

Dharmsinh Desai University
Faculty of Technology
Department of Information Technology

Detailed Syllabus Book



Detailed Syllabus for Bachelor of Technology (Information Technology) course

Department of Information Technology,
Faculty of Technology,
Dharmsinh Desai University, Nadiad – 387 001, Gujarat, India.
Website: <http://www.ddu.ac.in>

DHARMSINH DESAI UNIVERSITY, NADIAD

CBCS BASED TEACHING SCHEME AND DETAIL SYLLABUS FOR B.Tech. (INFORMATION TECHNOLOGY)

FOR THE BATCH 2016 – 2020

SR NO.	SEMESTER	CREDIT	TOTAL MARKS
1	SEM - I	27.5	850
2	SEM – II	27.5	850
3	SEM – III	25	750
4	SEM – IV	27	800
5	SEM – V	26	800
6	SEM – VI	27	850
7	SEM – VII	26	800
8	SEM - VIII	18	500
	TOTAL	204	6200

SEM-I		Teaching Scheme			Credit Structure			Exam Scheme				
SUB. CODE	SUBJECT NAME	LEC.	TUT.	PRAC.	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
AF 111	MATHEMATICS - I	4	--	--	4	--	4	60	40	--	--	100
AF 115	ENGINEERING GRAPHICS	4	--	3	4	1.5	5.5	60	40	--	50	150
AF 122	BASIC ELECTRICAL & ELECTRONICS ENGINEERING	4	--	2	4	1	5	60	40	25	25	150
AF 124	ENGINEERING MECHANICS	3	--	1	3	0.5	3.5	60	40	25	25	150
AF 126	WORK SHOP - I	--	--	3	--	1.5	1.5	--	--	--	50	50
CT 116	ELEMENT OF LINUX OS & C PROGRAMMING - I	4	--	2	4	1	5	60	40	25	25	150
ES 110	ENVIRONMENTAL SCIENCE	3	--	--	3	--	3	60	--	40	--	100
							27.5					850

SEM-II		Teaching Scheme			Credit Structure			Exam Scheme				
SUB. CODE	SUBJECT NAME	LEC.	TUT.	PRAC.	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
AF 201	MATHEMATICS - II	4	--	--	4	--	4	60	40	--	--	100
AF 212	ELECTRONICS PRINCIPLES	4	--	2	4	1	5	60	40	25	25	150
AF 214	MECHANICS OF SOLIDS	3	--	2	3	1	4	60	40	25	25	150
AF 215	HEAT POWER	4	--	2	4	1	5	60	40	25	25	150
AM 210	ENGINEERING ECONOMICS AND PRINCIPLES OF MANAGEMENT	3	--	--	3	--	3	60	--	40	--	100
CT 215	C PROGRAMMING - II	4	--	2	4	1	5	60	40	25	25	150
CT 216	ELECTRONICS WORKSHOP	--	--	2	--	1	1.5	--	--	--	50	50
							27.5					850

SEM-III		Teaching Scheme			Credit Structure			Exam Scheme				
SUB. CODE	SUBJECT NAME	LEC.	TUT.	PRAC.	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
AF 301	MATHEMATICS - III	4	--	--	4	--	4	60	40	--	--	100
IT 301	DESIGN OF DIGITAL CIRCUITS	4	--	2	4	1	5	60	40	25	25	150
IT 302	COMPUTER PERIPHERALS	--	--	2	--	1	1	--	--	25	25	50
IT 303	OBJECT ORIENTED PROGRAMMING	4	--	2	4	1	5	60	40	25	25	150
IT 304	DISCRETE MATHEMATICS	4	--	2	4	1	5	60	40	25	25	150
IT 305	COMMUNICATION SYSTEMS	4	--	2	4	1	5	60	40	25	25	150
							25					750

SEM-IV		Teaching Scheme			Credit Structure			Exam Scheme				
SUB. CODE	SUBJECT NAME	LEC.	TUT.	PRAC.	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
AF 410	FINANCIAL AND MANAGERIAL ACCOUNTING	3	--	--	3	--	3	60	--	--	40	100
AF 411	MATHEMATICS - IV	4	--	--	4	--	4	60	40	--	--	100
IT 402	COMPUTER ORGANIZATION	4	--	2	4	1	5	60	40	25	25	150
IT 403	MICROPROCESSOR ARCHITECTURE PROG. AND INTERFACING	4	--	2	4	1	5	60	40	25	25	150
IT 406	DATA STRUCTURES AND ALGORITHMS	4	--	2	4	1	5	60	40	25	25	150
IT 407	COMPUTER AND COMMUNICATION	4	--	2	4	1	5	60	40	25	25	150

	<u>NETWORK</u>											
							27					800

SEM-V		Teaching Scheme			Credit Structure			Exam Scheme				
SUB. CODE	SUBJECT NAME	LEC.	TUT.	PRAC.	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
AF 501	<u>PROFESSIONAL COMMUNICATION - I</u>	1	--	2	1	1	2	50	--	50	--	100
IT 502	<u>DATABASE MANAGEMENT SYSTEM</u>	4	--	2	4	1	5	60	40	25	25	150
IT 509	<u>DESIGN & ANALYSIS OF ALGORITHM</u>	4	--	2	4	1	5	60	40	25	25	150
IT 510	<u>CORE JAVA TECHNOLOGY</u>	4	--	2	4	1	5	60	40	25	25	150
IT 511	<u>THEORY OF AUTOMATA & FORMAL LANGUAGE</u>	4	--	--	4	--	4	60	40	--	--	100
IT 506	(ELECTIVE – I) <u>ADVANCED MICROPROCESSOR ARCHITECTURE</u>	4	--	2	4	1	5	60	40	25	25	150
IT 506A	(ELECTIVE – I) <u>EMBEDDED SYSTEM</u>	4	--	2	4	1	5	60	40	25	25	150
							26					800

SEM-VI		Teaching Scheme			Credit Structure			Exam Scheme				
SUB. CODE	SUBJECT NAME	LEC.	TUT.	PRAC.	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
CT 616	<u>SOFTWARE ENGINEERING</u>	4	--	2	4	1	5	60	40	25	25	150
IT 607	<u>APPLIED OPERATING SYSTEM</u>	4	--	2	4	1	5	60	40	25	25	150
IT 608	<u>LANGUAGE TRANSLATOR</u>	4	--	2	4	1	5	60	40	25	25	150
AF 601	<u>PROFESSIONAL COMMUNICATION - II</u>	1	--	2	1	1	2	50	--	50	--	100
IT 617	<u>ADVANCED JAVA TECHNOLOGY</u>	4	--	2	4	1	5	60	40	25	25	150
IT 618	(ELECTIVE – II) <u>DESIGN PATTERNS AND APPLICATION FRAMEWORKS</u>	4	--	2	4	1	5	60	40	25	25	150
IT 618A	(ELECTIVE – II) <u>MOBILE COMPUTING</u>	4	--	2	4	1	5	60	40	25	25	150
IT 618B	(ELECTIVE – II) <u>COMPUTER GRAPHICS</u>	4	--	2	4	1	5	60	40	25	25	150
IT 618C	(ELECTIVE – II) <u>DIGITAL SWITCHING SYSTEM</u>	4	--	2	4	1	5	60	40	25	25	150
							27					850

SEM-VII		Teaching Scheme			Credit Structure			Exam Scheme				
SUB. CODE	SUBJECT NAME	LEC.	TUT.	PRAC.	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
IT 704	DATA ANALYSIS & INFORMATION EXTRACTION	4	--	2	4	1	5	60	40	25	25	150
IT 707	SYSTEM DESIGN PRACTICE	--	--	2	--	1	1	--	--	25	25	50
IT 714	KNOWLEDGE SYSTEM	4	--	2	4	1	5	60	40	25	25	150
IT 717	DISTRIBUTED COMPUTING	4	--	2	4	1	5	60	40	25	25	150
IT 716	WEB TECHNOLOGY	2	2	2	4	1	5	60	40	25	25	150
IT 718	(ELECTIVE – III) E-COMMERCE AND E-SECURITY	4	--	2	4	1	5	60	40	25	25	150
IT 718A	(ELECTIVE – III) INTRODUCTION TO NEURAL NETWORKS	4	--	2	4	1	5	60	40	25	25	150
IT 718B	(ELECTIVE – III) DIGITAL IMAGE PROCESSING	4	--	2	4	1	5	60	40	25	25	150
IT 718C	(ELECTIVE – III) CLOUD COMPUTING	4	--	2	4	1	5	60	40	25	25	150
IT 718D	(ELECTIVE – III) MOBILE APP. DEVELOPMENT	4	--	2	4	1	5	60	40	25	25	150
							26					800

SEM-VIII		Teaching Scheme			Credit Structure			Exam Scheme				
SUB. CODE	SUBJECT NAME	LEC.	TUT.	PRAC.	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
AF 801	PROJECT/INDUSTRIAL TRAINING	--	--	28	--	14	14	--	--	300	100	400
AF 802	SEMINAR	--	4	--	4	--	4	--	100	--	--	100
							18					500

AF 111 – MATHEMATICS - I
SEM-I (1st Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

Teaching Scheme			Credit Structure			Exam Scheme				
LECTURE	TUTORIAL	PRACTICAL	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
4	0	--	4	--	4	60	40	--	--	100

[A] OBJECTIVES OF THE COURSE

- Ability to analysis and solve problems in both familiar and unfamiliar situations including those in real-life contexts with better accuracy.
- Able to apply knowledge of key theories, concepts, tools and techniques of Mathematics to solve structured and unstructured Engineering problems.
- Understand and be able to use the language, symbols and notation of mathematics
- Use different forms of mathematical representation (formulae, diagrams, tables, charts, graphs and models)
- Generate and/or analyze information, find relationships and patterns, describe these mathematically as general rules, and justify or prove them.

[B] DETAILED SYLLABUS

1) DIFFERENTIAL CALCULUS

Applications of differential calculus to geometrical problems, equation of tangent & normal, angle between two curves, subtangent, subnormal, length of tangent & length of normal, pedal equation, radius of curvature of plane curves in cartesian, polar and parametric equations, radius of curvature at origin by newton's method and by method of expansion.

2) SUCCESSIVE DIFFERENTIATION

Leibnitz's theorem, Maclaurin's theorem, Taylor's theorem, Applications to obtain expansion of functions.

3) INTEGRAL CALCULUS

Curve Tracing, applications for finding area, length of arc, volume and surface area of solids of revolutions.

4) REDUCTION FORMULA FOR

Reduction formula for $\int_0^{\frac{\pi}{2}} \sin^n x \, dx$, $\int_0^{\frac{\pi}{2}} \cos^n x \, dx$, $\int_0^{\frac{\pi}{2}} \sin^m x \cos^n x \, dx$, $\int_0^{\frac{\pi}{4}} \tan^n x \, dx$, $\int_0^{\frac{\pi}{4}} \cot^n x \, dx \dots$

5) BETA AND GAMMA FUNCTION

Definition, properties, relation between Beta and Gamma functions, use in evaluation of definite integrals.

6) ELLIPTIC AND ERROR FUNCTIONS

Definitions and Properties and use in evaluation of definite integrals.

7) FIRST ORDER DIFFERENTIAL EQUATION

Formation of differential equations, general and particular solution, equations of first order & first degree of the type variables separable, homogenous, reducible to homogenous, linear & exact and reducible to these forms. Application to geometrical and physical problems.

[C] LEARNING OUTCOMES

- To answer at least about the convergence or divergence of integral when integral is not easily evaluated using techniques known.
- Able to evaluate the volume and surface area of the solid generated by revolving the solids by Integration.
- Apply the knowledge of differential equation to solve some practical problems such as electrical circuits, Newton's Law of cooling and problem related to orthogonal trajectories.
- Apply the knowledge of differentiation to obtain the series of function.
- Able to evaluate curvature of the given function.

[D] RECOMMENDED TEXT BOOKS

- 1) Engineering Mathematics-II by: Shanti Narayan, Publisher: S. Chand & Company (PVT.) Ltd. Ram nagar, Delhi
- 2) Higher Engineering Mathematics. by: Dr. B. S. Grewal, Publisher: Khanna publishers, Delhi

[E] REFERENCE BOOKS

- 1) Engineering Mathematics-I, by: Shanti Narayan, Publisher: S. Chand & Company (PVT.) Ltd.
- 2) Applied Mathematics, by: P. N. & J. N. Wartikar, Publisher: Pune Vidyarthi Griha Prakashan.
- 3) Engineering Mathematics-I by: I. B. Prasad, Publisher: General

[F] LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE): Not applicable

AF 115 – ENGINEERING GRAPHICS
SEM-I (1st Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

Teaching Scheme			Credit Structure			Exam Scheme				
LECTURE	TUTORIAL	PRACTICAL	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
4	--	3	4	1.5	5.5	60	40	--	50	150

[A] OBJECTIVES OF THE COURSE

[B] DETAILED SYLLABUS

1) PLANE GEOMETRY: ENGINEERING CURVES

Construction of curves used in engineering such as Conics (Ellipse, Parabola, Hyperbola) Cycloidal curves -Cycloid, Epi-Cycloid, Hypo-Cycloid, involutes, Archemedian spirals

2) SOLID GEOMETRY

Projections of Points, Projections of Lines, construction for H.T. & V.T. Applications of projection of points and lines Projections of regular planes such as square, rectangle, triangle, circle, pentagon, hexagon, rhombus, etc. Projections of Right & Regular Solids (Prisms, Pyramids, Cylinder and Cone)

3) ORTHOGRAPHIC PROJECTIONS

First angle projection method and third angle projection method. Dimensioning techniques and methods. Conversion of pictorial views into Orthographic Projections with dimensions.

