TechSmith,
Ahmedabad

_____

Dr. Brijesh Bhatt
Professor, Dept. of Computer Engg,
DDU, Nadiad

_____

Prof. Prashant Jadav
Associate Professor,
Dept. of Computer Engg, DDU, Nadiad

_____

Dr. Bhavika Gambhava
Assistant Professor,
Dept. of Computer Engg, DDU, Nadiad

DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
DEPARTMENT OF COMPUTER ENGINEERING

M. Tech. Computer Engineering
Minutes of the Board of Studies Meeting (held on 7th April 2021)
Detailed Summary

Sr No	Sem	Existing Subject	Proposed Subject	Proposed Changes	Justification
1	I	-	Research Methodology for Computer Science	The subject will acquaint students with various practices followed for effective research	As per the AICTE model curriculum, introducing the course to make students aware about various practices followed in research
2	I	Seminar	-	The subject is removed	To adjust the credits as per the AICTE model curriculum and to accommodate the subject of "research methodology for Computer Science"
3	I	-	Advanced Data Structures	The subject contains advanced topics in data structures like dictionary, Hashing, Randomized structures, advanced tree structures etc.	The subject is recommended in AICTE model curriculum. Introduced as an elective along with existing elective subjects "operating system design and implementation" and "Advanced Programming in Unix"
4	II	Mobile Computing	Mathematical Foundation of Computer Science	Removal of the subject Mobile computing. Introducing topics of probability, statistics and graph theory which are useful for Advance research in Computer Engineering	As per AICTE model curriculum introducing the course of Mathematical Foundation of Computer Science
5	II	Pedagogy Practices	Pedagogy Studies	Introducing topics related to effective pedagogy studies	Aligning syllabus with the model AICTE curriculum and offering the subject as an audit course as per the AICTE guidelines

COURSE STRUCTURE FOR POST GRADUATE PROGRAM: M. TECH. (COMPUTER ENGINEERING)

w.e.from 2021-22 **TOTAL CREDIT 75**

SEM.	Sr. No.	SUBJECT	WORK LOAD			TOTAL	Credit	MARKS				
			Th	T	P			Th	Sess	TW	Pract	Total
Sem-I	1	Advance Compiler Techniques	3	1	2	**6**	**5**	60	40	25	25	**150**
	2	Advance Computer Network	3	1	2	**6**	**5**	60	40	25	25	**150**
	3	Machine Learning	4	0	2	**6**	**5**	60	40	25	25	**150**
	4	Elective – I	3	1	2	**6**	**5**	60	40	25	25	**150**
		Digital Image Processing										
		Advanced Software Engineering										
	5	Elective – II	3	1	2	**6**	**5**	60	40	25	25	**150**
		Operating System Design and Implementation										
		Advanced Programming in Unix										
		Advanced Data Structure										
	6	Research Methodology for Computer Science	2	0	0	**2**	**2**	40	-	-	-	**40**
		TOTAL	**18**	**4**	**10**	**32**	**27**	**340**	**200**	**125**	**125**	**790**
Sem-II	1	Mathematical Foundation of Computer Science	4	0	0	**4**	**4**	60	40	-	-	**100**
	2	Distributed Computing	3	1	2	**6**	**5**	60	40	25	25	**150**
	3	Design and Analysis of Algorithms	3	1	2	**6**	**5**	60	40	25	25	**150**
	4	Soft Computing	3	1	2	**6**	**5**	60	40	25	25	**150**
	5	Big Data Analytics	4	0	2	**6**	**5**	60	40	25	25	**150**
	6	Pedagogy Studies	2	0	0	**2**	**0**	-	-	-	-	-
		TOTAL	**19**	**3**	**8**	**30**	**24**	**300**	**200**	**100**	**100**	**700**

SEM.	Sr. No.	Subject	WORK LOAD			Total	Credit	MARKS				
			Th	T	P			Th	Sess	TW	Pract	Total
Sem-III	1	Dissertation -I	0	0	20	**20**	**10**	-	-	150	300	**450**
	2	Pedagogic Practice – I	0	2	2	**4**	**2**	-	-	50	-	**50**
		TOTAL	**0**	**2**	**22**	**24**	**12**	**0**	**0**	**200**	**300**	**500**
Sem-IV	1	Dissertation -II	0	0	20	**20**	**10**	-	-	150	300	**450**
	2	Pedagogic Practice -II	0	2	2	**4**	**2**	-	-	50	-	**50**
		TOTAL	**0**	**2**	**22**	**24**	**12**	**0**	**0**	**200**	**300**	**500**

DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY

BOARD OF STUDIES IN CIVIL ENGINEERING

MINUTES OF MEETING: Date: 11-04-2021

Expert members: 1. Prof. (Dr.) H. S. Patel 2. Shri T. S. Dholakia

Internal Members: 1. Prof. K. N. Sheth 2. Dr. S. S. Khandelwal 3. Dr. R. K. Sheth
4. Prof. (Ms) J. K. Pandya 5. Prof. C. A. kapatel

It was directed by the Vice Chancellor – DDU to accommodate AICTE Model Curriculum for UG and PG program in context of DDU. Central Level Committee consisting Dean- FoT and Heads of Departments have finalized Course Structure and Curriculum for B. Tech. First Year is put forward for consideration by BoS-CL for development of Provisional Overall Course Structure.

A Board of Studies Meeting of department members was held to discuss and update the course structures and Curriculum for B. Tech. (Civil Engg.) and M. Tech.(Civil-Structural Engineering) and M. Tech. (Geotechnical Engineering.) programs to be effective from 2021-22. Documents were sent to the Experts Members for review and recommendations. The approved documents are attached herewith for further action.

BoS – CL approves the following proposals:

1. BoS-CL endorse the course Structure of First Year B. Tech. (Civil Engg.) and approves the curriculum of Civil Engg. Subjects in First Year. It will be effective from year 2020-21.
2. BoS-CL approves the Provisional Course Structure for B. Tech. (Civil Engg.) incorporating AICTE Model Curriculum guidelines. This Course Structure shall be put forward to Academic Councill – DDU step wise for approval along with the curriculum.
3. BoS CL approves the recommendations for changes in Curriculum for M. Tech. (Civil-Structural Engineering) and M.Tech. (Geotechnical Engineering) programs.

(Prof. K. N. Sheth)
Chairman, BoS-CL

COURSE STRUCTURE FOR POST GRADUATE PROGRAM: M. TECH. (CIVIL-GEOTECHNICAL ENGINEERING)

w.e.from 2021-22 **TOTAL CREDIT 60**

SEM.	Sr. No.	SUBJECT	WORK LOAD			TOTAL	Credit	MARKS				
			Th	T	P			Th	Sess	TW	Pract	Total
Sem-I	1	Soil Engineering - 1	3	1	0	**4**	**4**	60	40	25	-	**125**
	2	Advanced Foundation Engineering	3	1	0	**4**	**4**	60	40	25	-	**125**
	3	Solid Mechanics with Finite Element Application	3	1	0	**4**	**4**	60	40	25	-	**125**
	4	Subsurface Explorations: Concept to Conclusion	2	1	0	**3**	**3**	40	-	25	-	**65**
	5	Geotech. Lab Testing	0	0	4	**4**	**2**	-	-	50	50	**100**
	6	Elective Paper: 1	2	1	0	**3**	**3**	40	-	25	0	**65**
		1. Environmental Geotechnology										
		2. Rock Mechanics										
		3. Num. Methods & Applications to Geotech. Engg.										
	7	Audit Course -1 (No Exam- Non Credit)	2	0	0	**2**	**0**	-	-	-	-	-
		TOTAL	**15**	**5**	**4**	**24**	**20**	**260**	**120**	**175**	**50**	**605**
Sem-II	1	Soil Engineering - 2	3	0	2	**5**	**4**	60	40	25	25	**150**
	2	Dynamics and Geotechnical EQ Engineering	3	1	0	**4**	**4**	60	40	25	-	**125**
	3	Soil Structure Interaction	3	1	0	**4**	**4**	60	40	25	-	**125**
	4	Elective Paper : 2	2	1	0	**3**	**3**	60	-	25	-	**85**
		1. Geophysical Explorations										
		2. Earth dam Engineering										
		3. Ground Improvement Techniques										
	5	Reinforced Earth & Geotextile	3	0	0	**3**	**3**	60	-	0	0	**60**
	6	Research Methodology	2	0	0	**2**	**2**	40	-	-	-	**40**
	7	Audit Course -2 (No Exam- Non Credit)	2	0	0	**2**	**0**	-	-	-	-	-
		TOTAL	**18**	**3**	**2**	**23**	**20**	**340**	**120**	**100**	**25**	**585**

SEM.	Sr. No.	SUBJECT	WORK LOAD			TOTAL	Credit	MARKS				
			Th	T	P			Th	Sess	TW	Pract	Total
Sem-III	1	Dissertation based on Research Work or based on Field Data Part-1	0	0	18	**18**	**9**	-	-	100	200	**300**
	2	Seminar -1	0	0	2	**2**	**1**	-	-	50	-	**50**
		TOTAL	**0**	**0**	**20**	**20**	**10**	**0**	**0**	**100**	**200**	**300**
Sem-IV	1	Dissertation based on Research Work or based on Field Data Part-2	0	0	18	**18**	**9**	-	-	100	200	**300**
	2	Seminar -2	0	0	2	**2**	**1**	-	-	50	-	**50**
		TOTAL	**0**	**0**	**20**	**20**	**10**	**0**	**0**	**150**	**200**	**350**

* Common Subject in M. Tech. - Structural Engg. Also

COURSE STRUCTURE FOR POST GRADUATE PROGRAM: M. TECH. (CIVIL-STRUCTURAL ENGINEERING)

w.e.from 2021-22 **TOTAL CREDIT 62**

SEM.	Sr. No.	SUBJECT	WORK LOAD			TOTAL	Credit	MARKS				
			Th	T	P			Th	Sess	TW	Pract	Total
Sem-I	1	Advanced Structural Analysis	3	1	0	**4**	**4**	60	40	25	-	**125**
	2*	Advanced Foundation Engineering	3	1	0	**4**	**4**	60	40	25	-	**125**
	3*	Solid Mechanics with Finite Element Application	3	1	0	**4**	**4**	60	40	25	-	**125**
	4	Design & Detailing of Structural Elements : RCC	2	0	2	**4**	**3**	40	-	25	25	**90**
	5	Design & Detailing of Structural Elements : Steel	2	0	2	**4**	**3**	40	-	25	25	**90**
	6	Elective Paper: 1	2	1	0	**3**	**3**	40	-	25	0	**65**
		1. Theory of Thin Plates & Shells										
		2. Theory of Structural Stability										
		3. Advanced Concrete Technology										
	7*	Audit Course -1 (No Exam- Non Credit)	2	0	0	**2**	**0**	-	-	-	-	-
		TOTAL	**17**	**4**	**4**	**25**	**21**	**300**	**120**	**150**	**50**	**620**
Sem-II	1	Dynamics and EQ Engineering	3	1	0	**4**	**4**	60	40	25	-	**125**
	2*	Soil Structure Interaction	3	1	0	**4**	**4**	60	40	25	-	**125**
	3	Elective Paper : 2	3	1	0	**4**	**4**	60	40	25	-	**125**
		1. Prestressed Concrete										
		2. Bridge Engineering										
		3. Num. Methods & Applications to Struct. Engg.										
		4. Structural Optimization & Reliablity										
	4	Design & Detailing of RCC Structures	2	0	3	**5**	**3.5**	40	-	25	25	**90**
	5	Design & Detailing of Steel Structures	2	0	3	**5**	**3.5**	40	-	25	25	**90**
	6*	Research Methodology	2	0	0	**2**	**2**	40	-	-	-	**40**
	7*	Audit Course -2 (No Exam- Non Credit)	2	0	0	**2**	**0**	-	-	-	-	-
		TOTAL	**15**	**3**	**6**	**24**	**21**	**300**	**120**	**125**	**50**	**595**

SEM.	Sr. No.	Subject	WORK LOAD			Total	Credit	MARKS				
			Th	T	P			Th	Sess	TW	Pract	Total
Sem-III	1	Dissertation based on Research Work or based on Field Data Part-1	0	0	18	**18**	**9**	-	-	100	200	**300**
	2	Seminar -1	0	0	2	**2**	**1**	-	-	50	-	**50**
		TOTAL	**0**	**0**	**20**	**20**	**10**	**0**	**0**	**150**	**200**	**350**
Sem-IV	1	Dissertation based on Research Work or based on Field Data Part-2	0	0	18	**18**	**9**	-	-	100	200	**300**
	2	Seminar -2	0	0	2	**2**	**1**	-	-	50	-	**50**
		TOTAL	**0**	**0**	**20**	**20**	**10**	**0**	**0**	**150**	**200**	**350**

* Common Subject in M. Tech. - Geotech. Engg. Also

DHARMSINH DESAI UNIVERSITY, NADIAD
Faculty of Technology
Minutes of Board of Studies Meeting (Online)
Department of Electronics & Communication

The above meeting is held online (11-04-2021). The recommendations of the following members are received.

1.	Dr. Purvang Dalal	Chairman, Professor & Head
2.	Dr. H. S. Mazumdar	Co-opt Member, Professor & Head R & D
3.	Dr. Nikhil Kothari	Co-opt Member, Professor
4.	Dr. Kiran Parmar	Expert, Professor, AIIE, A'bad
5.	Mr. NileshRanpura	Expert, Delivery Head, eInfochips, A'bad
6.	Mr. Brijesh Shah	Expert, AVP, Reliance Jio, Mumbai
7.	Dr. Hardip Shah	Internal Member, Professor
8.	Dr. VinayThumar	Internal Member, Associate Professor
9.	Dr. Rizwan Alad	Internal Member, Associate Professor
10.	Prof. Smith S. Thavalpill	Internal Member, Assistant Professor
11.	Prof. Manish K. Patel	Internal Member, Assistant Professor

The BoS resolutions with reference to the adoption of AICTE model curriculum are as follows.

B.Tech. (EC)

1) Programming for Problem Solving – II (Sem II) is proposed to replace the existing subject of Object Oriented Programming from Sem IV with its content.
2) As per the model curriculum, engineering Mathematics content is covered in Mathematics – I, Mathematics – II and Mathematics – III. Therefore, Mathematics IV (Sem IV) is removed.
3) A new subject Signals & Systems is introduced at Sem IV. The laboratory of this subject will cover the content of existing lab course on Applied Mathematics Laboratory (Sem IV); therefore the Applied Mathematics Laboratory (Sem IV) is removed.
4) To satisfy model curriculum requirement, 2 additional HMSS subjects Effective Technical Communication at Sem IV and Entrepreneurship and IP Strategy at Sem VII, are introduced.
5) To rename Term Project (Electronic Circuits) as Electronic Circuits Project (Sem V)
6) To rename Term Project (Microcontroller) as Microcontroller & IoT Project (Sem VI)
7) To rename Term Project (Software) as Software Project (Sem VII)

Consequently, the following shifting of subjects is proposed. This will also satisfy the prescribed criteria of hrs/week.

(a) Financial & Managerial Accounting from Sem III to Sem VI
(b) Audio Video Engineering From Sem IV to Sem VI
(c) Automated Electronics From Sem VI to V
(d) Control Theory from Sem V to Sem IV.

The course structure is revised to comply the guidelines for maximum course credits and contact hours. The same is attached as **Annexure-A**. The relevant changes in the Syllabi in the subjects will be presented in the next BoS for approval. The panel of examiner for Academic Council approval is attached as **Annexure-B**.

M.Tech. (ECS)

1) As per the model curriculum, Research Methodology and IPR is introduced at Sem I.
2) To remove Pedagogy Practice from all Semesters.
3) To offer Audit Course 1 – Pedagogy Studies at Semester III.
4) To offer Audit Course 2 – English for Research Paper Writing at Semester IV.

M.Tech. (ECS) … continue

5) To rename Term Project (Programming) as Software Project (Sem I)
6) To rename Term Project (Simulation) as System Modeling & Simulation Project (Sem II)
7) To revise syllabus of the following subjects in order to cover most of the syllabus proposed in the comparable subject as specified in the model curriculum. Also to revise subject titles accordingly.

Subject in Practice	Proposed Subject
Wireless Communication Technology (Sem I)	Wireless and Mobile Communication (Sem I)
Internetworking (Sem I)	Voice and data networks (Sem I – Elective 1)
ASIC Design (Sem I)	Analog and Digital CMOS VLSI Design (Sem I – Elective 2)
Probability Theory & Random Processes (Sem I)	Statistical Signal Analysis (Sem II)
Advanced Wireless Networks (Sem II)	Advanced Communication Networks (Sem II)
Advance Microwave Engineering (Sem II)	RF and Microwave Circuit Design (Sem II – Elective 3)

8) To revise syllabus of the Advance Wireless Communication Systems (Sem II-Elective 5)
9) To revise syllabus of Advance Digital Signal Processing (Sem I).
10) To replace existing subject of Image Processing (Sem I) with the more appropriate and advanced subject of Pattern Recognition and Machine Learning (Elective 4) to be offered at Sem II .
11) To remove Fiber Optic Communication & Sensor Systems (Sem II) and offer the same course as option under Elective 2 (Sem I) along with the other options; Analog and Digital CMOS VLSI Design and Digital Design and Verification.
12) To introduce Elective Options as follows.

Proposed Elective Option - (Semester)	Subjects
Elective 1 - (Semester I)	Voice and Data networks Remote Sensing Markov Chain and Queuing System
Elective 2 - (Semester I)	Analog and Digital CMOS VLSI Design Digital Design and Verification Fiber Optic Communication & Sensor Systems
Elective 3 - (Semester II)	RF and Microwave Circuit Design Cognitive Radio DSP Architecture
Elective 4 - (Semester II)	Pattern Recognition and Machine Learning Digital Image and Video Processing Optical Networks
Elective 5 - (Semester II)	Advance Wireless Communication Systems Satellite Communication Multispectral Signal Analysis

The proposed course structure and detailed syllabus is attached as **Annexure-C**.

Encl :

Annexure-A – B.Tech (EC) Course Structure.
Annexure-B – Panel of Examiner.
Annexure-C – M.Tech (ECS) Course Structure and Syllabi.

DHARMSINH DESAI UNIVERSITY

FACULTY OF TECHNOLOGY

COURSE STRUCTURE FOR M. TECH. (ELECTRONICS & COMM. SYSTEMS) w.e. from 2021-22

PROGRAM CREDITS 72

M.Tech. Semester-1

Subject	AICTE Course Type	Teaching Scheme			Total	Credit	Exam Scheme (Marks)				
		Lect	Tut	Prac			Th.	Int.	TW	Prac.	Total
Wireless and Mobile Communication	Core 1	3	0	2	5	4	60	40	-	25	125
Elective - I	PSE-1	3	0	2	5	4	60	40	-	25	125
Advanced Digital Signal Processing	Core 2	3	0	2	5	4	60	40	-	25	125
Elective - II	PSE-2	3	0	2	5	4	60	40	-	25	125
Research Methodology and IPR		2	0	0	2	2	40	-	-	-	40
Software Project	Lab 1	0	0	2	2	1	-	-	50	-	50
		14	**0**	**10**	**24**	**19**	**280**	**160**	**50**	**100**	**590**

M.Tech. Semester-2

Subject	AICTE Course Type	Teaching Scheme			Total	Credit	Exam Scheme (Marks)				
		Lect	Tut	Prac			Th.	Int.	TW	Prac.	Total
Elective - III	PSE-3	3	0	2	5	4	60	40	-	25	125
Elective - IV	PSE-4	3	0	2	5	4	60	40	-	25	125
Statistical Signal Analysis	Core 3	3	0	2	5	4	60	40	-	25	125
Advanced Communication Networks	Core 4	3	0	2	5	4	60	40	-	25	125
Elective - V	PSE-5	3	0	2	5	4	60	40	-	25	125
System Modelling & Simulation Project	Lab 2	0	0	2	2	1	-	-	50	-	50
		15	**0**	**12**	**27**	**21**	**300**	**200**	**50**	**125**	**675**

COURSE STRUCTURE FOR M. TECH. (ELECTRONICS & COMM. SYSTEMS) w.e. from 2021-22

M.Tech. Semester-3

Subject	AICTE Course Type	Teaching Scheme			Total	Total Credit	Exam Scheme (Marks)				
		Lect	Tut	Prac			Th.	Int.	TW	Prac	Total
Dissertation - I	Dissertation	0	**0**	**30**	**30**	**16**	-	-	125	225	**350**
Pedagogy Studies	Aud 1	2	0	0	2	**0**	-	-	50	-	**50**
		2	**0**	**30**	**32**	**16**	**0**	**0**	**175**	**225**	**400**

B.Tech. Semester-4

Subject	AICTE Course Type	Teaching Scheme			Total	Credit	Exam Scheme (Marks)				
		Lect	Tut	Prac			Th.	Int.	TW	Prac.	Total
Dissertation - II	Dissertation	0	**0**	**30**	**30**	**16**	-	-	150	300	**450**
English for Research Paper Writing	Aud 2	2	0	0	2	**0**	-	-	50	-	**50**
		2	**0**	**30**	**32**	**16**	**0**	**0**	**200**	**300**	**500**

COURSE STRUCTURE FOR M. TECH. (ELECTRONICS & COMM. SYSTEMS) w.e. from 2021-22

Program Specific Elective (PSE) Courses

Voice and Data Networks	PSE-1
Remote Sensing	
Markov Chain and Queuing System	
Analog and Digital CMOS VLSI Design	PSE-2
Digital Design and Verification	
Fiber Optic Communication & Sensor Systems	
RF and Microwave Circuit Design	PSE-3
Cognitive Radio	
DSP Architecture	
Pattern Recognition and Machine Learning	PSE-4
Digital Image and Video Processing	
Optical Networks	
Advance Wireless Communication Systems	PSE-5
Satellite Communication	
Multispectral Signal Analysis	

DHARMSINH DESAI UNIVERSITY, NADIAD

FACULTY OF TECHNOLOGY

COURSE STRUCTURE FOR B.TECH. (CE) (w.e. from 2021-22)

Proposed Teaching Scheme & credit structure for B. Tech. Computer Engineering

TOTAL CREDITS : 180

B Tech Semester 1

Subject	AICTE Code (Ref)	Teaching Scheme			Total	Credit	Examination Scheme (Marks)				
		Th	Tut	Prac			Th	Sess	TW	Prac	Total
Mathematics I	BSC102	3	1	0	4	4.0	60	40	0	-	100
Basic Electrical Engineering for ICT	ESC101	3	1	2	6	5.0	60	40	50	-	150
Programming for Problem Solving I	ESC201	4	0	3	7	5.5	60	40	50	-	150
Engineering Graphics & Design for ICT	ESC102	1	0	4	5	3.0	0	0	100	-	100
Software Workshop	ESC202	0	0	2	2	1.0	0	0	50	-	50
		11	2	11	24	18.5	180	120	250		550

B Tech Semester 2

Subject	AICTE Code (Ref)	Teaching Scheme			Total	Credit	Examination Scheme (Marks)				
		Th	Tut	Prac			Th	Sess	TW	Prac	Total
Mathematics II	BSC301	3	1	0	4	4.0	60	40	0	-	100
Programming for Problem Solving II	ESC201	4	0	3	7	5.5	60	40	50	-	150
Physics for ICT	BSC101	3	1	2	6	5.0	60	40	50	-	150
Hardware Workshop	ESC202	0	0	4	4	2.0	0	0	100	-	100
English	HSMC201	2	0	2	4	3.0	40	0	50	-	90
Environmental Sciences	MC-I	2	0	0	2	0.0	40	0	0	-	40
		14	2	11	27	19.5	260	120	250		630

B. Tech. Semester 3

Subject	AICTE Code (Ref)	Teaching Scheme			Total	Credit	Examination Scheme (Marks)				
		Th	Tut	Prac			Th	Sess	TW	Prac	Total
Data Structure and Algorithms	CS301	4	0	2	6	5.0	60	40	25	25	150
Database Management Systems	CS501	4	0	2	6	5.0	60	40	25	25	150
Design of Digital Circuit	ESC 302	4	0	2	6	5.0	60	40	25	25	150
Probabiity and Statistics	BSC201	2	0	0	2	2.0	40	0	0	0	40
Universal Human Values/ Financial and Managerial Accounting	HSMC301	3	0	0	3	3.0	60	0	0	0	60
Essence of Indian Knowledge Tradition	MC-II	2	0	0	2	0.0	0	0	0	0	0
Web Development Workshop		0	0	2	2	1.0	0	0	25	25	50
		19	0	8	27	21	280	120	100	100	600

B. Tech. Semester 4

Subject	AICTE Code (Ref)	Teaching Scheme			Total	Credit	Examination Scheme (Marks)				
		Th	Tut	Prac			Th	Sess	TW	Prac	Total
Discrete Mathematics	CS401	4	0	0	4	4.0	60	40	0	0	100
Design and Analysis of Algorithm	CS404	4	0	2	6	5.0	60	40	25	25	150
Computer System Architecture	CS402	4	0	2	6	5.0	60	40	25	25	150
Java Technology / Visual Technology	CS503	4	0	2	6	5.0	60	40	25	25	150
Software Engineering Principles and Practices	CS-S	4	0	2	6	5.0	60	40	25	25	150
Software Project	CS601	0	0	2	2	1.0	0	0	25	25	50
		20	0	10	30	25	300	200	125	125	750

B. Tech. Semester 5

Course Title	AICTE Code (Ref)	Teaching Scheme			Total	Credit	Examination Scheme (Marks)				
		Th	Tut	Prac			Th	Sess	TW	Prac	Total
Microprocessor Fundamental and Programming	CS402	4	0	2	6	5.0	60	40	25	25	150
Web Development in .NET		4	0	2	6	5.0	60	40	25	25	150
Operating Systems	CS403	4	0	2	6	5.0	60	40	25	25	150
Advanced Algorithms	CS-T	4	0	2	6	5.0	60	40	25	25	150
Advanced Technologies		4	0	2	6	5.0	60	40	25	25	150
		20	0	10	30	25	300	200	125	125	750

B. Tech. Semester 6

Subject	AICTE Code (Ref)	Teaching Scheme			Total	Credit	Examination Scheme (Marks)				
		Th	Tut	Prac			Th	Sess	TW	Prac	Total
Network & Information Security / Advanced Computer Architecture	CS-A CS-S	4	0	2	6	5.0	60	40	25	25	150
Theory of Automata and Formal Languages	CS502	4	0	0	4	4.0	60	40	0	0	100
Service Oriented Computing		4	0	2	6	5.0	60	40	25	25	150
Machine Learning	CS-D	4	0	2	6	5.0	60	40	25	25	150
Computer Networks	CS602	4	0	2	6	5.0	60	40	25	25	150
System Design Practice	CS701	0	0	2	2	1.0	0	0	25	25	50
		20	0	10	30	25	300	200	125	125	750

B. Tech. Semester 7

Subject	AICTE Code (Ref)	Teaching Scheme			Total	Credit	Examination Scheme (Marks)				
		Th	Tut	Prac			Th	Sess	TW	Prac	Total
Artificial Intelligence	CS-D	4	0	2	6	5.0	60	40	25	25	150
Elective I	CS-A	4	0	2	6	5.0	60	40	25	25	150
Elective II	CS-S	4	0	2	6	5.0	60	40	25	25	150
Elective III	CS-D	4	0	2	6	5.0	60	40	25	25	150
Compiler Construction	CS601	4	0	2	6	5.0	60	40	25	25	150
		20	0	10	30	25	300	200	125	125	750

B. Tech. Semester 8

Subject	AICTE Code (Ref)	Teaching Scheme			Total	Credit	Examination Scheme (Marks)				
		Th	Tut	Prac			Th	Sess	TW	Prac	Total
Project/Industrial Training	CS801					14.0	0	0	100	300	400
Seminar	CS802					4.0	0	0	100	0	100
Effective Technical Communication	HSMC201	1	0	4	5	3.0	0	0	100	0	100
		1	0	4	5	21	0	0	300	300	600

Elective I, II and III in 7th semester are offered from the list of the following subjects

(PEC : Professional Elective Course, CS : Computer Science, S : System, A: Applications D: Data Science)

Coures Name	Category
Cloud computing and IoT	PEC : CS-S
Image Processing	PEC : CS-A
Big Data Analytics	PEC : CS-D
Embedded Systems	PEC : CS-S
Computer Graphics	PEC : CS-A
Advanced Computer Network	PEC : CS-S
Knowledge Discovery	PEC: CS-D
Mobile Application Development	
Distributed Operating Systems	PEC : CS-S

Credit Break down : B. Tech. Computer Engineering

Course Category	CategoryName	Credit in the syllabus	Credit as per AICTE Model curriculum	Comment
BSC	Basic Science Course	19	24	Including Discrete maths
ESC	Engineering Science Course	27	29	
HSMC	Humanity & Social Science including Management	12	12	
MC	Mandatory Course	0	0	
PCC	Professional Core Courses	49	49	

B.Tech. Chemical Engineering Structure 2021-2022

Department of Chemical Engineering, FoT, DDU, Nadiad

B. TECH. SEM 1 & 2 : COURSE STRUCTURE FOR NON ICT

Sem.	Subject Code	Course Title	AICTE Code	Teaching Scheme					Examination Scheme			
				Th	Tut	Prac	Total	Credits	Th Ext	Th Int	TW + Viva	Total
I	BSC101	Mathematics -I	BS101	3	1	0	4	4.0	60	40	0	100
	GES102	Thermodynamics-I	ESC- GES102	3	0	2	5	4.0	60	40	50	150
	ESC103a	Basic Electrical Engineering	ESC- GES103a	3	0	2	5	4.0	60	40	50	150
	ESC105a	Engineering Mechanics	ESC- GES105a	3	1	0	4	4.0	60	40	0	100
	ESC103	Computer Programming	ESC- GES103	2	0	3	5	3.5	40	0	50	90
	ESC106a	Workshop Practice -1	ESC- GES106a	0	0	2	2	1.0	0	0	50	50
	MCXXX	Environmental Studies	MC	2	0	0	2	0.0	40	0	0	40
				16	**2**	**9**	**27**	**20.5**	**320**	**160**	**200**	**680**
II	BSC104	Mathematics-II	BS104	3	1	0	4	4.0	60	40	0	100
	ESC101	Engineering Graphics	ESC- GES101	3	0	3	6	4.5	60	40	50	150
	BSC103	Chemistry	BS103	3	0	0	3	3.0	60	0	0	60
	ESC103b	Basic Electronics	ESC- GES103b	3	0	2	5	4.0	60	40	50	150
	ESC105b	Mechanics of Solid	ESC- GES105b	3	0	2	5	4.0	60	40	50	150
	ESC106b	Workshop Practice - 2	ESC- GES106b	0	0	3	3	1.5	0	0	50	50
				15	**1**	**10**	**26**	**21**	**300**	**160**	**200**	**660**

B. TECH. SEM 3 & 4 : COURSE STRUCTURE FOR CHEMICAL ENGINEERING

Sem.	Subject Code	Course Title	AICTE Code	Teaching Scheme					Examination Scheme			
				Th	Tut	Prac	Total	Credits	Th Ext	Th Int	TW + Viva	Total
III	PCCXXX	Introduction to Chemical Engineering	PCC-CSXXX	2	0	2	4	3.0	40	0	50	90
	BS107	Chemistry-II	BS107	3	0	2	5	4.0	60	40	50	150
	ESC107	Material Science	ESC-GEC107	3	1	0	4	4.0	60	40	0	100
	PCC113	General Chemical Technology	PCC-CS113	3	0	2	5	4.0	60	40	50	150
	PCC101	Material and Energy Balance Computations	PCC-CS101	3	1	0	4	4.0	60	40	0	100
	BS102	Physics	BS102	2	0	2	4	3	40	0	50	90
	HS101	HASS1 (Engineering Economics and Financial Managemen	HSMC- HS101	3	0	0	3	3.0	50	0	0	50
				19	**2**	**8**	**29**	**25**	**370**	**160**	**200**	**730**
IV	PCC104	Heat Transfer	PCC-CS104	3	0	3	6	4.5	60	40	50	150
	PCC105	Mass Transfer - I	PCC-CS105	3	1	0	4	4.0	60	40	0	100
	PCC106	Fluid Mechanics	PCC-CS106	3	0	3	6	4.5	60	40	50	150
	PCC111	Particles and Fluid Particle Proceesing	PCC-CS111	3	0	2	5	4.0	60	40	50	150
	PCC107	Numerical Techniques in Chemical Eng.	PCC-CS107	2	0	2	4	3.0	40	0	50	90
	PCC103	Chemical Engineering Thermodynamics -II	PCC-CS103	3	0	0	3	3.0	60	0	0	60
	HS102	HASS2 (pofessional Communication 1)	HSMC- HS102	3	0	0	3	3.0	50	0	0	50
				20	**1**	**10**	**31**	**26**	**390**	**160**	**200**	**750**