4) SECTIONAL ORTHOGRAPHIC PROJECTION

Orthographic vies with section, types of sections - Full section, half section, offset section, Local section, Partial section, Conventions adopted for sectional views, interpretation of orthographic views.

5) ISOMETRIC PROJECTIONS

Conversion of Orthographic views into isometric Projections and views

6) MACHINE PARTS

Sketches of various important machine parts with empirical dimensions: Types of threads, Bolts, various types of Nuts, locking devices for Nuts, Rod connections like Cotter Joint & Knuckle Joint, Shaft: Couplings like protected type shaft: coupling and pin type flexible coupling, Bearings, Welded Joints, etc.

7) COMPUTER GRAPHICS

Introduction to Computer Graphics.

[C] LEARNING OUTCOMES

[D] RECOMMENDED TEXT BOOKS

- 1) Engineering Drawing by: N. D. Bhatt, Publisher: Charotar Publishing House.
- 2) Engineering Drawing Vol. 1 & Vol. 2. by: P. J. Shah, Publisher: S. Chand & Company Ltd.

[E] REFERENCE BOOKS

- 1) Fundamentals of Engineering Drawing. by: Luzadder, Publisher: Prentice Hall.
- 2) A Text Book of Geometrical Drawing. by: P. S. Gill, Publisher: S. K. Kataria & Sons.
- 3) A Text Book of Machine Drawing. by: P. S. Gill, Publisher: S. K. Kataria & Sons.

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

- The term work shall be based on the above syllabus.

AF 122 – BASIC ELECTRICAL & ELECTRONICS ENGINEERING
SEM-I (1st Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] OBJECTIVES OF THE COURSE

[B] DETAILED SYLLABUS

1) FUNDAMENTALS OF CURRENT ELECTRICITY AND DC CIRCUITS

Introduction: Definition, Symbol and Unit of Quantities, Multiple and sub-multiple units, Computation of Resistance at constant temperature, Temperature dependence of resistance, Computation of resistance at different temperatures, Computations of at different temperatures, Ohm's law statement, Illustration and limitation, Unit work, power and energy (Electrical, Thermal and Mechanical), Circuits-Identifying the elements and the connected terminology., Kirchhoff's laws-statement and illustration, Resistance in parallel and current division technique, Method of solving a circuit by kirchhoff's laws.

2) MAGNETIC CIRCUITS

Introduction, Definition of Magnetic questions, Magnetic circuit, Leakage flux, Fringing effect, Comparison between magnetic and electric circuits.

3) ELECTROMAGNETIC 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), Coupling coefficient between two magnetically coupled circuits(K).

4) AC FUNDAMENTALS

Introduction, Generation of alternating emf, Waveform terminology, Concept of 3-phase EMF Generation, Root mean square (RMS) of effective value, Average Value of AC, Phasor representation of alternating quantities, Analysis of AC circuit.

5) SINGLE PHASE AC CIRCUITS

Introduction, j operator, Complex algebra, Representation of alternating quantities in rectangular and polar forms, R-L series circuit, R-C series circuit, R-L-C series circuit, Admittance and its components, Simple method of solving parallel A. C. circuits, Resonance.

6) ELECTRICAL MACHINES

Introduction, D.C. generator, D.C. motor, Transformer, Three phase induction Motor, Applications of electrical machines.

7) PASSIVE CIRCUIT COMPONENTS

Constructional details of, Resistors, Capacitors, Inductors.

[C] LEARNING OUTCOMES

[D] RECOMMENDED TEXT BOOK

- 1) Basic Electrical, Electronics and Computer Engineering by: R. Muthusubramanian, S. Salivahanan, K. A. Muraleedharan. Publisher: Tata McGraw Hill Co. Ltd, New Delhi.

[E] REFERENCE BOOKS

- 1) Electrical Engineering. by: B. L. Thareja, Publisher: S. Chand.
- 2) Electrical Machines by: B. L. Thareja, Publisher: S. Chand.

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

AF 124 - ENGINEERING MECHANICS
SEM-I (1st Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

Teaching Scheme			Credit Structure			Exam Scheme				
LECTURE	TUTORIAL	PRACTICAL	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
3	--	1	3	0.5	3.5	60	40	25	25	150

[A] OBJECTIVES OF THE COURSE

[B] DETAILED SYLLABUS

1) STATICS

- Introduction, engineering and S. I. units, accuracy in engineering calculations, Vectors composition and resolution, concept of Rigid Body. Resultant of a force system: i) Concurrent Coplanar Force System ii) Non-concurrent Coplanar Force System (a) parallel and (b) non-parallel Using analytical as well as graphical methods. iii) Simple cases of concurrent force system in space.
- Concept of internal force, free body diagram. Equilibrium of force system listed above.
- Friction: Friction on an inclined plane, ladder friction, wedge friction, screw friction, belt and rope drive.
- Centre of gravity of lines, plane figures, volumes, bodies and Pappu's Theorem. Principle of Virtual Work and its application.
- Types of Beams, Types of Supports, Support Reaction for statically determinate beams.

2) DYNAMICS

- Rectilinear motion, Circular motion, Projectiles, Relative velocity, Instantaneous center in plane motion. Laws of Motion, Motion along an inclined plane, Principle of conservation of Momentum, Mass Moment of Inertia in Rotational Motion, Motion of connected bodies, Impulse and Momentum, Impact, work power and Energy, D'Alembert's principle, vibrations of SDOF systems. Motion along a smooth curve and super elevation.

[C] LEARNING OUTCOMES

After completion of the course students should be able to:

- Understand and describe concept of rigid body

- Describe resultant force systems using analytical and graphical methods
- Describe concept of internal forces
- Describe various types of motions like rectilinear, circular. Projectile etc.
- Understand and describe laws of motion and its applications

[D] RECOMMENDED TEXT BOOKS

- 1) Mechanics for Engineers - Statics by: F. P. Beer and E. R. Johnston Jr., Publisher: McGraw-Hill.
- 2) Mechanics for Engineers - Dynamics by: F. P. Beer and E. R. Johnston Jr., Publisher: McGraw-Hill.
- 3) Engineering Mechanics: Statics & Dynamics by: A. K. Tayal, Publisher: Umesh Publications

[E] REFERENCE BOOKS

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

- 1) Experiments
- 2) Problems based on theory

AF 126 - WORK SHOP – I
SEM-I (1st Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

Teaching Scheme			Credit Structure			Exam Scheme				
LECTURE	TUTORIAL	PRACTICAL	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
--	--	3	--	1.5	1.5	--	--	--	50	50

[A] OBJECTIVES OF THE COURSE

[B] DETAILED SYLLABUS

1) INSTRUCTION

Kinds of wood, types of carpentry tools, carpentry joints, Plumbing tools, pipe fittings, tin smithy and soldering tools.

2) DEMONSTRATIONS

Operation of wood working machines.

[C] LEARNING OUTCOMES

[D] RECOMMENDED TEXT BOOKS

[E] REFERENCE BOOKS

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

Each candidate shall submit the following term work.

- 1) Practice job in carpentry ---- One job.
- 2) Simple carpentry joint---- One job.
- 3) Threading of pipe and pipe fittings ---- One job.
- 4) Tin smithy and soldering ---- One job.

CT 116 - ELEMENT OF LINUX OS & C PROGRAMMING - I
SEM-I (1st Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] OBJECTIVES OF THE COURSE

- To teach basics of Linux Operating System.
- To teach the general-purpose utility commands, file system, to set permissions for files/directories, basic of process, editors and shell programming.
- To understand basic Structure of the C-Programming, declaration and usage of variables.
- To develop programming skills using the fundamentals and basics of C Language.
- To develop C programs using operators, conditional and iterative statements.

[B] DETAILED SYLLABUS

1) BASICS OF OPERATING SYSTEM

2) LINUX ARCHITECTURE

Kernel, shell and applications, Features of Linux, Basics of Command: Locating Commands, Types of Commands [Internal and External], Structure of Commands, Getting HELP: Commands like man, what is, apropos

3) LINUX USAGE

Logging in to a Linux System, switching between virtual consoles and the graphical environment, changing your password, the root user, Editing text files.

4) GENERAL PURPOSE UTILITY

cal, date, echo, be, script, who, uname

5) THE FILE SYSTEM

Linux File Hierarchy Concepts, Some Important Directories, Current Working Directory, File and Directory Names, Absolute and Relative Pathnames, Changing Directories, listing Directory Contents, Copying Files and Directories, Moving and Renaming Files and Directories, Creating and Removing Files, Creating and Removing Directories,

6) THE FILE SYSTEM IN-DEPTH

Partitions and Filesystems, inodes and Directories, cp and inodes, mv and inodes, rm and inodes, Hard links, Symbolic (or soft) Links, The Seven Fundamental Filetypes, Checking Free Space, mounting storage devices, Compressing and Archiving Files.

7) USERS, GROUPS AND PERMISSIONS

Users, Groups, Permission Types, Examining Permissions, Interpreting Permissions, Changing File Ownership, Changing Permissions - Symbolic Method, Changing Permissions - Numeric Method, User and Group ID Numbers, /etc/passwd, /etc/shadow and /etc/group files, User Management tools, System Users and Groups, Default Permissions, Special Permissions for Executables, Special Permissions for Directories.

8) FINDING AND PROCESSING FILES

Locate, locate Examples, find, Basic find Examples, find and logical Operators, find and Permissions, find and Numeric Criteria, find and Access Times, executing commands with find, find Execution Examples, The GNOME Search Tool.

9) BASICS OF PROCESS

10) TEXT EDITOR: vi

11) SHELL PROGRAMMING

Scripting Basics, Creating Shell Scripts, Generating Output, Handling Input, Exit Status, Control Structures, Conditional Execution, File Tests, String Tests, for and sequences, continue and break, Using positional parameters, handling parameters with Spaces, Scripting at the command line, Shell Script debugging.

12) OVERVIEW OF C

13) CONSTANTS, VARIABLES AND DATA TYPES

14) OPERATORS AND EXPRESSIONS

15) MANAGING INPUT OUTPUT OPERATIONS

16) DECISION MAKING AND BRANCHING

17) DECISION MAKING AND LOOPING

[C] LEARNING OUTCOMES

- On completion of this course the student should be able to identify and use UNIX/Linux utilities to create and manage simple file processing operations and organize directory structures with appropriate security.
- Student can develop shell scripts to perform more complex tasks.
- Using C programming students can design, implement, test, debug, and executes the programs.
- They will understand the concept of flow of control and program structures.
- They will know concepts in problem solving and to write diversified solutions using C language.

[D] RECOMMENDED TEXT BOOKS

- 1) Unix: Concept and Applications by: Sumitabha Das, 4th Ed., Publisher: Tata McGraw Hill
- 2) Programming in ANSI C, by: Balaguruswamy, 5th Ed., Publisher: Tata McGraw Hill

[E] REFERENCE BOOKS

- 1) Let Us C, by: Yashvant Kanetkar, 12th Ed., Publisher: BPB Publication
- 2) Programming in C, by: Ashok N. Kamthane, 2nd Ed., Publisher: Pearson Education
- 3) Linux Programming by Example: The Fundamentals, 1st Edition, by: Arnold Robbins, Publisher: Pearson Education.

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

- 1) Overview of the UNIX operating system
- 2) Explain the following commands: clear, cal, who, date, tput, exit, pwd, bc, wc, cat
- 3) Explain the following commands: cd, mkdir, rmdir, rm, cp, cmp, comm., diff
- 4) (i) Explain the file permission (ii) Explain the following commands: chmod, chown, chgrp
- 5) (i) Explain the following commands ps, kill, umask, more, less. (ii) Solve problems using find command
- 6) (i) Design shell script to find average of numbers
(ii) To find which number is greater amongst the three entered number
(ii) Design a shell script by which only the word “DDU” is displayed from the lines in any file
- 7) (i) Design a shell script which would display the summation of the digits of the given number

- (ii) Design the shell script to reverse a given number
- (ii) Design the shell script for a simple calculator
- 8) (i) Design shell script to count no. of ordinary files and directories in your system
- (ii) Design a shell script to create looping patterns
- 9) (i) Overview of Turbo C++ IDE & GCC (ii) WAP to display a “Hello world” message
- 10) (i) Use of \n, \t and escape sequences
- (ii) W. A. P to convert the temperature unit from Fahrenheit to Celsius using the formula $C = (F - 32) / 1.8$
- (iii) Assume that any month is of 30 days. Now you are given total days. Find out the exact number of Years, Months & Days
- (iv) You are given time in total seconds. Convert it into Hour: Min: Seconds format.
- 11) (i) W.A. P to determine whether input number is ODD or Even. Display appropriate message
- (ii) W.A. P that will display grad of student according to his/ her marks using if else ladder
- (iii) W.A.P that computes and prints the Factorial of a given number
- (iv) W.A.P that computes and prints the Fibonacci series
- 12) (i) W.A. P to print the different patterns
- (ii) W.A. P to count Blanks, Tabs and Newlines using while and getchar
- (iii) W.A.P for a calculator using do while
- (iv) W.A.P to check whether the input number is prime or not
- (v) W.A.P to display even numbers between 2 to 20 without using the modulo operation

ES 110 - ENVIRONMENTAL SCIENCE
SEM-I (1st Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

Teaching Scheme			Credit Structure			Exam Scheme				
LECTURE	TUTORIAL	PRACTICAL	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
3	--	--	3	--	3	60	--	40	--	100

[A] OBJECTIVES OF THE COURSE

[B] DETAILED SYLLABUS

1) THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, scope and importance, Need for public awareness.