B. TECH. SEM 5 & 6 : COURSE STRUCTURE FOR CHEMICAL ENGINEERING

Sem.	Subject Code	Course Title	AICTE Code	Teaching Scheme					Examination Scheme			
				Th	Tut	Prac	Total	Credits	Th Ext	Th Int	TW + Viva	Total
V	PCC108	Chemical Reaction Engineering- I	PCC-CS108	3	0	3	6	4.5	60	40	50	150
	PCC109	Mass Transfer - II	PCC-CS109	3	0	3	6	4.5	60	40	50	150
	PEC101	Core Elective - I (Renewable Energy)	PEC-CSEL101	3	1	0	4	4.0	60	40	0	100
	OEC101	Open Elective - I	OEC-OL101	3	0	0	3	3.0	60	0	0	60
	PCC117	Instrumentation and Process Control	PCC-CS117	3	1	3	7	5.5	60	40	50	150
	HS103	HASS3 (Professional Communication 2)	HSMC- HS103	3	0	0	3	3.0	50	0	0	50
				18	**2**	**9**	**29**	**24.5**	**350**	**160**	**150**	**660**
VI	PCC112	Chemical Reaction Engineering-II	PCC-CS112	3	0	3	6	4.5	60	40	50	150
	PCCYYY	Chemical System Modeling	PCC-CSYYY	3	0	0	3	3.0	60	40	0	100
	PCC102	Transport Phenomena	PCC-CS102	3	0	3	6	4.5	60	40	50	150
	PCCZZZ	Process Equipment Design and Drawing	PCC-CSZZZ	3	0	3	6	4.5	60	40	50	150
	PEC102	Core Elective - 2 (Environmental and Pollution control)	PEC-CSEL102	3	0	0	3	3.0	60	0	0	60
	OEC102	Open Elective-2	OEC-OL102	3	0	0	3	3.0	60	0	0	60
	HS104	HASS4 (Financial Management)	HSMC- HS104	3	0	0	3	3.0	50	0	0	50
				21	**0**	**9**	**30**	**25.5**	**360**	**160**	**150**	**670**

B. TECH. SEM 7 & 8 : COURSE STRUCTURE FOR CHEMICAL ENGINEERING

Sem.	Subject Code	Course Title	AICTE Code	Teaching Scheme					Examination Scheme			
				Th	Tut	Prac	Total	Credits	Th Ext	Th Int	TW + Viva	Total
VII	PCC116	Design and Simulation Lab	PCC-CS116	2	0	4	6	4.0	60	40	50	150
	PCC113	Process Technology and Economics	PCC-CS113	3	1	0	4	4.0	60	40	50	150
	PEC103	Core Elective-III (Computer Aided Design)	PEC-CSEL103	3	0	3	6	4.5	60	40	0	100
	PEC104	Core Elective-IV (porcess Safety)	PEC-CSEL104	3	0	0	3	3.0	60	0	0	60
	OEC103	Open Elective-III	OEC-OL103	3	1	0	4	4.0	60	40	50	150
	OEC104	Open Elective-IV	OEC-OL104	3	0	0	3	3.0	50	0	0	50
				17	**2**	**7**	**26**	**22.5**	**350**	**160**	**150**	**660**
VIII	PCC201	Industry Internship Project		12	0	0	12	12.0	300	100	50	450
	PCC202	Seminar		3	0	0	3	3.0	0	100	0	100
				15	**0**	**0**	**15**	**15**	**300**	**200**	**50**	**550**
										Total Credit		180

DHARMSINH DESAI UNIVERSITY

FACULTY OF TECHNOLOGY

COURSE STRUCTURE FOR B. TECH. (CIVIL ENGINEERING) w.e. from 2021-22

PROGRAM CREDITS **174.5**

B.Tech. Semester-1

Subject	AICTE Code Ref.	Teaching Scheme			Total	Credit	Exam Scheme (Marks)				
		Lect	Tut	Prac			Th.	Int.	TW	Prac.	Total
Mathematics-I	BSC103	3	1	0	4	**4**	60	40	-	-	100
Thermodynamics	ESC209	3	0	2	5	**4**	60	40	50	-	150
Elements of Electrical Engineering	ESC101	3	0	2	5	**4**	60	40	50	-	150
Mechanics	ESC205	3	1	0	4	**4**	60	40	-	-	100
Computer Programming	ESC103	2	0	3	5	**3.5**	40	-	50	-	90
Environmental Studies	MC-II	2	0	0	2	**0**	40	-	0	-	40
Workshop Practice-I	ESC104a	0	0	2	2	**1**	-	-	50	-	50
		16	**2**	**9**	**27**	**20.5**	**320**	**160**	**200**	**0**	**680**

B.Tech. Semester-2

Subject	AICTE Code Ref.	Teaching Scheme			Total	Credit	Exam Scheme (Marks)				
		Lect	Tut	Prac			Th.	Int.	TW	Prac.	Total
Mathematics-II	BSC104	3	1	0	4	**4**	60	40	-	-	**100**
Engineering Graphics	ESC102	3	0	3	6	**4.5**	60	40	50	-	**150**
Basic Electronics	ESC201	3	0	2	5	**4**	60	40	50	-	**150**
Mechanics of Solids	BSC101	3	0	2	5	**4**	60	40	50	-	**150**
Chemistry	BSC102	3	0	0	3	**3**	60	-	-	-	**60**
Workshop Practice-II	ESC104b	0	0	3	3	**1.5**	-	-	50	-	**50**
		15	**1**	**10**	**26**	**21**	**300**	**160**	**200**	**0**	**660**

COURSE STRUCTURE FOR B. TECH. (CIVIL ENGINEERING) w.e. from 2021-22

B.Tech. Semester-3

Subject	AICTE Code	Teaching Scheme			Total	Total Credit	Exam Scheme (Marks)				
		Lect	Tut	Prac			Theory	Session	TW	Prac	Total
Mathematics-III	BSC201a	3	1	0	4	**4**	60	40	-	-	**100**
Surveying-I	PCC-CE206	3	0	2	5	**4**	60	40	25	25	**150**
Fluid Mechanics-I	PCC-CE204	4	0	2	6	**5**	60	40	25	25	**150**
Introduction to Civil Engineering (CT-1)	HSMC251	3	0	2	5	**4**	60	40	25	25	**150**
Engineering Materials	PCC-CE207	3	0	0	3	**3**	60	-	-	-	**60**
English	HSMC101	2	0	2	4	**3**	40	-	50	-	**90**
		18	**1**	**8**	**27**	23	**340**	**160**	**125**	**75**	**700**

B.Tech. Semester-4

Subject	AICTE Code Ref.	Teaching Scheme			Total	Credit	Exam Scheme (Marks)				
		Lect	Tut	Prac			Th.	Int.	TW	Prac.	Total
Mathematics-IV	BSC201b	3	1	0	4	**4**	60	40	-	-	**100**
Structural Analysis-I	PCC-CE205	3	1	0	4	**4**	60	40	25	-	**125**
Fluid Mechanics-II	PCC-CE302	3	0	2	5	**4**	60	40	25	25	**150**
Civil Engineering Drawing (Planning)	ESC203	3	0	2	5	**4**	60	40	25	25	**150**
Basic Transportation Engineering	PCC-CE307a	3	0	0	3	**3**	60	-	-	-	**60**
Effective Technical Comm.	HSMC201	3	0	0	3	**3**	60	-	-	-	**60**
		18	**2**	**4**	**24**	22	**360**	**160**	**75**	**50**	**645**

COURSE STRUCTURE FOR B. TECH. (CIVIL ENGINEERING) w.e. from 2021-22

B.Tech. Semester-5

Subject	AICTE Code	Teaching Scheme			Total	Total Credit	Exam Scheme (Marks)				
		Lect	Tut	Prac			Theory	Session	TW	Prac	Total
Geotech. Engineering-I	PCC-CE202	3	0	2	5	**4**	60	40	25	25	**150**
Structural Analysis-II	PCC-CE301	3	1	0	4	**4**	60	40	25	-	**125**
Concrete Technology	PCC	3	0	2	5	**4**	60	40	25	25	**150**
Design of Structures-I (Steel)	PCC-CE303a	3	1	0	4	**4**	60	40	25	-	**125**
Water Resources Engineering	PCC-CE305	3	0	0	3	**3**	60	-	-	-	**60**
Open Elective-1	OEEL-302	3	0	0	3	**3**	60	-	-	-	**60**
		18	**2**	**4**	**24**	22	**360**	**160**	**100**	**50**	**670**

B.Tech. Semester-6

Subject	AICTE Code Ref.	Teaching Scheme			Total	Credit	Exam Scheme (Marks)				
		Lect	Tut	Prac			Th.	Int.	TW	Prac.	Total
Environmental Engineering	PCC-CE306	4	0	2	6	**5**	60	40	25	25	**150**
Geotech. Engineering-II	PCC-CE202	3	0	2	5	**4**	60	40	25	25	**150**
Design of Structures-II (RCC)	PCC-CE303b	3	1	0	4	**4**	60	40	25	-	**125**
Program Elective-1	PEC-CEEL302	3	1	0	4	**4**	60	40	25	-	**125**
Program Elective-2	PEC-CEEL304	3	0	0	3	**3**	60	-	-	-	**60**
Financial & Managerial Accounting	HSMC	3	0	0	3	**3**	60	-	-	-	**60**
		19	**2**	**4**	**25**	23	**360**	**160**	**100**	**50**	**670**

COURSE STRUCTURE FOR B. TECH. (CIVIL ENGINEERING) w.e. from 2021-22

B.Tech. Semester-7

Subject	AICTE Code Ref.	Teaching Scheme			Total	Credit	Exam Scheme (Marks)				
		Lect	Tut	Prac			Th.	Int.	TW	Prac.	Total
Professional Practice & Valuation	PCC-CE309	3	0	2	5	**4**	60	40	25	25	**150**
Highway Engineering	PCC-CE307b	3	0	2	5	**4**	60	40	25	25	**150**
Contruction Engineering & Management	PCC-CE308	3	1	0	4	**4**	60	40	25	-	**125**
Program Elective-3	PEC-CEEL401	3	1	0	4	**4**	60	40	25	0	**125**
Open Elective-2	OEEL-401a	3	0	0	3	**3**	60	-	-	-	**60**
Open Elective-3	OEEL-401b	3	0	0	3	**3**	60	-	-	-	**60**
		18	**2**	**4**	**24**	**22**	**360**	**160**	**100**	**50**	670

B.Tech. Semester-8

Subject	AICTE Code Ref.	Teaching Scheme			Total	Credit	Exam Scheme (Marks)				
		Lect	Tut	Prac			Th.	Int.	TW	Prac.	Total
Industrial Training Project (8 weeks)	PROJ-CE402		**6**	**12**	**18**	**12**	-	-	100	300	**400**
Program Elective-4	PEC-CSEL402a	1		4	5	**3**	-	-	50	50	**100**
Program Elective-5	PEC-CSEL402b	1		4	5	**3**	-	-	50	50	**100**
Program Elective-6	PEC-CSEL402c	1		4	5	**3**	-	-	50	50	**100**
		3	**6**	**24**	**33**	**21**	**0**	**0**	**250**	**450**	**700**

COURSE STRUCTURE FOR B. TECH. (CIVIL ENGINEERING) w.e. from 2021-22

List of Program Elective Courses

Advanced Surveying	PEC-1
Advanced Structural Analysis	
Prestressed Concrete	
Irrigation Engineering	PEC-2
Construction Technology-II	
Building Repairs and rehabilitation	
Advanced Foundation Engineering	PEC-3
Earthquake Engineering	
Advanced Concrete Technology	
Design of Hydraulic Structures	PEC-4
Environment Design Project	
Subsurface Exploration & Testing Practice	
Project Planning & Control	PEC-5
Design of Special Structures	
Numerical Modeling in Geotech. Engg.	
Urban Transportation Planning	PEC-6
Finite Element Method	
Building Information Modelling	

CREDIT - Summary

CATEGORY	BREAKUP OF CREDITS	
	AICTE	DDU
HSMC	12	13
BSC	26	23
ESC	29	29.5
PCC	47	68
PEC	23	20
OEL	11	9
PROJ	12	12
M.C.	Non Credit	(1 COURSE)
TOTAL	**160**	**174.5**

DHARMSINH DESAI UNIVERSITY
FACULTY OF TECHNOLOGY

COURSE STRUCTURE FOR B. TECH. (ELECTRONICS & COMM. ENGINEERING) w.e. from 2021-22

PROGRAM CREDITS 181

B.Tech. Semester-1

Subject	AICTE Code Ref.	Teaching Scheme			Total	Credit	Exam Scheme (Marks)				
		Lect	Tut	Prac			Th.	Int.	TW	Prac.	Total
Mathematics-I	BSC102	3	1	0	4	**4**	60	40	-	-	100
Basic Electrical Engineering	ESC101	3	1	2	6	**5**	60	40	50	-	150
Programming for Problem Solving I	ESC201	4	0	3	7	**5.5**	60	40	50	-	150
Engineering Graphics & Design	ESC102	1	0	4	5	**3**	-	-	100	-	100
Software Workshop	ESC202	0	0	2	2	**1**	-	-	50	-	50
		11	**2**	**11**	**24**	**18.5**	**180**	**120**	**250**	**0**	**550**

B.Tech. Semester-2

Subject	AICTE Code Ref.	Teaching Scheme			Total	Credit	Exam Scheme (Marks)				
		Lect	Tut	Prac			Th.	Int.	TW	Prac.	Total
Mathematics-II	BSC301	3	1	0	4	**4**	60	40	-	-	**100**
Programming for Problem Solving II	ESC201	4	0	3	7	**5.5**	60	40	50	-	**150**
Physics	BSC101	3	1	2	6	**5**	60	40	50	-	**150**
Software Workshop	ESC202	0	0	4	4	**2**	-	-	100	-	**100**
English	HSMC201	2	0	2	4	**3**	40	-	50	-	**90**
Environmental Studies	MC-II	2	0	0	2	**0**	40	-	-	-	**40**
		14	**2**	**11**	**27**	**19.5**	**260**	**120**	**250**	**0**	**630**

COURSE STRUCTURE FOR B. TECH. (ELECTRONICS & COMM. ENGINEERING) w.e. from 2021-22

B.Tech. Semester-3

Subject	AICTE Code	Teaching Scheme			Total	Total Credit	Exam Scheme (Marks)				
		Lect	Tut	Prac			Th.	Int.	TW	Prac	Total
Mathematics-III	BSC106a	3	1	0	4	**4**	60	40	-	-	**100**
Linear Electronics - I	PCC-EC01	4	0	2	6	**5**	60	40	25	25	**150**
Electronic Instrumentation	PCC-EC22	3	1	2	6	**5**	60	40	25	25	**150**
Network Analysis	PCC-EC06	3	1	2	6	**5**	60	40	25	25	**150**
Digital Electronics	PCC-EC03	3	1	2	6	**5**	60	40	25	25	**150**
Mathematical Computing Laboratory	BSC106b	0	0	2	2	**1**	-	-	25	25	**50**
		16	**4**	**10**	**30**	**25**	**300**	**200**	**125**	**125**	**750**

B.Tech. Semester-4

Subject	AICTE Code Ref.	Teaching Scheme			Total	Credit	Exam Scheme (Marks)				
		Lect	Tut	Prac			Th.	Int.	TW	Prac.	Total
Signal & Systems	PCC-EC05	2	1	2	5	**4**	60	40	25	25	**150**
Linear Electronics - II	PCC-EC09	4	0	2	6	**5**	60	40	25	25	**150**
Control Theory	PCC-EC19	3	1	2	6	**5**	60	40	25	25	**150**
Electrical Machines & Power	ESCXXX	3	0	2	5	**4**	60	40	25	25	**150**
Program Elective - 1	PEC-ECEL13	3	1	2	6	**5**	60	40	25	25	**150**
Effective Technical Comm.	HSMC201	2	1	0	3	**3**	60	-	-	-	**60**
		17	**4**	**10**	**31**	**26**	**360**	**200**	**125**	**125**	**810**

COURSE STRUCTURE FOR B. TECH. (ELECTRONICS & COMM. ENGINEERING) w.e. from 2021-22

B.Tech. Semester-5

Subject	AICTE Code	Teaching Scheme			Total	Total Credit	Exam Scheme (Marks)				
		Lect	Tut	Prac			Theory	Session	TW	Prac	Total
Microcontroller Applications	PCC-EC11	4	0	2	6	**5**	60	40	25	25	**150**
Electronic Communication	PCC-EC07a	3	0	2	5	**4**	60	40	25	25	**150**
Electromagnetic Fields	PCC-EC13	3	1	0	4	**4**	60	40	50	-	**150**
Program Elective - 2	PEC-ECEL14	4	0	2	6	**5**	60	40	25	25	**150**
Open Elective - 1	OEL-ECELXX	4	0	2	6	**5**	60	40	25	25	**150**
Electronic Circuits Project	PCC-EC23a	0	0	2	2	**1**	-	-	50	-	**50**
		18	**1**	**10**	**29**	**24**	**300**	**200**	**200**	**100**	**800**

B.Tech. Semester-6

Subject	AICTE Code Ref.	Teaching Scheme			Total	Credit	Exam Scheme (Marks)				
		Lect	Tut	Prac			Th.	Int.	TW	Prac.	Total
Open Elective - 2	OEL-EC15	4	0	2	6	**5**	60	40	25	25	**150**
Communication Systems	PCC-EC07b	3	1	2	6	**5**	60	40	25	25	**150**
Program Elective - 3	PEC-ECEL07	3	1	2	6	**5**	60	40	25	25	**150**
Digital Signal Processing	PCC-EC17	3	1	2	6	**5**	60	40	25	25	**150**
Audio Video Engineering	PCC-ECXX	0	0	2	2	**1**	-	-	25	25	**50**
Microcontroller and IoT Project	PCC-EC23b	0	0	2	2	**1**	-	-	50	-	**50**
Financial Management & Accounting	HSMCXX	2	0	0	2	**2**	60	-	-	-	**60**
		15	**3**	**12**	**30**	**24**	**300**	**160**	**175**	**125**	**760**

COURSE STRUCTURE FOR B. TECH. (ELECTRONICS & COMM. ENGINEERING) w.e. from 2021-22

B.Tech. Semester-7

Subject	AICTE Code Ref.	Teaching Scheme			Total	Credit	Exam Scheme (Marks)				
		Lect	Tut	Prac			Th.	Int.	TW	Prac.	Total
Data & Computer Communications	PCC-EC20	4	0	2	6	**5**	60	40	25	25	**150**
Open Elective - 3	OEL-ECEL10	4	0	2	6	**5**	60	40	25	25	**150**
Program Elective - 4	PEC-ECEL09	3	1	0	4	**4**	60	40	-	-	**100**
Program Elective - 5	PEC-ECEL03	3	1	0	4	**4**	60	40	-	-	**100**
Program Elective - 6	PEC-ECEL18	4	0	2	6	**5**	60	40	25	25	**150**
Software Project	PCC-EC23c	0	0	2	2	**1**	-	-	50	-	**50**
Entrepreneurship and IP Strategy	HSMCXX	2	0	0	2	**2**	60	-	-	-	**60**
		20	**2**	**8**	**30**	**26**	**360**	**200**	**125**	**75**	760

B.Tech. Semester-8

Subject	AICTE Code Ref.	Teaching Scheme			Total	Credit	Exam Scheme (Marks)				
		Lect	Tut	Prac			Th.	Int.	TW	Prac.	Total
Industrial Training Project	PROJ-ECP2a	0	**0**	**28**	**28**	**14**	-	-	100	300	**400**
Seminar	PROJ-ECP2b	0	4	0	4	**4**	-	-	50	50	**100**
		0	**4**	**28**	**32**	**18**	**0**	**0**	**150**	**350**	**500**

COURSE STRUCTURE FOR B. TECH. (ELECTRONICS & COMM. ENGINEERING) w.e. from 2021-22

List of Program Elective Courses

CMOS VLSI Design	PEC-1
Introduction to MEMS	
Nano Electronics	
Power Electronics	PEC-2
Scientific Computing	
Bio-Medical Electronics	
Microwave & Antennas	PEC-3
Microwave Theory and Techniques	
Satellite Communication	
Wireless Communication	PEC-4
Radar and Navigation	
Fiber Optic Communication	
Coding Theory & Compression Techniques	PEC-5
Error correcting codes	
High Speed Electronics	
Embedded Systems	PEC-6
RF Circuit Design	
Adaptive Signal Processing	

List of Open Elective Courses

Automated Electronics	OEL-1
Power Plant Automation	
Smart Instruments	
Advanced Microprocessors	OEL-2
Computer Organization & Architecture	
Robotics Engineering	
Image Processing	OEL-3
Wireless Sensor Networks	
Digital Switching Systems	

CREDIT - Summary

CATEGORY	BREAKUP OF CREDITS	
	AICTE	DDU
HSMC	12	10
BSC	25	18
ESC	24	26
PCC	48	66
PEC	18	28
OEL	18	15
PROJ	15	18
M.C.	Non Credit	(1 COURSE)
TOTAL	**160**	**181**

DHARMSINH DESAI UNIVERSITY, NADIAD
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COURSE STRUCTURE FOR B.TECH. (IC) SEMESTER- I & II (w.e. from 2021-22)

Sem.	Course Title	Subject Category	AICTE Code	Parent Dept.	Teaching Scheme					Examination Scheme			
					Th	Tut	Prac	Total	Credits	Th Ext	Th Int	TW	Total
I	Mathematics -I	Basic Sc.- Core	BSC103	Maths	3	1	0	4	4.0	60	40	0	100
	Thermodynamics	Engg Sc. - Core	ESC 209	Mech	3	0	2	5	4.0	60	40	50	150
	Mechanics	Basic Sc.- Core	BSC101	Civil	3	1	0	4	4.0	60	40	0	100
	Elements of Electrical Engineering	Engg Sc. - Core	ESC101	EC	3	0	2	5	4.0	60	40	50	150
	Computer Programming	Engg Sc. - Core	ESC-103	*Dept	2	0	3	5	3.5	40	0	50	90
	Workshop Practice -1	Engg Sc. - Core	ESC104a	Mech	0	0	2	2	1.0	0	0	50	50
	Environment Studies	Mandatory Course	MC-II	CH	2	0	0	2	0.0	40	0	0	40
					16	**2**	**9**	**27**	**20.5**	**320**	**160**	**200**	**680**
II	Mathematics -II	Basic Sc.- Core	BSC104	Maths	3	1	0	4	4.0	60	40	0	100
	Engineering Graphics	Engg Sc. - Core	ESC102	Mech	3	0	3	6	4.5	60	40	50	150
	Chemistry	Basic Sc.- Core	BSC102	Chem	3	0	0	3	3.0	60	0	0	60
	Basic Electronics	Engg Sc. - Core	ESC201	EC	3	0	2	5	4.0	60	40	50	150
	Mechanics of Solids	Engg Sc. - Core	ESC	Civil	3	0	2	5	4.0	60	40	50	150
	Electronic Workshop	Engg Sc. - Core	ESC	Dept	0	0	3	3	1.5	0	0	50	50
					15	**1**	**10**	**26**	**21**	**300**	**160**	**200**	**660**

DHARMSINH DESAI UNIVERSITY, NADIAD
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COURSE STRUCTURE FOR B.TECH. (IC) SEMESTER- III & IV (w.e. from 2021-22)

Sem.	Course Title	Subject Category	AICTE Code	Parent Dept.	Teaching Scheme					Examination Scheme				
					Th	Tut	Prac	Total	Credits	Th Ext	Th Int	TW	PR	Total
III	Mathematics -III	Basic Sc.- Core	BSC	Maths	3	0	0	3	3.0	60	0	0	0	60
	Linear Electronics I	Open Subject	OS	EC	4	0	2	6	5.0	60	40	25	25	150
	Electronic Measurement	Open Subject	OS	EC	2	1	2	5	4.0	60	40	25	25	150
	Network Analysis	Open Subject	OS	EC	3	1	2	6	5.0	60	40	25	25	150
	Digital Electronics	Open Subject	OS	EC	3	1	2	6	5.0	60	40	25	25	150
	English	HSMC	HSMC	HM	2	0	2	4	3.0	40	0	0	50	90
					17	**3**	**10**	**30**	**25.0**	**340**	**160**	**100**	**150**	**750**
IV	Control Theory	PCC	PCC	IC	2	1	0	3	3.0	60	0	0	0	60
	Linear Electronics II	Open Subject	OS	EC	4	0	2	6	5.0	60	40	25	25	150
	Power Electronics	PCC	PCC	IC	3	0	2	5	4.0	60	40	25	25	150
	Electrical Machines and Power	Open Subject	OS	EC	3	0	2	5	4.0	60	40	25	25	150
	Control System Components	PCC	PCC	IC	2	1	0	3	3.0	60	0	0	0	60
	Effective Communication	HSMC	HSMC	HM	2	0	2	4	3.0	40	0	0	50	90
					16	**2**	**8**	**26**	**22**	**340**	**120**	**75**	**125**	**660**

DHARMSINH DESAI UNIVERSITY, NADIAD
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COURSE STRUCTURE FOR B.TECH. (IC) SEMESTER- V & VI (w.e. from 2021-22)

Sem.	Course Title	Subject Category	AICTE Code	Parent Dept.	Teaching Scheme					Examination Scheme				
					Th	Tut	Prac	Total	Credits	Th Ext	Th Int	TW	PR	Total
V	Microcontroller Fundamentals	PCC	PCC	IC	3	0	2	5	4.0	60	40	25	25	150
	Instrumentation Software Tools **(Program Elective I)**	PEC	PEC	IC	2	0	3	5	3.5	40	0	25	25	90
	Modeling, Simulation and Evolutionary Techniques **(Program Elective I)**	PEC	PEC	IC	2	0	3	5	3.5	40	0	25	25	90
	Measurement Techniques	PCC	PCC	IC	3	0	2	5	4.0	60	40	25	25	150
	Process Measurement	PCC	PCC	IC	3	0	2	5	4.0	60	40	25	25	150
	Communication Systems **(Program Elective II)**	PEC	PEC	IC	3	0	2	5	4.0	60	40	25	25	150
	Cyber Physical Systems **(Program Elective II)**	PEC	PEC	IC	3	0	2	5	4.0	60	40	25	25	150
	Financial and Managerial Accounting	HSMC	HSMC	HM	2	0	0	2	2.0	40	0	0	0	40
					16	**0**	**11**	**25**	**21.5**	**320**	**160**	**125**	**125**	**730**
VI	Microcontroller Applications **(Program Elective III)**	PEC	PEC	IC	3	0	2	5	4.0	60	40	25	25	150
	Embedded Systems **(Program Elective III)**	PEC	PEC	IC	3	0	2	5	4.0	60	40	25	25	150
	Instrumentation Systems	PCC	PCC	IC	3	0	2	5	4.0	60	40	25	25	150
	Power Plant Automation **(Program Elective IV)**	PEC	PEC	IC	2	1	0	3	3.0	60	0	0	0	60
	Analytical Instrumentation **(Program Elective IV)**	PEC	PEC	IC	2	1	0	3	3.0	60	0	0	0	60
	Process Instrumentation and Control	PCC	PCC	IC	3	0	2	5	4.0	60	40	25	25	150
	Automation Systems Integration	PCC	PCC	IC	3	0	2	5	4.0	60	40	25	25	150
	Engineering Economics and Principles of Management	HSMC	HSMC	HM	2	0	0	2	2.0	40	0	0	0	40
					16	**2**	**8**	**25**	**21**	**340**	**160**	**100**	**100**	**700**

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COURSE STRUCTURE FOR B.TECH. (IC) SEMESTER- VII & VIII (w.e. from 2021-22)

Sem.	Course Title	Subject Category	AICTE Code	Parent Dept.	Teaching Scheme					Examination Scheme				
					Th	Tut	Prac	Total	Credits	Th Ext	Th Int	TW	PR	Total
VII	Biomedical Instrumentation	PCC	PCC	IC	3	0	2	5	4.0	60	40	25	25	150
	Digital Signal Processing **(Program Elective V)**	PEC	PEC	IC	2	1	2	5	4.0	60	40	25	25	150
	Industrial Electronics & Drives **(Program Elective V)**	PEC	PEC	IC	2	1	2	5	4.0	60	40	25	25	150
	Advanced Control Theory & Design	PCC	PCC	IC	2	1	0	3	3.0	60	0	0	0	60
	Process Control	PCC	PCC	IC	3	0	2	5	4.0	60	40	25	25	150
	Robotics Engineering	PCC	PCC	IC	2	1	2	5	4.0	60	40	25	25	150
	Industrial Exposure & Practice	PROJ	PROJ	IC	0	0	6	6	3.0	0	0	50	50	100
	Universal Human Values	HSMC	HSMC	HM	3	0	0	3	3.0	60	0	0	0	60
					15	**3**	**14**	**32**	**25**	**360**	**160**	**150**	**150**	**820**
VIII	Project and Industrial Training	PROJ	PROJ	IC	0	0	24	24	12.0	0	0	100	300	400
	Seminar	PROJ	PROJ	IC	0	0	6	6	3.0	0	0	100	0	100
					0	**0**	**30**	**30**	**15**	**0**	**0**	**200**	**300**	**500**

PROGRAM CREDITS 171

DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY

COURSE STRUCTURE FOR B.TECH. (IC) (w.e. from 2021-22)

CREDIT – Summary

CATEGORY	BREKUP OF CREDITS	
	AICTE	DDU (IC)
HSMC	12	13
BSC	25	18
ESC	24	26.5
PCC	48	49
PEC	18	18.5
OEL	18	28
PROJ	15	18
M.C.	Non Credit	(01 COURSE)
TOTAL	**160**	**171**

DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY

Course Code	Definition
BSC	Basic Science Courses
ESC	Engineering Science Courses
HSMC	Humanities and Social Sciences including Management courses
PCC	Professional core courses
PEC	Professional Elective courses
OS	Open Subject
PROJ	Project
MC	Mandatory Course

B. TECH. SEM 1 & 2 (INFORMATION TECHNOLOGY): COURSE STRUCTURE

Sem.	Course Title	Subject Category	AICTE Code	Parent Dept.	Teaching Scheme					Examination Scheme			
					Th	Tut	Prac	Total	Credits	Th Ext	Th Int	TW+Viva	Total
I	Mathematics – I	Basic Sc.- Core	BSC102	Maths	3	1	0	4	4.0	60	40	0	100
	Basic Electrical Engineering	Engg Sc. - Core	ESC101	EC	3	1	2	6	5.0	60	40	50	150
	Programming for Problem Solving I	Engg Sc. - Core	ESC201	Dept	4	0	3	7	5.5	60	40	50	150
	Engineering Graphics & Design	Engg Sc. - Core	ESC102	Mech	1	0	4	5	3.0	0	0	100	100
	ICT Workshop - I	Engg Sc. - Core	ESC202	Dept	0	0	2	2	1.0	0	0	50	50
					11	**2**	**11**	**24**	**18.5**	**180**	**120**	**250**	**550**
II	Mathematics - II	Basic Sc.- Core	BSC301	Maths	3	1	0	4	4.0	60	40	0	100
	Physics	Basic Sc.- Core	BSC101	Dept	3	1	2	6	5.0	60	40	50	150
	Programming for Problem Solving II	Engg Sc. - Core	ESC201	Dept	4	0	3	7	5.5	60	40	50	150
	ICT Workshop - II	Engg Sc. - Core	ESC202	Dept	0	0	4	4	2.0	0	0	100	100
	English	Humanities & MS	HSMC201	English	2	0	2	4	3.0	40	0	50	90
	Environmental Studies	Mandatory Course	MC-II	Chem	2	0	0	2	0.0	40	0	0	40
					14	**2**	**11**	**27**	**19.5**	**260**	**120**	**250**	**630**

EXTERNAL EXAM MARKS/DURATION :

THEORY 3 HRS OR MORE 60 MARKS WITH 3 HRS DURATION

THEORY 2 HRS 40 MARKS WITH 2 HRS DURATION

THEORY 1 HR : No Theory Exam

BSC : Basic Science

ESC : Engineering Science

HMSS : Humanity and Social Science

B. TECH. SEM 3 & 4 (INFORMATION TECHNOLOGY): COURSE STRUCTURE

Sem.	Course Title	Subject Category	AICTE Code	Parent Dept.	Teaching Scheme					Examination Scheme				
					Th	Tut	Prac	Total	Credits	Th Ext	Th Int	TW	Prac	Total
III	Mathematics – III	Basic Sc.- Core	BSC-	Maths	3	1	0	4	4.0	60	40	0	0	100
	Communication Systems	Engg Sc. - Core	ESC-	EC	4	0	2	6	5.0	60	40	25	25	150
	Design of Digital Circuits	Engg Sc. - Core	ESC-	Dept	4	0	2	6	5.0	60	40	25	25	150
	Effective Technical Communication	Humanities & MS	HSMC-	English	2	0	2	4	3.0	50	0	50	0	100
	Core Java Technology	Professional core cou.	PCC-	Dept	4	0	2	6	5.0	60	40	25	25	150
	Data Structures and Algorithms	Professional core cou.	PCC-	Dept	4	0	2	6	5.0	60	40	25	25	150
					21	**1**	**10**	**32**	**27.0**	**350**	**200**	**150**	**100**	**800**
IV	Financial and Managerial Accounting	Humanities & MS	HSMC-	***	2	0	0	2	2.0	60	0	40	0	100
	Discrete Mathematics	Professional core cou.	PCC-	Maths	3	1	0	4	4.0	60	40	0	0	100
	Computer and Communication Networks	Professional core cou.	PCC-	Dept	4	0	2	6	5.0	60	40	25	25	150
	Database Management System	Professional core cou.	PCC-	Dept	4	0	2	6	5.0	60	40	25	25	150
	Design & Analysis of Algorithm	Professional core cou.	PCC-	Dept	4	0	2	6	5.0	60	40	25	25	150
	Elective-1 (Microprocessor Architecture and Proggramming)	Professional Ele. Cou.	PEC-	Dept	4	0	2	6	5.0	60	40	25	25	150
					19	**1**	**8**	**30**	**26.0**	**360**	**200**	**140**	**100**	**800**

Elective-1 (Embedded Systems)

B. TECH. SEM 5 & 6 (INFORMATION TECHNOLOGY): COURSE STRUCTURE

Sem.	Course Title	Subject Category	AICTE Code	Parent Dept.	Teaching Scheme					Examination Scheme				
					Th	Tut	Prac	Total	Credits	Th Ext	Th Int	TW	Prac	Total
V	Computer Organisation	Professional core cou.	PCC-	Dept	4	0	0	4	4.0	60	40	0	0	100
	Theory Of Automata & Formal Language	Professional core cou.	PCC-	Dept	4	0	0	4	4.0	60	40	0	0	100
	App Development	Professional core cou.	PCC-	Dept	4	0	2	6	5.0	60	40	25	25	150
	Elective-2 (Advanced Java Technology)	Professional Ele. Cou.	PEC-	Dept	4	0	2	6	5.0	60	40	25	25	150
	Elective-3 (Software Engineering)	Professional Ele. Cou.	PEC-	Dept	4	0	2	6	5.0	60	40	25	25	150
					20	**0**	**6**	**26**	**23.0**	**300**	**200**	**75**	**75**	**650**
VI	Open Elective-1 (Data Analysis & Information Extraction)	Open Elec.	OEC-	Dept	4	0	2	6	5.0	60	40	25	25	150
	Language Translator	Professional core cou.	PCC-	Dept	4	0	2	6	5.0	60	40	25	25	150
	Applied Operating System	Professional core cou.	PCC-	Dept	4	0	2	6	5.0	60	40	25	25	150
	Development Operations	Professional core cou.	PCC-	Dept	0	0	2	2	1.0	0	0	25	25	50
	Elective-4 (Design Patterns And Application Frameworks)	Professional Ele. Cou.	PEC-	Dept	4	0	2	6	5.0	60	40	25	25	150
	System Design Practice	Proj. / SI	PROJ-	Dept	0	0	2	2	1.0	0	0	25	25	50
					16	**0**	**12**	**28**	**22.0**	**240**	**160**	**150**	**150**	**700**

Elective-2 (Advanced Operating System)

Elective-3 (Advanced Algorithms)

Open Elective-1 (Cloud Computing)

Elective-4 (Computer Graphics)

B. TECH. SEM 7 & 8 (INFORMATION TECHNOLOGY): COURSE STRUCTURE

Sem.	Course Title	Subject Category	AICTE Code	Parent Dept.	Teaching Scheme					Examination Scheme				
					Th	Tut	Prac	Total	Credits	Th Ext	Th Int	TW	Prac	Total
VII	Constitution Of India	Mandatory Cou.	MC-	***	0	0	1	1	0.0	0	0	0	0	0
	Open Elective-2 (Machine Learning)	Open Elec.	OEC-	Dept	4	0	2	6	5.0	60	40	25	25	150
	Open Elective-3 (E-Commerce And E-Security)	Open Elec.	OEC-	Dept	4	0	0	4	4.0	60	40	0	0	100
	Open Elective-4 (Knowledge System)	Open Elec.	OEC-	Dept	4	0	2	6	5.0	60	40	25	25	150
	Elective-5 (Distributed Computing)	Professional Ele. Cou.	PEC-	Dept	4	0	2	6	5.0	60	40	25	25	150
	Elective-6 (Web Technology)	Professional Ele. Cou.	PEC-	Dept	4	0	2	6	5.0	60	40	25	25	150
					20	**0**	**9**	**29**	**24.0**	**300**	**200**	**100**	**100**	**700**
VIII	Project/Industrial Training	Proj. / SI	PROJ-	Dept	0	0	28	28	14.0	0	0	100	300	400
	Industrial Practices	Proj. / SI	PROJ-	Dept	0	0	12	12	6.0	0	0	100	0	100
					0	**0**	**40**	**40**	**20.0**	**0**	**0**	**200**	**300**	**500**

Open Elective-2 (Digital Image Processing)

Open Elective-3 (Mobile Computing)

Open Elective-4 (Introduction To Neural Network)

Elective-5 (Internet Of Things)

Elective-6 (Speech & Natural Language Processing)

B. TECH. Summary (INFORMATION TECHNOLOGY): COURSE STRUCTURE

Credit, Semester-wise

Sem	AICTE Credit	Prop. Credit
I	17.5	18.5
II	20.5	19.5
III	23	27
IV	22	26
V	21	23
VI	22	22
VII	18	24
VIII	15	20
	159	180

No of Courses, Semester-wise

Sem	AICTE # Courses	Prop. # Courses
I	4	5
II	5	6
III	6	6
IV	6	6
V	7	5
VI	6	6
VII	5	6
VIII	4	2
	43	42

No of Contact Hours, Semester-wise

Sem	AICTE Contact Hrs	Prop. Contact Hrs
I	22	24
II	27	27
III	31	32
IV	28	30
V	25	26
VI	29	28
VII	24	29
VIII	21	40
	207	236

Credit and No of Courses Subject Type-wise

Sub Code	Subject Type	AICTE Credit	Prop. Credit	AICTE # Courses	Prop. # Courses
BSC	Basic Science Courses	24	17	6	4
ESC	Engineering Science Courses	29	32	7	8
HSMC	Humanities and Social Sciences including Management courses	12	8	4	3
PCC-CS	Professional core courses	49	53	11	12
PEC -CS	Professional Elective courses	18	30	6	6
OEC-CS	Open Elective courses	12	19	4	4
MC	Mandatory courses	0	0	2	2
SI / PROJ-CS	Summer Industry Internship / Project	15	21	3	3
		159	180	43	42

DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
PROPOSED COURSE STRUCTURE FOR B.TECH. (MECHANICAL ENGINEERING) W.E.F. AY - 2021-22

Program Credits = 173.5

B.Tech. Semester - 1

Course Title	AICTE Code Reference	Teaching Scheme			Total	Credits	Examination Scheme (Marks)				
		Th	Tut	Prac			Theory	Sessional	TW	PRAC.	Total
Mathematics -I	BSC103	3	1	0	4	4.0	60	40	0	0	100
Thermodynamics	ESC209	3	0	2	5	4.0	60	40	50	0	150
Basic Electrical Engg.	ESC101	3	0	2	5	4.0	60	40	50	0	150
Mechanics	BSC101	3	0	2	5	4.0	60	40	50	0	150
Computer Programming	ESC103	2	0	3	5	3.5	100	0	50	0	150
Environmental Studies	MC-II	2	0	0	2	0.0	50	0	0	0	50
Workshop Practice - I	ESC104a	0	0	2	2	1.0	0	0	50	0	50
		16	**1**	**11**	**28**	**20.5**	**390**	**160**	**250**	**0**	**800**

B.Tech. Semester - 2

Course Title	AICTE Code Reference	Teaching Scheme			Total	Credits	Examination Scheme (Marks)				
		Th	Tut	Prac			Theory	Sessional	TW	PRAC.	Total
Mathematics-II	BSC104	3	1	0	4	4.0	60	40	0	0	100
Engineering Graphics	ESC102	3	0	3	6	4.5	60	40	50	0	150
Basic Electronics	ESC201	3	0	2	5	4.0	60	40	50	0	150
Mechanics of Solids		3	0	2	5	4.0	60	40	50	0	150
Chemistry	BSC102	3	0	0	3	3.0	100	0	0	0	100
Workshop Practice - II	ESC104b	0	0	3	3	1.5	0	0	50	0	50
		15	**1**	**10**	**26**	**21**	**340**	**160**	**200**	**0**	**700**

DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
PROPOSED COURSE STRUCTURE FOR B.TECH. (MECHANICAL ENGINEERING) W.E.F. AY - 2021-22

B.Tech. Semester - 3

Course Title	AICTE Code Reference	Teaching Scheme			Total	Credits	Examination Scheme (Marks)				
		Th	Tut	Prac			Theory	Sessional	TW	PRAC.	Total
Mathmatics - III (Numerical Techniques)	BSC202	3	0	2	5	4.0	60	40	25	25	150
Electrical Machines and Drives	ESC201	3	0	2	5	4.0	60	40	25	25	150
Fluid Mechanics	PCC-ME203A	3	0	2	5	4.0	60	40	25	25	150
Kinematics of Machines	PCC-ME304A	3	1	2	6	5.0	60	40	25	25	150
Material Science and Metallurgy	PCC-ME205	3	0	2	5	4.0	60	40	25	25	150
English	HSMC-01	2	0	2	4	3.0	50	0	50	0	100
		17	**1**	**12**	**30**	**24**	**350**	**200**	**175**	**125**	**850**

B.Tech. Semester - 4

Course Title	AICTE Code Reference	Teaching Scheme			Total	Credits	Examination Scheme (Marks)				
		Th	Tut	Prac			Theory	Sessional	TW	PRAC.	Total
Dynamics of Machines	PCC-ME304B	3	1	2	6	5.0	60	40	25	25	150
Solid Mechanics	PCC-ME302	3	1	0	4	4.0	60	40	0	0	100
Manufacturing Technology - I	PCC-ME303	3	0	4	7	5.0	60	40	25	25	150
Applied Thermodynamics	PCC-ME202	3	0	2	5	4.0	60	40	25	25	150
Industrial Management and Economics	HSMC-05	2	0	2	4	3.0	50	0	50	0	100
Machine Drawing & Industrial Drafting	PCC-ME308	0	0	4	4	2.0	0	0	25	25	50
		14	**2**	**14**	**30**	**23**	**290**	**160**	**150**	**100**	**700**

DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
PROPOSED COURSE STRUCTURE FOR B.TECH. (MECHANICAL ENGINEERING) W.E.F. AY - 2021-22

B.Tech. Semester - 5

Course Title	AICTE Code Reference	Teaching Scheme			Total	Credits	Examination Scheme (Marks)				
		Th	Tut	Prac			Theory	Sessional	TW	PRAC.	Total
Heat and Mass Transfer	PCC-ME301	3	0	2	5	4.0	60	40	25	25	150
Measurement and Metrology	PCC-ME206	3	0	2	5	4.0	60	40	25	25	150
Manufacturing Technology - II	PCC-ME306	3	0	4	7	5.0	60	40	25	25	150
Machine Design - I	PCC-ME307a	3	1	2	6	5.0	60	40	25	25	150
Professional Elective - I	PEC-ME501	3	0	0	3	3.0	100	0	0	0	100
Mendatory Course - 2 (Constitution of India or Essence of Indian Knowledge Tradition)	MC-II	2	0	0	2	0.0	50	0	0	0	50
		17	**1**	**10**	**28**	**21**	**390**	**160**	**100**	**100**	**750**

B.Tech. Semester - 6

Course Title	AICTE Code Reference	Teaching Scheme			Total	Credits	Examination Scheme (Marks)				
		Th	Tut	Prac			Theory	Sessional	TW	PRAC.	Total
Machine Design - II	PCC-ME307b	3	1	2	6	5.0	60	40	25	25	150
Fluid Machines	PCC-ME203B	3	0	2	5	4.0	60	40	25	25	150
Professional Elective - II	PEC-ME601	3	0	2	5	4.0	60	40	25	25	150
Professional Elective - III	PEC-ME602	3	0	2	5	4.0	60	40	25	25	150
Open Elective - I	OEC-ME601	3	0	2	5	4.0	60	40	25	25	150
Seminar	PROJ-ME601	0	0	2	2	1.0	0	0	100	0	100
		15	**1**	**12**	**28**	**22**	**300**	**200**	**225**	**125**	**850**

DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
PROPOSED COURSE STRUCTURE FOR B.TECH. (MECHANICAL ENGINEERING) W.E.F. AY - 2021-22

B.Tech. Semester - 7

Course Title	AICTE Code Reference	Teaching Scheme			Total	Credits	Examination Scheme (Marks)				
		Th	Tut	Prac			Theory	Sessional	TW	PRAC.	Total
CAD/CAM	PCC-ME401	3	0	2	5	4.0	60	40	25	25	150
Professional Elective - IV	PEC-ME701	3	0	0	3	3.0	100	0	0	0	100
Professional Elective - V	PEC-ME702	3	0	2	5	4.0	60	40	25	25	150
Open Elective - II	OEC-ME701	3	0	2	5	4.0	60	40	25	25	150
Operation Research	HSMC-04	3	0	2	5	4.0	60	40	25	25	150
Project	PROJ-ME701	0	0	4	4	2.0	0	0	100	0	100
		15	**0**	**12**	**27**	**21**	**340**	**160**	**200**	**100**	**800**

B.Tech. Semester - 8

Course Title	AICTE Code Reference	Teaching Scheme			Total	Credits	Examination Scheme (Marks)				
		Th	Tut	Prac			Theory	Sessional	TW	PRAC.	Total
Open Elective - III	OEC-ME801	3	0	0	3	3.0	100	0	0	0	100
Open Elective - IV	OEC-ME802	3	0	0	3	3.0	100	0	0	0	100
Open Elective - V	OEC-ME803	3	0	0	3	3.0	100	0	0	0	100
Industrial Training	PROJ-ME801	0	0	24	24	12.0	0	0	200	300	500
		9	**0**	**24**	**33**	**21**	**300**	**0**	**200**	**300**	**800**

DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
PROPOSED COURSE STRUCTURE FOR B.TECH. (MECHANICAL ENGINEERING) W.E.F. AY - 2021-22

List of Professional Elective Courses (PEC)	
THEORY OF COMPOSITE MATERIALS	PEC-1
OPTIMIZATION	
STEAM AND GAS TURBINES	
POWER PLANT ENGINEERING	PEC-2
MECHANICAL VIBRATION & NOISE	
PRODUCTION TECHNOLOGY	
ADVANCED MANUFACTURING PROCESSES	
REFRIGERATION & AIR CONDITIONING	PEC-3
PRESSURE VESSEL DESIGN	
DESIGN OF TRANSMISSION SYSTEM	
QUALITY MANAGEMENT & RELIABILITY	
THERMAL SYSTEM DESIGN	PEC-4
FAILURE ANALYSIS & FRACTURE MECHANICS	
PRODUCTION PLANNING & CONTROL	
TRIBOLOGY	PEC-5
AUTOMOBILE SYSTEMS	
SUPPLY CHAIN MANAGEMENT	
ADDITIVE MANUFACTURING & REVERSE ENGINEERING	

List of Open Elective Courses (OEC)	
FINITE ELEMENT METHODS	OEC-1
CONTROL ENGINEERING	
COMPUTATIONAL FLUID DYNAMICS	OEC-2
HYDRAULIC & PNUMATIC SYSTEMS	
ROBOTICS & AUTOMATION	OEC-3
ENTREPRENEURSHIP	
ARTIFICIAL INTELLIGENCE	OEC-4
LEAN SIX SIGMA	
INDUSTRY 4.0 AND IoT	OEC-5
SOLAR TECHNOLOGY	

CREDIT - Summary		
CATEGORY	**BREAKUP OF CREDITS**	
	AICTE	**DDU**
HSMC	12	10
BSC	25	23
ESC	24	26.5
PCC	48	64
PEC	18	18
OEC	18	17
PROJ	15	15
MC	0	0
Total	**160**	**173.5**

NOTE : Minor changes may take place after final approval in BOS of deprtment.

DHARMSINH DESAI UNIVERSITY
Faculty of Management & Information Science
Department of MCA

Bridge Course: Scheme

Sr. No.	Subject	Number of Hours
1	Algorithm Development and Problem Solving	8
2	Introduction to Linux	8
3	Fundamentals of HTML	8
4	Mathematics Primer	8
5	Statistics Foundation	6

DHARMSINH DESAI UNIVERSITY
Faculty of Management & Information Science
Department of MCA

Bridge Course: Syllabus

1: Algorithm Development and Problem Solving

Basics of Algorithm and Problem Solving

Introduction to Flowchart, Symbols Used in Flowchart, Preparation of Flowchart, Advantages and Limitations of Flowchart, Development of Program Flowchart.

Introduction to Algorithm, Understanding Control structures and Looping constructs in terms of problem solving, Introduction to Decision Tables, Introduction to Program Development Life Cycle, Structured Programming Concepts.

Approach for problem solving by examples.

Reference Books:

1. "Introduction to Computer Data Processing and System Analysis", V. K. Kapoor, Sultan Chand and Sons Publication.

2: Introduction to Linux

Linux Introduction and Utility Commands

Introduction to Linux, Kernel -Shell Relationship, Linux architecture

Utility Commands: cal, date, echo, pwd, uname, man

File and Directory Handling Commands

Directory Handling Commands: mkdir, rmdir, cd, relative path, absolute path

File Handling Commands: cat, cp, mv, rm, ls- file attributes, wc

Linux file structure and Shell

ls commands with Wild-card Characters, Linux File Structure, Shell Interpretive Cycle, Shell Variables, pipe, tee

Filter Commands

Simple filter Commands: head, tail, cut, paste, sort, tr

grep – filter Command

Reference Books:

1. "UNIX – Concepts and Applications", Sumitabha Das, TMH Publication.

3: Fundamentals of HTML

Introduction to HTML and web

Overview of Web Design, Dynamic and Static website, Introduction to HTML, Why to Learn HTML, applications of HTML, Basic Structure of HTML Document

Basic Elements of HTML Document

<html>, <head>, <title>, <body>, <hr>, <br>, generic attributes used with HTML tags: align, valign, bgcolor, background, id, class, width, height, title, HTML text formatting elements

HTML Form

Form tag, attributes of form element, <INPUT> tag, Various Input tag types

Other form tags: <select>, <option>, <textarea>, <button>, onclick event

HTML Table

TR, TD, Table Heading, Cellpadding and Cellspacing Attributes, caption, Colspan and Rowspan Attributes, Table Height and Width, Table Header, Body, and Footer, Nested Tables

Reference Books:

1. "Black Book - HTML5", DT Editorial Services, DreamTech Publication

4: Mathematics Primer

Sets and Propositions

Definitions and different types of sets, Venn diagram to represent sets, Basic operations on sets, Principles of inclusion and exclusion,

Mathematical Logic

Propositions, Truth table, Tautology, Contradiction and Contingency, Logical Equivalences

Trees

Tree Terminology, prefix codes, spanning trees, minimum spanning trees

Probability

Introduction, Addition and Multiplication Theorem, Conditional Probability, Bayes theorem Examples, Probability Distribution.

Reference Books:

1. "Elements of Discrete Mathematics", C. L. Liu, 2nd Ed., McGraw-Hill

2. "Discrete Mathematics", S. K. Chakraborty and B. K. Sarkar, Oxford University Press

5: Statistics Foundation

Introduction

Introduction and Scope of statistics, Collection of data, Functions and Limitations of Statistics, Frequency Distribution, Graphical presentation.

Central tendency

Arithmetic Mean (AM), Properties of Arithmetic Mean, Weighted Arithmetic Mean, Geometric Mean (GM), Harmonic Mean (HM), Relation between AM, GM, HM,
Median, Quartiles, Deciles & Percentiles, Mode

Testing Hypotheses

Test of significance for attributes, Test of significance of variables for large samples, Test of significance of variables for small samples, t-Test, Chi-Square Test, F-test

Reference Books:

1. "Statistical Methods", S. P. Gupta, Sultan Chand & Sons

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DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF INFORMATION SCIENCE
BC508 Data Communication & Network

Teaching scheme (H/W)			Exam. Scheme (Marks)				
L	Tu	Pr	Th	Ss	Tw	Pr	Total
4	-	-	60	40	25	-	125

Sr. No	Existing Syllabus	Sr. No	Proposed Syllabus
A.	**Communication**, Block diagram of communication system, Types of communication, Telecommunication, Use of communication (TB1) [2]	A.	**Communication**, Block diagram of communication system, Types of communication, Telecommunication, Use of communication (TB1) [2]
B.	**Communication channels**, Wavepropogation modes, TE, TM, TEM mode Frequency, Wavelength, Electromagnetic waves, serial and parallel data transmission, Wireless communication, types of noise, Wireless communication, Fiber optics, coaxial cable, channel capacity, Frequency spectrum, Facsimile. (TB1) [4]	B.	**Communication channels**, Wavepropogation modes, TE, TM, TEM mode Frequency, Wavelength, Electromagnetic waves, serial and parallel data transmission, Wireless communication, types of noise, Wireless communication, Fiber optics, coaxial cable, channel capacity, Frequency spectrum, Facsimile. (TB1) [4]
C.	Design issues of **Modulation**, Amplitude modulation, Frequency modulation, Phase modulation, Base band system, Total power, carrier power, Digital communication, ASK, FSK, PSK, Line codes, Synchronous and Asynchronous modulation, Demodulation, Phase Locked Loop. (TB1) [3]	C.	Design issues of **Modulation**, Amplitude modulation, Frequency modulation, Phase modulation, Base band system, Total power, carrier power, Digital communication, ASK, FSK, PSK, Line codes, Synchronous and Asynchronous modulation, Demodulation, Phase Locked Loop. (TB1) [3]
D.	**Multiplexing**, ~~SDM~~, FDM, TDM, Combined Multiplexing, TDM designing with counter, decoder and switches. (TB1) [3]	D.	**Multiplexing**, FDM, TDM, CDMA (Code Division Multiple Access - TB2), WDM(Wavelength Division Multiplexing - TB2) Combined Multiplexing, TDM designing with counter, decoder and switches. (TB1) [3]
E.	~~RS 232C standard, Voltage loop, positive and negative logic, Data bits, Slew rate, baud value, RS232 errors, Different lines of RS232 and functions, RS232 applications. (TB1) [3]~~	E.	
F.	**Use of computer network**, open loop and closed loop network, Network topology, Mesh, Star, Ring, Tree, Bus, Tree topology, LAN, MAN, WAN. (TB1) [3]	F.	**Use of computer network**, open loop and closed loop network, Network topology, Mesh, Star, Ring, Tree, Bus, Tree topology, LAN, MAN, WAN. (TB1) [3]

G.	**OSI model**, Introduction to each layers of OSI model. (TB1) [3]	G.	**OSI model**, Introduction to each layers of OSI model. (TB1) [3]
H.	**Physical layer,** Transmission media, Geostationary satellites, circuit switching and packet switching, ~~N-ISDN, N-ISDN channels, N-ISDN interface, Functioning of each parts of ISDN, ISDN services, Broad band ISDN, B-ISDN and ATM reference model.~~ (TB2). ~~[3]~~	H.	**Physical layer,** Transmission media, Geostationary satellites, circuit switching and packet switching, PSTN (Public Switched Telephone Network - Structure of Telephone System, Modem, ADSL and Fibre), The Mobile Telephone System - overview of 1G, 2G and 3G. (TB2). [4]
I.	**Design issues of Data Link Layer**, , Elementary data link protocols, UTOPIA protocol, ~~Stop and Wait protocol~~ (TB2). ~~[3]~~	I.	**Design issues of Data Link Layer**, Services provided to network layer, Framing, Error Control, Flow control, Elementary data link protocols, UTOPIA protocol, Simplex Stop and Wait protocol, Simplex Stop and Wait protocol for noisy channel, One bit sliding window protocol (TB2). [5]
J.	**The Medium Access Sub Layer**, The channel allocation problem, ALOHA and CSMA protocols, IEEE Standard 802.3(Ethernet), 802.4(Token Bus), 802.5 (Token Ring), Comparison of 802.3, 802.4 and 802.5, ARP, arp command, RARP Setting hostname, using ifconfig, netsate command, ping tracing a connection, Gateway and routing protocols (TB2) [5]	J.	**The Medium Access Sub Layer**, The channel allocation problem, ALOHA and CSMA protocols, IEEE Standard 802.3(Ethernet), 802.4(Token Bus), 802.5 (Token Ring), Comparison of 802.3, 802.4 and 802.5, ARP, arp command, RARP Setting hostname, using ifconfig, netsate command, ping tracing a connection, Gateway and routing protocols (TB2) [5]
K.	**The Network Layer**, Network layer design issues, The Optimality principle, Shortest path routing, How Network Differ, The IP protocol, IP address, Internet Protocol (IP), Primary function of IP, Data delivery by IP, IP header (TB2). [5]	K.	**The Network Layer**, Network layer design issues, The Optimality principle, Shortest path routing, How Network Differ, The IP protocol, IP address, Internet Protocol (IP), Primary function of IP, Data delivery by IP, IP header (TB2). [5]
L.	**The Transport Layer**, Ports, TCP architecture, UDP architecture, The Transport Service, Elements of Transport Protocol. (TB2) [4]	L.	**The Transport Layer**, Ports, TCP architecture, UDP architecture, The Transport Service, Elements of Transport Protocol. (TB2) [4]
M.	**The Application Layer**, Network Security, DNS Domain Name System. (TB2). [2]	M.	**The Application Layer**, Network Security, DNS Domain Name System. (TB2). [2]

Note:

TB1 = Text Book 1
TB2 = Text Book 2

Text Books:

1. Data Communication By W.L, Schweber
2. Computer Networks By A.S.Tanenbaum.

Ref. Books:

1. Data Communication and Networking By Behrouz Forouzan.

भारतीय दन्त परिषद
DENTAL COUNCIL OF INDIA
(A STATUTORY BODY CONSTITUTED UNDER THE DENTISTS ACT, 1948)

SPEED POST/EMAIL/WEBSITE

No.DE-22-Academic(BDS)/2020 5007 Dated 30 December, 2020

To

1. The Vice Chancellor of all universities affiliating dental colleges,
2. The DME of all the States,
3. The Principals of all Dental Colleges

Sub: DCI guidelines/advisories and SOPs in pursuance of the directions of the Government of India, Ministry of Health and Family Welfare, New Delhi contained in its D.O.No.V.12025/160/2020-DE dated 24.12.2020 for Re-Opening of Dental Colleges Post Lockdown due to COVID-19 Pandemic

Respected Madam /Sir,

I am directed to state that as we all are aware that the Universities and Dental Colleges across the country have been closed since March, 2020 when the Government of India announced a countrywide lockdown as one of the measures to contain the COVID-19 outbreak. Keeping in view of the COVID-19 pandemic and subsequent lockdown, the Dental Council of India as well as the Government of India and respective State/UTs issued various guidelines in this regard from time to time. The universities and colleges however had put in their best efforts to continue their academic programmes and complete the syllabi using various ICT tools of teaching and learning since their closure from mid-March onwards.

2. The Government of India, Ministry of Health and Family Welfare, vide its DO.No.V.11025/235/2020-MEP dated 25.11.2020 has asked all the Chief Secretary and the administrator of all the State/UTs to take necessary steps to open the medical colleges on or before 1.12.2020 complying all the SOPs/guidelines with respect to social distancing and prevention of spread of epidemic issued by them. The National Medical Commission has also issued certain guidelines and suggestive schedule of academic programme including university examinations in this regard. The Dental Council of India, on the similar lines of NMC on 11.12.2020 sent its self contained proposal with guidelines to Government of India for re-opening of dental colleges and for internship completion.

3. The Government of India, Ministry of Health and Family Welfare, New Delhi contained in its D.O.No.V.12025/160/2020-DE dated 24.12.2020 **(Annexure-I)**, on the suggestion of the Dental Council of India, on the similar lines of NMC, has now requested that the Sates/UTs may take necessary steps to open the Dental Colleges on or before 4th January, 2021. Needless to say, all the SOPs/guidelines with respect to social distancing and prevention of spread of epidemic issued by Central/States/UT Governments will be followed scrupulously by all the Colleges. Simultaneously, the GOI vide its letter of even number dated 28.12.2020 requested DCI to issue separate SOPs/guidelines of Dental Colleges and suggestive schedule of training of different classes.

4. It is also relevant to state that new academic session is going on and the universities and dental colleges need a customized plan, as per the local conditions where they are located, to deal with any eventuality arising due the COVID -19 before resuming the activities on campuses. The top priority, while opening the institutions, should be the safety, health and well-being of the students, teachers and staff.

Contd..2/-

ऐवान-ए-ग़ालिब मार्ग, कोटला रोड़, नई दिल्ली – 110 002 ¤ Aiwan-E-Ghalib Marg, Kotla Road, New Delhi – 110 002
दूरभाष/Phones : 011-23238542, 23236740 ई-मेल/E-mail : secy-dci@nic.in, वेबसाईट/Website : www.dciindia.gov.in

5. The DCI has now accordingly framed and uploaded its "*Guidelines for Re-Opening of Dental Colleges Post Lockdown due to COVID-19 Pandemic*" **(Annexure-II)**, "*Tentative/Suggestive Schedule of Academic Programme –(Post Pandemic COVID 19 Situation) and its duration including University Exam*" **(Annexure-III)** and Advisory on "*Relaxation of three months period in submission of the Post Graduate dissertation/Thesis*" **(Annexure-IV)** on its website which provide in detail the measures to be taken before re-opening of dental college. These guidelines/advisories may be adopted by the dental colleges as per the local conditions and directives of the Government authorities.

6. In view of the above, It is requested to adopt these guidelines and take necessary steps to implement them accordingly. Further, the universities/dental colleges are again requested to carry out the academic activities following necessary advisories / guidelines / directions issued by the Central / State Government, Ministry of Education (MoE) or UGC from time to time to prevent the spread of COVID-19.

With kind regards,

Yours faithfully,

(M.L. Meena)
Offig. Secretary
Dental Council of India

Copy for information to:

The Secretary to the Govt. of India, Ministry of Health and Family Welfare, Department of Health-(DE Section), Maulana Azad Road, Nirman Bhawan, New Delhi- 110011, w.r.t. GOI letter No. V.12025/160/2020-DE [8087715] dated 28th December, 2020.

(M.L. Meena)
Offig. Secretary
Dental Council of India

CC:

1. The Acting President, Dental Council of India, New Delhi.
2. ARPM Section- for email and to upload on website

Annexure -III

'DCI–Dental colleges – Tentative/Suggestive Schedule of Academic Program – (Post Pandemic Covid 19 Situation) and its duration including University Exam'.

S. No.	UG Batch Joining Academic Year	1st Year	2nd Year	3rd Year	4th Year	Internship	NEET-PG
1.	**2016-17** (Internship batch)	--	--	--	--	January 2021 to December 2021 **(12 months)**	**NEET PG December 2021**
2.	**2017-18** (4th Year)	--	--	--	January 2021 to September 2021 (9 months)	October 2021 to September 2022 **(12 months)**	**NEET PG – December 2022**
3.	**2018-19** (3rd Year)	--	--	January 2021 to September 2021 **(9 months)**	October 2021 to August 2022 **(11 months)**	September 2022 to August 2023 **(12 months)**	**NEET PG - December 2023**
4.	**2019 – 20** (2nd Year)	--	January 2021 to August 2021 **(8 months)**	September 2021 to July 2022 **(11 months)**	August 2022 to July 2023 **(12 months)**	September 2023 to August 2024 **(12 months)**	**NEET PG – December 2024**
5.	**2020 – 21** (1st Year **Covid – 19 batch)**	January 2021 – September 2021 **(9 months)**	October 2021 to August 2022 **(11 months)**	September 2022 to July 2023 **(11 months)**	August 2023 to July 2024 **(12 months)**	September 2024 to August 2025 **(12 months)**	**NEET PG –December 2025**
6.	**2021-2022** Onwards	October 2021 – September 2022 **(12 months)**	October 2022 to August 2023 **(11 months)**	September 2023 to August 2024 **(11 months)**	September 2024 to August 2025 **(12 months)**	October 2025 to September 2026 **(12 months)**	**NEET PG –December 2026**
7.	**Further batches from AYs 2022-23**	As per normal schedule/academic calendar as prescribed by the DCI/University					

MINISTRY OF HUMAN RESOURCE DEVELOPMENT

UNIVERSITY GRANTS COMMISSION

NOTIFICATION

New Delhi, the 5th May, 2016

University Grants Commission (Minimum Standards and Procedure for Award of M.PHIL./PH.D Degrees) Regulations, 2016

{In supersession of the UGC (Minimum Standards and Procedure for Awards of M.Phil./Ph.D. Degree) Regulation, 2009, notified in The Gazette of India [No. 28, Part III- Section 4] for the week July 11-July 17, 2009}

No. F. 1-2/2009(EC/PS)V(I) Vol. II - In exercise of the powers conferred by clauses (f) and (g) of sub-section (1) of Section 26 of the University Grants Commission Act, 1956 (3 of 1956), and in supersession of the UGC (Minimum Standards and Procedure for Awards of M.Phil./Ph.D. Degree) Regulation, 2009, notified in The Gazette of India [No. 28, Part III-Section 4] for the week July 11 — July 17, 2009, the University Grants Commission hereby makes the following Regulations, namely:-

1. Short title, Application and Commencement:

1.1 These Regulations may be called University Grants Commission (Minimum Standards and Procedure for Award of M.Phil./Ph.D. Degrees) Regulations, 2016.

1.2 They shall apply to every University established or incorporated by or under a Central Act, a Provincial Act, or a State Act , every affiliated college, and every Institution Deemed to be a University under Section 3 of UGC Act, 1956.

1.3 They shall come into force from the date of their publication in the Gazette of India.

2. Eligibility criteria for admission to the M.Phil. programme:

2.1 Candidates for admission to the M.Phil. programme shall have a Master's degree or a professional degree declared equivalent to the Master's degree by the corresponding statutory regulatory body, with at least 55% marks in aggregate or its equivalent grade 'B' in the UGC 7-point scale (or an equivalent grade in a point scale wherever grading system is followed) or an equivalent degree from a foreign educational Institution accredited by an Assessment and Accreditation Agency which is approved, recognized or authorized by an authority, established or incorporated under a law in its home country or any other statutory authority in that country for the purpose of assessing, accrediting or assuring quality and standards of educational institutions.

2.2 A relaxation of 5% of marks, from 55% to 50%, or an equivalent relaxation of grade, may be allowed for those belonging to SC/ST/OBC(non-creamy layer)/Differently-Abled and other categories of candidates as per the decision of the Commission from time to time, or for those who had obtained their Master's degree prior to 19th September, 1991. The eligibility marks of 55% (or an equivalent grade in a point scale wherever grading system is followed) and the relaxation of 5% to the categories mentioned above are permissible based only on the qualifying marks without including the grace mark procedures.