2) NATURAL RESOURCES

Renewable and non-renewable resources, Natural resources and associated problems.

- a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
- b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies
- e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.
- f) 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 for sustainable lifestyles.

3) ECOSYSTEMS

- a) Concept of an ecosystem.
- b) Structure and function of an ecosystem.
- c) Producers, consumers and decomposers.

- d) Energy flow in the ecosystem.
- e) Ecological succession.
- f) Food chains, food webs and ecological pyramids.
- g) Introduction, types, character
 - Forest ecosystem
 - Grassland ecosystem
 - Desert ecosystem
 - Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

4) **BIODIVERSITY AND ITS CONSERVATION**

- a) Introduction Definition: genetic, species and ecosystem diversity.
- b) Biogeographical classification of India
- c) Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values
- d) Biodiversity at global, National and local levels.
- e) India as a mega-diversity nation
- f) Hot-spots of biodiversity,
- g) Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts,
- h) Endangered and endemic species of India
- i) Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

5) **ENVIRONMENTAL POLLUTION**

□ Definition, Causes, effects and control measures of:

- a) Air pollution
- b) Water pollution
- c) Soil pollution
- d) Marine pollution
- e) Noise pollution
- f) Thermal pollution
- g) 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

- a) From Unsustainable to Sustainable development
- b) Urban problems related to energy
- c) Water conservation. rain water harvesting, watershed management
- d) Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- e) Environmental ethics: Issues and possible solutions.
- f) Climate change. global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- g) Wasteland reclamation.
- h) Consumerism and waste products.
- i) Environment Protection Act.
- j) Air (Prevention and Control of Pollution) Act.
- k) Water (Prevention and control of Pollution) Act
- l) Wildlife Protection Act
- m) Forest Conservation Act
- n) Issues involved in enforcement of environmental legislation
- o) Public awareness.

7) HUMAN POLLUTION AND THE ENVIORNMENT

- a) Population growth, variation among nations.
- b) Population explosion-Family Welfare Programme
- c) Environment and Human Health
- d) Human Rights
- e) Value Education
- f) HIV/AIDS
- g) Women and Child Welfare
- h) Role of Information Technology in Enviornment and human health
- i) Case Studies

8) FIELD WORK

- a) Visit to local area to document environmental assets- rivers/forest/grasslands/hill/mountains
- b) Visit to local polluted sites- Urban/Rural/Industrial/Agricultural
- c) Study of common plants, insects, birds
- d) Study of simple ecosystems- pond, river, hill slopes etc.

[C] LEARNING OUTCOMES

[D] RECOMMENDED TEXT BOOKS

[E] REFERENCE BOOKS

- 1) Environmental Biology, by: K. C. Agrawal, Publisher: Nidi Public. Ltd. Bikaner.
- 2) The biodiversity of India by: Bharucha Erach, Publisher: Mapin Publishing Pvt. Ltd. Ahmedabad, India
- 3) Hazardous Waste Incineration, by: C. R. Brunner, Publisher: Mcgraw Hill Inc.
- 4) Marine Pollution, by: R. S. Clark, Publisher: Clanderson Press Oxford (TB)
- 5) Environmental Encyclopedia, by: W. P. Cunningham, T. H. Cooper, E. Gorhani & M. T. Hepworth, Publisher: Jaico. Publ. House, Mumbai
- 6) Environmental Chemistry, by: A. K. De., Publisher: New Age International Publishers
- 7) Down to Earth, Centre for Science and Environment (R)
- 8) Water in Crisis, Pacific Institute for studies in Dev. Environment Security Stockholm Env. Institute, by: P. H. Gleick, Publisher: Oxford University Press
- 9) Encyclopedia of Indian Natural History, Bombay Natural History Society, by: R. E. Hawkins, Publisher: OUP India.
- 10) Global Biodiversity Assessment by: V. H. Heywood & R. T. Watson Publisher: Cambridge University
- 11) Environmental Protection and Laws by: H. V. Jadhav & V. M. Bhosale, Publisher: Himalaya Public House.
- 12) Environmental Science Systems & Solutions, by: M. L. Mckinpey & R. M. Schoch, publisher: Jones and Bartlett Publishers
- 13) Matter Hazardous by: A. K. Mhanskar, Publisher: Techno-Science Publications (TB)
- 14) Environmental Science, G. T. Miller, Publisher: Publisher: Wadsworth Publishing Co. (TB)
- 15) Fundamentals of Ecology, by: E. P. Odum, Publisher: W. B. Saunders, Co. USA
- 16) Waste Water Treatment, by: M. N. Rao & A. K. Datta, Publisher: Oxford & IBH Publications Co. Pvt. Ltd.

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

AF 201 – MATHEMATICS - II
SEM-II (1st Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

Teaching Scheme			Credit Structure			Exam Scheme				
LECTURE	TUTORIAL	PRACTICAL	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
4	--	--	4	--	4	60	40	--	--	100

[A] OBJECTIVES OF THE COURSE

- Ability to analyze and solve problems in both familiar and unfamiliar situations including those in real-life contexts with better accuracy.
- Able to apply knowledge of key theories, concepts, tools and techniques of Mathematics to solve structured and unstructured Engineering problems.
- Understand and be able to use the language, symbols and notation of mathematics
- Use different forms of mathematical representation (formulae, diagrams, tables, charts, graphs and models)
- Generate and/or analyze information, find relationships and patterns, describe these mathematically as general rules, and justify or prove them.

[B] DETAILED SYLLABUS

1) PARTIAL DIFFERENTIATION & ITS APPLICATIONS

Partial derivatives, Homogenous functions Euler's theorem, Total Derivatives-Differentiation of implicit functions, Change of variables, errors and approximations, Maxima & Minima of functions of two variables, Lagrange's method of undetermined multipliers.

2) MULTIPLE INTEGRALS & THEIR APPLICATIONS

Double integrals, definition evaluation, change of order of integration, double integrals in polar co-ordinates, area enclosed by plane curves, Triple integrals, change of variables, volume of solids.

3) INFINITE SERIES

Introduction, Definitions, Convergence, divergence and Oscillation of a series, P-test, Comparison test, Ratio test, Root test, Higher ratio test, Rabbe's test, Log test, Alternating Series, Leibnitz's rule.

4) COMPLEX NUMBER

Definition, elementary operations, Argan's diagram, De-Moivre's theorem, and its applications to expand $\sin n\theta$, $\cos n\theta$ in powers of $\sin \theta$, $\cos \theta$ respectively. To expand $\sin^n \theta$, $\cos^n \theta$ and $\sin^m \theta \cos^n \theta$ in a series of Sines or Cosines of multiples of θ , Hyperbolic functions, Formulae of hyperbolic functions, Inverse hyperbolic functions, Logarithm of complex quantities. Separation of real and imaginary parts. C + is method.

5) LAPLACE TRANSFORMS

Introduction, Definition Transforms of elementary functions, properties of Laplace transforms, Inverse transforms, note on partial fractions, transforms of derivatives, Transforms of integrals. Multiplication and division by t , convolution theorem.

[C] LEARNING OUTCOMES

At the end of the course student should be able to

- Obtain Laplace transform of standard Mathematical functions.
- Evaluate Partial Derivatives and apply the knowledge to solve some practical problems such as constrained optimization problems and other problems involving Partial Differentiation.
- Understand the concept of Multiple Integration and its applications viz. Area and Volume. Obtain the behavior of Infinite series.
- Evaluate Exponential, Trigonometric and Hyperbolic Functions of a complex number

[D] RECOMMENDED TEXT BOOKS

- 1) Higher Engineering Mathematics by: Dr. B.S. Grewal, Publisher: Khanna publishers, Delhi.

[E] REFERENCE BOOKS

- 1) Applied Mathematics for Engineers and Physicists. by: Pipes & Harvill Publisher: Mc-Graw Hill Kogakusha Ltd.
- 2) Applied Mathematics by: P. N. & J. N. Wartikar, Publisher: Pune Vidyarthi Griha Prakashan

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

Not applicable

AF 212 – ELECTRONICS PRINCIPLES
SEM-II (1st Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] OBJECTIVES OF THE COURSE

[B] DETAILED SYLLABUS

1) DIODE THEORY

Semiconductor theory, Conduction in crystals, Doping source, The unbiased diode, Forward bias, Reverse bias, Linear devices, The diode graph, Load lines, Diode approximations, D.C. resistance of a diode.

2) DIODE CIRCUITS

The sine wave, The transformer, The half wave rectifier, The full wave rectifier, The bridge rectifier, The capacitor input filter.

3) SPECIAL PURPOSE DIODES

The zener diode, The dener regulator, Optoelectronic devices.

4) BIPOLAR TRANSISTOR

Some basic ideas, Forward-reverse biad, The CE connection, transistor characteristics, DC load lines, The transistor switch.

5) TRANSISTOR BIASING CIRCUITS

Base bias, Emitter-feedback bias, Collector--feedback, Voltage divider bias, Emitter bias, Moving ground around, PNP circuits.

6) CE AMPLIFIERS

Coupling and bypass capacitors, The superposition theorem for amplifiers, AC resistance of the emitter diode, AC beta, The grounded emitter amplifier, The ac model of a CE stage.

7) CC AND CB AMPLIFIERS

The CC amplifier, The ac model of an emitter follower, Types of coupling, Direct coupling.

8) CLASS A AND B POWER AMPLIFIER

The ac load line of a CE amplifier, AC load lines of other amplifier, Class-A operation.

9) OP-AMP CIRCUITS

Non-inverting voltage amplifiers, The inverting voltage amplifiers, The summing amplifier, Comparators.

10) OSCILLATORS AND TIMERS

Theory of sinusoidal oscillation, The wein-bridge oscillator.

11) THYRISTORS

The ideal latch, The four-layer diode, The silicon-controlled rectifier.

12) FREQUENCY DOMAIN

The Fourier series, The spectrum of a signal.

13) FREQUENCY MIXING

Non-linearity, Medium-signal, operation with one sine wave, Medium signal operation with two sine waves.

14) AMPLITUDE MODULATION

Basic idea, Percent modulation, AM spectrum, The envelope detector, The super heterodyne receiver.

15) DIGITAL ICS

Number system, Boolean algebra, Logic gates.

[C] LEARNING OUTCOMES

[D] RECOMMENDED TEXT BOOKS

- 1) Electronic Principles (Third Edition) By- Albert Paul Malvino Tata McGraw Hill Publishing Co. Ltd, New Delhi.
- 2) Basic Electrical, Electronics & Computer Engg. By-R. Muthusubramanian, S. Salivahanan, K. A. Muraleedharan. Tata McGraw Hill Co. Ltd, New Delhi.

[E] REFERENCE BOOKS

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

AF 214 – MECHANICS OF SOLIDS
SEM-II (1st Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

Teaching Scheme			Credit Structure			Exam Scheme				
LECTURE	TUTORIAL	PRACTICAL	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
3	--	2	3	1	4	60	40	25	25	150

[A] OBJECTIVES OF THE COURSE

[B] DETAILED SYLLABUS

1) SIMPLE STRESSES AND STRAINS

Introduction, stress, strain, tensile, compressive and shear stresses, Elastic limit, Hooke's law, Poisson's Ratio, Modulus of Elasticity, Modulus of Rigidity, Bulk Modulus, Bars of Varying sections, Extension of tapering rods, Bars of uniform strength, temperature stresses, Hoop stress, stress on oblique sections, State of simple shear, Relation between Elastic constants.

2) MECHANICAL PROPERTIES OF MATERIALS

Ductility, Brittleness, Toughness, Malleability, Behavior of ferrous and nonferrous metals in tension and compression, shear and bending tests, Standard test pieces, influence of various parameters on test results, True and nominal stress, Modes of failure, Characteristic stress-strain curves, Strain hardening, Hardness, Different methods of measurement, Izod, Charpy and tension impact tests, Fatigue, Creep, Correlation between different mechanical properties, Effect of temperature. Testing machines and special features, Different types of extensometers and compress meters, Measurement of strain by electrical resistance strain gauges.

3) BENDING MOMENT AND SHEAR FORCE

Bending moment, shear force in statically determinate beams subjected to uniformly distributed, concentrated and varying loads. Relation between bending moment, shear force and rate of loading.