3. Eligibility criteria for admission to Ph.D.programme:

Subject to the conditions stipulated in these Regulations, the following persons are eligible to seek admission to the Ph.D. programme:

3.1 Master's Degree holders satisfying the criteria stipulated under Clause 2 above.

3.2 Candidates who have cleared the M.Phil. course work with at least 55% marks in aggregate or its equivalent grade 'B' in the UGC 7-point scale (or an equivalent grade in a point scale wherever grading system is followed) and successfully completing the M.Phil. Degree shall be eligible to proceed to do research work leading to the Ph. D. Degree in the same Institution in an integrated programme. A relaxation of 5% of marks, from 55% to 50%, or an equivalent relaxation of grade, may be allowed for those belonging to SC/ST/OBC(non-creamy layer)/differently-abled and other categories of candidates as per the decision of the Commission from time to time.

3.3 A person whose M.Phil. dissertation has been evaluated and the viva voce is pending may be admitted to the Ph.D. programme of the same Institution;

3.4 Candidates possessing a Degree considered equivalent to M.Phil. Degree of an Indian Institution, from a Foreign Educational Institution accredited by an Assessment and Accreditation Agency which is approved, recognized or authorized by an authority, established or incorporated under a law in its home country or any other statutory authority in that country for the purpose of assessing, accrediting or assuring quality and standards of educational institutions, shall be eligible for admission to Ph.D. programme.

4. Duration of the Programme:

4.1 M.Phil. programme shall be for a minimum duration of two (2) consecutive semesters / one year and a maximum of four (4) consecutive semesters / two years.

4.2 Ph.D. programme shall be for a minimum duration of three years, including course work and a maximum of six years.

4.3 Extension beyond the above limits will be governed by the relevant clauses as stipulated in the Statute/Ordinance of the individual Institution concerned.

4.4 The women candidates and Persons with Disability (more than 40% disability) may be allowed a relaxation of one year for M.Phil and two years for Ph.D. in the maximum duration. In addition, the women candidates may be provided Maternity Leave/Child Care Leave once in the entire duration of M.Phil/Ph.D. for up to 240 days.

5. Procedure for admission:

5.1 All Universities and Institutions Deemed to be Universities shall admit M.Phil/Ph.D. students through an Entrance Test conducted at the level of Individual University/Institution Deemed to be a University. The University/Institution Deemed to be a University may decide separate terms and conditions for Ph.D. Entrance Test for those students who qualify UGC-NET (including JRF)/UGC-CSIR NET (including JRF)/SLET/GATE/teacher fellowship holder or have passed M.Phil programme. Similar approach may be adopted in respect of Entrance Test for M.Phil programme.

5.2 Higher Educational Institutions (HEIs) referred to in sub-clause 1.2 above and Colleges under them which are allowed to conduct M.Phil. and/or Ph.D. programmes, shall:

5.2.1 decide on an annual basis through their academic bodies a predetermined and manageable number of M.Phil. and/or Ph.D. scholars to be admitted depending on the number of available Research Supervisors and other academic and physical facilities available, keeping in mind the norms regarding the scholar- teacher ratio (as indicated in Para 6.5), laboratory, library and such other facilities;

5.2.2 notify well in advance in the institutional website and through advertisement in at least two (2) national newspapers, of which at least one (1) shall be in the regional language, the number of seats for admission, subject/discipline-wise distribution of available seats, criteria for admission, procedure for admission, examination centre(s) where entrance test(s) shall be conducted and all other relevant information for the benefit of the candidates;

5.2.3 adhere to the National/State-level reservation policy, as applicable.

5.3 The admission shall be based on the criteria notified by the Institution, keeping in view the guidelines/norms in this regard issued by the UGC and other statutory bodies concerned, and taking into account the reservation policy of the Central/State Government from time to time.

5.4 HEIs as mentioned in Clause 1.2 shall admit candidates by a two stage process through:

5.4.1 An Entrance Test shall be qualifying with qualifying marks as 50%. The syllabus of the Entrance Test shall consist of 50% of research methodology and 50% shall be

subject specific. The Entrance Test shall be conducted at the Centre(s) notified in advance (changes of Centres, if any, also to be notified well in advance) at the level of the individual HEI as mentioned in clause 1.2; and

5.4.2 An interview/*viva-voce* to be organized by the HEI as mentioned in clause 1.2 when the candidates are required to discuss their research interest/area through a presentation before a duly constituted Department Research Committee.

5.5 The interview/*viva voce* shall also consider the following aspects, viz. whether:

5.5.1 the candidate possesses the competence for the proposed research;

5.5.2 the research work can be suitably undertaken at the Institution/College;

5.5.3 the proposed area of research can contribute to new/additional knowledge.

5.6 The University shall maintain the list of all the M.Phil. / Ph.D. registered students on its website on year-wise basis. The list shall include the name of the registered candidate, topic of his/her research, name of his/her supervisor/co-supervisor, date of enrolment/registration.

6. **Allocation of Research Supervisor:** Eligibility criteria to be a Research Supervisor, Co- Supervisor, Number of M.Phil./Ph.D. scholars permissible per Supervisor, etc.

6.1 Any regular Professor of the University/Institution Deemed to be a University/College with at least five research publications in refereed journals and any regular Associate/Assistant Professor of the university/institution deemed to be a university/college with a Ph.D. degree and at least two research publications in refereed journals may be recognized as Research Supervisor.

Provided that in areas/disciplines where there is no or only a limited number of refereed journals, the Institution may relax the above condition for recognition of a person as Research Supervisor with reasons recorded in writing.

6.2 Only a full time regular teacher of the concerned University/Institution Deemed to be a University/College can act as a supervisor. The external supervisors are not allowed. However, Co-Supervisor can be allowed in inter-disciplinary areas from other departments of the same institute or from other related institutions with the approval of the Research Advisory Committee.

6.3 The allocation of Research Supervisor for a selected research scholar shall be decided by the Department concerned depending on the number of scholars per Research Supervisor, the available specialization among the Supervisors and research interests of the scholars as indicated by them at the time of interview/*viva voce*.

6.4 In case of topics which are of inter-disciplinary nature where the Department concerned feels that the expertise in the Department has to be supplemented from outside, the Department may appoint a Research Supervisor from the Department itself, who shall be known as the Research Supervisor, and a Co-Supervisor from outside the Department/ Faculty/College/Institution on such terms and conditions as may be specified and agreed upon by the consenting Institutions/Colleges.

6.5 A Research Supervisor/Co-supervisor who is a Professor, at any given point of time, cannot guide more than three (3)M.Phil. and Eight (8) Ph.D. scholars. An Associate Professor as Research Supervisor can guide up to a maximum of two (2) M.Phil. and six (6) Ph.D. scholars and an Assistant Professor as Research Supervisor can guide up to a maximum of one (1) M.Phil. and four (4) Ph.D. scholars.

6.6 In case of relocation of an M.Phil/Ph.D. woman scholar due to marriage or otherwise, the research data shall be allowed to be transferred to the University to which the scholar intends to relocate provided all the other conditions in these regulations are followed in letter and spirit and the research work does not pertain to the project secured by the parent institution/ supervisor from any funding agency. The scholar will however give due credit to the parent guide and the institution for the part of research already done.

7. **Course Work:** Credit Requirements, number, duration, syllabus, minimum standards for completion, etc.

7.1 The credit assigned to the M.Phil. or Ph.D. course work shall be a minimum of 08 credits and a maximum of 16 credits.

7.2 The course work shall be treated as prerequisite for M.Phil./Ph.D. preparation. A minimum of four credits shall be assigned to one or more courses on Research Methodology which could cover areas such as quantitative methods, computer applications, research ethics and review of published research in the relevant field, training, field work, etc. Other courses shall be advanced level courses preparing the students for M.Phil./Ph.D. degree.

7.3 All courses prescribed for M.Phil. and Ph.D. course work shall be in conformity with the credit hour instructional requirement and shall specify content, instructional and assessment methods. They shall be duly approved by the authorized academic bodies.

7.4 The Department where the scholar pursues his/her research shall prescribe the course(s) to him/her based on the recommendations of the Research Advisory Committee, as stipulated under sub-Clause 8.1 below, of the research scholar.

7.5 All candidates admitted to the M.Phil. and Ph.D. programmes shall be required to complete the course work prescribed by the Department during the initial one or two semesters.

7.6 Candidates already holding M. Phil. degree and admitted to the Ph.D. programme, or those who have already completed the course work in M.Phil. and have been permitted to proceed to the Ph.D. in integrated course, may be exempted by the Department from the Ph.D. course work. All other candidates admitted to the Ph.D. programme shall be required to complete the Ph.D. course work prescribed by the Department.

7.7 Grades in the course work, including research methodology courses shall be finalized after a combined assessment by the Research Advisory Committee and the Department and the final grades shall be communicated to the Institution/College.

7.8 A M.Phil./Ph.D. scholar has to obtain a minimum of 55% of marks or its equivalent grade in the UGC 7-point scale (or an equivalent grade/CGPA in a point scale wherever grading system is followed) in the course work in order to be eligible to continue in the programme and submit the dissertation/thesis.

8. Research Advisory Committee and its functions:

8.1 There shall be a Research Advisory Committee, or an equivalent body for similar purpose as defined in the Statutes/Ordinances of the Institution concerned, for each M.Phil. and Ph.D. scholar. The Research Supervisor of the scholar shall be the Convener of this Committee. This Committee shall have the following responsibilities:

8.1.1 To review the research proposal and finalize the topic of research;

8.1.2 To guide the research scholar to develop the study design and methodology of research and identify the course(s) that he/she may have to do.

8.1.3 To periodically review and assist in the progress of the research work of the research scholar.

8.2 A research scholar shall appear before the Research Advisory Committee once in six months to make a presentation of the progress of his/her work for evaluation and further guidance. The six monthly progress reports shall be submitted by the Research Advisory Committee to the Institution/College with a copy to the research scholar.

8.3 In case the progress of the research scholar is unsatisfactory, the Research Advisory Committee shall record the reasons for the same and suggest corrective measures. If the research scholar fails to implement these corrective measures, the Research Advisory Committee may recommend to the Institution/College with specific reasons for cancellation of the registration of the research scholar.

9. Evaluation and Assessment Methods, minimum standards/credits for award of the degree, etc.:

9.1 The overall minimum credit requirement, including credit for the course work, for the award of M.Phil. degree shall not be less than 24 credits.

9.2 Upon satisfactory completion of course work, and obtaining the marks/grade prescribed in sub-clauses 7.8 above, as the case may be, the M.Phil./Ph.D. scholar shall be required to undertake research work

and produce a draft dissertation/thesis within a reasonable time, as stipulated by the Institution concerned based on these Regulations.

9.3 Prior to the submission of the dissertation/thesis, the scholar shall make a presentation in the Department before the Research Advisory Committee of the Institution concerned which shall also be open to all faculty members and other research scholars. The feedback and comments obtained from them may be suitably incorporated into the draft dissertation/thesis in consultation with the Research Advisory Committee.

9.4 M.Phil scholars shall present at least one (1) research paper in a conference/seminar and Ph.D. scholars must publish at least one (1) research paper in refereed journal and make two paper presentations in conferences/seminars before the submission of the dissertation/thesis for adjudication, and produce evidence for the same in the form of presentation certificates and/or reprints.

9.5 The Academic Council (or its equivalent body) of the Institution shall evolve a mechanism using well developed software and gadgets to detect plagiarism and other forms of academic dishonesty. While submitting for evaluation, the dissertation/thesis shall have an undertaking from the research scholar and a certificate from the Research Supervisor attesting to the originality of the work, vouching that there is no plagiarism and that the work has not been submitted for the award of any other degree/diploma of the same Institution where the work was carried out, or to any other Institution.

9.6 The M.Phil. dissertation submitted by a research scholar shall be evaluated by his/her Research Supervisor and at least one external examiner who is not in the employment of the Institution/College. The *viva-voce* examination, based among other things, on the critiques given in the evaluation report, shall be conducted by both of them together, and shall be open to be attended by Members of the Research Advisory Committee, all faculty members of the Department, other research scholars and other interested experts/ researchers.

9.7 The Ph.D. thesis submitted by a research scholar shall be evaluated by his/her Research Supervisor and at least two external examiners, who are not in employment of the Institution/College, of whom one examiner may be from outside the country. The *viva-voce* examination, based among other things, on the critiques given in the evaluation report, shall be conducted by the Research Supervisor and at least one of the two external examiners, and shall be open to be attended by Members of the Research Advisory Committee, all faculty members of the Department, other research scholars and other interested experts/researchers.

9.8 The public *viva-voce* of the research scholar to defend the dissertation/thesis shall be conducted only if the evaluation report(s) of the external examiner(s) on the dissertation/thesis is/are satisfactory and include a specific recommendation for conducting the *viva-voce* examination. If the evaluation report of the external examiner in case of M.Phil. dissertation, or one of the evaluation reports of the external examiner in case of Ph.D. thesis, is unsatisfactory and does not recommend *viva-voce*, the Institution shall send the dissertation/ thesis to another external examiner out of the approved panel of examiners and the *viva-voce* examination shall be held only if the report of the latest examiner is satisfactory. If the report of the latest examiner is also unsatisfactory, the dissertation/ thesis shall be rejected and the research scholar shall be declared ineligible for the award of the degree.

9.9 The Institutions shall develop appropriate methods so as to complete the entire process of evaluation of M.Phil. dissertation/ Ph.D. thesis within a period of six months from the date of submission of the dissertation/thesis.

10. Academic, administrative and infrastructure requirement to be fulfilled by Colleges for getting recognition for offering M.Phil./Ph.D. programmes:

10.1 Colleges may be considered eligible to offer M.Phil./Ph .D programmes only if they satisfy the availability of eligible Research Supervisors, required infrastructure and supporting administrative and research promotion facilities as per these Regulations.

10.2 Post-graduate Departments of Colleges, Research laboratories of Government of India/State Government with at least two Ph.D. qualified teachers/scientists/other academic staff in the Department concerned along with required infrastructure, supporting administrative and research promotion facilities as per these Regulations, stipulated under sub-clause 10.3, shall be considered eligible to offer M.Phil./Ph.D. programmes. Colleges should additionally have the necessary recognition by the

Institution under which they operate to offer M.Phil/Ph.D. programme.

10.3 Colleges with adequate facilities for research as mentioned below alone shall offer M.Phil./Ph. D. programmes:

10.3.1 In case of science and technology disciplines, exclusive research laboratories with sophisticated equipment as specified by the Institution concerned with provision for adequate space per research scholar along with computer facilities and essential software, and uninterrupted power and water supply;

10.3.2 Earmarked library resources including latest books, Indian and International journals, e-journals, extended working hours for all disciplines, adequate space for research scholars in the Department/ library for reading, writing and storing study and research materials;

10.3.3 Colleges may also access the required facilities of the neighbouring Institutions/Colleges, or of those Institutions/Colleges/R&D laboratories/Organizations which have the required facilities.

11. Treatment of Ph.D / M.Phil. through Distance Mode/Part-time:

11.1 Notwithstanding anything contained in these Regulations or any other Rule or Regulation, for the time being in force, no University; Institution, Deemed to be a University and College shall conduct M.Phil. and Ph.D. Programmes through distance education mode.

11.2 Part-time Ph.D will be allowed provided all the conditions mentioned in the extant Ph.D Regulations are met.

12. Award of M.Phil./Ph.D. degrees prior to Notification of these Regulations, or degrees awarded by foreign Universities:

12.1 Award of degrees to candidates registered for the M.Phil./Ph.D. programme on or after July 11, 2009 till the date of Notification of these Regulations shall be governed by the provisions of the UGC (Minimum Standards and procedure for Awards of M.Phil/Ph.D Degree) Regulation, 2009.

12.2 If the M.Phil./Ph.D. degree is awarded by a Foreign University, the Indian Institution considering such a degree shall refer the issue to a Standing Committee constituted by the concerned institution for the purpose of determining the equivalence of the degree awarded by the foreign University.

13. Depository with INFLIBNET:

13.1 Following the successful completion of the evaluation process and before the announcement of the award of the M.Phil./Ph.D. degree(s), the Institution concerned shall submit an electronic copy of the M.Phil. dissertation /Ph. D. thesis to the INFLIBNET, for hosting the same so as to make it accessible to all Institutions/Colleges.

13.2 Prior to the actual award of the degree, the degree-awarding Institution shall issue a provisional Certificate to the effect that the Degree has been awarded in accordance with the provisions of these UGC Regulations, 2016.

Prof. JASPAL S. SANDHU, Secy.

[ADVT.-III/4/Exty./143(113)]

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नोट 2: उस स्थिति में दण्ड, जब साहित्यिक चोरी का लाभ अथवा क्रेडिट पहले ही प्राप्त किया गया हो– यदि लाभ अथवा क्रेडिट प्राप्त किए जाने, जैसा भी मामला हो, की तिथि के बाद साहित्यिक चोरी सिद्ध हो तो उसके द्वारा प्राप्त लाभ अथवा क्रेडिट को आईएआईपी द्वारा संस्तुत अवधि के लिए आस्थगित रखा जाएगा तथा संस्थान के प्रमुख द्वारा अनुमोदित किया जाएगा।

नोट 3 : उच्चतर शिक्षा संस्थान ऐसा तंत्र विकसित करेंगे ताकि यह सुनिश्चित किया जाए कि छात्र, संकाय, शोधकर्ता अथवा कर्मचारिवृंद द्वारा प्रकाशित किए गए प्रत्येक पत्र/शोध–प्रबंध (थीसीस) तथा शोध–निबंध (डिसरटेशन) को अग्रेषित/ प्रस्तुत किए जाने के समय साहित्यिक चोरी के लिए जांचा जाए।

नोट 4 : यदि उच्चतर शिक्षा संस्थान के प्रधान के विरूद्ध साहित्यिक चोरी की कोई शिकायत हो तो, इन विनियमों के अनुरूप उच्चतर शिक्षा संस्थान के नियंत्रण अधिकारी द्वारा उपर्युक्त कार्रवाई की जाएगी।

नोट 5 : यदि संस्थागत स्तर पर विभागाध्यक्ष/प्राधिकारियों के विरूद्ध साहित्यिक चोरी की कोई शिकायत हो तो, इन विनियमों के अनुरूप आईएआईपी द्वारा उपयुक्त कार्रवाई की जाएगी जिसे सक्षम अधिकारी द्वारा अनुमोदित किया जाएगा।

नोट 6 : यदि डीएआईपी अथवा आईएआईपी के किसी सदस्यगण के विरूद्ध साहित्यिक चोरी की कोई शिकायत हो तो, ऐसा सदस्य ऐसी बैठकों में भाग नहीं लेगा जहां उसके मामले के संबंध में चर्चा की जा रही हो/अथवा जांच की जा रही हो।

13. कठिनाइयों का निवारण

विश्वविद्यालय अनुदान आयोग, इन विनियमों के कार्यान्वयन के दौरान सामने आने वाली कठिनाइयों को भारत सरकार/मानव संसाधन विकास मंत्रालय के परामर्श से निवारण करने का अधिकार सुरक्षित रखता है।

प्रो. रजनीश जैन, सचिव

[विज्ञापन–III/4/असा./161/18]

UNIVERSITY GRANTS COMMISSION

NOTIFICATION

UNIVERSITY GRANTS COMMISSION (PROMOTION OF ACADEMIC INTEGRITY AND PREVENTION OF PLAGIARISM IN HIGHER EDUCATIONAL INSTITUTIONS) REGULATIONS, 2018

New Delhi, the 23rd July, 2018

F. 1-18/2010(CPP-II).—

Preamble

Whereas, University Grants Commission (UGC), as per UGC Act, 1956, is mandated to coordinate and determine the standards of higher education;

And whereas, assessment of academic and research work done leading to the partial fulfillment for the award of degrees at Masters and Research level, by a student or a faculty or a researcher or a staff, in the form of thesis, dissertation and publication of research papers, chapters in books, full-fledged books and any other similar work, reflects the extent to which elements of academic integrity and originality are observed in various relevant processes adopted by Higher Educational Institutions (HEIs);

Therefore, in exercise of the powers conferred by clause (j) of Section 12 read with clauses (f) and (g) of sub-section (1) of Section 26 of the University Grants Commission Act, 1956, the University Grants Commission hereby makes the following regulations:-

1. Short title, application and commencement –

a. These regulations shall be called the University Grants Commission (Promotion of Academic Integrity and Prevention of Plagiarism in Higher Educational Institutions) Regulations, 2018.

b. They shall apply to the students, faculty, researchers and staff of all Higher Educational Institutions in the country.

c. These regulations shall come into force from the date of their notification in the Official Gazette.

2. Definitions -

In these regulations, unless the context otherwise requires—

a. "Academic Integrity" is the intellectual honesty in proposing, performing and reporting any activity, which leads to the creation of intellectual property;

b. "Author" includes a student or a faculty or a researcher or staff of Higher Educational Institution (HEI) who claims to be the creator of the work under consideration;

c. "Commission" means the University Grants Commission as defined in the University Grants Commission Act, 1956;

d. "Common Knowledge" means a well known fact, quote, figure or information that is known to most of the people;

e. "Degree" means any such degree specified by the University Grants Commission, by notification in the Official Gazette, under section 22 of the University Grants Commission Act, 1956;

f. "Departmental Academic Integrity Panel" shall mean the body constituted at the departmental level to investigate allegations of plagiarism;

g. "Faculty" refers to a person who is teaching and/or guiding students enrolled in an HEI in any capacity whatsoever i.e. regular, ad-hoc, guest, temporary, visiting etc;

h. "Higher Educational Institution (HEI)" means a university recognized under section 2(f) of the UGC Act, 1956 or an institution deemed to be university under section 3 of the UGC Act, 1956 or an affiliating college / institution or a constituent unit of a university;

i. "Information" includes data, message, text, images, sound, voice, codes, computer programs, software and databases or microfilm or computer generated microfiche;

j. "Institutional Academic Integrity Panel" shall mean the body constituted at Institutional level to consider recommendations of the departmental academic integrity panel and take appropriate decisions in respect of allegations of plagiarism and decide on penalties to be imposed. In exceptional cases, it shall investigate allegations of plagiarism at the institutional level;

k. "Notification" means a notification published in the Official Gazette and the expression "notify" with its cognate meanings and grammatical variation shall be construed accordingly;

l. "Plagiarism" means the practice of taking someone else's work or idea and passing them as one's own.

m. "Programme" means a programme of study leading to the award of a masters and research level degree;

n. "Researcher" refers to a person conducting academic / scientific research in HEIs;

o. "Script" includes research paper, thesis, dissertation, chapters in books, full-fledged books and any other similar work, submitted for assessment / opinion leading to the award of master and research level degrees or publication in print or electronic media by students or faculty or researcher or staff of an HEI; however, this shall exclude assignments / term papers / project reports / course work / essays and answer scripts etc.;

p. "Source" means the published primary and secondary material from any source whatsoever and includes written information and opinions gained directly from other people, including eminent scholars, public figures and practitioners in any form whatsoever as also data and information in the electronic form be it audio, video, image or text; Information being given the same meaning as defined under Section 2 (1) (v) of the Information Technology Act, 2000 and reproduced here in Regulation 2 (l);

q. "Staff" refers to all non-teaching staff working in HEIs in any capacity whatsoever i.e. regular, temporary, contractual, outsourced etc.;

r. "Student" means a person duly admitted and pursuing a programme of study including a research programme in any mode of study (full time or part-time or distance mode);

s. "University" means a university established or incorporated by or under a Central Act, a Provincial Act or a State Act, and includes an institution deemed to be university under section 3 of the UGC Act, 1956;

t. "Year" means the academic session in which a proven offence has been committed.

Words and expressions used and not defined in these regulations but defined in the University Grants Commission Act, 1956 shall have the meanings respectively assigned to them in UGC Act, 1956.

3. Objectives

3.1 To create awareness about responsible conduct of research, thesis, dissertation, promotion of academic integrity and prevention of misconduct including plagiarism in academic writing among student, faculty, researcher and staff.

3.2 To establish institutional mechanism through education and training to facilitate responsible conduct of research, thesis, dissertation, promotion of academic integrity and deterrence from plagiarism.

3.3. To develop systems to detect plagiarism and to set up mechanisms to prevent plagiarism and punish a student, faculty, researcher or staff of HEI committing the act of plagiarism.

4. Duties of HEI:

Every HEI should establish the mechanism as prescribed in these regulations, to enhance awareness about responsible conduct of research and academic activities, to promote academic integrity and to prevent plagiarism.

5. Awareness Programs and Trainings:

(a) HEI shall instruct students, faculty, researcher and staff about proper attribution, seeking permission of the author wherever necessary, acknowledgement of source compatible with the needs and specificities of disciplines and in accordance with rules, international conventions and regulations governing the source.

(b) HEI shall conduct sensitization seminars/ awareness programs every semester on responsible conduct of research, thesis, dissertation, promotion of academic integrity and ethics in education for students, faculty, researcher and staff.

(c) HEI shall :

i. Include the cardinal principles of academic integrity in the curricula of Undergraduate (UG)/Postgraduate (PG)/Master's degree etc. as a compulsory course work/module.

ii. Include elements of responsible conduct of research and publication ethics as a compulsory course work/module for Masters and Research Scholars.

iii. Include elements of responsible conduct of research and publication ethics in Orientation and Refresher Courses organized for faculty and staff members of the HEI.

iv. Train student, faculty, researcher and staff for using plagiarism detection tools and reference management tools.

v. Establish facility equipped with modern technologies for detection of plagiarism.

vi. Encourage student, faculty, researcher and staff to register on international researcher's Registry systems.

6. Curbing Plagiarism

a) HEI shall declare and implement the technology based mechanism using appropriate software so as to ensure that documents such as thesis, dissertation, publications or any other such documents are free of plagiarism at the time of their submission.

b) The mechanism as defined at (a) above shall be made accessible to all engaged in research work including student, faculty, researcher and staff etc.

c) Every student submitting a thesis, dissertation, or any other such documents to the HEI shall submit an undertaking indicating that the document has been prepared by him or her and that the document is his/her original work and free of any plagiarism.

d) The undertaking shall include the fact that the document has been duly checked through a Plagiarism detection tool approved by the HEI.

e) HEI shall develop a policy on plagiarism and get it approved by its relevant statutory bodies/authorities. The approved policy shall be placed on the homepage of the HEI website.

f) Each supervisor shall submit a certificate indicating that the work done by the researcher under him / her is plagiarism free.

g) HEI shall submit to INFLIBNET soft copies of all Masters, Research program's dissertations and thesis within a month after the award of degrees for hosting in the digital repository under the "*Shodh Ganga e-repository*".

h) HEI shall create Institutional Repository on institute website which shall include dissertation / thesis / paper / publication and other in-house publications.

7. Similarity checks for exclusion from Plagiarism

The similarity checks for plagiarism shall exclude the following:

i. All quoted work reproduced with all necessary permission and/or attribution.

ii. All references, bibliography, table of content, preface and acknowledgements.

iii. All generic terms, laws, standard symbols and standards equations.

Note:

The research work carried out by the student, faculty, researcher and staff shall be based on original ideas, which shall include abstract, summary, hypothesis, observations, results, conclusions and recommendations only and shall not have any similarities. It shall exclude a common knowledge or coincidental terms, up to fourteen (14) consecutive words.

8. Levels of Plagiarism

Plagiarism would be quantified into following levels in ascending order of severity for the purpose of its definition:

i. Level 0: Similarities upto 10% - Minor similarities, no penalty

ii. Level 1: Similarities above 10% to 40%

iii. Level 2: Similarities above 40% to 60%

iv. Level 3: Similarities above 60%

9. Detection/Reporting/Handling of Plagiarism

If any member of the academic community suspects with appropriate proof that a case of plagiarism has happened in any document, he or she shall report it to the Departmental Academic Integrity Panel (DAIP). Upon receipt of such a complaint or allegation the DAIP shall investigate the matter and submit its recommendations to the Institutional Academic Integrity Panel (IAIP) of the HEI.

The authorities of HEI can also take *suomotu* notice of an act of plagiarism and initiate proceedings under these regulations. Similarly, proceedings can also be initiated by the HEI on the basis of findings of an examiner. All such cases will be investigated by the IAIP.

10. Departmental Academic Integrity Panel (DAIP)

i. All Departments in HEI shall notify a DAIP whose composition shall be as given below:

a. Chairman - Head of the Department

b. Member - Senior academician from outside the department, to be nominated by the head of HEI.

c. Member - A person well versed with anti plagiarism tools, to be nominated by the Head of the Department.

The tenure of the members in respect of points 'b' and 'c' shall be two years. The quorum for the meetings shall be 2 out of 3 members (including Chairman).

ii. The DAIP shall follow the principles of natural justice while deciding about the allegation of plagiarism against the student, faculty, researcher and staff.

iii. The DAIP shall have the power to assess the level of plagiarism and recommend penalty(ies) accordingly.

iv. The DAIP after investigation shall submit its report with the recommendation on penalties to be imposed to the IAIP within a period of 45 days from the date of receipt of complaint / initiation of the proceedings.

11. Institutional Academic Integrity Panel (IAIP)

i. HEI shall notify a IAIP whose composition shall be as given below:

a. Chairman - Pro-VC/Dean/Senior Academician of the HEI.

b. Member - Senior Academician other than Chairman, to be nominated by the Head of HEI.

c. Member - One member nominated by the Head of HEI from outside the HEI

d. Member - A person well versed with anti-plagiarism tools, to be nominated by the Head of the HEI.

The Chairman of DAIP and IAIP shall not be the same. The tenure of the Committee members including Chairman shall be three years. The quorum for the meetings shall be 3 out of 4 members (including Chairman).

ii. The IAIP shall consider the recommendations of DAIP.

iii. The IAIP shall also investigate cases of plagiarism as per the provisions mentioned in these regulations.

iv. The IAIP shall follow the principles of natural justice while deciding about the allegation of plagiarism against the student, faculty, researcher and staff of HEI.

v. The IAIP shall have the power to review the recommendations of DAIP including penalties with due justification.

vi. The IAIP shall send the report after investigation and the recommendation on penalties to be imposed to the Head of the HEI within a period of 45 days from the date of receipt of recommendation of DAIP/ complaint / initiation of the proceedings.

vii. The IAIP shall provide a copy of the report to the person(s) against whom inquiry report is submitted.

12. Penalties

Penalties in the cases of plagiarism shall be imposed on students pursuing studies at the level of Masters and Research programs and on researcher, faculty & staff of the HEI only after academic misconduct on the part of the individual has been established without doubt, when all avenues of appeal have been exhausted and individual in question has been provided enough opportunity to defend himself or herself in a fair or transparent manner.

12.1 Penalties in case of plagiarism in submission of thesis and dissertations

Institutional Academic Integrity Panel (IAIP) shall impose penalty considering the severity of the Plagiarism.

i. **Level 0: Similarities upto 10% -** Minor Similarities, no penalty.

ii. **Level 1: Similarities above 10% to 40% -** Such student shall be asked to submit a revised script within a stipulated time period not exceeding 6 months.

iii. **Level 2: Similarities above 40% to 60% -** Such student shall be debarred from submitting a revised script for a period of one year.

iv. **Level 3: Similarities above 60%** -Such student registration for that programme shall be cancelled.

Note 1: Penalty on repeated plagiarism- Such student shall be punished for the plagiarism of one level higher than the previous level committed by him/her. In case where plagiarism of highest level is committed then the punishment for the same shall be operative.

Note 2: Penalty in case where the degree/credit has already been obtained - If plagiarism is proved on a date later than the date of award of degree or credit as the case may be then his/her degree or credit shall be put in abeyance for a period recommended by the IAIP and approved by the Head of the Institution.

12.2 Penalties in case of plagiarism in academic and research publications

I. **Level 0: Similarities up to 10% -** Minor similarities, no penalty.

II. **Level 1: Similarities above 10% to 40%**

i) Shall be asked to withdraw manuscript.

III. **Level 2: Similarities above 40% to 60%**

i) Shall be asked to withdraw manuscript.

ii) Shall be denied a right to one annual increment.

iii) Shall not be allowed to be a supervisor to any new Master's, M.Phil., Ph.D. Student/scholar for a period of two years.

IV. **Level 3: Similarities above 60%**

i) Shall be asked to withdraw manuscript.

ii) Shall be denied a right to two successive annual increments.

iii) Shall not be allowed to be a supervisor to any new Master's, M.Phil., Ph.D. Student/scholar for a period of three years.

Note 1: Penalty on repeated plagiarism - Shall be asked to withdraw manuscript and shall be punished for the plagiarism of one level higher than the lower level committed by him/her. In case where plagiarism of highest level is committed then the punishment for the same shall be operative. In case level 3 offence is repeated then the disciplinary action including suspension/termination as per service rules shall be taken by the HEI.

Note 2: Penalty in case where the benefit or credit has already been obtained - If plagiarism is proved on a date later than the date of benefit or credit obtained as the case may be then his/her benefit or credit shall be put in abeyance for a period recommended by IAIP and approved by the Head of the Institution.

Note 3: HEIs shall create a mechanism so as to ensure that each of the paper publication/thesis/dissertation by the student, faculty, researcheror staff of the HEI is checked for plagiarism at the time of forwarding/submission.

Note 4: If there is any complaint of plagiarism against the Head of an HEI, a suitable action, in line with these regulations, shall be taken by the Controlling Authority of the HEI.

Note 5: If there is any complaint of plagiarism against the Head of Department/Authorities at the institutional level, a suitable action, in line with these regulations, shall be recommended by the IAIP and approved by the Competent Authority.

Note 6: If there is any complaint of plagiarism against any member of DAIP or IAIP, then such member shall excuse himself / herself from the meeting(s) where his/her case is being discussed/investigated.

13. Removal of Difficulty

UGC reserves the right to remove difficulty/difficulties in the course of implementations of these Regulations in consultation with the Government of India/ Ministry of Human Resource Development.

Prof. RAJNISH JAIN, Secy.