4) MOMENT OF INERTIA

Concept of moment of inertia, Moment of inertia of plane areas, polar moment of Inertia, Radius of gyration of an area, Parallel Axis theorem, Moment of Inertia of composite Areas, product of inertia, Principal axes and principal Moments of inertia.

5) STRESSES IN BEAMS

Theory of simple bending, bending stresses, moment of resistance, modulus of section, built up and composite beam section, Beams of uniform strength, Distribution of shear stress in different sections.

6) TORSION

Torsion of circular. Solid and hollow section shafts, shear stress angle of twist, torsional moment of resistance, power transmitted by a shaft, keys and couplings, combined bending and torsion, close coiled helical spring

7) PRINCIPLE STRESSES AND STRAINS

Compound stresses, principle planes and principle stresses, Mohr's circle of stress, principle strains, Angle of obliquity of resultant stresses, principle stresses in beams, principle stresses in shafts subjected to bending, torsion and axial force.

[C] LEARNING OUTCOMES

[D] RECOMMENDED TEXT BOOKS

- 1) Strength of Materials, by: Timoshenko (Vol. 1 & 2), Publisher: CBS
- 2) Strength of Material, by: Popov Publisher: Pearson
- 3) Mechanics of structure, by: Junnarkar S. B., Publisher: Charotar Publishing House Pvt. Ltd
- 4) Strength of Materials, by: S. Ramamrutham, Publisher: Oxford University Press.

[E] REFERENCE BOOKS

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

This will consist of experiments and solution of problems based on syllabus.

AF 215 – HEAT POWER
SEM-II (1st Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] OBJECTIVES OF THE COURSE

[B] DETAILED SYLLABUS

1) PROPERTIES OF STEAM

Distinction between gas and vapour, sensible heat, latent heat, total heat and super heat of steam, condition of steam, dryness fraction, methods of determination of dryness fraction, internal energy of steam, specific volume, critical pressure and temperature.

2) PROPERTIES OF GASES

Zeroth, first and second laws of thermodynamics, laws of perfect gases (Boyle's law, Charle's law, Regnault's law, Joule's law), Characteristic equation of gas, gas constants, internal energy, specific heat at constant pressure and specific heat at constant volume, relationship between specific heats, thermodynamic processes of perfect gases

3) FUELS & COMBUSTION

Solid, liquid and gaseous fuels used for boilers and I.C. engines, combustion of fuels, air required, products of combustion of fuel, analysis of flue gases, calorific value of fuels and its determination

4) BOILERS

Classification of boilers, Cochran & Babcock-wilcox boiler, boiler mountings and accessories, draught (Natural & Artificial)

5) I. C. ENGINES

Prime movers, classification of prime movers with examples of each classes, advantages of I.C. engines over E.C. engines, classification of I.C. engines, thermodynamic air cycles (Carnot cycle, Constant volume auto cycle, Constant pressure Joule cycle, Diesel cycle), Air standard efficiency, construction and working of 2-stroke and 4-stroke cycle engines, P-v diagrams, determination of I.P., B.P., fuel supply in LC. engines, ignition system of I.C. engines, Cooling of J.C. engines, Lubrication & governing of I.C. engines

6) SOLAR ENERGY

Introduction to solar energy systems

[C] LEARNING OUTCOMES

[D] RECOMMENDED TEXT BOOKS

- 1) Elements of Heat Engines (SI Units) Vol – I by: R. C. Patel & C. J. Karamchandani, Publisher: Acharya Book Depot, Baroda.
- 2) Elements of Heat Engines (SI Units) by: N. C. Pandya & C. S. Shah, Publisher: Charotar Publishing House, Anand.

[E] REFERENCE BOOKS

- 1) Heat Engine by: P. L. Ballaney Publisher: Khanna
- 2) A Course in thermodynamics & heat engines. by: Kothandaraman. Publisher: Dhanpat rai & co

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

Term - work shall be based on the above syllabus

AM 210 – ENGINEERING ECONOMICS AND PRINCIPLES OF MANAGEMENT
SEM-II (1st Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

Teaching Scheme			Credit Structure			Exam Scheme				
LECTURE	TUTORIAL	PRACTICAL	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
3	--	--	3	--	3	60	--	40	--	100

[A] OBJECTIVES OF THE COURSE

[B] DETAILED SYLLABUS

- **ECONOMICS**

1) BASIC CONCEPTS AND DEFINITIONS

Marshall, Robbins and Samuelsons' Definition of Economics. Positive and Normative Economics. Micro and Macro Economics. Utility, goods and services. Money and wealth. Consumer Surplus and producer's surplus.

2) DEMAND ANALYSIS AND CONSUMER BEHAVIOR

Demand Function, law of demand, elasticity of demand and its types, price, income and cross elasticity. Measures of demand elasticity Factors of production. Advertising elasticity. law of supply, equilibrium between demand & supply Elasticity.

3) MARKETS, PRODUCT PRICING AND FACTOR PRICING

Concept of perfect competition, monopoly and monopolistic competition (meaning and characteristics). Control of monopoly. Price discrimination and dumping. Concept of Duopoly and Oligopoly. Kinky demand curve (price leadership model with reference to oligopoly).

4) PRODUCTION, COST AND REVENUE ANALYSIS

Production and production function, short run and long run production function. Cost analysis, various concepts of cost. Total fixed cost, total variable cost, total cost, average fixed cost, average variable cost, average cost and marginal cost. Opportunity cost. Basic concepts of revenue. Relationship between average revenue and marginal revenue. Break even analysis; meaning, explanation.

5) MONEY

Meaning, functions, types, Monetary policy- meaning, objectives, tools, fiscal policy-meaning, objectives, tools Banking; meaning, types, functions, Central Bank- RBI; its functions, concepts; CRR, bank rate, repo rate, reverse repo rate, SLR. Functions of central and commercial banks Inflation, Deflation, Stagflation, Monetary and cycles, new economic policy, Liberalization, Globalization, privatization, fiscal policy of the government.

• MANAGEMENT

1) NATURE OF MANAGEMENT

Concept of Management, Management and Administration, Importance of Management, Nature of Management, Management: Science or Art, Management as Profession, Professionalization of Management in India, Universality of Management, Applying Management Theory in Practice, Role of Management Principles, Effective Management

2) MANAGEMENT FUNCTIONS AND SKILLS

Management Function, Nature of Management Functions, Management Role, Functions at Various level of Management, Top Management, Functions of Board of Directors, Functions of Chief Executive, Middle Management, Supervisory Management, Functional Areas of Management, Management Skills, Top Management Skills, Middle Management Skills, Supervisory Management Skills

3) FUNDAMENTAL OF PLANNING

Concept of Planning, Nature of Planning, Importance of Planning, Steps in Planning, Types of Planning, Corporate and Functional Planning, Strategic and Operational Planning, Long term and Short-term Planning, Proactive and Reactive Planning, Formal and Informal Planning, Types of Plans, Barriers to Effective Planning, Making Planning Effective, Planning in Indian Organizations

4) FUNDAMENTAL OF ORGANIZING

Concept of Organization and Organizing, Organization Theory, Classical Organization Theory, Modern Organization Theory: Systems Approach, Modern Organization Theory: Contingency Approach, Factors Affecting Organization Structure, Environment, Strategy, Technology, Size of Organization, People

5) FUNDAMENTAL OF DIRECTING

Concept of Direction, Principles of Direction, Direction and Supervision, Effective Supervision, Order Giving, Technique of Direction, Directing and Human Factor, Managerial Models

6) MOTIVATION THEORIES

Concept of Motivation, Theories of Motivation, Maslow's Need Hierarchy, Herzberg's Motivation-hygiene Theory, McClelland's Needs Theory, McGregor's Theory X and Theory Y, Contingency Approach of Motivation, Motivational Pattern in Indian Organizations

7) CONTROLLING

Concept of Controlling, Controlling and Other Functions, Steps in Controlling, Types of Control, Control Areas, Controlling and Management by Exception, Benefits of Management by Exception, Design of Effective Control System

[C] LEARNING OUTCOMES

[D] RECOMMENDED TEXT BOOKS

- 1) Modern Economics, by: H. L. Ahuja, Publisher: S Chand Publishing.
- 2) Modern Economic Theory, by: K. K. Dewett, Publisher: S Chand.
- 3) Monetary Economics, by: M.L. Seth, Publisher: Lakshmi Narain Agarwal.

[E] REFERENCE BOOKS

• ECONOMICS

- 1) Engineering Economics, by: R. Panneerselvam, Publisher: PHI Learning Pvt. Ltd.
- 2) Fundamentals of Management: Essential Concepts and Applications, by: S. P. Robbins and David A. DeCenzo Publisher: Pearson Education.
- 3) Economics: Principles of Economics, by: N. Gregory Mankiw, Publisher: Cengage Learning
- 4) Modern Economic Theory, by: Dr. K. K. Dewett & M. H. Navalur, Publisher: S. Chand Publications.
- 5) Introduction to Economics – Caiseneross
- 6) Managerial Economics – Jean

• MANAGEMENT

- 7) Principles and Practice of Management by L. M. Prasad, Publisher: Sultan Chand & Sons.
- 8) Management by: James A. F. Stoner, R. Edward Freeman & Daniel R. Gilbert, Publisher: Pearson
- 9) Essential of Management by: Harold Koontz & Heinz Weihrich, Publisher: Tata McGraw Hill
- 10) Management Today, by: Gene Burton & Manab Thakur, Publisher: Tata McGraw Hill
- 11) Management, by: Stephen P. Robbins & Mary Coulter Publisher: Prentice-Hall of India

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

CT 215 – C PROGRAMMING - II
SEM-II (1st Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] OBJECTIVES OF THE COURSE

- To develop programming skills using the fundamentals and basics of C Language.
- To teach effective usage of arrays, structures, functions, pointers and to implement the memory management concepts and preprocessor.
- To teach how the files are managed through programming and usage of file systems.

[B] DETAILED SYLLABUS

1) ARRAYS

One-dimensional arrays, Multi-dimensional arrays, Dynamic arrays

2) CHARACTER ARRAYS AND STRINGS

String variables, Arithmetic Operations on Characters, Comparison of Strings, String handling functions, Table of Strings

3) USER-DEFINED FUNCTIONS

Need for user defined functions, A multi-function program, Elements of user defined function, Definition of functions, return values and their types, Function calls, Function declarations, Functions with arguments, Function with multiple return values, Nesting of functions, Recursion, Passing arrays to functions

4) STRUCTURES AND UNIONS

Introduction, Structures definition, Giving values to members, Structure initialization, Comparison of structure variables, Arrays of structures, Arrays within structure, Structure and function, Unions, Size of structures, Bit fields.

5) POINTERS

Introduction, understanding of pointers, Accessing the address of a variable, Declaring and initializing pointers, accessing a variable through its pointers, Pointers expressions, Pointer increments and scale factor, Pointers and arrays, Pointers and character strings, Pointers on pointers, Pointer as function argument, Functions returning pointer, Pointers to functions, Pointers and structures.

6) FILE MANAGEMENT IN C

Introduction, Defining and opening a file, Closing a file, Input/output operations on files, Error handling during I/O operations, Random access to files, Command line arguments.

7) DYNAMIC MEMORY ALLOCATION

Allocating memory, Releasing the used space, Altering size of a block

8) THE PREPROCESSOR

Macro substitution, File Inclusion, Compiler control directives

[C] LEARNING OUTCOMES

- Students can develop programs using the basic elements like control statements, Arrays and Strings.
- They will learn to solve the memory access problems by using pointers also they understand about the dynamic memory allocation using pointers which is essential for utilizing memory.
- Students will understand the code reusability with the help of user defined functions.
- To develop advanced applications using enumerated data types, function pointers and nested structures.
- They learn the basics of file handling mechanism that is essential for understanding the concepts in database management systems.
- To implement the concepts in data structure like linked lists also to understand the uses of preprocessors and various header file directives.

[D] RECOMMENDED TEXT BOOKS

- 1) Programming in ANSI C by: Balagurusamy, 5th Ed., Publisher: Tata McGraw Hill

[E] REFERENCE BOOKS

- 1) Let Us C, by: Yashvant Kanetkar, 12th Ed., Publisher: BPB Publication.
- 2) Programming in C by: Ashok N. Kamthane, 2nd Ed., Publisher: Pearson Education.
- 3) The C Programming Language by: Kernighan and Ritchie, 2nd Ed., Publisher: PHI Learning

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

- 1) Implement the programs of Arrays
- 2) Implement the programs of Character Array
- 3) Implement the programs using Functions
- 4) Implement programs using Recursive function & Arrays as arguments to function
- 5) Implement the programs using Structures
- 6) Implement the programs using Union
- 7) Implement the programs using Pointers
- 8) Implement programs for Files & Command line arguments
- 9) Implement programs for Dynamic Memory allocation
- 10) Implement programs using Link List concept
- 11) Implement the program for Pre-Processor

CT 216 – ELECTRONICS WORKSHOP
SEM-II (1st Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

Teaching Scheme			Credit Structure			Exam Scheme				
LECTURE	TUTORIAL	PRACTICAL	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
--	--	2	--	1.5	1.5	--	--	--	50	50

[A] OBJECTIVES OF THE COURSE

[B] DETAILED SYLLABUS

[C] LEARNING OUTCOMES

[D] RECOMMENDED TEXT BOOKS

[E] REFERENCE BOOKS

- 1) Electronic Principles, by: Albert Malvino and David J. Bates, Publisher: Mc Graw Hill (7th edition)
- 2) Electronic Devices, by: Thomas L. Floyd, Publisher: Person (7th edition)

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

- 1) Introduction to Electrical Components: switches, MCB, ELCB, Tube light, bulb, parallel connection of electrical components, wiring in fan and motor.
- 2) Introduction to Electronic Components: active and passive components.
- 3) Use of basic source & measuring instruments (Power supply, function generator, CRO, DMM)
- 4) Measure voltage, current, frequency, phase difference, power/ power factor for single and three phase supply.
- 5) Identify various types of ports, cables and connectors.
- 6) Linux installation
- 7) Network Cabling and Crimping for wired and wireless network.
- 8) PCB Layout design (like proteus) Software installation and layout design using the same.

- 9) PCB layout design and manufacturing process. Solder and de-solder electronic components on PCB. Identify and rectify open circuit and short circuit faults in PCB/system.
- 10) 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.

- 1) To design a device for charging small battery during door opening and closing.
- 2) To design a mobile charger using solar PV cell panel for offices and house hold.
- 3) To design/develop an electronic weighing machine.
- 4) To design/develop an electronic lock for house in the workshop.
- 5) To design/develop an innovative electrical bell using electronics components.

AF 301 – MATHEMATICS - III
SEM-III (2nd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

Teaching Scheme			Credit Structure			Exam Scheme				
LECTURE	TUTORIAL	PRACTICAL	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
4	--	--	4	--	4	60	40	--	--	100

[A] OBJECTIVES OF THE COURSE

- Ability to analyze and solve problems in both familiar and unfamiliar situations including those in real-life contexts with better accuracy.
- Able to apply knowledge of key theories, concepts, tools and techniques of Mathematics to solve structured and unstructured Engineering problems.
- Understand and be able to use the language, symbols and notation of mathematics
- Use different forms of mathematical representation (formulae, diagrams, tables, charts, graphs and models)
- Generate and/or analyze information, find relationships and patterns, describe these mathematically as general rules, and justify or prove them.

[B] DETAILED SYLLABUS

1) FOURIER SERIES

Euler's Formulae, condition for a Fourier expansion, functions having points of discontinuity, change of interval, odd & even functions, Expansion of odd & even periodic functions, Half range series.

2) MATRICES

Fundamental concepts, operations, associated with matrices, matrix method of solution of simultaneous equations, Rank of Matrix, Linear dependence of vectors, consistency of a system of linear equations, characteristic equations, Eigen vectors and Eigen roots, Cayley Hamilton theorem.

3) ORDINARY DIFFERENTIAL EQUATIONS

Linear differential equations of higher order with constant coefficients, equations reducible to linear equations with constant coefficients, Simultaneous linear equations with constant coefficients. Application to engineering problems.

4) PARTIAL DIFFERENTIAL EQUATIONS

Introduction, formation, 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 & the particular integral, non-homogenous linear equations with constant coefficients. Method of separation of variables - vibrating string problem, Heat flow equation etc.

5) LAPLACE TRANSFORMS

Application to differential equation, simultaneous linear equation with constant coefficients.

[C] LEARNING OUTCOMES

At the end of the course students are able to

- Obtain Fourier series of a periodic function into the sum of a (possibly infinite) set of simple oscillating functions, namely sines and cosines.
- Able to apply the method of solving linear system of equations, linear transformation and Eigen value problem as they arise, for instance from electrical networks, framework in mechanics, curve fitting, other optimization problems and processes in statistics.
- Model physical processes using partial and ordinary differential equation and same can be solved analytically as well numerically.
- Solve basic initial value problems, directly without determining a general solution with the help of Laplace Transformation.
- Characterize the solutions of a differential equation with respect to initial values and analyze the behavior of solutions.
- Solve wave and heat equation.

[D] RECOMMENDED TEXT BOOKS

- 1) Higher Engineering Mathematics by: Dr. B. S. Grewal. Publisher: Khanna publishers, Delhi

[E] REFERENCE BOOKS

- 1) A Text Book of Applied Mathematics by: P. N. & J. N. Wartikar, Publisher: Pune Vidyarthi Griha Prakashan
- 2) Mathematics for Engineering by: Chandrika Prasad, Publisher: Pothishala Pvt. Ltd.
- 3) A Text Book of engineering Mathematics by: Dr. K. N. Srivastva & G. K. Dhawan, Publisher: Dhanpat Rao and sons, Delhi

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

IT 301 – DESIGN OF DIGITAL CIRCUITS
SEM-III (2nd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] OBJECTIVES OF THE COURSE

- The subject design of digital circuits aims to provide the basic knowledge of digital logic levels and its applications. The objective of this course is to familiarize the student with fundamental principles of digital design. It provides the capability to analyze and design the digital circuits for both combinational and sequential logic.

[B] 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) REGISTERS, 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.

[C] LEARNING OUTCOMES

- Students will have the understanding of the fundamental concepts and techniques used in digital circuits. They will learn the structure of various number systems and its application in digital design, the ability to understand, analyze, and design various combinational and sequential circuits. They will have ability to identify the basic requirements for a design application and propose a cost-effective solution. Also, they will develop skill to build, and troubleshoot digital circuits.

[D] RECOMMENDED TEXT BOOKS

- 1) Digital Logic and Computer Design by: M. Morris Mano Publisher: Pearson Education.

[E] REFERENCE BOOKS

- 1) Microelectronics by: Jacob Millman & Arvin Grabel, Second Edition, Publisher: McGraw - Hill International Edition

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

- 1) To make 5-volt DC power supply.
- 2) To verify basic logic gates.
- 3) To verify universal gates NAND and NOR.
- 4) To implement half adder and full adder circuits.
- 5) To implement circuit that converts binary to gray and gray to binary.
- 6) (A) To implement 3X8 decoder
(B) Using 3X8 decoder implements 4X16 decoder.
- 7) To implement 8X1 Multiplexer.
- 8) (A) To implement 4-bit comparator.
(B) Using 4-bit comparator implements 8-bit comparator.
- 9) To verify various flip-flops like D, T, JK.
- 10) To implement 3-bit and 4-bit binary counters.
- 11) To implement BCD counter.

IT 302 – COMPUTER PERIPHERALS
SEM-III (2nd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

Teaching Scheme			Credit Structure			Exam Scheme				
LECTURE	TUTORIAL	PRACTICAL	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
--	--	2	--	1	1	--	--	25	25	50

[A] OBJECTIVES OF THE COURSE

- The main objective of this course is to introduce PC maintenance, upgrading, repairing. To that end, this course helps to fully understand the family of computers that has grown from the original IBM PC, including all PC-compatible systems.
- This course discusses most areas of system improvements, such as motherboards, processors, memory, and even case and power supply improvements. Also, this course discusses proper system and component care, specifies the most failure-prone items in various PC systems, and tells the student how to locate and identify a failing component.
- Students will learn about powerful diagnostics hardware and software that enable a system to help them determine the cause of a problem and how to repair it.

[B] DETAILED SYLLABUS

- 1) Assembling of Computer
- 2) Study of CMOS – Setup options
- 3) Study of Peripherals (Motherboards, HDD, RAM, I/O Cards)
- 4) Installation of OS (win-Xp)
- 5) Installation of OS (Linux)
- 6) Network Topologies & Cabling
- 7) Installation of Server OS (win 2003)
- 8) Configuration of Client (Win Xp)
- 9) User Management (win 2003)
- 10) Active Directory Service (win 2003)
- 11) Policy Settings (win 2003)
- 12) Network Printer Configuration

LAB WORK BEYOND CURRICULA

13) Study of Virtual Box

14) Study of Printers

[C] LEARNING OUTCOMES

- After completion of this subject, students will be able to understand computer systems with different components, slots, sockets and motherboards.
- Distinguish each type of RAM, Memory, Different CPU types, BIOS component, storage devices and related media, connector types and how to configure them.
- Understand different operating systems and how to install and configure for real time application.

[D] RECOMMENDED TEXT BOOKS

1) PC Upgrade and Maintenance, by: Mark Minasi, Publisher: Sybex.

[E] REFERENCE BOOKS

1) IBM PC and clones, by: Govindarajalu, Publisher: McGraw Hill Education.

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

- 1) Assembling of Computer
- 2) Study of CMOS – Setup options
- 3) Study of Peripherals (Motherboards, HDD, RAM, I/O Cards)
- 4) Installation of OS (win-Xp)
- 5) Installation of OS (Linux)
- 6) Network Topologies & Cabling
- 7) Installation of Server OS (win 2003)
- 8) Configuration of Client (Win Xp)
- 9) User Management (win 2003)
- 10) Active Directory Service (win 2003)
- 11) Policy Settings (win 2003)
- 12) Network Printer Configuration

LAB WORK BEYOND CURRICULA

13) Study of Virtual Box

14) Study of Printers

IT 303 – OBJECT ORIENTED PROGRAMMING
SEM-III (2nd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] OBJECTIVES OF THE COURSE

- To provide fundamental concepts of object-oriented programming like abstraction, inheritance, virtual functions etc.
- To teach programmatic implementation of these concepts using c++ language.
- To give advantages of object-oriented programming over procedural programming.
- These concepts can be useful to learn the subjects like software engineering and object-oriented design & analysis.

[B] DETAILED SYLLABUS

1) PROGRAMMING IN C++

- C++ programming basics, loops, structures, functions, arrays Output using cout, input with cin, manipulators, type conversion
- Various loops: for, while and do-while
- Decision making: if, if-else, switch statement and conditional Operator
- Specifying the structure, accessing structures members, structures within structures, enumerated data types.
- Simple functions, passing arguments to functions, returning values from functions, reference arguments, overloaded functions, inline functions, default arguments, variables and storage classes, returning by reference

2) OBJECTS AND CLASSES, ARRAYS AND OPERATOR-OVERLOADING

- Characteristics of Object-Oriented Languages.
- Objects, classes, constructor, destructor, returning objects from functions, structures and classes, static class data
- Array fundamentals, arrays as class member data, arrays of objects, strings.
- Overloading unary operators, overloading binary operators, data conversion.

3) INHERITANCE AND POINTERS

- Derived class and base class, derived class constructors, overriding member functions, public private and public inheritance, multiple inheritance, containership.
- Addresses and pointers, pointers and arrays, pointers and functions, pointer and strings, memory management: new and delete, pointers to objects, pointers to pointers.

4) VIRTUAL FUNCTIONS, FILES AND STREAMS

- Virtual functions, friend functions, static functions, assignment and copy initialization, this pointer.
- Streams, string I/O, character I/O, I/O with multiple objects, file pointers, Disk I/O with member functions, Error handling, Redirection, Command line arguments, overloading the extraction and insertion operators.

[C] LEARNING OUTCOMES

- Students can design the software application or system.
- Students can do implementation of the given object-oriented system.
- These concepts can be useful in higher semesters while learning subjects like Java.

[D] RECOMMENDED TEXT BOOKS

- 1) Object-Oriented Programming in Turbo C++, by Robert Lafore, Publisher: Galgotia Publications Pvt Ltd

[E] REFERENCE BOOKS

- 1) C++ Programming Design by Davidson and Cohoon, Publisher: TMH publications.

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

- 1) Write a program to generate student exam result using structures.
- 2) Scan mixed character string with space and count capital letter, lower case letters and Digits.
- 3) i) Write a program to exchange two variable values by functions (pass by value and pass by reference)
ii) Sum of Structure variable and returning structure variable
- 4) i) Employees Total Salary calculation using nested structures
ii) Room area calculation using structure and class.
- 5) Define class with constructor and destructor which will count no. of object created and destroyed.

- 6) i) Plus, operator overloading ii) Minus operator overloading iii) Study of friend function
- 7) Study of inheritance
- 8) Implement string as new data type
- 9) Stack with Virtual function
- 10) i) Write a program that writes 10 records in a file and display all the records.
 ii) Store 10 integer nos. in file, in character and binary form.

IT 304 – DISCRETE MATHEMATICS
SEM-III (2nd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] OBJECTIVES OF THE COURSE

- Learn basic logic, set theory, permutations, combinations, and discrete probabilities.
- Learn concepts of relations and functions and proof techniques
- Learn core ideas in graph theory and tree and solving related problems
- Learn core concepts of Finite-state machines
- Learn how to perform Analysis of algorithms and how to form and solve Recurrence relations for given problems
- Learn to solve counting problems and use combinatorial mathematics
- Learn ideas of grouping and apply to solve practical problems
- Learn ordered structure such as lattices and learn abstract type of algebra: Boolean Algebra

[B] DETAILED SYLLABUS

- **MAJOR TOPICS:** Sets, propositions, permutations, combinations, discrete probabilities, relations, functions, graphs, trees and cut-sets, Finite-state machines, analysis of algorithms, computability and Formal languages, recurrence relations, generating functions, discrete numerical functions, group, rings, lattices and Boolean algebras.