[ADVT.-III/4/Exty./161/18]

RAKESH SUKUL

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M. TECH. SEMESTER – I (CE)
SUBJECT: ADVANCED COMPILER TECHNIQUES

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	1	2	6	5	60	40	25	25	150

A. DETAILED SYLLABUS

1 INTRODUCTION TO ADVANCED TOPICS

Review of Compiler Structure, Advanced Issues in Elementary Topics, The Importance of Code Optimization, Structure of Optimizing Compilers, Informal Compiler Algorithm Notation (ICAN)

2 CONTROL FLOW ANALYSIS

Approaches to Control-Flow Analysis, Depth-First Search, Preorder Traversal, Postorder Traversal, and Breadth-First Search, Dominators, Loops and Strongly Connected Components, Reducibility, Interval Analysis and Control Trees, Structural Analysis

3 DATA FLOW ANALYSIS

Basic Concepts: Lattices, Flow Functions, and Fixed Points, Taxonomy of Data-Flow Problems and Solution Methods, Iterative Data-Flow Analysis, Lattices of Flow Functions, Control-Tree-Based Data-Flow Analysis, Structural Analysis, Interval Analysis, Static Single-Assignment (SSA) Form, Dealing with Arrays, Structures, and Pointers

4 DEPENDENCE ANALYSIS AND DEPENDENCE GRAPHS

Dependence Relations, Basic-Block Dependence DAGs, Dependences in Loops, Dependence Testing, Program-Dependence Graphs

5 EARLY OPTIMIZATION

Constant-Expression Evaluation (Constant Folding), Scalar Replacement of Aggregates, Algebraic Simplifications and Re-association, Value Numbering, Copy Propagation, Sparse Conditional Constant Propagation

6 REDUNDANCY ELIMINATION

Common-Sub-expression Elimination, Loop-Invariant Code Motion, Partial-Redundancy Elimination, Redundancy Elimination and Reassociation, Code Hoisting

7 LOOP OPTIMIZATION

Induction-Variable Optimizations, Unnecessary Bounds-Checking Elimination

8 REGISTRATION ALLOCATION

Register Allocation and Assignment, Local Methods, Graph Coloring, Priority-Based Graph Coloring

9 INSTRUCTION SCHEDULING

branch scheduling, list scheduling

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Advanced Compiler Design and Implementation, by Steven Muchnick, Publisher: Morgan Kaufmann
2. Engineering a Compiler, by Keith Cooper and Linda Torczon, Publisher: Morgan Kaufmann
3. Optimizing Compilers for Modern Architectures, by Randy Allen & Ken Kennedy, Publisher: Morgan Kaufmann.

M. TECH. SEMESTER – I (CE)
SUBJECT: ADVANCE COMPUTER NETWORKS

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	1	2	6	5	60	40	25	25	150

A. DETAILED SYLLABUS

1 OVERVIEW

Overview of TCP/IP protocol suite, Different TCP/IP Layers and their major Functionalities

Various addressing used in TCP/IP

2 IP ADDRESSING & DELIVERY OF IP PACKETS

IPv4 addressing scheme and notations, Subnetting and Supernetting, Different Routing Methods

3 PROTOCOLS

ARP, RARP, IP, ICMP,IGMP ,TCP and UDP

4 WIRELESS NETWORKS

Introduction & Applications, Types of Wireless Networks

5 AD HOC WIRELESS NETWORKS

Introduction & Issues in Ad-hoc wireless networks, Ad Hoc wireless Internet, Issues of Routing Protocol, Various Routing Protocols, Energy Management in Ad Hoc Wireless Networks

6 TRANSPORT LAYER AND SECURITY PROTOCOLS FOR AD HOC WIRELESS NETWORKS

Issues in Designing a Transport Layer Protocol for Wireless Networks, Design Goals of a Transport Layer Protocol for Wireless Networks, Classification of Transport Layer Solutions TCP over Wireless Networks, Other Transport Layer Protocols for Wireless Networks

7 DELAY TOLERANT NETWORKS

Application and issues, Architecture and routing algorithms

B. RECOMMENDED TEXTBOOK/ REFERENCE BOOKS

1. AdHoc Wireless Networks, Architectures and Protocols, 2nd Edition By: C. Siva Ram Murthy, B. S. Manoj. Publisher: Prentice Hall of India
2. Adhoc Mobile Wireless Networks: Principles, Protocols and Applications, 2nd Edition By:Subir Kumar Sarkar, T. G.Basavaraju, C. Puttamadappa Publisher: Auerbach Publications
3. Adhoc Networks: Technology & Protocols, 1st Edition By:Prasant Mohapatra, S.V. Krishna-murthy Publisher: Spriger
4. Principles of Wireless Networks, 4th Edition By: Kaveh Pahlavan, Prashant Krishnamurthy Publisher: Pearson Education
5. Wireless Networks, 1st Edition By: P. Nicopolitidis, M. S. Obaidat, G.I. Papadimitria, A.S. Pomportsis Publisher: John Wiley & Sons.
6. Wireless Communications & Networks, 2nd Edition By: W. Stallings Publisher: Prentice Hall

M.TECH. SEMESTER – I (CE)
SUBJECT: MACHINE LEARNING

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
4	0	2	6	5	60	40	25	25	150

A. DETAILED SYLLABUS

1 INTRODUCTION

Well posed learning problem, Perspective and issues in machine learning

2 CONCEPT LEARNING

Concept learning tasks, Finding maximally specific hypothesis, version space and candidate elimination, Inductive bias

3 DECISION TREE CLASSIFICATION

Appropriate problem for Decision tree learning, decision tree algorithm, hypothesis space search, Inductive bias in decision tree, Issues in decision tree leraning.

4 HYPOTHESIS EVALUATION

Estimating Hypothesis accuracy, Basics of sampling theory, Confidence interval, comparing learning algorithms

5 BAYESIAN LEARNING

Bayes theorem, Bayes theorem and concept learning, maximum likelihood and least square error hypothesis, Minimum description length principle, Bayes optimal classifier, Gibbs algorithm, Naive bayes classifier, Bayesian Belief Network, The EM algorithm.

6 SUPPORT VECTOR MACHINE

Max margin motivation: low density, high stability, Margin geometry to primal SVM formulation for separable training data, Dual formulation and role of alpha in a form of sparse local regression, Inseparable data, slack variables, hinge loss, upper bound on 0/1 training loss, Handling non-linear regression by lifting data points to higher dimension, Polynomial, Gaussian, RBF kernels, Sequential minimal optimization (SMO) algorithm

7 COMPUTATIONAL LEARNING THEORY

Probably learning an approximately correct hypothesis, sample complexity of finite hypothesis space, sample complexity of infinite hypothesis test, The mistake bound model of learning

8 INSTANCE BASED LEARNING

K-Nearest neighbor learning, Locally weighted regression, Radial basis function, Case based

reasoning, Lazy and Eager learning

9 CLUSTERING

Mixture model and Expectation maximization, K-Means Clustering, Distance based clustering, Density based clustering techniques

10 LEARNING SET RULES

Sequential covering algorithm, Learning first order rules, FOIL, induction and inverted deduction, Inverting resolution

11 ENSAMBLE LEARNING

Bagging and Boosting, Random forest, Adaboost

12 DIMENSIONALITY REDUCTION

Curse of dimensionality, Principal Component Analysis, Latent Semantic Analysis

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Machine Learning. T. Mitchell. McGraw-Hill, 1997.
2. Understanding Machine Learning. Shai Shalev-Shwartz and Shai Ben-David. Cambridge University Press. 2017
3. Pattern recognition and machine learning by Christopher Bishop, Springer Verlag, 2006.

M. TECH. SEMESTER – I (CE)
SUBJECT: DIGITAL IMAGE PROCESSING

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	1	2	6	5	60	40	25	25	150

A. DETAILED SYLLABUS

1 INTRODUCTION

Introduction, components of Digital Image Processing, examples, steps in DIP.

2 DIGITAL IMAGE FUNDAMENTALS

Elements of Visual perception, Light and Electromagnetic spectrum, Image Sensing and application, image sampling and quantization, Basic relationships between pixels, mathematical tools.

3 IMAGE TRANSFORMATION AND SPATIAL FILTERING

Basic intensity transformation, Histogram processing, Spatial filtering, smoothing and sharpening, combining spatial enhancement methods

4 IMAGE TRANSFORMATION IN FREQUENCY DOMAIN

Concepts, Sampling and Fourier transform, 1D and 2D Discrete Fourier Transform, properties of DFT, Basics of filtering, Image smoothing and sharpening, selective filtering, implementation.

5 IMAGE RESTORATION AND RECONSTRUCTION

Model of image degradation/restoration, noise models, restoration in spatial and frequency domain, estimating degradation function, inverse filtering, Wiener filtering, constrained least square filtering, geometric mean filter, image reconstruction from projections

6 COLOR IMAGE PROCESSING

Fundamentals, color models, pseudocolor image processing, full-color image processing, color transformation, smoothing and sharpening, segmentation based on color, noise in color images

7 WAVELETS AND MULTI-RESOLUTION PROCESSING

Background, multi-resolution expansion, wavelet transformation in one dimension, fast wavelet transform.

8 IMAGE COMPRESSION

Fundamentals, Huffman coding, golomb coding, arithmetic coding, LZW coding, run-length coding, symbol-based coding, bit-plane coding, block transform coding, predictive coding,

wavelet coding.

9 MORPHOLOGICAL IMAGE PROCESSING

Erosion and dilation, opening and closing, hit-or-miss transformation, basic morphological algorithms.

10 IMAGE SEGMENTATION

Fundamentals, point-line-edge detection, thresholding, region-based segmentation.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Digital Image Processing (3 rd Edition) By: Rafael C. Gonzalez and Richard E. Woods Publisher: Pearson
2. Fundamental of Digital Image Processing, 1 st Edition By: Anil K. Jain, Publisher: Pearson Education
3. Introduction to Data Compression, 3rd Edition By: Khalid Sayood, Publisher: Morgan kaufmann.

M. TECH. SEMESTER – I (CE)
SUBJECT: ADVANCED SOFTWARE ENGINEERING

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	1	2	6	5	60	40	25	25	150

A. DETAILED SYLLABUS

1 INTRODUCTION

Software Product and Process, Phases in Software Development, Software Development Process Models.

2 SOFTWARE ANALYSIS AND DESIGN

Analysis Methods, Software Requirement Specifications, System Design Methods, Detailed Design, Architectural Design and Component Level Design, User Interface Design.

3 IMPLEMENTATION AND TESTING

Coding, Verification and Testing. Testing Techniques

4 SOFTWARE QUALITY

Quality Standards, Quality Assurance, Measuring Aspect of Software Quality, Software Reliability and Maintenance.

5 SOFTWARE METRICS

Software Measurement and Metrics, Software Quality, Metrics for Software Product, Process and Project.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Software Engineering, Pressman, McGraw-Hill, 1992
2. Software Metrics , Fenton & Pfleeger, PWS Publication
3. Watts S. Humphrey, Managing The Software Process, Addison Wesley, 1989
4. Encyclopedia Of Software Engineering , J.J. Marciniak, Ed., Vols. 1 And 2 John Wiley,1994

M. TECH. SEMESTER I (CE)
SUBJECT: OPERATING SYSTEM DESIGN AND IMPLEMENTATION

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	1	2	6	5	60	40	25	25	150

A. DETAILED SYLLABUS

1. **Booting and system calls**
2. **Devices And Device Drivers**
3. **Processes Description And Control**
4. **Signals**
5. **Memory Management And Virtual Memory**
6. **Threads, SMP, Microkernel, Exo-Kernel**
7. **Inter-process Communication (shared Memory, Semaphores, And Synchronization)**
8. **Kernel Interaction With Runtime Support Systems**
9. **Multiprocessor & Real-time Scheduling**
10. **Memory Management In UNIX/Linux**
11. **Fundamentals Of Real Time Operating Systems & Study Of Various RTOS – Real Time Operating**
12. **System :** RTAI, WinCE, VxWorks

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Operating System By William Stallings, PHI Publication
2. “The Design Of The UNIX O/S", Maurice J.Bach,PHI
3. "Modern Operating Systems", Tannenbaum, PHI
4. "O/S:A Design-Oriented Approach", Charles Crowley, TMH
5. Research Papers Related To RTOS, Linux Kernel Internals, Exo-Kernel

M. TECH. SEMESTER – I (CE)
SUBJECT: ADVANCED PROGRAMMING IN UNIX

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
3	1	2	6	5	60	40	25	25	150

A. DETAILED SYLLABUS

1 **UNIX system overview**

2 **File I/O & Files and directories**

3 **System data files and information**

4 **Process environment**

5 **Process control & Process relationships**

6 **Signals**

7 **Threads**

8 **Daemon processes**

9 **Inter-process communication**

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. "Advanced Programming in the UNIX Environment" by W. Richard Stevens and Stephen A. Rago, 3rd edition, Addision Wesley Professional
2. "Advanced Linux Programming" by Mark Mitchell, Jeffrey Oldham, Alex Samuel, 1st edition, Pearson Education
3. "Beginning Linux Programming" by Neil Matthew and Richard Stones, 4th edition, Wiley Publishing Inc.
4. "Linux System Programming" by Robert Love, O'reilly

M. TECH. SEMESTER I (CE)
SUBJECT: ADVANCED DATA STRUCTURES

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
3	1	2	6	5	60	40	25	25	150

A. DETAILED SYLLABUS

1 DICTIONARIES

Definition, Dictionary Abstract Data Type, Implementation of Dictionaries.

2 HASHING

Review of Hashing, Hash Function, Collision Resolution Techniques in Hashing, Separate Chaining, Open Addressing, Linear Probing, Quadratic Probing, Double Hashing, Rehashing, Extendible Hashing.

3 SKIP LIST

Need for Randomizing Data Structures and Algorithms, Search andUpdate Operations on Skip Lists, Probabilistic Analysis of Skip Lists, Deterministic Skip Lists

4 TREES

Binary Search Trees, AVL Trees, Red Black Trees, 2-3 Trees, B-Trees, Splay Trees

5 TEXT PROCESSING

Sting Operations, Brute-Force Pattern Matching, The Boyer-Moore Algorithm, The Knuth-Morris-Pratt Algorithm, Standard Tries, Compressed Tries, Suffix Tries, The Huffman Coding Algorithm, The Longest Common Subsequence Problem (LCS), Applying Dynamic Programming to the LCS Problem.

6 COMPUTATIONAL GEOMETRY

One Dimensional Range Searching, Two Dimensional Range Searching, Constructing a Priority Search Tree, Searching a Priority Search Tree, Priority Range Trees, Quadtrees, k-D Trees.

7 Recent Trends in Hashing, Trees, and various computational geometry methods for effeciently solving the new evolving problem

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, 2nd Edition, Pearson, 2004.

2. M T Goodrich, Roberto Tamassia, Algorithm Design, John Wiley, 2002.

M. TECH. SEMESTER I (CE)
SUBJECT: RESEARCH METHODOLOGY FOR COMPUTER SCIENCE

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
2	0	0	2	2	40	-	-	-	40

A. DETAILED SYLLABUS

1 INTRODUCTION TO RESEARCH METHODOLOGY

Motivation and Objectives in Research, Distinct Approaches and Significance of research-Descriptive vs Analytical, Applied vs Fundamental, Quantitative vs Qualitative, Conceptual vs Empirical, The Significance of Research. Research Methods vs Methodology. Significance of research.

2 LITERATURE SURVEY

Finding Research Papers, Critical Reading, Developing a Literature, Authors, Editors, and Referees.

3 HYPOTHESIS, QUESTIONS AND EVIDENCE IN COMPUTER SCIENCE AND ENGINEERING

Hypotheses, Defending Hypotheses, Forms of Evidence, Use of Evidence, Approaches to Measurement

4 QUANTITATIVE AND QUALITATIVE STUDY DESIGNS, DATA COLLECTION

Concept of Quantitative and Qualitative Study Designs, Data collection in Quantitative and Qualitative research, Major approaches of Information gathering.

5 EXPERIMENTATION IN COMPUTER SCIENCE AND ENGINEERING

Persuasive Data, Interpretation, Robustness, Performance of Algorithms, Human Studies, Coding for Experimentation, Describing Experiments

6 PUBLICATION

Writing research papers, purpose, nature and evaluation, content and format, Presentation of Algorithms and graphs,Research Presentations.

7 ETHICS

Intellectual Creations, Plagiarism, Misrepresentation, Authorship

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. “Writing for Computer Science”, by Justin Zobel, Springer,2014

2. “Guide to Advanced Empirical Software Engineering”, by Forrest Shull, Springer,2008

3. “Research Methodology: A Step by Step Guide for Beginners”, by Ranjit Kumar, Pearson India,2005
4. Easterbrook, Steve, et al. "Selecting empirical methods for software engineering research." Guide to advanced empirical software engineering. Springer, London, 2008. 285-311.
5. S. Demeyer, "Research methods in computer science," 2011 27th IEEE International Conference on Software Maintenance (ICSM), Williamsburg, VI, 2011, pp. 600-600.
6. Nallaperumal, Krishnan & Krishnan, Annam. (2013). Engineering Research Methodology A Computer Science and Engineering and Information and Communication Technologies Perspective.
7. Research Design. Qualitative, Quantitative, and Mixed Methods Approaches. By John W. Creswell, Fourth Edition. SAGE Publication, 2014

M. TECH. SEMESTER – II (CE)
SUBJECT: MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
4	0	0	4	4	60	40	-	-	100

A. DETAILED SYLLABUS

1. Probability mass, density, and cumulative distribution functions, Parametric families of distributions, Expected value, variance, conditional expectation, Applications of the univariate and multivariate Central Limit Theorem, Probabilistic inequalities, Markov chains

2. Random samples, sampling distributions of estimators, Methods of Moments and Maximum Likelihood

3. Statistical inference, Introduction to multivariate statistical models: regression and classification problems, principal components analysis, The problem of overfitting model assessment.

4. Graph Theory: Isomorphism, Planar graphs, graph colouring, Hamilton circuits and Euler cycles. Permutations and Combinations with and without repetition. Specialized techniques to solve combinatorial enumeration problems

5. Computer science and engineering applications in Data mining, Network protocols, analysis of Web traffic, Computer security, Software engineering, Computer architecture, operating systems, distributed systems, Bioinformatics, Machine learning.

6. Recent Trends in various distribution functions in mathematical field of computer science for varying fields like bioinformatic, soft computing, and computer vision

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. John Vince, Foundation Mathematics for Computer Science, Springer.
2. K. Trivedi. Probability and Statistics with Reliability, Queuing, and Computer Science Applications. Wiley.
3. M. Mitzenmacher and E. Upfal.Probability and Computing: Randomized Algorithms and Probabilistic Analysis.
4. Alan Tucker, Applied Combinatorics, Wiley

M. TECH. SEMESTER – II (CE)
SUBJECT: DISTRIBUTED COMPUTING

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	1	2	6	5	60	40	25	25	150

A. DETAILED SYLLABUS

1 **Distributed System Architecture**

2 **Logical Time and Global States**

3 **Distributed Mutual Exclusion**

4 **Distributed Deadlock**

5 **Distributed File Systems**

6 **Distributed Shared Memory**

7 **Distributed Scheduling (job scheduling, load balancing, load sharing)**

8 **Consistency and Replication**

9 **Failure Recovery and Fault Tolerance**

10 **Security in Distributed Systems**

11 **Peer to Peer Systems**

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Advanced Concepts in Operating Systems by Mukesh Singhal and Niranjan Shivaratri, MGH
2. Distributed Systems: Principles and Paradigms by Andrew Tanenbaum and Maarten Steen, Pearson
3. Distributed Operating Systems: Concepts And Design by Pradip K. Sinha, Pearson
4. Distributed Systems : Concepts & Design by Colouris and Dollimore, Addison Wesley

M. TECH. SEMESTER – II (CE)
SUBJECT: DESIGN AND ANALYSIS OF ALGORITHMS

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	1	2	6	5	60	40	25	25	150

A. DETAILED SYLLABUS

1 **Notion Of Algorithms. Big-Oh, Small-OS, Theta & Omega Notations**

2 **Review Of Data Structures And Models Of Computation**

3 **Basic Paradigms, E.g. Greedy Algorithms, Divide And Conquer Strategies, Dynamic Programming**

4 **Graph Algorithms**

5 **Algorithms For Sorting & Searching**

6 **Order Statistics**

7 **String Matching & Sequence Comparison**

8 **Geometric Algorithms**

9 **Probabilistic Algorithms**

10 **The Classes P and NP And The Notation Of NP-completeness.**

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Aho, A. V. , Hopcroft J. E. , Ullman J.D., Design And Analysis Of Algorithms, Addison-wesly, 1974
2. Brassard G, And Bratley P., Algorithms, Theory And Practices, Prentice-Hall International-1988
3. Cormen T. H. , Leiserson C.E. And Rivest R. L., Introduction To Algorithms, MIT Press, 1990

M. TECH. SEMESTER II (CE)
SUBJECT: SOFT COMPUTING

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	1	2	6	5	60	40	25	25	150

A. DETAILED SYLLABUS

1 INTRODUCTION

Introduction to soft computing, Intelligent System, neural network, fuzzy logic and genetic algorithm

2 NEURAL NETWORK

Introduction, architecture, supervised and unsupervised learning, multilayer feed forward network and back propagation algorithm, Error-correction learning, Memory based learning, Hebbian learning, competitive learning, Boltzmann learning, Single layer perceptron, Multilayer perceptron.

3 CONVOLUTIONAL NEURAL NETWORK

Basics of convolutional neural networks, activation functions (soft-max, Relu), initialization, dropout, batch normalization, Update rules, ensembles, data augmentation, transfer learning, applications of CNN.

4 FUZZY LOGIC

Introduction, fuzzy sets and rules, fuzzy membership function, fuzzy controllers, application of fuzzy logic.

5 GENETIC ALGORITHM

Introduction, operators, selection, crossover mutations, different genetic algorithms and its applications.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Neural Networks: A Comprehensive Foundation, S. Haykin, PHI
2. Introduction To Applied Fuzzy Electronics, Ahmad Ibrahim, PHI
3. Genetic Algorithms In Search, Optimization, And Machine Learning, D. E. Goldberg, Addison-Wesley
4. Fundamental of deep learning” by Nikhil Buduma

M. TECH. SEMESTER II (CE)
SUBJECT: BIG DATA ANALYTICS

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
4	0	2	6	5	60	40	25	25	150

A. DETAILED SYLLABUS

1 INTRODUCTION

An overview of Data Warehousing and data mining.

2 A MULTI DIMENSIONAL DATA MODEL

Multi dimentional data cubes, Star, Starr Flakes & fact constellation Schema, concept Hierarchies, OLAP

3 DATA WAREHOUSE ARCHITECTURE

Steps for Design & Construction of Data Warehouse,A 3-Tier Data Warehouse Architecture, ROLAP, MOLAP, HOLAP

4 DATA PREPROCESSING

Overview, Need for Pre- Processing, Issues Related to Efficient Data Handling(Extacting, Tranformation And Handling of Large Databases)

5 DATA REDUCTION

Discretization & Concept Hierarchy Generation, Data Warehouse Implementation: Efficient Computation of Data Cubes, Indexing OLAP data, Efficient, Processing of OLAP Queries, Metadata, Data Warehouse Backend Tools & Utilities. Data Mining Premitives, Language & System Architecture: What defines a Data Mining Task ? A Data Mining Query Language, Architecture of a Data Mining System

6 CONCEPT DESCRIPTION

Characterization & Comparison: An Overview, Data generalization & Summarization-based Characterization, Analytical Characterization: Analysis & Attribute Relevance, Mining class Comparisons, Mining Descriptive Statistical Measures, Concept Description & Its Mining

7 MINING ASSOCIATION RULE

Basic Concepts, Market Basket Analysis, Mining Multi-Level, Association Rules From Transaction Rules from Trasactional Database, Mining Multi-Level Association Rules From Transaction Database, Mining Multi-Dimensional Association Rules From Relational Databases & Data Warehouses, From Association Mining To Correlation Analysis, Constraint Based Association Mining

8 CLASSIFICATION & PREDICTION

An Overview & Basic Concepts, Classification by Decision Tree Induction, Bayesian Classification, Classification by back Propagation, Classification Based on Concepts from Association Rules Mining, other Methods, such as Genetic Algorithm, Fuzzy set Approach, Case based Reasoning, etc., Prediction, classifier Accuracy

9 CLUSTER ANALYSIS

An Overview & Basic Concepts, Partitioning methods, hierarchical methods, density-based methods, grid-base clustering methods.

10 MINING COMPLEX TYPES OF DATA

An overview & basic concepts, mining spatial databases, mining multimedia databases, mining time series & sequence data, mining text databases, mining the world world wide web.

11 APPLICATIONS & TRENDS IN DATA MINING

Data mining applications, data mining system procedures & research prototypes, additional themes on data mining, social impact of data mining, social impact of data mining, trends in data mining. Popular products, and a methodology to select a data mining tool

12 INTRODUCTION TO BIG DATA

Introduction of Big Data and Hadoop – Overview and Evolution of Big-Data Hadoop, Architecture/Framework, HDFS Architecture/Framework, Map reduce, Hadoop Environment Setup, Distributed File System – Big Data and its Importance, Drivers for Big data, Big Data Analytics, Big Data Applications, Optimization techniques, Dimensionality Reduction techniques, Time series Forecasting, Social networking and its Application, Big Data analysis using Hadoop, Pig, Hive, Mongodb, Spark and Mahout, Data analysis techniques like Discriminant Analysis and Cluster Analysis, Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), Introduction to NOSQL (Neo4j) and MongoDB, Hive Architecture, HBase concepts, PIG, Zookeeper - how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications with Zookeeper.

13 HADOOP

Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands , Anatomy of File Write and Read., NameNode, Secondary NameNode, and DataNode, Hadoop MapReduce paradigm, Algorithms using Map Reduce, Understanding inputs and outputs of MapReduce ,Map and Reduce tasks, Job, Task trackers ,Cluster Setup, SSH and Hadoop Configuration, HDFS Administering ,Monitoring and Maintenance Moving Data in and out of Hadoop, Data Serialization

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Jiawei Han & Michelline Kamber, Data Mining – Concepts & Techniques, Morgan Kaufmann Publishers (Academic Press)
2. W. B. Frakes & R. Baeza – Yates Eds., Information Retrieval: Data Structures & Algorithms, Prentice Hall, 1992
3. Michael J A Berry & Gordon Linoff, Data Mining Techniques: For Marketing, sales, customer support
4. Pieter Adriaans & Dolf Zantinge, Data Mining, Pearson Education Asia, 2001

M. TECH. SEMESTER II (CE)
SUBJECT: PEDAGOGY STUDIES

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
2	0	0	2	0	-	-	-	-	-

A. DETAILED SYLLABUS

1 INTRODUCTION AND METHODOLOGY

Aims and rationale, Policy background, Conceptual framework and terminology, Theories of learning, Curriculum, Teacher education. Conceptual framework, Research questions. Overview of methodology and Searching.

2 THEMATIC OVERVIEW

Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries. Curriculum, Teacher education.

3 EVIDENCE ON THE EFFECTIVENESS OF PEDAGOGICAL PRACTICES

Methodology for the in depth stage: quality assessment of included studies. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? Theory of change. Strength and nature of the body of evidence for effective pedagogical practices. Pedagogic theory and pedagogical approaches. Teachers' attitudes and beliefs and Pedagogic strategies.

4 PROFESSIONAL DEVELOPMENT

alignment with classroom practices and follow-up support Peer support, Support from the head teacher and the community. Curriculum and assessment Barriers to learning: limited resources and large class sizes

5 RESEARCH GAPS AND FUTURE DIRECTIONS

Research design, Contexts, Pedagogy, Teacher education, Curriculum and assessment, Dissemination and research impact.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2): 245-261.
2. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of Curriculum Studies, 36 (3): 361-379.
3. Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report 1. London: DFID.

4. Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33 (3): 272–282.
5. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.
6. Chavan M (2003) Read India: A mass scale, rapid, 'learning to read' campaign.

M. TECH. SEMESTER – I (CIVIL-GEOTECHNICAL ENGINEERING)

SUBJECT: SOIL ENGINEERING - I

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	prac	Total
3	1	0	4	4	60	40	25	-	125

A. DETAILED SYLLABUS

Problems in Geotech. Engg., Concept of point, line and plane, Idealized concept soil based on practice size, orientation, crystal structure, electrical imbalance, viscosity, Stock's law, Concept of effective diameter, clay minerals, soil water consistency, activity, sensitivity and thixotropy, IS soil classification

Basic concept of flow through porous media; Darcy's law its limitation for use in real soils; Effective stress concept; suction potential and capillary flow, seepage, flow nets and phreatic lines

Description of state of stress and strain at a point, Stress distributions, Problems in elastic half-space; familiarity with Boussinesq's, Westergard's, Burmister's and Midlin's problems, distribution of contact pressure

Soil compaction, compressibility of soil, consolidation, one, two and three dimensional problems; Consolidation of partially saturated soils; determination of over consolidation pressure, Settlement computations.

PREREQUISITES/ SELF-STUDY:

Soil as three phase system, weight and volume relations, Soil Classification Systems,

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Soil Mechanics – D. W. Taylor
2. Soil Engieering – M. G. Spangler
3. Soil Mechanics – Means & Parcher
4. Advanced Soil Mechanics – B. M. Das
5. Soil Physics – Baver
6. Principles of Soil Mechanics – R. F. Scott

M. TECH. SEMESTER – I (CIVIL-GEOTECHNICAL ENGINEERING)

SUBJECT: ADVANCED FOUNDATION ENGINEERING

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	1	0	4	4	60	40	25	-	125

A. DETAILED SYLLABUS

- Planning of subsoil exploration of major civil engineering projects, deriving characteristic strength deformation parameters from soil exploration report, calculation of safe bearing capacity for various soil types from shear as well as settlement criteria, pull out resistance of foundations, extrapolation of plate load test and pile load tests.
- Proportioning of isolated footings, combined footings, raft, floating foundations for different load combinations,
- Design of pile foundation for axial load – compression and pull out, lateral loads, negative skin friction, group action in piles, design of piles cap
- Foundations for water tanks, chimney, transmission line towers, antenna etc.
- Free and fixed cantilever sheet pile walls, anchored bulkheads

PREREQUISITES/ SELF-STUDY:

- Methods of drilling/boring and sampling.
- Field Test Procedures as per IS Code: SPT, SCPT, Plate Load Test, Pile Load Test
- Laboratory Test Procedures as per IS Code: Classification Tests, Shear Tests, Consolidation Test, Swell Tests,
- Bearing Capacity as per IS 6403 for Shallow Foundations, Settlement Calculations for Sand and Clay soils as per IS 8009.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Analysis and design of foundation - J. E. Bowles
2. Soil mechanics & foundation engg. vol-II - V.N.S. Murthy
3. Principles of foundation Engg. - Braj M. Das
4. Foundation Engineering - M.J. Tomlinson
5. Analysis and Design of Substructures - Swami Saran
6. Foundation Design – Coduto
7. Design Aids in Soil Mecahnics and Foundation Engg. - Kaniraj
8. SP 36, pt 1 and 2, IS 6403, IS 8009 pt.1, IS 2911 (all),

M. TECH. SEMESTER – I (CIVIL-GEOTECHNICAL ENGINEERING)

SUBJECT: SOLID MECHANICS WITH FINITE ELEMENT METHODS

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	1	0	4	4	60	40	25	-	125

A. DETAILED SYLLABUS

- Linear elasticity; stress, strain, constitutive relations; Boundary conditions; Description of an elasticity problem as a boundary value problem, Plane stress, strain, axial symmetrical problems.

- Introduction to plasticity, Yield condition; ideal elasto-plastic material.

- Analysis of Continuum and discrete structures, finite element principle and solution for continuum problems, steps in finite element analysis, principles of discretization, formulation of element stiffness matrix based on direct, variation principles, shape functions, numerical integration, convergence, 2-D formulations for plane stress, plane strain, axisymmetric including isoperimetric elements, introduction to 3D brick elements for Continuum problems.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Finite Element Analysis - Krishnamurthy
2. Finite Element Method - Desai & Ables
3. The Finite Element Method - Rockey, Evans & others
4. The Finite Element Method - Zienkiewicz
5. Concepts and Application of Finite Element Analysis - Cook
6. Advance Mechanics of Solids - Srinath

M. TECH. SEMESTER – I (CIVIL-GEOTECHNICAL ENGINEERING)

SUBJECT: SUBSURFACE EXPLORATIONS: CONCEPT TO CONCLUSION

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
2	1	0	3	3	40	0	25	-	65

A. DETAILED SYLLABUS

For Soil as well as Rock : Problems and phases of foundation investigations, planning of subsurface exploration program, defining no. of boreholes, depth of boreholes, insitu tests and sampling frequency for each borehole, other insitu tests, samples to be collected, type and no. of lab. test to be carried out on various samples, tendering and specifications, soundings and drilling, sample requirements, sampling, methods and equipment, Handling, preservation and Transportation of samples, sample preparation, insitu testing, analysis of the results of insitu and lab testing, characteristic strength deformation parameters for geotechnical design, detailed reporting for various geotechnical problems. Use of software for Report preparation in subsurface explorations.

Insitu testing includes SPT, SCPT, DCPT, Static and Cyclic plate load test as well as Pile Load test, Block Vibration test, Electrical resistivity test, Seismic refraction tests, Ground penetration radar, high strain and low strain nondestructive testing of pile etc.