- **COURSE CONTENTS**

1) SETS AND PROPOSITIONS

Combination, finite, uncountable infinite and infinite sets, mathematical induction, principles of inclusion and exclusion, propositions.

2) PERMUTATIONS, COMBINATIONS, DISCRETE PROBABILITIES

Rules of sums and products, permutations, combinations, generation, discrete probability, conditional probability, information.

3) RELATIONS 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, Travelling 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 MACHINES

FSM as models of physical systems, equivalent machines, FSM as language recognizer.

7) ANALYSIS OF ALGORITHMS

Time complexity of algorithms, example of shortest path algorithm, complexity, tractable and non-tractable problems.

8) COMPUTABILITY AND FORMAL LANGUAGES

Russell's paradox and non-computability, ordered sets, languages, phrase structured grammars, types of grammars and languages.

9) RECURRENCE RELATIONS

Linear recurrence relations with constant coefficient, homogeneous, particular and total solutions, generating functions, sorting algorithms, matrix multiplication.

10) DISCRETE NUMERICAL FUNCTIONS

Manipulations of numerical functions, asymptotic behaviour, generating functions, combinatorial problems.

11) GROUP

Groups and sub-groups, generators, evaluation of powers, cosets, Lagrange's theorem, permutation group and Burnside's theorem, group codes, isomorphism, automorphism, homomorphism, normal subgroups, rings, integral domains and fields, ring homomorphism, polynomial rings and cyclic codes.

12) LATTICES AND BOOLEAN ALGEBRAS

Lattices and algebraic systems, principle of duality, properties of algebraic systems, distributive lattices, Boolean algebras, uniqueness, Boolean functions and expressions, propositional calculus.

[C] LEARNING OUTCOMES

- Students will learn how to apply logical reasoning to solve a variety of problems and how to apply the operations of sets and use Venn diagrams to solve practical problems
- Students will learn identifying types of relations and functions for given problems, how to construct correct direct and indirect (contradiction and contraposition) proofs and learn how to use Principle of Mathematical Induction to prove theorems
- Students will understand the notations and language of graphs and trees and will learn (i) how to determine if a given graph is simple or a multigraph, directed or undirected, cyclic or acyclic, and determine the connectivity of a graph and (ii) types of trees and methods for traversing trees
- Students will learn formulating FSM for given problem statements.
- Students will understand types of algorithms and the issue of efficiency of algorithms
- Students will learn which grouping techniques/theorems to apply for given practical problems
- Students will understand how to apply combinatorial ideas to real life problems
- Students will learn how to apply principle of duality and how to use Boolean algebras.

[D] RECOMMENDED TEXT BOOKS

- 1) Elements of Discrete Mathematics by: C. L. Liu, 2nd Ed. Publisher: McGraw-Hill

[E] REFERENCE BOOKS

- 1) Modern Applied Algebra by: Birkhoff and Bartee, Publisher: McGraw-Hill, CBS.
- 2) Discrete Mathematics - A Unified Approach, by: Stephen A. Wiitala. Computer Science Series, Publisher: McGraw-Hill.

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

- 1) Write a program to find intersection set of two sets.
- 2) Write a program to find union set of two sets.
- 3) Write a program to find Compliment set of the given set.
- 4) Write a program to find difference set of two sets.
- 5) Write a program to find symmetric difference set of two sets.
- 6) Write a program to prove the D'Morgan's Laws of set theory.
- 7) Write a program to find the power set of the given set.
- 8) Write a program to find permutation of the set.
- 9) Write a program to implement Binary Search.
- 10) Find the cardinality of the set and prove $|A \cup B \cup C| = |A| + |B| + |C| - |A \cap B| - |B \cap C| - |A \cap C| + |A \cap B \cap C|$

IT 305 – COMMUNICATION SYSTEMS
SEM-III (2nd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[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

Communication System, Analog and Digital Messages, Signal-to-Noise Ratio, Channel Bandwidth, and the Rate of Communication, Modulation, Randomness, Redundancy, and Coding

2) INTRODUCTION TO SIGNALS

Size of a Signal, Classification of Signals, Some Useful Signal Operations, Unit Impulse Function, Trigonometric Fourier series, Exponential Fourier series

3) ANALYSIS AND TRANSMISSION OF SIGNALS

A periodic Signal Representation by Fourier Integral, Transforms of Some Useful Functions, Some Properties of the Fourier Transform, Signal Transmission through a Linear System, Ideal and Practical Filters, Signal Distortion over a Communication Channel, Signal Energy and Energy Spectral Density, Signal Power and Power Spectral Density, Numerical Computation of Fourier Transform: The DFT.

4) AMPLITUDE (LINEAR) MODULATION

Base band and Carrier Communication, Amplitude Modulation: Double Sideband (DSB), Amplitude Modulation (AM), Quadrature Amplitude Modulation (QAM), Amplitude Modulation: Single Sideband (SSB), Amplitude Modulation: Vestigial Sideband (VSB), Carrier Acquisition

5) ANGLE (EXPONENTIAL) MODULATION

Concept of Instantaneous Frequency, Bandwidth of Angle-Modulated Waves, Generation of FM Waves, Demodulation of FM, Interference in Angle-Modulated Systems, FM Receiver

6) SAMPLING AND PULSE CODE MODULATION

Sampling Theorem, Pulse-Code Modulation (PCM), Differential Pulse Code Modulation (DPCM), Delta Modulation.

7) PRINCIPLES OF DIGITAL DATA TRANSMISSION

A Digital Communication System, Line Coding, Pulse Shaping, Scrambling, Regenerative Repeater, Detection-Error Probability, M-ary Communication, Digital Carrier Systems, 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 analysis and evaluate analog as well as digital Communication systems.
- Recognizes the broad applicability of analog and digital communication systems in real world scenario.

[D] RECOMMENDED TEXT BOOKS

- 1) Modern Digital & Analog Communication Systems (Third Edition), by: B. P. Lathi, Publisher: OXFORD

[E] REFERENCE BOOKS

- 1) Digital Communications by: Banard Sklar, Publisher: Pearson education.
- 2) Communication System by: Bruce Carlson, Publisher: 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.

AF 410 – FINANCIAL AND MANAGERIAL ACCOUNTING
SEM-IV (2nd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

Teaching Scheme			Credit Structure			Exam Scheme				
LECTURE	TUTORIAL	PRACTICAL	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
3	--	--	3	--	3	60	--	--	40	100

[A] OBJECTIVES OF THE COURSE

- To enable students to understand, interpret & analyze Accounting System, Accounting books I records Financial Statements & also understand & decide relevance of accounting information to Managerial Decisions
- To familiarize students with the basic elements of the Financial Management.
- To enable students to evaluate performance of various business concerns by use of technique of ratio analysis, cash flow statement

[B] 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 - Cashbook, Posting to Ledger accounts Posting to Ledger

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, Difference 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

[C] LEARNING OUTCOMES

- Students will gain understanding of various concepts of Accounting and Finance. They will learn how financial transaction are to be recognized and recorded in practical life. They will learn the concepts and principles governing final accounts and get practical exposure to make the analysis of the Final accounts of firms.

[D] RECOMMENDED TEXT BOOKS

- 1) Financial Accounting for Managers -Text book & cases - Third Revised edition by: S. K. Bhattacharya, John Dearden Publisher: Vikash Publishing House Private Limited
- 2) Management Accounting, By: Ravi M. Kishore, Publisher: Taxman

[E] REFERENCE BOOKS

- 1) Financial Management, 10th edition, by: I. M. Pandey, Publisher: Vikas Publication.
- 2) Fundamentals of Financial Management, by: Van horne, Publisher: Pearson Education.
- 3) Financial Management, by: Brigham, Publisher: Cengage Publication.
- 4) Financial Management: Principles and Applications, 10th Ed. by: John D. Martin, J. William Petty, David Scott, Jr. Arthur J. Keown, Publisher: Pearson.
- 5) Financial Management: Theory and Practice, by: Prasanna Chandra, 10th Edition, Publisher: TMH, New Delhi.
- 6) Cost Accounting by: B. K. Bhar Publisher: Academic Publisher latest edition.
- 7) Cost Accounting by: Charles, Srikant and George, Publisher: PHI latest edition.

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

AF 411 – MATHEMATICS - IV
SEM-IV (2nd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

Teaching Scheme			Credit Structure			Exam Scheme				
LECTURE	TUTORIAL	PRACTICAL	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
4	--	--	4	--	4	60	40	--	--	100

[A] OBJECTIVES OF THE COURSE

- Ability to analyze and solve problems in both familiar and unfamiliar situations including those in real-life contexts with better accuracy.
- Able to apply knowledge of key theories, concepts, tools and techniques of Mathematics to solve structured and unstructured Engineering problems.
- Understand and be able to use the language, symbols and notation of mathematics
- Use different forms of mathematical representation (formulae, diagrams, tables, charts, graphs and models)
- Generate and/or analyze information, find relationships and patterns, describe these mathematically as general rules, and justify or prove them.

[B] DETAILED SYLLABUS

1) FUNCTIONS OF COMPLEX VARIABLE

Analytic functions, Cauchy-Rieman equations, Harmonic functions, orthogonal system, complex potential function, Determination of conjugate function, conformal transformation, some standard transformations, bilinear transformation, line integral, properties of complex integration, Cauchy's theorem and Cauchy's integral formula.

2) NUMERICAL METHOD

Solution of algebraic and transcendental equations, by Newton - Raphson method, Direct iteration method, false position method, Solution of linear simultaneous equation :(1) Gauss - elimination (2) Gauss-jordan (3) Gauss-siedal method, Numerical methods to solve first order and first degree ordinary differential equations by Picard's method & Taylor's series method, Modified Euler's Method, Milne's Method, Runge's method, Runge kutta method.

3) FINITE DIFFERENCES & DIFFERENCE EQUATIONS

Finite difference, Interpolation, Newton's forward and backward and central differences and Lagrange's formula, Strling & bessel's formula, Numerical differentiation & Integration, Trapezoidal rule, Simpson's (both) rules, Difference equations with constant coefficient.

4) VECTOR CALCULUS

Vector function of a single scalar variable, Differentiation of vectors, simple applications to plane, motion, scalar and vector point functions, Del applied to scalar point function (gradient) Divergence of a vector point function, curl of a vector, second order expressions, line integrals, surface integrals, Gauss theorem and stoke's theorem.

5) STATISTICAL METHODS

Binomial distribution, poission distribution, normal distribution, calculation of errors, probable errors, standard error, coefficient of correlation, lines of regression.

[C] LEARNING OUTCOMES

- Proficient to apply the theory and concepts of vector differential calculus and vector integral calculus in problems related to fluid flow, heat flow, electro static and so on.
- Understanding concept of Complex numbers and Complex functions and able to check the analyticity based on Cauchy-Riemann equations.
- Able to evaluate the complex integration and real integrals of practical interest.
- Able to interpolate and extrapolate the data with the help of numerical methods.
- Use numerical methods to find an approximate solution of algebraic and transcendental equations using appropriate method.
- Able to handle data numerically or graphically, in order to see what properties data, have and what kind of information we can extract and if data influenced by chance student may apply the concepts and rules of probability theory.

[D] RECOMMENDED TEXT BOOKS

- 1) Higher Engineering Mathematics by: Dr. B. S. Grewal. Publisher: Khanna publishers, Delhi

[E] REFERENCE BOOKS

- 1) A Text Book of Applied Mathematics by: P. N. & J. N. Wartikar & Chandrika Prasad. Publisher: Pune Vidyarthi Griha Prakashan

[F] LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE): Not applicable

IT 402 – COMPUTER ORGANIZATION
SEM-IV (2nd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] OBJECTIVES OF THE COURSE

- This course will introduce students to the fundamental concepts underlying modern computer organization and architecture. Main objective of the course is to familiarize students about hardware design including logic design, basic structure and behavior of the various functional modules of the computer and how they interact to provide the processing needs of the user. It will cover machine level representation of data, instruction sets, computer arithmetic, CPU structure and functions, memory system organization and architecture, system input/output, multiprocessors, and digital logic. The emphasis is on studying and analyzing fundamental issues in architecture design and their impact on performance.

[B] DETAILED SYLLABUS

1) COMPUTING AND COMPUTERS

The nature of computing, The evolution of computers, The VLSI Era

2) DESIGN METHODOLOGY

The system design, Register level, The processor level

3) PROCESSOR BASICS

CPU organization, Data representation, Instruction sets

4) DATA PATH DESIGN

Fixed point arithmetic, Arithmetic logic units, Advanced topics

5) CONTROL DESIGN

Basic concepts, Micro programmed control, Pipeline control

6) MEMORY ORGANIZATION

Memory technology, Memory systems, Caches

7) SYSTEM ORGANIZATION

Communication methods, IO and system control, Parallel Processing

[C] LEARNING OUTCOMES

- Understand the basics of computer hardware and how software interacts with computer hardware
- Analyze and evaluate computer performance
- Understand how computers represent and manipulate data
- Understand computer arithmetic and convert between different number systems
- Understand basics of Instruction Set Architecture (ISA) – MIPS
- Assemble a simple computer with hardware design including data format, instruction format, instruction set, addressing modes, bus structure, input/output, memory, Arithmetic/Logic unit, control unit, and data, instruction and address flow
- Use Boolean algebra as related to designing computer logic, through simple combinational and sequential logic circuits

[D] RECOMMENDED TEXT BOOKS

- 1) Computer Architecture and Organization, 3rd edition by: John. P. Hayes, Computer science series, Publisher: Mc Graw-Hill

[E] REFERENCE BOOKS

- 1) Computer System Architecture, by: Morris Mano, Publisher: Prentice Hall.
- 2) Computer Organization, 3rd edition, by: Hamacher, Vranesic and Zaky, Computer Science Series, Publisher: McGraw-Hill

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

- 1) Study of Introduction to verilog and installation.
- 2) Write a basic program of verilog and understand the syntax.