PREREQUISITES/ SELF-STUDY:

- Methods of drilling/boring, sampling
- Field Test Procedures as per IS Code: SPT, SCPT, Plate Load Test, Pile Load Test
- Laboratory Test Procedures as per IS Code: Classification Tests, Shear Tests, Consolidation Test, Swell Tests,
- Bearing Capacity as per IS 6403 for Shallow Foundations, Settlement Calculations for Sand and Clay soils as per IS 8009.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Earth Manual – USDI Publications
2. Compendium of Indian standards on soil Engineering part II, 1988.
3. IRC- 78
4. Subsurface Explorations – Handy
5. Foundation Engineering Handbook – Witerkorn and Fang
6. Foundation engineering Handbook – Sowers and Sowers
7. Foundation Engineering Handbook – Leonards
8. Principles of Foundation Engg. – B. M. Das
9. Analysis and design of foundation – J. E. Bowles
10. Foundation design Manual – N. V. Nayak
11. Handbook of Geotechnical engg. – R. K. Rowe

M. TECH. SEMESTER – I (CIVIL-GEOTECHNICAL ENGINEERING)

SUBJECT: GEOTECH. LAB TESTING PRACTICE

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
0	0	4	4	2	0	0	50	50	100

A. DETAILED SYLLABUS

Laboratory Tests on Soil: sample preparation, testing, analysis and reporting as per IS Code, uncertainty analysis of test results,

Grain size distribution for coarse grain soil, fine grain soil: dry sieve analysis, wet sieve analysis, hydrometer analysis, liquid limit, plastic limit, shrinkage limit, free swell test

Light compaction test, heavy compaction test, unconfined compressive strength, direct shear test, triaxial compression test, vane shear test

Constant head and falling head permeability test, One dimensional consolidation test, swell pressure test

Rock core sample preparation, rock tests,

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Head, H.K Manual of laboratory testing: Vol: 1 to 3,1981
2. Compendium of Indian standards on soil Engineering part I, 1987
3. Lab. Soil Testing – Lambe T. W.

M. TECH. SEMESTER – I (CIVIL-GEOTECHNICAL ENGINEERING)

SUBJECT: ELECTIVE PAPER - I

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
2	1	0	0	3	40	0	25	0	65

SUBJECT OPTIONS:

1. ENVIROMENTAL GEOTECHNOLOGY

Introduction to environmental geotechnique, source, production and classification of wastes; soil-pollution interaction, effects of pollutant on soil properties, foundation problems on contaminated clays, hazardous waste management, criteria for selection of sites for waste disposal facilities, subsurface disposal techniques, passive containment systems, monitoring and performance of waste facilities.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Proceeding of the Workshop on Geotechnical Hazardous Waste Management at DDU Nadiad
2. Criteria for Hazardous Waste Landfills: CPCB Publication, Feb. 2001.
3. Geotechnology of Waste Management - Oweis I, S. and Khera R.P.

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2. ROCK MECHANICS

Physical and structural geology of rocks, classification of rocks, mapping of joins, Classification of inferential testing, transitional materials, engineering property evaluation; laboratory methods and insitu tests, friction in rocks, elasticity and strength of rocks, insitu stress determination, application of rock mechanics in engineering and underground openings, slope stability and foundation problems.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Rock Mechanics – Goodman, F. E.
2. Rock Engineering – Ohn, A. Franklin and Maurice B. Dusseault,
3. Rock Mechanics in Engineering Practical – Stagg K G & Zienkiewicz 0 C
4. Rock Mechanics – Muller
5. Engineering in Rocks for Slopes, Foundation and tunnels – Ramamurthy T.
6. Engineering Rock Mechanics – An Introduction to the Principles – Hudson J A and Harrison J P

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3. NUM. METHODS & APPLICATION TO GEOTECHNICAL ENGG.

A. DETAILED SYLLABUS

Advanced Matlab Applications for:

Solution of non – linear algebraic equations, , numerical solutions of ordinary differential equations and partial differential equations, its applications to structural engineering problems. Solution of Eigen value problems, iterative methods & transformation methods. Use of software for transformation methods. Computer oriented algorithms

Correlation and regression, Principles of least squares
Euler's equation -Functional dependent on first and higher order derivatives

Laplace transform methods, Laplace equation -Properties of harmonic functions -Fourier transform methods for Laplace equation.

Application : Excel spread sheets for the design of shallow foundations, laboratory testing applications, settlement calculations, pile foundations etc.

Constitutive modeling of soil, Software Usage: Applications of Geo4, Z-soil, Plaxis, STAAD, STRAP etc. for Soil Structure Interaction and geotechnical design problems.

B. RECOMMENDED TEXT / REFERENCE BOOKS

Reference Books:

1) Numerical methods in Engineering	Salvadori & Baron
2) Numerical Methods in Finite Element Analysis	Bathe & Wilson
3) Numerical Analysis	Scarborough
4) Numerical Methods in Geotechnical Engg.	Desai C.s. and Christian
5) Foundation Design	Bowles J. E.

M. TECH. SEMESTER – I (CIVIL-GEOTECHNICAL ENGINEERING)

SUBJECT: AUDIT COURSE – I: DISASTER MANAGEMENT

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
2	0	0	0	0	0	0	0	0	0

A. DETAILED SYLLABUS

1. Introduction
   Disaster: Definition, Factors and Significance; Difference between Hazard and Disaster; Natural and Manmade Disasters: Difference, Nature, Types and Magnitude.

2. Repercussions of Disasters and Hazards: Economic Damage, Loss of Human and Animal Life, Destruction of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts And Famines, Landslides And Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks And Spills, Outbreaks Of Disease And Epidemics, War And Conflicts.

3. Disaster Prone Areas In India
   Study of Seismic Zones; Areas Prone To Floods and Droughts, Landslides and Avalanches; Areas Prone To Cyclonic and Coastal Hazards with Special Reference to Tsunami; Post-Disaster Diseases and Epidemics

4. Disaster Preparedness And Management
   Preparedness: Monitoring Of Phenomena Triggering A Disaster Or Hazard; Evaluation Of Risk: Application Of Remote Sensing, Data From Meteorological And Other Agencies, Media Reports: Governmental And Community Preparedness.

5. Risk Assessment
   Disaster Risk: Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation. Techniques of Risk Assessment, Global Co-Operation in Risk Assessment and Warning, People's Participation in Risk Assessment. Strategies for Survival.

6. Disaster Mitigation
   Meaning, Concept and Strategies of Disaster Mitigation, Emerging Trends in Mitigation. Structural Mitigation and Non-Structural Mitigation, Programs Of Disaster Mitigation in India.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Disaster Management in India: Perspectives, issues and strategies - R. Nishith, Singh AK
2. Disaster Mitigation Experiences and Reflections - Sahni, PardeepEt.Al.
   Disaster Administration and Management Text and Case Studies - Goel S. L.

M. TECH. SEMESTER – II (CIVIL-GEOTECHNICAL ENGINEERING)

SUBJECT: SOIL ENGINEERING - II

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	0	2	5	4	60	40	25	0	65

A. DETAILED SYLLABUS

Shear strength of cohesionless and cohesive soils, physic-chemical aspects, experimental determination of shear strength, failure theories yield criteria. Influence on failure conditions of intermediate principal stress, history, drainage; rate of stress applications ets;

Platic equilibrium in soils, Mohr diagram, active and passive states, theories of earth pressure on retaining walls, effect of wall friction on the shape of sliding surface, theories of arching, bearing capacity, concepts of general and local shear failure, critical height of vertical banks,

Various methods of computation of slope stability, earth pressure on tempering of cuts and on free and anchored bulkheads.

Geological classification of rock, basic terminologies, Index Properties of rock, Classification of rock for engineering purposes, Strength classification of intact rocks, Laboratory tests of rocks, modes of failure of rocks

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Theoretical Soil Mechanic – Karl Terzaghi
2. Advanced Soil Mechanics – B. M. Das
3. Soil Mechanics – Whitlow
4. Foundation of Theoretical Soil Mechanics- , Harr M. E.

M. TECH. SEMESTER – II (CIVIL-GEOTECHNICAL ENGINEERING)

SUBJECT: DYNAMICS AND GEOTECHNICAL EARTHQUAKE ENGINEERING

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	1	0	4	4	60	40	25	0	125

A. DETAILED SYLLABUS

Elements of Soil Dynamics, Free and forced vibrations with and without damping for single degree of freedom.

Wave Propagation: Waves in elastic half space, Elements of seismic methods, Steady state vibrations, Influence of soil condition on shaking intensity and associated structural damage and land slides.

Elastic Properties of Soil: Field and laboratory methods, Stress strain characteristics of soil under dynamic loads, damping properties, bearing capacity and earth pressure of soil under dynamic/seismic loads by pseudo static analysis.

Liquefaction and Ground Improvement: Mechanism, Laboratory methods, Evaluation of liquefaction in the field, Factors affecting liquefaction, Anti liquefaction measures, Introduction to Ground improvement in cohesionless soils

Machine foundation - types, general criteria, Natural frequency of foundation soil system, dynamic soil parameters, lumped mass parameters, elastic half space theory, block type machine foundation, foundation for high speed machinery, Vibration isolation.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Richart, F.E., Wood, R. D. and Hall, J. R., Vibrations of Soils and Foundations, Pentice Hall, 1970
2. Steven, Kramer, Geotechnical Earthquake Engineering, Pearson Education, 2003
3. Day, Robert, W, Geotechnical Earthquake Engineering Hand Book, Mc Graw Hill – 2002.
4. Handbook of Machine Foundation – P. Srinivashulu and C. V. Vaidyanathan
5. Das, B. M. – Fundamentals of Soil Dynamics, Elsevier Scientific Pub.- NY -1983
6. Prakash S. and Puri V. K. – Foundations for machines. Mc Graw Hill - 1987
7. Swami Saran – Analysis and Design of Foundations and Retaining Structures subjected to Seismic Loads, IK International Pub. – New Delfi - 2012

M. TECH. SEMESTER – II (CIVIL-GEOTECHNICAL ENGINEERING)

SUBJECT: SOIL STRUCTURE INTERACTION

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	1	0	4	4	60	40	25	0	125

A. DETAILED SYLLABUS

- Critical study of conventional methods of foundation design; Nature of complexities of soil structure interaction; Application of advanced techniques of analysis such as the finite element method, finite differences, relaxation and interaction for the evaluation of soil-structure interaction for different types of structures under various conditions of loading and subsoil characteristics;
- Preparation of comprehensive design-oriented computer programs for specific problems.
- Interaction problems based on the theory of sub-grade reaction such as beams, footings, rafts bulkheads etc, Analysis of different types of framed structures founded on stratified natural deposits with linear and non-linear stress-strain characteristics.
- Determination of axial and lateral pile capacities; group action of piles considering stress-strain characteristics of real soils.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1 Analysis and design of foundation - J. Bowles
2 Numerical Methods in Geotechnical Engg. - Desai & Christian
3 Elastic Analysis of Soil Foundation Interaction - A P S Selvadurai
4 Advanced Geotechnical Engineering - C S Desai, M. Zaman

M. TECH. SEMESTER – II (CIVIL-GEOTECHNICAL ENGINEERING)

SUBJECT: ELECTIVE PAPER -II

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
2	1	0	0	3	40	0	25	0	65

SUBJECT OPTIONS:

1. GEOPHYSICAL EXPLORATIONS

A. DETAILED SYLLABUS

1. Introduction,
An overview of geophysical methods of exploration; classification – major /minor; artificial / natural; applications and limitations, need for integrated surveys. Physical properties, rocks-density, susceptibility, resistivity and elastic wave velocities, factors controlling the properties, numerical values for important rock types, concept of physical property contrast. Role of geophysics in understanding the internal structure of the earth and plate tectonics.

2. Gravity Methods
Earth's gravity field, origin, variation with elevation and depth, temporal and transient variations, international gravity formula, geoid, spheroid. Principle of gravity exploration, concept of gravity anomaly; gravimeters, gravity surveys, reduction of data, free air, Bougrer and topographic correlations; concepts of regional and residuals; contamination and derivative maps. Quantitative interpretation of anomaly maps, identification of faults, folds and contacts, principles of quantitative interpretation with reference to spheres, cylinders and thin horizontal sheets; concepts of modeling and inversion.

3. Magnetic Methods
Earth's magnetic field, origin; magnetic elements, interrelationships, transient and temporal variations; IGRF; principle of magnetic method, origin of anomalies, induced and remanant magnetizations; magnetometers, proton precession and fluxgate; plan of magnetic surveys, reduction of data; anomaly maps, identification of structures; familiarization of magnetic anomalies over spheres, sheets and dykes; interpretation of magnetic anomalies of sheets and dykes. Airborne magnetometry, plan of surveying and presentation of results.

4. Electrical and Electromagnetic Methods
Self-potential method, origin of SP; resistivity method, concept of apparent resistivity, Werner, Schlumberger and Dipole-dipole configurations; electrical sounding, interpretation through curve matching, electrical profiling; elements of electromagnetic methods, in phase, out of phase components, identification of conductors from EM anomalies.Telluric and magneto methods, application in oil exploration.

5. Seismic Methods

Elastic propagation in rocks, Hooke's Law, acoustic impedance; Snell's Law, principles of seismic refraction method, travel time curves over horizontal interfaces and faults, interpretation of results; principles of seismic reflection method, travel time curves, over horizontal and dipping layers, interpretation; concept of RMS interval and average velocities; seismic data acquisition on land and sea, sub-bottom profilers, seismic sources, air gun, etc., processing of seismic reflection data, single channel and multi channel seismic data interpretation methods, pitfalls, seismic stratigraphy, velocity pull ups, bright spots etc., Technological advances in seismic data processing, modern survey techniques; GPS; reservoir characterization.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. M.B.R.Rao, (1993). Outlines of geophysical prospecting, English Book Depo, Dehradun.
2. Radhakrishna Murthy, I.V., (1998). Gravity and magnetic interpretation in exploration geophysics. Geol. Soc. India, Bangalore.
3. Jhon, Milsom (2003). Field Geophysics, 3rd Edn. John Wiley, London.
4. Dobrin, M.B. and Savit, C.H. (1988). Introduction to geophysical prospecting, 4th Edn., McGraw Hill, New York.
5. Saha, J. G. Seismic data processing manual, ONGC Pub. Dehradun.
6. Coffeen, J.A. 1986. Seismic exploration fundamentals and seismic techniques for finding oil, 2nd Edn. Pennwell Pub. Co., Tulsa, Oklahoma.
7. Domenico, S.N. 1983. Modern Seismic Exploration concepts. Tulsa, Oklahoma.
8. Macquillin, R. Bacon, M.(eds). 1984. An introduction to seismic interpretation, reflection seismics in petroleum exploration, Grahmam, Trot.

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2. EARTHDAM ENGINEERING

A. DETAILED SYLLABUS

Factors influencing design of earthdams, types of earthdams, Control of pore pressure within the dam and foundation, critical study of earthdam failures, embankment settlement during and after construction, differential settlement and cracks, construction pore pressures and control, seepage analysis, various methods of construction of flownets, methods of foundation treatment, critical evaluation of methods of stability analysis, dams with impervious membranes of manufactured materials like reinforced concrete, steel plates and asphaltic conctrete, embankment construction procedures, equipment, methods of quality control, measuring instruments, performance observations, aseismic design, slope protection, rockfill construction.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Sherrared - Earth Dam Engg.
2. Creager W. P. - Engineering for dams, Wiley, 1967.
3. Singh, B. - Earth and Rockfill dam, Sarita Prakashan, 1973.
4. Sowers G. I. - Earth and Rockfill dam engineering,
5. Earth Manual, - USBR Publication.
6. Arcold - Volume on earth and rockfill dams.
1. Sharma H. D., Embankment Dams, Oxford and IBH Pub., 1991.
2. Design of Small Dams, USDI, Oxford and IBH, 1976.

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3. GROUND IMPROVEMENT TECHNIQUES

A. DETAILED SYLLABUS

Weak deposts- identification, problems associated with weak deposits, Mitchel chart for applicability of treatment methods

Insitu compaction of cohesionless soil, injection grouting, soil stabilization, vibroflotation, reloading, sand drains, prefabricated vertical drains, stone columns, dynamic consolidation, blasting, compaction piles

Ground water control methods, diaphragm walls, well point system

Geo-reinforcement applications

Techniques for expansive soils, loess,

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Construction and Geotechnical Methods in Foundation Engg. – Koerner R. M.
2. Foundation Engineering in Difficult Subsoil Conditions - Zeevart L.
3. Foundation Engineering in Difficult Ground – Bell F. G.
4. Engg. Principles of Ground Modifications – Haussman M. R.
5. Earth Reinforcement and Soil Structure – Jones J E P.
6. An Intro. To Ground Improvement Engg. – Satyendra mittal

M. TECH. SEMESTER – II (CIVIL-GEOTECHNICAL ENGINEERING)

SUBJECT: REINFORCED EARTH AND GEOTEXTILES

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	0	0	3	3	60	0	0	0	60

A. DETAILED SYLLABUS

Basic introduction to the elements of ground engineering characteristics of reinforcing materials, definition of reinforced and advantage of RE, Soil reinforcement interaction, behaviour of reinforced earth walls, basis of wall design, the coulomb force method, the rankine force method, internal and external stability condition, field application of RE, randomly reinforced earth and analysis of reinforced soils, testing of soil reinforcements.

Definitions, functions, properties and application of geotextiles, design of geotextile applications, definitions, functions, properties and application of geo membranes, design of geo membranes applications, geo textiles associated with geo membranes, testing on geo textiles, environmental efforts, ageing and weathering.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Reinforced Earth & Geotextiles : Koerner
2. Reinforced Earth & Geotextiles : G. V. Rao
3. Reinforced Soil and its Engg. Applications – Swami saran
4. An Intro. To Soil reinf. And Geosymthetics – G. L. Sivakumar Babu

M. TECH. SEMESTER – II (CIVIL-GEOTECHNICAL ENGINEERING)

SUBJECT: RESEARCH METHODOLOGY

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
2	0	0	2	2	40	0	0	0	40

A. DETAILED SYLLABUS

1. Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

2. Effective literature studies approaches, analysis Plagiarism , Research ethics

3. Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

4. Nature of Intellectual Property - Patents, Designs, Trademark and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

5. Patent Rights - Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.

6. New Developments in IPR - Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Stuart Melville and Wayne Goddard, Research methodology: an introduction for science & engineering students
2. Wayne Goddard and Stuart Melville, “Research Methodology: An Introduction”
3. Ranjit Kumar, 2nd Edition , “Research Methodology: A Step by Step Guide for beginners”
4. Halbert, “Resisting Intellectual Property”, Taylor & Francis Ltd ,2007.
5. Mayall, “Industrial Design”, McGraw Hill, 1992.
6. Niebel , “Product Design”, McGraw Hill, 1974.
7. Asimov , “Introduction to Design”, Prentice Hall, 1962.
8. Robert P. Merges, Peter S. Menell, Mark A. Lemley, “ Intellectual Property in New Technological Age”, 2016.
9. T. Ramappa, “Intellectual Property Rights Under WTO”, S. Chand, 2008

M. TECH. SEMESTER –II (CIVIL-GEOTECHNICAL ENGINEERING)

SUBJECT: AUDIT COURSE – II: PEDAGOGIC STUDIES

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
2	0	0	0	0	0	0	0	0	0

A. DETAILED SYLLABUS

1. Introduction and Methodology:
   Aims and rationale, Policy background, Conceptual framework and terminology, Theories of learning, Curriculum, Teacher education. Conceptual framework, Research questions**.** Overview of methodology and Searching.
2. Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries. Curriculum, Teacher education.
3. Evidence on the effectiveness of pedagogical practices, Methodology for the in depth stage: quality assessment of included studies. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? Theory of change. Strength and nature of the body of evidence for effective pedagogical practices. Pedagogic theory and pedagogical approaches. Teachers' attitudes and beliefs and Pedagogic strategies.
4. Professional development: alignment with classroom practices and followup support Peer support, Support from the head teacher and the community, Curriculum and assessment, Barriers to learning: limited resources and large class sizes
5. Research gaps and future directions, Research design, Contexts, Pedagogy, Teacher education, Curriculum and assessment, Dissemination and research impact.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Culture and pedagogy: International comparisons in primary education. - Alexander RJ
2. Read India: A mass scale, rapid, 'learning to read' campaign - Chavan M

M. TECH. SEMESTER – I (CIVIL-STRUCTURAL ENGINEERING)

ADVANCED STRUCTURAL MECHANICS

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	1	0	4	4	60	40	25	0	125

A. DETAILED SYLLABUS

- Review of concepts of structural analysis
- Member stiffness approach for analysis of skeletal structures: beams, plane truss, plane frame, grid, space truss, space frame with computer programming
- Special Problems: effect of shear deformation in stiffness matrix, torsional effects for thin-walled member inclusive of torsional bending, finite joints (both rigid and flexible); consideration of local load (inclusive of temperature) effects; formulation of geometric stiffness due to axial force; linear buckling analysis.
- Introduction to Material non-linearity and Geometric non-linearity, assumption of non-linear analysis; Secant and Tangent Stiffness Matrices, Various methods to solve non-linear equations, Non-linear analysis of truss, Plastic Analysis: Step by step procedure of analysis, Non-linear analysis of frames

PREREQUISITES/ SELF-STUDY:

- Flexibility and Stiffness Method - System Approach.
- Basic Programming using C / MATLAB

B. RECOMMENDED TEXT / REFERENCE BOOKS

Reference Books:

1. Matrix Analysis of Framed Structure - Gere & Weaver
2. Structural Analysis - Ghali & Nevelle
3. Computer Analysis of Structural Systems - Fleming J.F.
4. Non-linear Structures - Majid
5. Matrix Structural Analysis - W. McGuire, R. H. Gallagher,
6. Matrix Methods of Structural Analysis, - Dr A. S. Meghre, S. K. Deshmukh
7. Structural Analysis: A unified classical and matrix approach - A. Ghali, A. M. Neville

M. TECH. SEMESTER – I (CIVIL-STRUCTURAL ENGINEERING)

ADVANCED FOUNDATION ENGINEERING

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	1	0	4	4	60	40	25	0	125

A. DETAILED SYLLABUS

- Planning of subsoil exploration of major civil engineering projects, deriving characteristic strength deformation parameters from soil exploration report, calculation of safe bearing capacity for various soil types from shear as well as settlement criteria, pull out resistance of foundations, extrapolation of plate load test and pile load tests.
- Proportioning of isolated footings, combined footings, raft, floating foundations for different load combinations,
- Design of pile foundation for axial load – compression and pull out, lateral loads, negative skin friction, group action in piles, design of piles cap
- Foundations for water tanks, chimney, transmission line towers, antenna etc.
- Free and fixed cantilever sheet pile walls, anchored bulkheads

PREREQUISITES/ SELF-STUDY:

- Methods of drilling/boring and sampling.
- Field Test Procedures as per IS Code: SPT, SCPT, Plate Load Test, Pile Load Test
- Laboratory Test Procedures as per IS Code: Classification Tests, Shear Tests, Consolidation Test, Swell Tests,
- Bearing Capacity as per IS 6403 for Shallow Foundations, Settlement Calculations for Sand and Clay soils as per IS 8009.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Analysis and design of foundation - J. E. Bowles
2. Soil mechanics & foundation engg. vol-II - V.N.S. Murthy
3. Principles of foundation Engg. - Braj M. Das
4. Foundation Engineering - M.J. Tomlinson
5. Analysis and Design of Substructures - Swami Saran
6. Foundation Design – Coduto
7. Design Aids in Soil Mecahnics and Foundation Engg. - Kaniraj
8. SP 36, pt 1 and 2, IS 6403, IS 8009 pt.1, IS 2911 (all),

M. TECH. SEMESTER – I (CIVIL-STRUCTURAL ENGINEERING)

SOLID MECHANICS WITH FINITE ELEMENT APPLICATIONS

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	1	0	4	4	60	40	25	0	125

A. DETAILED SYLLABUS

- Linear elasticity; stress, strain, constitutive relations; Boundary conditions; Description of an elasticity problem as a boundary value problem, Plane stress, strain, axial symmetrical problems.

- Introduction to plasticity, Yield condition; ideal elasto-plastic material.

- Analysis of Continuum and discrete structures, finite element principle and solution for continuum problems, steps in finite element analysis, principles of discretization, formulation of element stiffness matrix based on direct, variation principles, shape functions, numerical integration, convergence, 2-D formulations for plane stress, plane strain, axisymmetric including isoperimetric elements, introduction to 3D brick elements for Continuum problems.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Finite Element Analysis - Krishnamurthy
2. Finite Element Method - Desai & Ables
3. The Finite Element Method - Rockey, Evans & others
4. The Finite Element Method - Zienkiewicz
5. Concepts and Application of Finite Element Analysis - Cook
6. Advance Mechanics of Solids - Srinath

M. TECH. SEMESTER – I (CIVIL-STRUCTURAL ENGINEERING)

DESIGN & DETAILING OF STRUCTURAL ELEMENTS: RCC

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
2	0	2	4	3	40	0	25	25	90

A. DETAILED SYLLABUS

- Introduction to various design methods i.e. Working Stress Method, Ultimate Load Method and Limit State Method.
- Design of Singly Reinforced and Double Reinforced Rectangular Beams for Limit State of Collapse for Flexure. Development of non-linear moment-curvature relationship.
- Design of Flanged Beams for Limit State of Collapse for Flexure
- Design of Rectangular Beams for Limit State of Collapse for Shear and Torsion.
- Design of One-way and Two-way simply supported and continuous Slabs.
- Design of Short and Slender Columns subjected to Axial Load and Uniaxial or Biaxial Bending. Development of non-linear P-M-M relationship.
- Design of Isolated and Combined Footings
- Preparation and use of excel sheets for RCC element design

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Design of RCC Structures Vol-I - H. J. Shah
2. Reinforced Concrete Design - N. Krishna Raju
3. Design of RCC Structures - P. C. Varghese
4. Reinforced Concrete Design - S. N. Sinha
5. Reinforced Concrete Design - S Unnikrishna Pillai & Devdas Menon

M. TECH. SEMESTER – I (CIVIL-STRUCTURAL ENGINEERING)

DESIGN & DETAILING OF STRUCTURAL ELEMENTS: STEEL

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
2	0	2	4	3	40	0	25	25	90

A. DETAILED SYLLABUS

- Introduction to various design methods i.e. Working Stress Method, Ultimate Load Method and Limit State Method - Brief History and Comparison.
- Design of Tension Members made up of single and built-up sections, Choice of sections, Connections (riveted, bolted & welded), Splices.
- Design of Compression Members: Single and Built-up sections, Choice of sections, lacing and battering.
- Design of Laterally Restrained and Unrestrained Beams including deflection check.
- Design of Slab base, Gusseted base.
- Design of members subjected to combined actions, bending with compression/tension.
- Preparation and use of excel sheets for RCC element design

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Design of Steel Structures - N. Subramanian
2. Design of Steel Structures - Arya & Ajmani
3. Design of Steel Structures - S. Ramamrutham
4. Design of Steel Structures – Vol 1 and Vol. 2 - Ramchandran
5. Design of steel Structures - P. Dayaratnam

M. TECH. SEMESTER – I (CIVIL-STRUCTURAL ENGINEERING)

ELECTIVE PAPER – I

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
2	1	0	3	3	40	0	25	0	65

1. THEORY OF THIN PLATES AND SHELLS

A. DETAILED SYLLABUS

Thin plate: small deflection theory, plate equation. Applications of Navier's solution, Levy's solution, tables & charts for solution of rectangular and circular plates, use for rectangular water tanks with different boundary conditions.

Shell behaviour, shell surfaces and characteristics, classification of shells equilibrium equations in curvilinear co-ordinates. Stress-strain & force displacement relations. Membrane analysis of shells of revolution and cylindrical shells under different loads.
Applications of membrane solution of elliptic paraboloids and hyperboloids. Solution of some typical problems.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Theory of Plates and shells - S.P.Timoshenko and Woinowsky-Krieger
2. Design of cylindrical shell roofs - W.T. Marshall
3. Design & construction of concrete shell roofs - Ramaswamy, G. S.
4 A Text Book of Plate Analysis - Bairagi N. K.
5. Shell Analysis - Bairagi N.K.
6. Theory and Analysis of Plates : Classical and Numerical Methods - Szilard R.

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2. THEORY OF STRUCTURAL STABILITY

A. DETAILED SYLLABUS

- Criteria for Design of Structures: Stability, Strength, and Stiffness, Classical Concept of Stability of Discrete and Continuous Systems, Linear and nonlinear behaviour.
- Stability of Columns: Axial and Flexural Buckling, Lateral Bracing of Columns, Combined Axial, Flexural and Torsion Buckling.
- Stability of Frames: Member Buckling versus Global Buckling, Slenderness Ratio of frame members.
- Stability of Beams: Lateral torsional buckling.
- Stability of Plates: Axial flexural buckling, Shear flexural buckling, buckling under combined loads.
- Introduction to Inelastic Buckling and Dynamic Stability.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Theory of elastic stability - Timoshenko and Gere,
2. Principles of Structural Stability Theory - Alexander Chajes
3. Structural Stability of columns and plates - Iyengar, N. G. R.
4 Strength of Metal Structures - Bleich F. Bucking

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3. ADVANCED CONCRETE TECHNOLOGY

A. DETAILED SYLLABUS

Cement: Hydration, chemistry and microstructure of cement paste, special cement
Microstructures of concrete: Interfacial transition zone, Structure-property relationships.
Chemical and mineral admixtures in concrete: Types, Mechanism, Application.
Properties of hardened concrete:
Strength, stress-strain behavior, Dimensional stability, Fracture mechanics and concrete failure mechanism.
Mix Design: Concrete mix design (IS, ACI, BS)
Concrete Durability:
Physical deterioration (abrasion, erosion, cracking) Chemical attack (sulfates/seawater/acid), Corrosion, Durability improvement measures.
Testing and quality assurance of concrete: Testing of fresh concrete, Destructive and non-destructive evaluation of hardened concrete, statistical quality control.
Special concrete: Cement and polymer concrete compositions, Self-compacting concrete, Ready mixed concrete, High performance concrete.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Concrete technology - A. N. Nevile, J.J. Brooks
2. Micro Concrete - P. Kumar Mehta

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M. TECH. SEMESTER – I (CIVIL- STRUCTURAL ENGINEERING)

SUBJECT: AUDIT COURSE – I: DISASTER MANAGEMENT

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
2	0	0	2	0	0	0	0	0	0

A. DETAILED SYLLABUS

1. Introduction
   Disaster: Definition, Factors and Significance; Difference between Hazard and Disaster; Natural and Manmade Disasters: Difference, Nature, Types and Magnitude.

2. Repercussions of Disasters and Hazards: Economic Damage, Loss of Human and Animal Life, Destruction of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts And Famines, Landslides And Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks And Spills, Outbreaks Of Disease And Epidemics, War And Conflicts.

3. Disaster Prone Areas In India
   Study of Seismic Zones; Areas Prone To Floods and Droughts, Landslides and Avalanches; Areas Prone To Cyclonic and Coastal Hazards with Special Reference to Tsunami; Post-Disaster Diseases and Epidemics

4. Disaster Preparedness And Management
   Preparedness: Monitoring Of Phenomena Triggering A Disaster Or Hazard; Evaluation Of Risk: Application Of Remote Sensing, Data From Meteorological And Other Agencies, Media Reports: Governmental And Community Preparedness.

5. Risk Assessment
   Disaster Risk: Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation. Techniques of Risk Assessment, Global Co-Operation in Risk Assessment and Warning, People's Participation in Risk Assessment. Strategies for Survival.

6. Disaster Mitigation
   Meaning, Concept and Strategies of Disaster Mitigation, Emerging Trends in Mitigation. Structural Mitigation and Non-Structural Mitigation, Programs Of Disaster Mitigation in India.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Disaster Management in India: Perspectives, issues and strategies - R. Nishith, Singh AK
2. Disaster Mitigation Experiences and Reflections - Sahni, PardeepEt.Al.
3. Disaster Administration and Management Text and Case Studies - Goel S. L.

M. TECH. SEMESTER – II (CIVIL-STRUCTURAL ENGINEERING)

DYNAMICS AND EARTHQUAKE ENGINEERING

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	1	0	4	4	60	40	25	0	125

A. DETAILED SYLLABUS

- SDOF Systems: Equation of motion, free vibration, harmonic load, evaluation of damping, periodic load, general load (time-domain, frequency domain) response spectrum load.
- MDOF systems: Structural matrices, undamped free vibrations; generation of damping matrix; mode superposition analysis; practical considerations.
- Characterization of ground motion; earthquake intensity and magnitude; recording instruments and baseline correction; predominant period and amplification through soil; Earthquake spectra for elastic and in-elastic systems, idealization of structural systems for low, medium and high-rise building; effect of foundation/soil on earthquake response; Codal provisions.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Dynamics of Structures - Anil K. Chopra
2. Dynamics and Vibration of Structures - Demeter G.Fertis
3. Introduction to Structural Dynamics - John M.Biggs
4. Structural Vibrations - Theory and - Mario Paz Computation
5. Structural Dynamics - Clough & Penzien
6. Elements of earthquake engineering - Jaikrishna & Chandrasekaran

M. TECH. SEMESTER – II (CIVIL-STRUCTURAL ENGINEERING)

SOIL STRUCTURE INTERATION

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	1	0	4	4	60	40	25	0	125

A. DETAILED SYLLABUS

- Critical study of conventional methods of foundation design; Nature of complexities of soil structure interaction; Application of advanced techniques of analysis such as the finite element method, finite differences, relaxation and interaction for the evaluation of soil-structure interaction for different types of structures under various conditions of loading and subsoil characteristics;
- Preparation of comprehensive design-oriented computer programs for specific problems.
- Interaction problems based on the theory of sub-grade reaction such as beams, footings, rafts bulkheads etc, Analysis of different types of framed structures founded on stratified natural deposits with linear and non-linear stress-strain characteristics.
- Determination of axial and lateral pile capacities; group action of piles considering stress-strain characteristics of real soils.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1 Analysis and design of foundation - J. Bowles
2 Numerical Methods in Geotechnical Engg. - Desai & Christian
3 Elastic Analysis of Soil Foundation Interaction - A P S Selvadurai
4 Advanced Geotechnical Engineering - C S Desai, M. Zaman

M. TECH. SEMESTER – II (CIVIL-STRUCTURAL ENGINEERING)

ELECTIVE PAPER – II

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
3	1	0	4	4	60	40	25	0	125

1. PRESTRESSED CONCRETE

A. DETAILED SYLLABUS

Prestressing concepts, materials, systems of prestressing and losses. Introduction to working stress method, limit state analysis and design of members for bending. Shear torsion and forces. End block design. Deflections, use of relevant codes of practice.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Design of Prestressed Concrete Structures – Krishna Raju
2. Limit State Design of Prestressed Concrete Structures – Mallick & Gupta

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2. BRIDGE ENGINEERING

A. DETAILED SYLLABUS

- Loading Standards.
- Design of Balanced Cantilever Bridge.
- Design of Bow String Girder Bridge.
- Design of prestressed concrete girder and box girder bridges considering only primary torsion. Design of end block.
- Bridge Bearing: Types of Bearings, Elastomeric bearing.
- Piers, Abutments, Wing walls factors effecting and stability. Well foundations. Design of well, Construction, open sinking of walls, Plugging, sand filling and casting of well cap.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Concrete Bridges practice Analysis. Design &Economics - V.K. Raina
2. Design of Concrete Bridges - Vazirani, Ratwani and Aswani

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3. NUM. METHODS & APPLICATIONS TO STRUCTURAL ENGG.

A. DETAILED SYLLABUS

- Advanced MATLAB Applications for Solution of non – linear algebraic equations, , numerical solutions of ordinary differential equations and partial differential equations, its applications to structural engineering problems. Solution of Eigen value problems, iterative methods & transformation methods. Use of software for transformation methods. Computer oriented algorithms
- Correlation and regression, Principles of least squares
- Euler's equation -Functional dependent on first and higher order derivatives
- Laplace transform methods, Laplace equation -Properties of harmonic functions -Fourier transform methods for Laplace equation.
- Application to Structural Engineering: Software Usage: Modeling, analysis and design using professional software like STAAD, STRAP, STRUDS, RISA 3D as Group exercise

B. RECOMMENDED TEXT / REFERENCE BOOKS

1) Numerical Methods for Engineers - Chapra and Canane
2) Numerical methods in Engineering - Salvadori & Baron

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4. STRUCTURAL OPTIMIZATION AND RELIABILITY

A. DETAILED SYLLABUS

- Introduction to optimization, optimization techniques for unconstrained and constrained optimization problems, Classical Optimization, Lagrange Multiplier technique and Kuhn – Tucker conditions, Solution of NLP by direct methods and by series of unconstrained optimization problems, formulation of different types of structural optimization problems.
- Computation of derivatives of response quantities with respect to design variables. Minimum weight design of trusses, frame, etc.
- Concept of Structural safety, design methods, basic statistics, probability Theory, statistics for concrete and steel properties, probabilistic analysis of loads
- Basic structural reliability Monte Carlo method, level 2 reliability, reliability-based design and reliability of simple structural systems

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Optimization theory & application - S. S. Rao
2. Structural optimization - Majid
3. Advanced mathematics - Kresysig
4. Foundation of structural optimization - Marris

M. TECH. SEMESTER – II (CIVIL-STRUCTURAL ENGINEERING)

DESIGN AND DETAILING OF RCC STRUCTURES

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
2	0	3	5	3.5	40	0	25	25	90

A. DETAILED SYLLABUS

Loads on structures: Earthquake forces on Frames.

Reinforced concrete:

- Complete design and structural detailing of structures, viz.
- Design of grid floors, deep beams, Design of shear wall, Design of material retaining structures, silos, bunkers, Water Tanks, Chimney, Multistory buildings, Earthquake Resistant Design, machine foundation

- Check for serviceability limits, analytical calculations for deflection, crack width, fire resistance, Detailing of RC Structures.

B. RECOMMENDED TEXT / REFERENCE BOOKS

- Manual of Limit State Design - Variyani and Radhaji
- Reinforced Concrete Design. - Pillai & Menon
- Illustrated Design of G + 3 Building - Shah & Karve
- Advanced R.C.C Design - Krishna Raju
- Plain & Reinforced Concrete Vol. II - Jain & Jaikrishna

M. TECH. SEMESTER – II (CIVIL-STRUCTURAL ENGINEERING)

DESIGN AND DETAILING OF STEEL STRUCTURES

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
2	0	3	5	3.5	40	0	25	25	90

A. DETAILED SYLLABUS

- Connection design, Design of Plate Girders, Gantry Girders
- Complete design and structural detailing of structures, viz. Chimney, Steel bridges, Multi-storeyed buildings, Industrial building, Godowns, cantilever sheds, platform roofs, Towers etc.
- Plastic design of continuous beam and portal frames,
- Introduction and applications of Cable Structures
- Use of cold form sections, Castellated beams, light metal structures, stability of portal frames

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Design of Metal structures - K. Mukhanov,
2. Design of steel structure - B.Bresler, T.Y lin and JB Scalzi,
3. Design of Steel Structures - Arya Ajmani
4. Design of Steel Structures Vol-1 & 2 - Ramchandran
5. Design of Steel Structures - N. Subramanian

M. TECH. SEMESTER – II (CIVIL- STRUCTURAL ENGINEERING)

SUBJECT: RESEARCH METHODOLOGY

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
2	0	0	2	2	40	0	0	0	40

A. DETAILED SYLLABUS

1. Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

2. Effective literature studies approaches, analysis Plagiarism , Research ethics

3. Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

4. Nature of Intellectual Property - Patents, Designs, Trademark and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

5. Patent Rights - Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.

6. New Developments in IPR - Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Stuart Melville and Wayne Goddard, Research methodology: an introduction for science & engineering students
2. Wayne Goddard and Stuart Melville, “Research Methodology: An Introduction”
3. Ranjit Kumar, 2nd Edition , “Research Methodology: A Step by Step Guide for beginners”
4. Halbert, “Resisting Intellectual Property”, Taylor & Francis Ltd ,2007.
5. Mayall, “Industrial Design”, McGraw Hill, 1992.
6. Niebel , “Product Design”, McGraw Hill, 1974.
7. Asimov , “Introduction to Design”, Prentice Hall, 1962.
8. Robert P. Merges, Peter S. Menell, Mark A. Lemley, “ Intellectual Property in New Technological Age”, 2016.
9. T. Ramappa, “Intellectual Property Rights Under WTO”, S. Chand, 2008

M. TECH. SEMESTER –II (CIVIL- STRUCTURAL ENGINEERING)

SUBJECT: AUDIT COURSE – II: PEDAGOGIC STUDIES

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Prac	Total
2	0	0	0	0	0	0	0	0	0

A. DETAILED SYLLABUS

1. Introduction and Methodology:
   Aims and rationale, Policy background, Conceptual framework and terminology, Theories of learning, Curriculum, Teacher education. Conceptual framework, Research questions**.** Overview of methodology and Searching.
2. Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries. Curriculum, Teacher education.
3. Evidence on the effectiveness of pedagogical practices, Methodology for the in depth stage: quality assessment of included studies. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? Theory of change. Strength and nature of the body of evidence for effective pedagogical practices. Pedagogic theory and pedagogical approaches. Teachers' attitudes and beliefs and Pedagogic strategies.
4. Professional development: alignment with classroom practices and followup support Peer support, Support from the head teacher and the community, Curriculum and assessment, Barriers to learning: limited resources and large class sizes
5. Research gaps and future directions, Research design, Contexts, Pedagogy, Teacher education, Curriculum and assessment, Dissemination and research impact.

B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Culture and pedagogy: International comparisons in primary education. - Alexander RJ
2. Read India: A mass scale, rapid, 'learning to read' campaign - Chavan M

M. TECH. SEMESTER – I (ECS)
SUBJECT: WIRELESS AND MOBILE COMMUNICATION
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme			
Lect	Tut	Prac	Total		Ext	Sess.	Prac	Total
3	0	2	5	4	60	40	25	125

DETAILED SYLLABUS

1. Cellular Communication Fundamentals: Cellular system design, Frequency reuse, cell splitting, handover concepts, Co channel and adjacent channel interference, interference reduction techniques and methods to improve cell coverage, Frequency management and channel assignment. GSM architecture and interfaces, GSM architecture details, GSM subsystems, GSM Logical Channels, Data Encryption in GSM, Mobility Management, Call Flows in GSM. 2.5G Standards: High speed Circuit Switched Data (HSCSD), General Packet Radio Service (GPRS), 2.75 G Standards: EDGE

2. Overview of digital modulation techniques: BPSK, QPSK, 8PSK, QAM, FSK and MSK, Spectral efficiency analysis based on calculations for Multiple access technologies: TDMA, FDMA and CDMA, Comparison of these technologies based on their signal separation techniques, advantages, disadvantages and application areas. Wireless network planning (Link budget and power spectrum calculations)

3. Code Division Multiple Access: Introduction to CDMA technology, IS 95 and CDMA 2000 system

4. Mobile Radio Propagation: Large Scale Path Loss, Free Space Propagation Model, Reflection, Ground Reflection (Two-Ray) Model, Diffraction, Scattering, Practical Link Budget Design using Path Loss Models, Outdoor Propagation Models, Indoor Propagation Models, Signal Penetration into Buildings. Small Scale Fading and Multipath Propagation, Impulse Response Model, Multipath Measurements, Parameters of Multipath channels, Types of Small Scale Fading: Time Delay Spread; Flat, Frequency selective, Doppler Spread; Fast and Slow fading.

5. Equalization, Diversity, Equalizers in a communications receiver, Algorithms for adaptive equalization, diversity techniques, space, polarization, frequency diversity, Interleaving. Channel Coding & Speech Coding

6. Higher Generation Cellular Standards: 3G Standards: evolved EDGE, enhancements in 4G standard, Architecture and representative protocols, call flow for LTE, VoLTE, UMTS, introduction to 5G (eMBB, uRLLC, mMMTC-5G IoT)

RECOMMENDED TEXT / REFERENCE BOOKS

1. Andreas F. Molisch, Wireless Communications, Second Edition, John Wiley & Sons Ltd. 2011
2. T. S. Rappaport, "Wireless Communications Principles and Practice", 2nd Edition, PHI, 2002.

3. V. K. Garg, J. E. Wilkes, "Principle and Application of GSM", Pearson Education, 5th Edition, 2008.
4. V. K. Garg, "IS-95 CDMA & CDMA 2000", Pearson Education, 4th Edition, 2009.
5. William C. Y. Lee, "Mobile Cellular Telecommunications Analog and Digital Systems", 2nd Edition, TMH, 1995.
6. Asha Mehrotra, "A GSM system Engineering" Artech House Publishers Bosten, London, 1997.
7. Multiple Access Techniques for 5G Wireless Networks and Beyond, aezi, Mojtaba, Ding, Zhiguo, Poor, H. Vincent, Springer International Publishing, 2020.

M. TECH. SEMESTER – I (ECS)
SUBJECT: VOICE AND DATA NETWORKS
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme			
Lect	Tut	Prac	Total		Ext	Sess.	Prac	Total
3	0	2	5	4	60	40	25	125

DETAILED SYLLABUS

1. Network Design Issues, Network Performance Issues, Network Terminology, centralized and distributed approaches for networks design, Issues in design of data networks, Layered and Layer less Communication, Cross layer design of Networks.

2. Data Communication Networks and their Design, Link layer design- Link adaptation, Link Layer Protocols, Retransmission. Mechanisms (ARQ), Hybrid ARQ (HARQ), Go Back N, Selective Repeat protocols and their analysis.

3. Unit 3: Queuing Models of Networks, Traffic Models, Little's Theorem, Markov chains, M/M/1 and other Markov systems, Multiple Access Protocols for Local Area Networks.

4. Inter-networking, Bridging, Global Internet, IP protocol and addressing, Sub netting, Classless Inter domain Routing (CIDR), IP address lookup, Dynamic IP Address Configuration, Routing in Internet, Internet Routing Protocols – OSPF and BGP, Mobile IP, Translating IP addresses to domain names.

5. Unit 5: End to End Protocols, TCP and UDP. TCP Congestion Control - Additive Increase/Multiplicative Decrease , Slow Start, Fast Retransmit/ Fast Recovery, Congestion avoidance, RED TCP Throughput Analysis, Quality of Service in Packet Networks. Network Calculus, Packet Scheduling Algorithms.

6. Socket Interface - Concept of Process, Process Creation (Forking) and Process Identification, Concurrent and Iterative mode of services, Socket Introduction Socket System calls.

RECOMMENDED TEXT / REFERENCE BOOKS

1. D. Bertsekas and R. Gallager, “Data Networks”, 2nd Edition, Prentice Hall, 1992.
2. L. Peterson and B. S. Davie, “Computer Networks: A Systems Approach”, 5th Edition, Morgan Kaufman, 2011.
3. Kumar, D. Manjunath and J. Kuri, “Communication Networking: An analytical approach”, 1st Edition, Morgan Kaufman, 2004.
4. Walrand, “Communications Network: A First Course”, 2nd Edition, McGraw Hill, 2002.
5. Leonard Kleinrock, “Queueing Systems, Volume I: Theory”, 1st Edition, John Wiley and Sons, 1975.
6. Aaron Kershenbaum, “Telecommunication Network Design Algorithms”, McGraw Hill, 1993.
7. Vijay Ahuja, “Design and Analysis of Computer Communication Networks”, McGraw Hill, 1987

8. TCP/IP Protocol Suite, 7th Edition By: Behrouz A. Forouzan Publisher: Tata McGraw Hill
9. Internetworking with TCP/IP Vol.1, 2, 3, 2nd Edition By: Douglas Comer Publisher: Prentice Hall of India
10. Unix Network Programming, 1st Edition By: W. R. Stevens Publisher: Prentice Hall of India
11. TCP/IP Illustrated Vol. I, 1st Edition By: W. R. Stevens Publisher: Pearson Education

M. TECH. SEMESTER – I (ECS)
SUBJECT: REMOTE SENSING
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme			
Lect	Tut	Prac	Total		Ext	Sess.	Prac	Total
3	0	2	5	4	60	40	25	125

DETAILED SYLLABUS

1. Physics Of Remote Sensing: Electro Magnetic Spectrum, Physics of Remote Sensing Effects of Atmosphere-Scattering–Different types–Absorption-Atmospheric window-Energy interaction with surface features –Spectral reflectance of vegetation, soil and water atmospheric influence on spectral response patterns-multi concept in Remote sensing.

2. Data Acquisition: Types of Platforms–different types of aircrafts-Manned and Unmanned spacecrafts – sun synchronous and geo synchronous satellites –Types and characteristics of different platforms –LANDSAT, SPOT, IRS, INSAT, IKONOS, QUICKBIRD etc

3. Photographic products, B/W, color, color IR film and their characteristics –resolving power of lens and film - Opto mechanical electro optical sensors –across track and along track scanners-multispectral scanners and thermal scanners–geometric characteristics of scanner imagery -calibration of thermal scanners.

4. Scattering System: Microwave scatterometry, types of RADAR –SLAR –resolution – range and azimuth –real aperture and synthetic aperture RADAR. Characteristics of Microwave images topographic effect-different types of Remote Sensing platforms –airborne and space borne sensors -ERS, JERS, RADARSAT, RISAT - Scatterometer, Altimeter-LiDAR remote sensing, principles, applications.

5. Thermal And Hyper Spectral Remote Sensing: Sensors characteristics-principle of spectroscopy-imaging spectroscopy–field conditions, compound spectral curve, Spectral library, radiative models, processing procedures, derivative spectrometry, thermal remote sensing – thermal sensors, principles, thermal data processing, applications.

6. Data Analysis: Resolution–Spatial, Spectral, Radiometric and temporal resolution-signal to noise ratio-data products and their characteristics-visual and digital interpretation–Basic principles of data processing –Radiometric correction–Image enhancement–Image classification– Principles of LiDAR, Aerial Laser Terrain Mapping.

RECOMMENDED TEXT / REFERENCE BOOKS

1. Lillesand T.M., and Kiefer,R.W. Remote Sensing and Image interpretation, John Wiley & Sons-2000, 6th Edition
2. John R. Jensen, Introductory Digital Image Processing: A Remote Sensing Perspective, 2nd Edition, 1995.
3. John A.Richards, Springer –Verlag, Remote Sensing Digital Image Analysis, 1999.

4. Paul Curran P.J. Principles of Remote Sensing, ELBS; 1995.
5. Charles Elachi and Jakob J. van Zyl , Introduction To The Physics and Techniques of Remote Sensing , Wiley Series in Remote Sensing and Image Processing, 2006.
6. Sabins, F.F. Jr, Remote Sensing Principles and Image interpretation, W. H. Freeman & Co, 1978

M. TECH. SEMESTER – I (ECS)
SUBJECT: ADVANCE DIGITAL SIGNAL PROCESSING
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme			
Lect	Tut	Prac	Total		Ext	Sess.	Prac	Total
3	0	2	5	4	60	40	25	125

DETAILED SYLLABUS

1. Overview of DSP, Overview of discrete time signal and systems, Convolution and correlations and their application, Characterization in time and frequency, overview of Z-transform and its applications, overview of DFT, FFT Algorithms, Digital filter design and structures: Basic FIR/IIR filter design & structures, design techniques of linear phase FIR filters, IIR filters by impulse invariance, bilinear transformation, FIR/IIR Cascaded lattice structures, and Parallel all pass realization of IIR.

2. Multi rate DSP, Decimators and Interpolators, Sampling rate conversion, multistage decimator & interpolator, poly phase filters, QMF, digital filter banks, Applications in sub-band coding.

3. Minimum mean square error and linear minimum mean square error criteria, FIR Wiener filter and linear prediction, steepest descent algorithm and LMS algorithm, Recursive Least Square algorithm. Applications: Adaptive Modelling and System Identification, Inverse Adaptive Modelling, Deconvolution, Adaptive Inverse Control, Adaptive Interference Cancelling.

4. Estimation of Spectra from Finite-Duration Observations of Signals. Nonparametric Methods for Power Spectrum Estimation, Parametric Methods for Power Spectrum Estimation.

5. Fixed and floating point representation of numbers, quantization noise in signal representations, finite word-length effects in coefficient representation, limit cycle oscillations, scaling to prevent overflow

6. Characteristics of DSP algorithms and hardware requirements, von Neumann architecture, Harvard architecture, parallelism and hardware units of typical digital signal processor. Architectural details of TMS320C6x. Introduction to wavelets, Wavelet transform applications.

RECOMMENDED TEXT / REFERENCE BOOKS

1. J. G. Proakis and D. G. Manolakis, "Digital signal processing: Principles, Algorithm and Applications", 4th Edition, Prentice Hall, 2007.
2. N. J. Fliege, "Multirate Digital Signal Processing: Multirate Systems -Filter Banks – Wavelets", 1st Edition, John Wiley and Sons Ltd, 1999.
3. Bruce W. Suter, "Multirate and Wavelet Signal Processing", 1st Edition, Academic Press, 1997.
4. Digital Signal Processing: A computer Based Approach, 2nd Edition By: S. K. Mitra Publisher: Tata McGraw Hill

5. Analog and Digital Signal Processing, 2nd Edition By: Ashok Ambardar Publisher: THOMSON Brooks
6. Digital Signal Processing: A Practical Approach, 2nd Edition, By - Emmanuel Ifeachor , Barrie Jervis Publisher: Pearson.
7. M. H. Hayes, "Statistical Digital Signal Processing and Modeling", John Wiley & Sons Inc., 2002.
8. S. Haykin, "Adaptive Filter Theory", 4th Edition, Prentice Hall, 2001.
9. D. G. Manolakis, V. K. Ingle and S. M. Kogon, "Statistical and Adaptive Signal Processing", McGraw Hill, 2000.

M. TECH. SEMESTER – I (ECS)
SUBJECT: ANALOG AND DIGITAL CMOS VLSI DESIGN
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme			
Lect	Tut	Prac	Total		Ext	Sess.	Prac	Total
3	0	2	5	4	60	40	25	125

DETAILED SYLLABUS

1. Introduction-VLSI Design Flow, Technology Scaling & Road map, Scaling issues.

Digital CMOS Design

2. Review of Basic MOS structure and its static behaviour, CMOS Transistor RC model, Inverter: Static CMOS inverter, Switching threshold AC & DC analysis of CMOS logic and their evaluation, Dynamic behaviour, Power consumption.

3. Combinational logic - Static CMOS design, Logical effort, Dynamic logic, Speed and power dissipation in dynamic logic, Cascading dynamic gates, CMOS transmission gate logic.

Analog CMOS VLSI Design

4. Single Stage Amplifier - CS stage with resistance load, Divide connected load, Current source load, Triode load, CS stage with source degeneration, Source follower, Common gate stage, Cascade stage, Choice of device models. Differential Amplifiers: Basic difference pair, Common mode response, Differential pair with MOS loads, Gilbert cell.

5. Passive and active current mirrors - Basic current mirrors, Cascade mirrors, Active current mirrors. Frequency response of CS stage: Source follower, Common gate stage, Cascade stage and difference pair, Noise.

6. Operational Amplifiers - Single stage OPAMP, Two stage OPAMP, Gain boosting, Common mode feedback, Slew rate, PSRR, Compensation of 2 stage OPAMP, Other compensation techniques

Physical Design & Testing

7. Physical Design - Floor Planning, Placement, CTS, Routing, Introduction to verification.

8. Programmable ASICs - Programmable ASIC Logic Cells, IO cells, Interconnect

9. Testing - Boundary Scan Test, Fault modelling and simulation, ATPG & PODEM, Built in self-test.

Advanced Technologies

10. Short channel effects, High–k, Metal Gate Technology, FinFET, TFET – Overview, Structure.

RECOMMENDED TEXT / REFERENCE BOOKS

1. J P Rabaey, A P Chandrakasan, B Nikolic, "Digital Integrated circuits: A design perspective", Prentice Hall electronics and VLSI series, 2nd Edition.
2. BehzadRazavi , "Design of Analog CMOS Integrated Circuits", TMH, 2007.
3. Phillip E. Allen and Douglas R. Holberg, "CMOS Analog Circuit Design", Oxford, 3rd Edition
4. Michael John Sebastian Smith, Application Specific Integrated Circuits, 6th Indian Edition, Pearson Education
5. John P. Uyemura, Introduction to VLSI Circuits and Systems, 1st Edition, Wiley publisher
6. Baker, Li, Boyce, "CMOS Circuit Design, Layout, and Simulation", Wiley, 2nd Edition.

M. TECH. SEMESTER – I (ECS)
SUBJECT: DIGITAL DESIGN AND VERIFICATION
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme			
Lect	Tut	Prac	Total		Ext	Sess.	Prac	Total
3	0	2	5	4	60	40	25	125

DETAILED SYLLABUS

1. Revision of basic Digital systems: Combinational Circuits, Sequential Circuits, Logic families. Synchronous FSM and asynchronous design, Metastability, Clock distribution and issues, basic building blocks like PWM module, pre-fetch unit, programmable counter, FIFO, Booth's multiplier, ALU, Barrel shifter etc.
2. Verilog/VHDL Comparisons and Guidelines, Verilog: HDL fundamentals, simulation, and test bench design, Examples of Verilog codes for combinational and sequential logic, Verilog AMS
3. System Verilog and Verification: Verification guidelines, Data types, procedural statements and routines, connecting the test bench and design, Assertions, Basic OOP concepts, Randomization, Introduction to basic scripting language: Perl, Tcl/Tk
4. Current challenges in physical design: Roots of challenges, Delays: Wire load models Generic PD flow, Challenges in PD flow at different steps, SI Challenge - Noise & Crosstalk, IR Drop, Process effects: Process Antenna Effect & Electro migration
5. Programmable Logic Devices: Introduction, Evolution: PROM, PLA, PAL, Architecture of PAL's, Applications, Programming PLD's, FPGA with technology: Antifuse, SRAM, EPROM, MUX, FPGA structures, and ASIC Design Flows, Programmable Interconnections, Coarse grained reconfigurable devices
6. IP and Prototyping: IP in various forms: RTL Source code, Encrypted Source code, Soft IP, Netlist, Physical IP, and Use of external hard IP during prototyping, Case studies, and Speed issues. Testing of logic circuits: Fault models, BIST, JTAG interface

RECOMMENDED TEXT / REFERENCE BOOKS

1. Douglas Smith, “HDL Chip Design: A Practical Guide for Designing, Synthesizing & Simulating ASICs & FPGAs Using VHDL or Verilog”, Doone publications, 1998.
2. Samir Palnitkar, “Verilog HDL: A guide to Digital Design and Synthesis”, Prentice Hall, 2nd Edition, 2003.
3. Doug Amos, Austin Lesea, Rene Richter, “FPGA based Prototyping Methodology Manual”, Synopsys Press, 2011.
4. Christophe Bobda, “Introduction to Reconfigurable Computing, Architectures, Algorithms and Applications”, Springer, 2007.
5. Janick Bergeron, “Writing Test benches: Functional Verification of HDL Models”, Second Edition, Springer, 2003.

M. TECH. SEMESTER – I (ECS)
SUBJECT: FIBER OPTIC COMMUNICATION & SENSOR SYSTEMS
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme			
Lect	Tut	Prac	Total		Ext	Sess.	Prac	Total
3	0	2	5	4	60	40	25	125

DETAILED SYLLABUS

1. INTRODUCTION TO FIBER - Fiber structures and wave guiding fundamentals, optical source, power launching and coupling, photo detectors, optical receiver's transmission link analysis.

2. MULTICHANNEL SYSTEMS - WDM Lightwave systems, WDM Components, System performance issues, TDM, CDM and sub carrier multiplexing.

3. SOLITON SYSTEM - Fiber Solitons, Soliton-based communication, Loss Managed Soliton.

4. OPTICAL SWITCHING AND NETWORKS - Introduction, applications, technologies, SONET, wavelength routed network.

5. ALL-OPTICAL TIME-DIVISION MULTIPLEXING TECHNOLOGY - Role of All-optical TDN technology, Key Technologies for its systems.

6. OPTICAL FIBER SENSOR TECHNOLOGY - Multimode optical fiber sensors, distributed fiber optic sensors.

7. FIBER OPTICS APPLICATIONS - LANs, Broadband networks, sensing systems, system measurements

RECOMMENDED TEXT / REFERENCE BOOKS

1. Fiber Optics Communications, 4th Edition By: Gerd Keiser Publisher: Tata McGraw Hill
2. Optical Fibers and Fiber Optic Communication Systems, 2nd Edition By: Subir Kumar Sarkar Publisher: S. Chand
3. Optical Fiber Communication: Principles and Systems, 1st Edition By: A. Selvarajan, S Kar, T Srinivas Publisher: Tata McGraw Hill
4. Optical Fiber Communication: Principles and Practice, 2nd Edition By: John M. Senior Publisher: Prentice Hall of India
5. WDM Optical Networks, 1st Edition By: C. Siva Ram Murthy and Mohan Gurusamy Publisher: Prentice Hall of India

M. TECH. SEMESTER – I (ECS)
SUBJECT: RESEARCH METHODOLOGY AND IPR
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme			
Lect	Tut	Prac	Total		Ext	Sess.	Prac	Total
2	0	0	2	2	40	0	0	40

DETAILED SYLLABUS

1. Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

2. Effective literature studies approaches, analysis Plagiarism , Research ethics,

3. Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

4. Nature of Intellectual Property - Patents, Designs, Trademark and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.

5. Patent Rights - Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.

6. New Developments in IPR - Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.

RECOMMENDED TEXT / REFERENCE BOOKS

1. Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students'"
2. Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"
3. Ranjit Kumar, 2nd Edition , "Research Methodology: A Step by Step Guide for beginners"
4. Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007.
5. Mayall, "Industrial Design", McGraw Hill, 1992.
6. Niebel , "Product Design", McGraw Hill, 1974.
7. Asimov , "Introduction to Design", Prentice Hall, 1962.
8. Robert P. Merges, Peter S. Menell, Mark A. Lemley, " Intellectual Property in New Technological Age", 2016.
9. T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008

M. TECH. SEMESTER – I (ECS)
SUBJECT: SOFTWARE PROJECT
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme			
Lect	Tut	Prac	Total		Ext	Sess.	Prac	Total
0	0	2	2	1	-	-	50	50

Each student will take up a software project based on Object Oriented Design.

M. TECH. SEMESTER – II (ECS)
SUBJECT: RF AND MICROWAVE CIRCUIT DESIGN
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme			
Lect	Tut	Prac	Total		Ext	Sess.	Prac	Total
3	0	2	5	4	60	40	25	125

DETAILED SYLLABUS

1. TRANSMISSION LINE THEORY
   Lumped element circuit model for transmission line, field analysis, Smith chart, quarter wave transformer, generator and load mismatch, impedance matching and tuning.

2. MICROWAVE NETWORK ANALYSIS
   Impedance and equivalent voltage and current, Impedance and admittance matrix, The scattering matrix, transmission matrix, Signal flow graph.

3. MICROWAVE COMPONENTS
   Microwave resonators, Microwave filters, power dividers and directional couplers, Ferromagnetic devices and components

4. MICROSTRIP ANTENNA ARRAY
   Fundamentals of Array Antenna, Linear & Planar Arrays, Array Synthesis, Adaptive Array, Microstrip Array

5. MICROWAVE SEMICONDUCTOR DEVICES AND MODELING
   PIN diode, Tunnel diodes, Varactor diode, Schottky diode, IMPATT and TRAPATT devices, transferred electron devices, Microwave BJTs, GaAs FETs, low noise and power GaAs FET, MESFET, MOSFET, HEMT.

6. AMPLIFIERS DESIGN
   Power gain equations, stability, impedance matching, constant gain and noise figure circles, small signal, low noise, high power and broadband amplifier, oscillators, Mixers design

RECOMMENDED TEXT / REFERENCE BOOKS

1. Matthew M. Radmanesh, "Advanced RF & Microwave Circuit Design: The Ultimate Guide to Superior Design", Author House, 2009.
2. D. M. Pozar, " Microwave engineering" ,Wiley, 4th edition, 2011.
3. R. Ludwig and P. Bretchko, "R. F. Circuit Design", Pearson Education Inc, 2009.
4. G.D. Vendelin, A.M. Pavoi, U. L. Rohde, "Microwave Circuit Design Using Linear And Non Linear Techniques", John Wiley 1990.
5. S.Y. Liao, "Microwave circuit Analysis and Amplifier Design", Prentice Hall 1987.
6. Radmanesh, "RF and Microwave Electronics Illustrated", Pearson Education, 2004.
7. C. A. Balanis, "Antenna Theory", Wiley, 3rd Edition, 2005.

M. TECH. SEMESTER – II (ECS)
SUBJECT: COGNITIVE RADIO
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme			
Lect	Tut	Prac	Total		Ext	Sess.	Prac	Total
3	0	2	5	4	60	40	25	125

DETAILED SYLLABUS

1. Introduction to Cognitive Radios: Digital dividend, cognitive radio (CR) architecture, functions of cognitive radio, dynamic spectrum access (DSA), components of cognitive radio, spectrum sensing, spectrum analysis and decision, potential applications of cognitive radio.
2. Spectrum Sensing: Spectrum sensing, detection of spectrum holes (TVWS), collaborative sensing, geo-location database and spectrum sharing business models (spectrum of commons, real time secondary spectrum market).
3. Optimization Techniques of Dynamic Spectrum Allocation: Linear programming, convex programming, non-linear programming, integer programming, dynamic programming, stochastic programming.
4. Dynamic Spectrum Access and Management: Spectrum broker, cognitive radio architectures, centralized dynamic spectrum access, distributed dynamic spectrum access, learning algorithms and protocols.
5. Spectrum Trading: Introduction to spectrum trading, classification to spectrum trading, radio resource pricing, brief discussion on economics theories in DSA (utility, auction theory), classification of auctions (single auctions, double auctions, concurrent, sequential).
6. Research Challenges in Cognitive Radio: Network layer and transport layer issues, cross-layer design for cognitive radio networks.

RECOMMENDED TEXT / REFERENCE BOOKS

1. Ekram Hossain, Dusit Niyato, Zhu Han, “Dynamic Spectrum Access and Management in Cognitive Radio Networks”, Cambridge University Press, 2009.
2. Kwang-Cheng Chen, Ramjee Prasad, “Cognitive radio networks”, John Wiley & Sons Ltd., 2009.
3. Bruce Fette, “Cognitive radio technology”, Elsevier, 2nd edition, 2009.
4. Huseyin Arslan, “Cognitive Radio, Software Defined Radio, and Adaptive Wireless Systems”, Springer, 2007.
5. Francisco Rodrigo Porto Cavalcanti, Soren Andersson, “Optimizing Wireless Communication Systems” Springer, 2009.

M. TECH. SEMESTER – II (ECS)
SUBJECT: DSP ARCHITECTURE
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme			
Lect	Tut	Prac	Total		Ext	Sess.	Prac	Total
3	0	2	5	4	60	40	25	125

DETAILED SYLLABUS

1. Programmable DSP Hardware: Processing Architectures (von Neumann, Harvard), DSP core algorithms (FIR, IIR, Convolution, Correlation, FFT), IEEE standard for Fixed and Floating Point Computations, Special Architectures Modules used in Digital Signal Processors (like MAC unit, Barrel shifters), On-Chip peripherals, DSP benchmarking.