- 3) Write a program to implement different logic gates in verilog.
- 4) Write a program to implement half adder and full adder in verilog.
- 5) Write a program to implement multiplexer in verilog.
- 6) Write a program to implement D-flip-flop in verilog.
- 7) Write a program to implement ring counter in verilog.
- 8) Write a program to implement 8-bit ALU in verilog.
- 9) Write a program to implement Booth's multiplication algorithm in C language.
- 10) To write and read data in RAM IC 6264.

IT 403 – MICROPROCESSOR ARCHITECTURE PROG. AND INTERFACING
SEM-IV (2nd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] OBJECTIVES OF THE COURSE

- Provides a balanced approach to learn about Intel 8085 microprocessor from two different disciplines: hardware concepts from electronics point of view and assembly language programming skills from computer science point of view.
- To introduce the basic concepts of microprocessor and its interfacing with memory and programmable peripheral chips involving system design.
- To develop an in-depth understanding of execution of instructions and how microprocessor communicates with memory and peripheral devices to be used for real time applications.

[B] DETAILED SYLLABUS

MICROPROCESSOR

1) INTRODUCTION

Microprocessor architecture & its operation, Memory, Input/Output, Microcomputer system, Interfacing devices.

2) 8085 MICROCOMPUTER ARCHITECTURE & MEMORY INTERFACING:

Block diagram, Address, Data, Control Bus, Generating control signals, Memory Map, Memory Interfacing.

3) INTERFACING I/O DEVICES:

Basic interfacing concepts, interfacing Input/output devices, memory mapped I/O.

4) 8085 INSTRUCTIONS SET

The 8085 programming Model, Addressing Models, Data Format, Instruction classifications - Data transfer, Arithmetic, Logic, Branch operations, Assembly language program, Debugging.

5) PROGRAMMING TECHNIQUES

Looping, counting, Indexing, Counters & time delay. Stack & sub-routines, Code conversion, arithmetic operations.

6) BASIC INTERFACING TECHNIQUES

Interfacing memory, Interrupt processing, programming and interfacing of VLSI based peripheral Devices like 8253, 8251, 8255, 8259, 8279, 8257 etc., interfacing ADC/DAC.

MICROCONTROLLER

- Basic concepts of Microcontroller and review of 8051 Architecture

[C] LEARNING OUTCOMES

- Providing a sound pedagogy - from basic concepts to applications - it fully prepares students to apply concepts learned to other microprocessors in higher level courses or may be useful during their minor/major project work or in their future jobs.
- Prepare the students to digest the concept of Operating System and Advance Microprocessor subjects in higher semesters.
- Gives clarity to understand some of the syntax used in 'C' language which allows students to write most optimized code.

[D] RECOMMENDED TEXT BOOKS

- 1) Architecture, Programming & applications with 8085/8080A by: R. S. Gaonkar 4th ed., Publisher: Penram International Publishing
- 2) The 8051 Microcontroller by: Kenneth J. Ayala, Publisher: Cengage Learning

[E] REFERENCE BOOKS

- 1) 8080A-8085 Assembly language programming by: Lance A. Leventhal, Publisher: McGraw-Hill Osborne Media

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

- 1) (A) Introduction to Microprocessor Trainer Kit
(B) Addition of two 8-bit numbers.
- 2) Addition of ten 8-bit numbers stored in memory
- 3) Find no. of negative elements in a block of data
- 4) Observing T-States, Machine cycles and instruction cycle on oscilloscope.

- 5) Sorting of numbers (Ascending/Descending)
- 6) Code Conversion: Binary to BCD
- 7) Working of RST 7.5 interrupt
- 8) Study 8255 PPI
- 9) To Transfer data serially between two kits. It will cover Study of 8253/8251/USART
- 10) Study of 8279 Programmable Keyboard/Display Controller
- 11) Study of ADC/DAC
 - (A) Reading analog voltage through ADC 0809
 - (B) Generating different waveforms on DAC800 output

- **LAB WORK BEYOND CURRICULA**

- 12) Design a kit that can be used as software digital clock
- 13) Design a kit that can be used as voltmeter to measure voltmeter to measure 0 to 5 volts

IT 406 – DATA STRUCTURES AND ALGORITHMS
SEM-IV (2nd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] OBJECTIVES OF THE COURSE

- To learn different data structures and their operations.
- To teach selection of efficient data structure for improving efficiency (time complexity and space complexity) of the system.
- These concepts will be useful to students while learning subjects like Database Management System and Algorithm Analysis.
- To give the knowledge of real-world application of the data structures.

[B] DETAILED SYLLABUS

1) BASIC CONCEPTS

Algorithm Specification

2) ARRAYS

Array as an abstract Data type, Representation of Arrays

3) STACKS AND QUEUES

Stack as an abstract data type, Queue as an abstract type, Evaluation of Expressions

4) LINKED LISTS

Singly Linked Lists, Circular Lists, Linked Stacks and Queues, Polynomials, Doubly Linked Lists, Generalized Lists

5) TREES

Introduction, Binary Trees, Binary tree traversal and tree iterators, Additional Binary tree operations, threaded binary trees, heaps, binary search trees, forests, Huffman Algorithm

6) GRAPHS

Graph Abstract data type, Elementary Graph operations, Shortest path –Dijkstra's algorithm

7) SORTING

Insertion sort, quick sort, merge sort, heap sort, sorting on several keys, list and table sort, summary of internal sorting

8) HASHING

Static Hashing, linear probing, hash functions

9) SEARCH STRUCTURES

AVL Trees, 2-3 Trees, 2-3-4 Trees, Red-Black trees, B-trees, Digital Search Trees, Tries

[C] LEARNING OUTCOMES

- Students can do selection of efficient data structure for the given problem.
- Students can compare different data structures based on operations supported and their complexity.
- Students can do implementation of these data structures in object-oriented programming language.

[D] RECOMMENDED TEXT BOOKS

- 1) Fundamentals of Data Structures using C++, by: Ellis Horowitz, Sartaj Sahni, Publisher: Galgotia Pub. 1998 ed.

[E] REFERENCE BOOKS

- 1) Data Structures & Algorithms, Aho, Ullman, Publisher: Addison Wesley
- 2) An Introduction to Data Structures with applications, by: Tremblay, Sorenson, Publisher: McGraw Hill.
- 3) The art of Computer Programming Vol. I & III, by: Knuth, Publisher: Addison Wesley.
- 4) Data Structures using C and C++ by: Yedidyah Langsam, Tenenbaum, Publisher: Prentice Hall India Learning Private Limited

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

- 1) Implement the Polynomial representation using an Array.
- 2) Implement the Application of Stack Infix to Postfix.
- 3) Make the basic operations of circular Queue.

- 4) Implement the Polynomial representation using a Link -List.
- 5) Implement the Doubly Link-List.
- 6) Implement the Binary Tree Traversal.
- 7) Find the Shortest Path using Diskstra's Algo.
- 8) Implement the Shorting using Quick Sort method.
- 9) Implement the Shorting using Merge Sort method.
- 10) Implement the Static Hashing using any one method.

IT 407 – COMPUTER AND COMMUNICATION NETWORK
SEM-IV (2nd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] OBJECTIVES OF THE COURSE

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

- Understand uses of computer network in daily life.
- Understand basics of network hardware and network software with understanding of protocol hierarchies and reference models.
- Identify services provided by each layer of OSI reference model.
 - Flow control and error control at DLL (wired and wireless LAN) and devices at DLL
 - IP addressing (IPV4), sub netting, super netting and routing algorithms and devices at Network Layer
 - Quality of service and congestion control at network and transport layer
- Understand Application layer protocol and security in computer networks.

[B] DETAILED SYLLABUS

1) INTRODUCTION

- Uses of computer Networks, Network Hardware-LAN, MAN, WAN, internetworks. Network Software – Design Issues, interfaces & Services, Connection Oriented & Connectionless services. Service primitives. Relationship of services to protocols. Reference Models - OSI & TCP/IP, their comparison & critiques.

2) THE PHYSICAL LAYER

- Transmission Media – magnetic media, twisted pair, baseband & broadband, fiber optics.
- Wireless Transmission- radio, microwave, infrared & light wave. Narrowband ISDN, Broadband ISDN & ATM.

3) THE DATA LINK LAYER

- DLL Design issues, Error Detection & Correction. Elementary Data link Protocols - Utopia, Stop N Wait and Automatic Repeat Request. Sliding Window Protocols 1-bit sliding window, Go Back N, Selective Repeat Protocols. Examples of Data link layer protocols HDLC, PPP

4) MEDIUM ACCESS SUB LAYER

- Channel Allocation Problem - Static & Dynamic. Multiple Access protocols - ALOHA, CSMA, Collision Free Protocols, Limited contention protocols, WDMA protocol, wireless LAN protocols. IEEE-802.3(Ethernet),802.4(Token Bus) ,802.5(Token Ring) and FDDI
- Bridges - From 802.x to 802.y, transparent Bridges, Spanning Tree, Source Routing Bridges, remote bridge. Introduction of Repeaters, Hub, bridges, switches, routers and gateways.

5) THE NETWORK LAYER

- Network layer Design issues. Routing Algorithms. Congestion Control Algorithms - general policies, congestion prevention policies, traffic shaping, flow specifications, congestion control in VC subnets, Congestion controls in Data gram Subnets, load shedding, jitter control. Quality of services-requirements, techniques to achieving good quality of services-Leaky bucket algorithm. Token bucket algorithm, resource reservation, admission control, packet scheduling.
- Internetworking-How networks differ, how networks can be connected, concatenated virtual circuits, connectionless internetworking, tunneling, internetwork routing, fragmentation
- The network layer in the internet - the IP protocol, IP addresses & subnets, Internet Control Protocols – ARP,RARP,OSPF & BGP

6) THE TRANSPORT LAYER

- The Transport Service-services provided to upper layers, transport services primitives, Elements of Transport Protocols, The Internet Transport Protocols – TCP service model, TCP protocol, TCP Segment Header, TCP Connection Management, TCP Transmission Policy, TCP Congestion Policy. UDP & overview of Socket.

7) THE APPLICATION LAYER

- Application Layer Protocols: File transfer protocol, Domain Name System, SMTP, HTTP

8) SECURITY & PERFORMANCE ISSUES IN COMPUTER NETWORKS

- Data Encryption, Public Key Cryptography, Trusted System, Firewall, Network Performance measurement, Network baseline, Network Management & Documentations

[C] LEARNING OUTCOMES

After completing this course, the student must demonstrate the knowledge and ability to:

- Implement and identify basic network topologies.
- Identify the work of each layer and protocols available at that layer with possible algorithms.
- Identify the network devices and their functionality within the network.
- Build a simple network with use of sub netting, super netting and basic routing algorithm within the network.
- Implement a simple connection oriented and connection less service using service primitives.
- Troubleshoot basic network issues within network.

[D] RECOMMENDED TEXT BOOKS

- 1) Computer Networks by: Andrew S. Tanenbaum, 4th Edition, Publisher: Prentice - Hall of India (PHI).

[E] REFERENCE BOOKS

- 1) Data Communications and Networking, by: Behrouz A. Forouzan, Publisher: McGraw Hill Education.
- 2) Data & Computer Communications, by: William Stallings, 2ed, Publisher: Pearson Education
- 3) Communication Networks: Fundamental Concepts and Key Architecture by: Leon-Garcia and I. Widjaja, Publisher: Tata McGraw Hill 2000

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

- 1) Write a program to transmit a character, a string and a file from one PC to another using RS-232 cable
- 2) Study of different types of Network cables and practically implement the cross-wired cable and straight through cable using clamping tool.
- 3) Write a program to implement bit stuffing and character stuffing.
- 4) Study of Network Devices in Detail
- 5) Study of network IP Classification of IP address Sub netting Super netting
- 6) Study of basic network command and Network configuration commands
- 7) Configure a Network topology using packet tracer software
- 8) Configure a Network using Distance Vector Routing protocol. RIP and IGRP
- 9) Configure Network using Link State Vector Routing protocol. OSPF
- 10) Write a program to implement TCP/IP protocol using socket programming using UNIX
- **LAB WORK BEYOND CURRICULA**
- 11) Implement Bellman Ford's Algorithm
- 12) Connect the computers in Local Area Network

AF 501 – PROFESSIONAL COMMUNICATION - I
SEM-V (3rd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

Teaching Scheme			Credit Structure			Exam Scheme				
LECTURE	TUTORIAL	PRACTICAL	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
1	--	2	1	1	2	50	--	50	--	100

[A] COURSE PRE-REQUISITES

[B] OBJECTIVES OF THE COURSE

[C] DETAILED SYLLABUS

1) PROFESSIONAL COMMUNICATION

Introduction, Methods & Manners, Objectives

2) COMMUNICATION

Communication Process, Barriers and their solutions to communication, Main problems in Communication, Verbal Communication: Effective Communication, Listening Process, Nonverbal Communication: Body Language, Paralanguage

3) LANGUAGE PROFICIENCY

Grammar, Vocabulary, Usages of Language

4) COMMUNICATION: LSRW

Listening: Listening criticism, speaking: Elements of Speaking Skills: Vowels & Consonants, Pronunciation, Speech Art, Reading: Skimming, Scanning, Intensive Reading, Levels of Comprehension (Literal and Inferential), Writing: Developing Basic writing skill, letter & e-mail writing

[D] LEARNING 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.