2. Structural and Architectural Considerations: Parallelism in DSP processing, Texas Instruments TMS320 Digital Signal Processor Families, Fixed Point TI DSP Processors: TMS320C1X and TMS320C2X Family,TMS320C25 –Internal Architecture, Arithmetic and Logic Unit, Auxiliary Registers, Addressing Modes (Immediate, Direct and Indirect, Bit-reverse Addressing), Basics of TMS320C54x and C55x Families in respect of Architecture improvements and new applications fields, TMS320C5416 DSP Architecture, Memory Map, Interrupt System, Peripheral Devices, Illustrative Examples for assembly coding.

3. VLIW Architecture: Current DSP Architectures, GPUs as an alternative to DSP Processors, TMS320C6X Family, Addressing Modes, Replacement of MAC unit by ILP, Detailed study of ISA, Assembly Language Programming, Code Composer Studio, Mixed Cand Assembly Language programming, On-chip peripherals, Simple applications developments as an embedded environment.

4. Multi-core DSPs: Introduction to Multi-core computing and applicability for DSP hardware, Concept of threads, introduction to P-thread, mutex and similar concepts, heterogeneous and homogenous multi-core systems, Shared Memory parallel programming –OpenMP approach of parallel programming, PRAGMA directives, OpenMP Constructs for work sharing like for loop, sections, TI TMS320C6678 (Eight Core subsystem).

5. FPGA based DSP Systems: Limitations of P-DSPs, Requirements of Signal processing for Cognitive Radio (SDR), FPGA based signal processing design-case study of a complete design of DSP processor.

6. High Performance Computing using P-DSP: Preliminaries of HPC, MPI, OpenMP, multicore DSP as HPC infrastructure.

RECOMMENDED TEXT / REFERENCE BOOKS

1. M. Sasikumar, D. Shikhare, Ravi Prakash, “Introduction to Parallel Processing”, 1st Edition, PHI, 2006.
2. Fayez Gebali, “Algorithms and Parallel Computing”,1st Edition, John Wiley & Sons, 2011.

3. Rohit Chandra, Ramesh Menon, Leo Dagum, David Kohr, DrorMaydan, Jeff McDonald,"Parallel Programming in OpenMP", 1st Edition, Morgan Kaufman,2000.
4. Ann Melnichuk,Long Talk, "Multicore Embedded systems", 1st Edition, CRC Press,2010.
5. Wayne Wolf, "High Performance Embedded Computing: Architectures, Applications and Methodologies", 1st Edition, Morgan Kaufman, 2006.
6. E.S.Gopi, "Algorithmic Collections for Digital Signal Processing Applications Using MATLAB", 1st Edition, Springer Netherlands, 2007.

M. TECH. SEMESTER – II (ECS)
SUBJECT: PATTERN RECOGNITION AND MACHINE LEARNING
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme			
Lect	Tut	Prac	Total		Ext	Sess.	Prac	Total
3	0	2	5	4	60	40	25	125

DETAILED SYLLABUS

1. Revisiting concepts of Image Processing

2. Introduction to Pattern Recognition: Problems, applications, design cycle, learning and adaptation, examples, Probability Distributions, Parametric Learning - Maximum likelihood and Bayesian Decision Theory- Bayes' rule, discriminant functions, loss functions and Bayesian error analysis

3. Linear Models: Linear Models for Regression, linear regression, logistic regression Linear Models for Classification

4. Neural Network: perceptron, multi-layer perceptron, back-propagation algorithm, error surfaces, practical techniques for improving back-propagation, additional networks and training methods, Adaboost, Deep Learning

5. Linear Discriminant Functions: decision surfaces, two-category, multi-category, minimum squared error procedures, the Ho-Kashyap procedures, linear programming algorithms, Support vector machine

6. Algorithm independent machine learning: lack of inherent superiority of any classifier, bias and variance, re-sampling for classifier design, combining classifiers

7. Unsupervised learning and clustering: k-means clustering, fuzzy k-means clustering, hierarchical clustering

RECOMMENDED TEXT / REFERENCE BOOKS

1. Tom Mitchell, Machine Learning. McGraw-Hill, 1997.
2. Richard O. Duda, Peter E. Hart, David G. Stork, "Pattern Classification", 2nd Edition John Wiley & Sons, 2001.
3. Trevor Hastie, Robert Tibshirani, Jerome H. Friedman, "The Elements of Statistical Learning", 2nd Edition, Springer, 2009.
4. Christopher Bishop, Pattern recognition and machine learning, Springer Verlag, 2006.
5. Peter Harrington, Machine Learning in Action, Manning Shelter Island
6. Simon Haykin, Neural Networks and Learning Machines, 3rd edition, Pearson, PHI.

M. TECH. SEMESTER – II (ECS)
SUBJECT: DIGITAL IMAGE AND VIDEO PROCESSING
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme			
Lect	Tut	Prac	Total		Ext	Sess.	Prac	Total
3	0	2	5	4	60	40	25	125

DETAILED SYLLABUS

1. **Digital Image and Video Fundamentals -** Digital image and video fundamentals and formats, 2-D and 3-D sampling and aliasing, 2-D/3-D filtering, image decimation/interpolation, video sampling and interpolation, Basic image processing operations, Image Transforms. Need for image transforms, DFT, DCT, Walsh, Hadamard transform, Haar transform, Wavelet transform

2. **Image and Video Enhancement and Restoration -** Histogram, Point processing, filtering, image restoration, algorithms for 2-D motion estimation, change detection, motion-compensated filtering, frame rate conversion, deinterlacing, video resolution enhancement, Image and Video restoration (recovery).

3. **Image and Video Segmentation -** Discontinuity based segmentation- Line detection, edge detection, thresholding, Region based segmentation, Scene Change Detection, Spatiotemporal Change Detection, Motion Segmentation, Simultaneous Motion Estimation and Segmentation Semantic Video Object Segmentation, Morphological image processing.

4. **Colour image Processing -** Colour fundamentals, Colour models, Conversion of colour models, Pseudo colour image processing, Full colour processing

5. **Image and Video Compression -** Lossless image compression including entropy coding, lossy image compression, video compression techniques, and international standards for image and video compression (JPEG, JPEG 2000, MPEG-2/4, H.264, SVC), Video Quality Assessment

6. **Object recognition -** Image Feature representation and description-boundary representation, boundary descriptors, regional descriptors, feature selection techniques, introduction to classification, supervised and unsupervised learning, Template matching, Bayes classifier

RECOMMENDED TEXT / REFERENCE BOOKS

1. Ed. Al Bovik ,"Handbook of Image and Video Processing", 2nd Edition, Academic Press, 2000.
2. J. W. Woods, "Multidimensional Signal, Image and Video Processing and Coding",2nd Edition, Academic Press, 2011.
3. Rafael C. Gonzalez and Richard E. Woods," Digital Image Processing", 3rd Edition, Prentice Hall, 2008.
4. A. M. Tekalp, "Digital Video Processing", 2nd Edition, Prentice Hall, 2015.
5. S. Shridhar, "Digital Image Processing", 2nd Edition, Oxford University Press, 2016.

M. TECH. SEMESTER – II (ECS)
SUBJECT: OPTICAL NETWORKS
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme			
Lect	Tut	Prac	Total		Ext	Sess.	Prac	Total
3	0	2	5	4	60	40	25	125

DETAILED SYLLABUS

1. SONET/SDH: optical transport network, IP, routing and forwarding, multiprotocol label switching.

2. WDM network elements: optical line terminals and amplifiers, optical add/drop multiplexers, OADM architectures, reconfigurable OADM, optical cross connects.

3. Control and management: network management functions, optical layer services and interfacing, performance and fault management, configuration management, optical safety.

4. Network Survivability: protection in SONET/SDH & client layer, optical layer protection schemes

5. WDM network design: LTD and RWA problems, dimensioning wavelength routing networks, statistical dimensioning models.

6. Access networks: Optical time division multiplexing, synchronization, header processing, buffering, burst switching, test beds, Introduction to PON, GPON, AON.

RECOMMENDED TEXT / REFERENCE BOOKS

1. Rajiv Ramaswami, Sivarajan, Sasaki, “Optical Networks: A Practical Perspective”, MK, Elsevier, 3 rd edition, 2010.
2. C. Siva Ram Murthy and Mohan Gurusamy, “WDM Optical Networks: Concepts Design and Algorithms”, PHI, EEE, 2001.

M. TECH. SEMESTER – II (ECS)
SUBJECT: STATISTICAL SIGNAL ANALYSIS
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme			
Lect	Tut	Prac	Total		Ext	Sess.	Prac	Total
3	0	2	5	4	60	40	25	125

DETAILED SYLLABUS

1. Random Variables: Probability Concepts, distribution and density functions, moments, independent, uncorrelated and orthogonal random variables; Vector-space representation of Random variables, Vector quantization, Tchebyshev inequality theorem, Central Limit theorem, Discrete & Continuous Random Variables.

2. Random Process - Expectations, Moments, Ergodicity, Discrete-Time Random Processes Stationary Process, autocorrelation and auto covariance functions, Spectral representation of random signals, Properties of power spectral density, Gaussian Process and White noise process, Poisson process, Markov Process

3. Random Signal Modelling - MA(q), AR(p), ARMA(p,q) models, Hidden Markov Model & its applications, Linear System with random input, Forward and Backward Predictions, Levinson Durbin Algorithm.

4. Statistical Decision Theory - Bayes' Criterion, Binary Hypothesis Testing, M-ary Hypothesis Testing, Minimax Criterion, Neyman-Pearson Criterion, Composite Hypothesis Testing.

5. Parameter Estimation Theory - Maximum Likelihood Estimation, Generalized Likelihood Ratio Test, Some Criteria for Good Estimators, Bayes' Estimation Minimum Mean-Square Error Estimate, Minimum, Mean Absolute Value of Error Estimate Maximum A Posteriori Estimate, Multiple Parameter Estimation, Best Linear Unbiased Estimator, Least-Square Estimation, Recursive Least-Square Estimator.

6. Spectral Analysis - Estimated autocorrelation function. Periodogram, Averaging the Periodogram (Barlett Method), Welch Modification, Parametric method. AR(p) spectral estimation and detection of Harmonic signals

RECOMMENDED TEXT / REFERENCE BOOKS

1. Papoulis and S.U. Pillai. "Probability, Random Variables and Stochastic Process" 4th Edition. McGraw-Hill. 2002.
2. D.G. Manolakis. V.K. Ingle and S.M. Kogon. "Statistical and Adaptive Signal Processing", McGraw Hill, 2000.
3. Detection, Estimation, and Modulation Theory, Part 1 Harry L. Van Tree, John Wiley & Sons.
4. Mourad Barkat, "Signal Detection and Estimation", Artech House, 2nd Edition, 2005

M. TECH. SEMESTER – II (ECS)

SUBJECT: ADVANCED COMMUNICATION NETWORK
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme			
Lect	Tut	Prac	Total		Ext	Sess.	Prac	Total
3	0	2	5	4	60	40	25	125

DETAILED SYLLABUS

1. Overview of Internet - Concepts, challenges and history. TCP/IP Congestion and Flow Control in Internet-Throughput analysis of TCP congestion control. TCP for high bandwidth delay networks, Fairness issues in TCP.

2. Real Time Communications over Internet. Adaptive applications. Latency and throughput issues. Integrated Services Model (intServ). Resource reservation in Internet. RSVP. Characterization of Traffic by Linearly Bounded Arrival Processes (LBAP). Leaky bucket algorithm and its properties.

3. Packet Scheduling Algorithms-requirements and choices. Scheduling guaranteed service connections. GPS, WFQ and Rate proportional algorithms. High speed scheduler design. Latency Rate servers and delay bounds in packet switched networks for LBAP traffic. Active Queue Management - RED. IP switching and MPLS.

4. IP address lookup-challenges. Packet classification algorithms and Flow Identification Grid of Tries, Cross producing and controlled prefix expansion algorithms.

5. Admission control in Internet. Concept of Effective bandwidth. Measurement based admission control. Differentiated Services in Internet (DiffServ). DiffServ architecture and framework.

6. Protocols for Advanced Wireless Networks - Issues in Designing a Transport Layer Protocol for Wireless Networks, Classification of Transport Layer Solutions, TCP proposals over wireless networks, Transport Protocols for Interplanetary Communication & Issues.

7. Wireless Sensor Networks - Architecture, Data Dissemination, Data Gathering, Location Discovery, Need for energy management

RECOMMENDED TEXT / REFERENCE BOOKS

1. Jean Wairand and Pravin Varaiya, “High Performance Communications Networks”, 2nd Edition, 2000.
2. Jean Le Boudec and Patrick Thiran, “Network Calculus A Theory of Deterministic Queueing Systems for the Internet”, Springer Veriag, 2001.
3. Zhang Wang, “Internet QoS”, Morgan Kaufman, 2001.
4. Anurag Kumar, D. Manjunath and Joy Kuri, “Communication Networking: An Analytical Approach” , Morgan Kaufman Publishers, 2004.
5. George Kesidis, “ATM Network Performance”, Kluwer Academic, Research Papers, 2005.

M. TECH. SEMESTER – II (ECS)
SUBJECT: ADVANCED WIRELESS COMMUNICATION SYSTEMS
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme			
Lect	Tut	Prac	Total		Ext	Sess.	Prac	Total
3	0	2	5	4	60	40	25	125

DETAILED SYLLABUS

1. Multicarrier techniques, Orthogonal Frequency Division Multiplexing (OFDM), Cyclic prefix, OFDMA, AMC, bit and power allocation, PAPR, Synchronization issues. Introduction to NOMA.

2. Introduction to Multi-antenna Systems, Motivation, Types of multi-antenna systems, MIMO vs. multi-antenna systems, Exploiting multipath diversity, Transmit diversity, Space-time codes, The Alamouti scheme, Delay diversity, Cyclic delay diversity, Space-frequency codes, Spatial Multiplexing, Spectral efficiency and capacity, Transmitting independent streams in parallel, Mathematical notation

3. MIMO precoding, MIMO Beam forming channel state information (CSI) and channel estimation techniques

4. Case study - MIMO in LTE, Codewords to layers mapping, Pre-coding for spatial multiplexing, Pre-coding for transmit diversity, Beamforming in LTE, Cyclic delay diversity based pre-coding, Pre-coding codebooks, Propagation Channels, Time & frequency channel dispersion, AWGN and multipath propagation channels, Delay spread values and time variations, Fast and slow fading environments, Complex baseband multipath channels, Narrowband and wideband channels, MIMO channel models.

5. Introduction to Cognitive Radios: Digital dividend, cognitive radio (CR) architecture, functions of cognitive radio, dynamic spectrum access (DSA), components of cognitive radio, spectrum sensing, spectrum analysis and decision, Spectrum Management, Spectrum Sharing, Spectrum Overlay cognitive Radio, potential applications of cognitive radio.

6. Relaying, Multi-Hop, and Cooperative Communications - Introduction and Motivation, Fundamentals of Relaying, Relaying with Multiple, Parallel Relays, Routing and Resource Allocation in Multi-Hop Networks, Routing and Resource Allocation in Collaborative Networks, Relay Network Coding, Applications.

RECOMMENDED TEXT / REFERENCE BOOKS

1. Claude Oestges, Bruno Clerckx, "MIMO Wireless Communications : From Real-world
2. Propagation to Space-time Code Design",Academic Press, 1st Edition, 2010.
3. Mohinder Janakiraman, “Space - Time Codes and MIMO Systems”, Artech House Publishers, 2004.

4. Andreas F. Molisch, Wireless Communications, Second Edition, John Wiley & Sons Ltd. 2011
5. Ekram Hossain, Dusit Niyato, Zhu Han, "Dynamic Spectrum Access and Management in Cognitive Radio Networks", Cambridge University Press, 2009.
6. Kwang-Cheng Chen, Ramjee Prasad, "Cognitive radio networks", John Wiley & Sons Ltd., 2009.
7. Bruce Fette, "Cognitive radio technology", Elsevier, 2nd Edition, 2009.
8. Huseyin Arslan, "Cognitive Radio, Software Defined Radio, and Adaptive Wireless Systems", Springer, 2007.
9. Francisco Rodrigo Porto Cavalcanti, Soren Andersson, "Optimizing Wireless Communication Systems" Springer, 2009.
10. Linda Doyle, "Essentials of Cognitive Radio", Cambridge University Press, 2009.
11. Multiple Access Techniques for 5G Wireless Networks and Beyond, aezi, Mojtaba, Ding, Zhiguo, Poor, H. Vincent, Springer International Publishing, 2020.

M. TECH. SEMESTER – II (ECS)
SUBJECT: SATELLITE COMMUNICATION
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme			
Lect	Tut	Prac	Total		Ext	Sess.	Prac	Total
3	0	2	5	4	60	40	25	125

DETAILED SYLLABUS

1. Architecture of Satellite Communication System: Principles and architecture of satellite Communication, Brief history of Satellite systems, advantages, disadvantages, applications, and frequency bands used for satellite communication and their advantages/drawbacks.

2. Orbital Analysis: Orbital equations, Kepler's laws of planetary motion, Apogee and Perigee fo an elliptical orbit, evaluation of velocity, orbital period, angular velocity etc of a satellite, concepts of Solar day and Sidereal day.

3. Satellite sub-systems: Architecture and Roles of various sub-systems of a satellite system such as Telemetry, tracking, command and monitoring (TTC & M), Attitude and orbit control system (AOCS), Communication sub-system, power sub-systems, antenna sub-system.

4. Typical Phenomena in Satellite Communication: Solar Eclipse on satellite, its effects, remedies for Eclipse, Sun Transit Outage phenomena, its effects and remedies, Doppler frequency shift phenomena and expression for Doppler shift.

5. Satellite link budget: Flux density and received signal power equations, Calculation of System noise temperature for satellite receiver, noise power calculation, Drafting of satellite link budget and C/N ratio calculations in clear air and rainy conditions, Case study of Personal Communication system (satellite telephony) using LEO.

6. Modulation and Multiple Access Schemes used in satellite communication. Typical case studies of VSAT, DBS-TV satellites and few recent communication satellites launched by NASA/ ISRO. GPS.

RECOMMENDED TEXT / REFERENCE BOOKS

1. Timothy Pratt and Others, "Satellite Communications", Wiley India, 2nd edition, 2010.
2. S. K. Raman, "Fundamentals of Satellite Communication", Pearson Education India, 2011.
3. Tri T. Ha, "Digital Satellite Communications", Tata McGraw Hill, 2009.
4. Dennis Roddy, "Satellite Communication", McGraw Hill, 4th Edition, 2008.

M. TECH. SEMESTER – II (ECS)
SUBJECT: MULTISPECTRAL SIGNAL ANALYSIS
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme			
Lect	Tut	Prac	Total		Ext	Sess.	Prac	Total
3	0	2	5	4	60	40	25	125

DETAILED SYLLABUS

1. Hyperspectral Sensors and Applications: Introduction, Multi-spectral Scanning Systems (MSS), Hyperspectral Systems, Airborne sensors, Space borne sensors, Ground Spectroscopy, Software for Hyperspectral Processing, Applications, Atmosphere and Hydrosphere, Vegetation, Soils and Geology, Environmental Hazards and Anthropogenic Activity

2. Overview of Image Processing: Introduction, Image File Formats, Image Distortion and Rectification, Radiometric Distortion, Geometric Distortion and Rectification, Image Registration, Image Enhancement, Point Operations, Geometric Operation, Image Classification, Supervised Classification, Unsupervised Classification, Crisp Classification Algorithms, Fuzzy Classification Algorithms, Classification Accuracy Assessment, Image Change Detection, Image Fusion, Automatic Target Recognition

3. Mutual Information: A Similarity Measure for Intensity Based Image Registration: Introduction, Mutual Information Similarity Measure, Joint Histogram Estimation Methods, Two-Step Joint Histogram Estimation, One-Step Joint Histogram Estimation, Interpolation Induced Artifacts, Generalized Partial Volume Estimation of Joint Histograms, Optimization Issues in the Maximization of MI

4. Independent Component Analysis: Introduction, Concept of ICA, ICA Algorithms, Preprocessing using PCA, Information Minimization Solution for ICA, ICA Solution through Non-Gaussianity Maximization, Application of ICA to Hyperspectral Imagery, Feature Extraction Based Model, Linear Mixture Model Based Model, An ICA algorithm for Hyperspectral Image Processing, Applications using ICA.

5. Support Vector Machines : Introduction, Statistical Learning Theory, Empirical Risk Minimization, Structural Risk Minimization, Design of Support Vector Machines, Linearly Separable Case, Linearly Non-Separable Case, Non-Linear Support Vector Machines, SVMs for Multiclass Classification, One Against the Rest Classification, Pair wise Classification, Classification based on Decision Directed Acyclic Graph and Decision Tree Structure, Multiclass Objective Function, optimization Methods , Applications using SVM.

6. Markov Random Field Models: Introduction, MRF and Gibbs Distribution, Random Field and Neighborhood ,Cliques, Potential and Gibbs Distributions, MRF Modeling in Remote Sensing Applications, Optimization Algorithms, Simulated Annealing, Metropolis Algorithm, Iterated Conditional Modes Algorithm

RECOMMENDED TEXT / REFERENCE BOOKS

1. Pramod K. Varshney, Manoj K. Arora, "Advanced Image Processing Techniques for Remotely Sensed Hyperspectral Data", Springer, 2013.
2. S. Svanberg, "Multi-spectral Imaging– from Astronomy to Microscopy – from Radio waves to Gamma rays", Springer Verlag, 2009.

M. TECH. SEMESTER – II (ECS)
SUBJECT: SYSTEM MODELLING & SIMULATION PROJECT
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme			
Lect	Tut	Prac	Total		Ext	Sess.	Prac	Total
0	0	2	2	1	-	-	50	50

Each student will take up a project on System modelling using a simulation platform as a prelude to the M.Tech. Dissertation activities to be carried out during Semester III & Semester IV.

M. TECH. SEMESTER – III (ECS)
SUBJECT: DISSERTATION PHASE – I
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme		
Lect	Tut	Prac	Total		Prac	TW	Total
0	0	30	30	16	225	125	350

Each student will take up a project involving analysis, design, and implementation and testing of substantial hardware, software or any combination of them related to live problems in the fields of study.

A dissertation report will be prepared and submitted for a viva-voce examination.

M. TECH. SEMESTER – III (ECS)
SUBJECT: PEDAGOGY STUDIES
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme		
Lect	Tut	Prac	Total		Prac	TW	Total
2	0	0	2	0	-	50	50

DETAILED SYLLABUS

1. Introduction and Methodology: Aims and rationale, Policy background, Conceptual framework and terminology, Theories of learning, Curriculum, Teacher education. Conceptual framework, Research questions. Overview of methodology and Searching.

2. Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries. Curriculum, Teacher education.

3. Evidence on the effectiveness of pedagogical practices, Methodology for the in depth stage: quality assessment of included studies. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? Theory of change. Strength and nature of the body of evidence for effective pedagogical practices. Pedagogic theory and pedagogical approaches. Teachers' attitudes and beliefs and Pedagogic strategies.

4. Professional development: alignment with classroom practices and follow-up support, Peer support, Support from the head teacher and the community. Curriculum and assessment, Barriers to learning: limited resources and large class sizes

5. Research gaps and future directions, Research design, Contexts, Pedagogy, Teacher education, Curriculum and assessment, Dissemination and research impact.

RECOMMENDED TEXT / REFERENCE BOOKS

1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2): 245-261.
2. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of Curriculum Studies, 36 (3): 361-379.
3. Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report 1. London: DFID.
4. Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33 (3): 272–282.
5. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.
6. Chavan M (2003) Read India: A mass scale, rapid, 'learning to read' campaign.
7. www.pratham.org/images/resource%20working%20paper%202.pdf.

M. TECH. SEMESTER – IV (ECS)
SUBJECT: DISSERTATION PHASE – II
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme		
Lect	Tut	Prac	Total		Prac	TW	Total
0	0	30	30	16	300	150	450

Each student will take up a project involving analysis, design, and implementations and testing of substantial hardware, software or any combination of them related to live problems in the fields of study.

A dissertation report will be prepared and submitted for a viva-voce examination.

M. TECH. SEMESTER – IV (ECS)
SUBJECT: ENGLISH FOR RESEARCH PAPER WRITING
SYLLABUS & SCHEME (W.E.F. 2021)

Teaching Scheme (Hours/Week)				Credits	Examination Scheme		
Lect	Tut	Prac	Total		Prac	TW	Total
2	0	0	2	0	-	50	50

DETAILED SYLLABUS

1. Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness

2. Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction

3. Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.

4. key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature

5. skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions

6. useful phrases, how to ensure paper is as good as it could possibly be the first- time submission

RECOMMENDED TEXT / REFERENCE BOOKS

1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books)
2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press
3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman's book.
4. Adrian Wallwork, English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011

Dharmsinh Desai University, Nadiad-387001.

Minutes for Academic Council Meeting
28th April 2022

Following members gave their concurrence and comments in the meeting:

1)Dr H M Desai 2)Prof K N Sheth 3) Dr B N Suhagia 4) Dr R N Misra 6) Dr N K Patel 7) Dr Hiren Patel 8) Dr Arun H Vyas 9)Prof R K Jain, Registrar (Member Secretary)

1.It was resolved to consider the Minutes of the last meeting held on 27th April 2021 (Virtual Through Mail) as approved since there was no written dissent received.

2.The Academic Council members discussed, deliberated and resolved to take on record the following agenda and proposals from those received from various Board of Studies :

2.1. **Faculty of Technology** :

2**.1.1. Computer Engineering Department** :

2.1.1.1 B Tech Program: It was resolved to approve New Course Structure and Syllabus of the subjects for B Tech Sem V and VI with effect from 2022-23 as per the details given in Annexure I-2

2.1.1.2 It was resolved to approve introducing Open Elective subjects at Sem III and IV and Introduction of tutorials at Sem III to VI. It was resolved to approve revision of Teaching scheme and credits at Sem VIII Industrial Training and it was resolved to approve introduction of new subject Communication Practice for Software Industries at Sem VIII. Details given in Annexure I-1

2.1.1.3 It was resolved to approve Examiners Panel for B Tech & M Tech program Internal and External Examiners Details are given in Annexure I-3,4

2.1.1.4 It was resolved to approve Computer Engineering Department Vision, Mission, PEOs, POs & PSOs Statements . Details are given in Annexure I-5

2**.1.2. Chemical Engineering Department:**

2.1.2.1 B Tech Program: It was resolved to approve New Course Structure and Syllabus of the subjects for B Tech Sem III and IV with effect from 2022-23 as per the details given in Annexure I- 1,2

2.1.2.2 It was resolved to approve Examiners Panel for B Tech (CH) and Diploma Chemical Engineering program Internal and External Examiners Details are given in Annexure II-3

2.1.2.3 It was resolved to approve Chemical Engineering Department Proposed Vision, Mission, PEOs, POs & PSOs statements. Details are given in Annexure II-4,5

2**.1.3. Civil Engineering Department:**

2.1.3.1 B Tech Program: It was resolved to approve New Course Structure and Syllabus of the subjects for B Tech Sem III and IV with effect from 2022-23 as per the details given in Annexure III- 1,2

2.1.3.2 It was resolved to approve Examiners Panel for B Tech and M Tech program Internal and External Examiners Details are given in Annexure III-3,4

2.1.3.3 It was resolved to approve Civil Engineering Department : Vision, Mission, PEOs, POs & PSOs statements. Details are given in Annexure III-5

2.1.4. Electronics & Communication Engineering Department:

2.1.4.1 B Tech Program: It was resolved to approve New Course Structure and Syllabus of the subjects for B Tech Sem III and IV with effect from 2022-23 as per the details given in Annexure IV- 1,2

2.1.4.2 It was resolved to approve Examiners Panel for B Tech and M Tech program Internal and External Examiners Details are given in Annexure IV-3,4

2.1.4.3 It was resolved to approve Electronics & Communication Engineering Department : Vision, Mission, PEOs, POs & PSOs statements. Details are given in Annexure IV-5

2.1.5 Instrumentation & Control Engineering Department:

2.1.5.1 B Tech Program: It was resolved to approve New Course Structure and Syllabus of the subjects for B Tech Sem III and IV with effect from 2022-23 as per the details given in Annexure V- 1,2

2.1.5.2 It was resolved to approve Examiners Panel for B Tech program Internal and External Examiners Details are given in Annexure V-3

2.1.5.3 It was resolved to approve Instrumentation & Control Engineering Department : Vision, Mission, PEOs, POs & PSOs statements Details are given in Annexure V-4

2.1.6 Information Technology Department:

2.1.6.1 B Tech Program: It was resolved to approve New Course Structure and Syllabus of the subjects for B Tech Sem III and IV with effect from 2022-23 as per the details given in Annexure VI- 1,2

2.1.6.2 It was resolved to approve Examiners Panel for B Tech program Internal and External Examiners Details are given in Annexure VI-3

2.1.6.3 It was resolved to approve Information Technology Department : Vision, Mission, PEOs, POs & PSOs statements Details are given in Annexure VI-4

2.1.7 Mechanical Engineering Department:

2.1.7.1 B Tech Program: It was resolved to approve New Course Structure and Syllabus of the subjects for B Tech Sem III and IV with effect from 2022-23 as per the details given in Annexure VII- 1,2

2.1.7.2 It was resolved to approve Examiners Panel for B Tech and M Tech program Internal and External Examiners Details are given in Annexure VII-3,4

2.1.7.3 It was resolved to approve Mechanical Engineering Department : Vision, Mission, PEOs, POs & PSOs statements Details are given in Annexure VII-5

2.1.8.1 It was resolved to approve Examiners Panel for Mathematics subject B Tech Examiners Panel Details are given in Annexure VIII

2.2 **Faculty of Management & Information Science:**

2.2.1 M B A department: It was resolved to approve Mission, Vision ,course structure , syllabus ,PEOS for MBA program as per the Annexure :IX -1,2,3,4

2.2.2M C A Department It was resolved to approve Mission, Vision ,course structure , syllabus ,PEOS for MCA program as per the Annexure :X -1,2,3

2.2.3B C A Department It was resolved to approve revised syllabus for B C A Sem IV and V in one subject each as per details given in Annexure XI-1,2

2.2.4 B B A (Hotel Management):It was resolved to approve modification in syllabus of Four subjects of Sem I . Details are given in Annexure XIV.

2.3 Faculty of Dental Science:

2.3.1B D S Programme : It was resolved to approve PO , CL and syllabus of all the subject from First Year to Final year as per details given In Annexure XII-1 to 12

2.3.2 M D S Programme: It was resolved to approve PO , CL and syllabus of all the Branches of M D S program as per details given in Annexure XIII – 1 to 7

2.4. Faculty of Pharmacy:

2.4.1 It was resolved to approve Vision, Mission ,PEOS and PSOS for B Pharm and M Pharm Program as per details given in Annexure :XV

2.4.2 It was resolved to approve revision in syllabus of B Pharm and M Pharm program as per given in Annexure XVI

2.4.3 It was resolved to approve Panel of Examiners for B Pharm and M Pharm program Annexure XVII

2,4,4 It was resolved to approve syllabus for B Pharm program as per Annexure XVIII

2.4.5.It was resolved to approve syllabus for M Pharm program as per Annexure XIX

2.5 Faculty of Medical Science and Research :

2.5.1It was resolved to approve GME_REGULATION CURRICULUM for M B B S program Phase II as per GME 2019 Details are given in Annexure :XX

2.5.2It was resolved to approve panel of Examiners for M B B S program as per Annexure XXI

2.6 Constituent Institute of Commerce and B B A :

2.6.1 It was resolved to approve revised syllabus for B Com Sem I and II as per Annexure :XXII

2.6.2 It was resolved to approve revised syllabus for B B A Sem I and II as per Annexure XXIII.

2.6.3 It was resolved to approve revised syllabus for M Com Sem I and II as per Annexure XXIV

3.1**Research Program (Ph D):** It was resolved to approve to award Ph D degree on recommendations of all the three referees to the following students:

1 .Name of Research Scholar : Raval Sejal Kamlesh (ID No.17PH13)
Thesis Title: Passive Fault Tolerant Control for Affine SISO and MIMO level Control System With Uncertainities
Name of Guide: Dr Vipul A Shah, Professor & Head,IC Department,D D University, Nadiad

2 .Name of Research Scholar :Himanshukumar Rajendrabhai Patel (ID No.17PH02)
Thesis Title: Passive Fault Tolerant Control Strategy for Interacting and Non Interacting Process With Possible Fault using Artificial Intelligence
Name of Guide: Dr Vipul A Shah, Professor & Head,IC Department,D D University, Nadiad

3.Name of Research Scholar : Dipika Chavda (ID No.16PH07)
Thesis Title: Systematic Development of Supersaturated Naproxen and Pomengranate Peel Extract containing Topical Spray for the Treatment of Osteoarthrits
Name of Guide: Dr Atindra Shukla Director, SSCSS & Nano Technology, Dharmsinh Desai University , Nadiad
Name of Co Guide: Dr Tejal G Soni, Professor, Faculty of Pharmacy,D D University, Nadiad

4.0 Honorable Chairman permitted following Additional Items :

4.1 Introduction of New Course in Mechanical Department

It was proposed by the Vice Chancellor Sir to introduce program for advanced learning with use of advances in ICT applications to core branches in Faculty of Technology. At present B. Tech. (Mechanical Engineering) with 120 seats approved by AICTE is being offered at Faculty of Technology.
It was resolved to approve advanced program in B Tech (Mechanical Engineering) from the Academic Year 2023-24 to initiate advanced course after getting consent letter from Board of Governors in due course which is a pre requisite by AICTE.

4.2 One Smart Class Room for each department

It was proposed by the Vice Chancellor Sir to provide Smart Class Rooms in all the Faculty of our University along with one for each department of B. Tech. program.
It was resolved to approve Smart Class Room as per technical and commercial details worked out by Dean Faculty of Technology for Interior and Equipment requirement for converting existing Class room in to Smart Class room.

5.0 The chair thanked all the members for their participation and valuable contribution.