[E] RECOMMENDED TEXT BOOKS

- 1) Provided by the Language Lab Software
- 2) Will be specially designed for the target students

[F] REFERENCE BOOKS

- 1) Effective Technical Communication, by: M Ashraf Rizvi, Publisher: Tata McGraw-Hill Education, 2005
- 2) Effective Business Communication, by: Asha Kaul, Edition: 2, illustrated, Publisher: PHI Learning Pvt. Ltd.

[G] LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

[H] 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.

IT 502 – DATABASE MANAGEMENT SYSTEM
SEM-V (3rd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] COURSE PRE-REQUISITES

- Basic knowledge about computers includes good experience using Windows or Unix.
- Knowledge about programming in some common programming language.
- Good knowledge of basic course of data structures and algorithms.

[B] OBJECTIVES OF THE COURSE

This course mainly enriches knowledge of

- Relational Data Models, Relational Algebra, Relational Database Design, Storage and File Structure, Transaction Concurrency, Recovery and Distributed databases.
- The objective of the course is on the designing and implementation of Database Management Systems.
- Main emphasis is placed on a sufficient semester long, DBMS project.

[C] 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 RELATIONSHIP 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 Design 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 DATA BASES

10) SECURITY AND INTEGRITY OF DATA BASE

[D] LEARNING OUTCOMES

Upon successful completion of course, a student will be able to:

- Understand database concepts and structures
- Understand terms related to database design and management
- Understands objectives of data and information management
- Get thorough with data modelling and database development process and actual construction and normalization of data models at practical level
- Use DBMS systems such as Oracle SQL Plus, MySQL and SQL Server.
- Understand the issues related to database performance and become proficient in using DBQL, i.e. SQL and PL/SQL.

[E] RECOMMENDED TEXT BOOKS

- 1) Data Base System Concepts by: Henry F. Korth and A. Silberschatz. 2nd Ed., Publisher: McGraw-Hill 1991.

[F] REFERENCE BOOKS

- 1) Fundamentals of Database Systems, by: Shamkant Navathe, Publisher: Pearson

[G] LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

- 1) Introduction to SQL, an exercise on data types in SQL & Data Definition Language commands.
- 2) Exercise on Data Manipulation Language and transaction control commands.
- 3) Exercise on Types of Data Constraints.
- 4) Exercise on Joins (single-table or multi-table) and using normalization.
- 5) Exercise on group-by clause and date arithmetic.
- 6) Exercise on different functions (aggregate, math and string).
- 7) Exercise on different types of sub queries.
- 8) Introduction to PL/SQL, Control Structures, Procedures and Functions, view.
- 9) Introduction to triggers and cursors.
- 10) Mini project on designing and implementing one database management system.

IT 509 – DESIGN & ANALYSIS OF ALGORITHM
SEM-V (3rd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] COURSE PRE-REQUISITES

- A strong understanding of programming, data structure and a solid background in discrete mathematics, including probability, are necessary prerequisites to this course.

[B] OBJECTIVES OF THE COURSE

This course introduces students to the analysis and design of computer algorithms. Upon completion of this course, students will be able to do the following:

- Analyze the asymptotic performance of algorithms.
- Demonstrate a familiarity with major algorithms and data structures.
- Apply important algorithmic design paradigms and methods of analysis.
- Synthesize efficient algorithms in common engineering design situations.

[C] DETAILED SYLLABUS

- 1) INTRODUCTION TO ALGORITHMS
- 2) ELEMENTARY DATA STRUCTURES
- 3) METHODS FOR SOLVING RECURRENCE RELATIONS 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 PROBLEMS

[D] LEARNING OUTCOMES

Students who complete the course will have demonstrated the ability to do the following:

- Argue the correctness of algorithms using inductive proofs and loop invariants.
- Analyze worst-case running times of algorithms using asymptotic analysis. Compare the asymptotic behaviors of functions obtained by elementary composition of polynomials, exponentials, and logarithmic functions. Describe the relative merits of worst-, average-, and best-case analysis.
- Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize divide-and conquer algorithms. Derive and solve recurrences describing the performance of divide and-conquer algorithms.
- Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize dynamic-programming algorithms and analyze them.
- Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms and analyze them.
- Explain the major algorithms for sorting. Recite the analyses of these algorithms and the design strategies that the algorithms embody. Synthesize algorithms that employ sorting as a sub procedure. Derive lower bounds on the running time of comparison sorting algorithms and explain how these bounds can be overcome.
- Explain the major elementary data structures for implementing dynamic sets and the analyses of operations performed on them. Recite algorithms that employ data structures and how their performance depends on the choice of data structure. Synthesize new data structures by augmenting existing data structures. Synthesize algorithms that employ data structures as key components.

- Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems, when appropriate. Synthesize new graph algorithms and algorithms that employ graph computations as key components and analyze them.

[E] RECOMMENDED TEXT BOOKS

- 1) Fundamentals of Computer Algorithms, by: Horowitz, Sahni, Publisher: Galgotia Pub. 2001 ed.

[F] REFERENCE BOOKS

- 1) Fundamentals of Algorithms, by: Brassard & Bratley, Publisher: PHI.
- 2) Introduction to Algorithms, by: Cormen, Publisher: Tata McGraw Hill.
- 3) Design & Analysis of Computer Algorithms, by: Aho, Ullman, Publisher: Addison Wesley.
- 4) The art of Computer Programming Vol. I & III, by: Knuth, Publisher: Addison Wesley.

[G] LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

- 1) Introduction to gnu profiler tool.
- 2) a) Write a program that implements Tower of Hanoi.
b) Write a program that implements Fibonacci Series.
- 3) a) Write a program that implements Insertion Sort.
b) Write a program that implements Selection Sort.
- 4) a) Write a program that implements Heap Sort.
b) Write a program that implements Quick Sort.
c) Write a program that implements Merge Sort.
- 5) a) Write a program that implements Binary Search.
b) Write a program that implements Prim's Algorithm.
- 6) a) Write a program that implements Kruskal's Algorithm.
b) Write a program that implements String editing.
- 7) a) Write a program that implements Make a change using greedy.
b) Write a program that implements Knapsack using greedy.
- 8) a) Write a program that implements Dijkstra's Algorithm.
b) Write a program that implements Longest Common Subsequence.
- 9) Write a program that implements N-Queen Problem.
- 10) Write a program that implements Knapsack using backtracking.

IT 510 – CORE JAVA TECHNOLOGY
SEM-V (3rd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] COURSE PRE-REQUISITES

- Basic Knowledge of Computer Programming (Conditional Statements, Looping, Functions, Compilation)
- Basic Knowledge of Object Oriented Design

[B] OBJECTIVES OF THE COURSE

- Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
- Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- Have the ability to write a computer program to solve specified problems.
- Be able to use the Java SDK environment to create, debug and run simple Java programs.
- Design and develop powerful GUI based components.
- Create Animation using Applet, Application, Thread and AWT controls.

[C] DETAILED SYLLABUS

1) INTRODUCTION TO JAVA

History of Java, Characteristics of Java, Use of Java development tools, Introduction to java Application and Applet

2) PRIMITIVE DATA TYPES

Identifiers, variables, constants and their uses, Numerical data types, numerical literals, numeric type conversion, character data type, Boolean data type, Shortcut operators, operators, operator precedence, Programming errors: compile time, runtime, Programming coding style and documentation, Using data types and operator in class

3) CONTROL STRUCTURES

Basic control structures: if, switch, Basic loop structures: for, while, do while, use of break and continue.

4) METHODS

Creating and calling methods from same class and from a separate class, Method overloading, Method abstraction, Debugging, Recursion, recursion versus iteration

5) PROGRAMMING WITH OBJECTS AND CLASSES

Objects and classes, passing objects to methods, Instance variables and class variables, Instance methods and class methods, Scope of variables, Package: Naming convention, CLASSPATH, create classes in a package and use from the same package and from a different package., Introduction to Java API, Math class and important methods

6) ARRAY AND STRING

Declaring and creating Arrays, Initializing and processing Arrays, Sorting and Searching arrays, Array of objects, copying arrays, Multidimensional arrays, dynamic (zig-zag) array, String, StringBuffer, and StringTokenizer classes and their important methods, Command line arguments: passing and processing arguments

7) CLASS INHERITANCE

Inheritance, superclass, and subclass, Calling superclass constructor and methods using super keyword, Use of this keyword, Object class and its equals() and toString() method, The final and abstract modifiers, Casting objects, Processing numbers using Number class and its derived classes, Processing Date and Time

8) GETTING STARTED WITH GRAPHIC PROGRAMMING

AWT and its class hierarchy, Creating Frame, Event-driven programming: event, event source, event registration, listening, and handling, Layout managers: FlowLayout, GridLayout, and BorderLayout, Panels, The repaint(), update(), and paint() methods, Canvas class and Color class, Drawing geometric figures, Font and FontMetrics classes, Drawing lines, rectangles, ovals, arcs, polygons, etc.

9) CREATING USER INTERFACE

Use of basic components and event handling: Label, TextField, TextArea, Choice, List, Checkbox, CheckboxGroup, Dialog, Menu. Creating multiple windows and data exchange

10) APPLETS AND ADVANCED GRAPHICS

Applet class and its lifecycle, passing parameters to Applets, Conversion between applications and applets, Running GUI as an Applet and an application, Drawing with the mouse, Keyboard events, Layouts: CardLayout, GridBagLayout, and no layout

11) EXCEPTION HANDLING

Exceptions and exception hierarchy, Exception handling: claim, throw, and catch exceptions, User defined exception, Rethrowing exceptions and finally clause, Use of exception in a real program

12) MULTITHREADING

Multithreading in Java, Thread class and Runnable interface, Thread state, priority, and thread groups, Synchronization: synchronize method, synchronize block, wait(), notify(), and notifyAll() methods

13) INPUT AND OUTPUT

Byte oriented and character oriented I/O, InputStream, OutputStream and its subclasses, Reader, Writer and its subclasses, File Input/output, Keyboard input/output, Filter stream, data stream, buffered stream, Parsing text files: StreamTokenizer, Random Access Files, Introduction to PipedStreams, String Streams, Pushback Streams, LineNumberReader, and Object Streams

14) NETWORK PROGRAMMING

Introduction to TCP/IP and networking fundamentals, Client/Server computing, TCP client server, UDP client server, Serving multiple clients
View web pages: URL, Retrieving files from web servers

[D] LEARNING OUTCOMES

- Students can be able to program Java classes and methods using a subset of data types and using assignment, method calls, while loops, for loops, and conditionals.
- Students can learn how to use and manipulate several core data structures: Arrays, linked lists, trees, stacks, and queues.
- Students can be able to construct simple Java user interfaces and identify where data structures are appearing in those user interfaces.
- Students can develop GUI based application.

[E] RECOMMENDED TEXT BOOKS

- 1) An Introduction to JAVA programming by: Y. Daniel Liang, Publisher: PHI

[F] REFERENCE BOOKS

- 1) The Complete Reference Java 2, by: Herbert Schildt, 5th edition, Publisher: Tata McGraw-Hill

[G] LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

- 1) Write the programs using the concept of nested for loops and recursion.
- 2) Write the programs using the concept of command line argument.
- 3) Write the programs using the concept of arrays and StringBuffer class.
- 4) Write the programs using the concept of Generic class, Inheritance, Interface and Package.
- 5) Write the program which creates the Frame and implements MouseListener.
- 6) Implementing a GUI based calculator application and drawing different figures on a Canvas.
- 7) Write an application to simulate traffic lights and calculator using GridbagLayout.
- 8) Write a program that uses the concept of Applet and Exception Handling.
- 9) Write the programs that uses the concept of Threads.
- 10) Write a program that uses the concept of File I/O.
- 11) Write a program that uses the concept of socket programming.

IT 511 – THEORY OF AUTOMATA & FORMAL LANGUAGE
SEM-V (3rd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

Teaching Scheme			Credit Structure			Exam Scheme				
LECTURE	TUTORIAL	PRACTICAL	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
4	--	--	4	--	4	60	40	--	--	100

[A] COURSE PRE-REQUISITES

- IT304 Discrete Mathematics

[B] OBJECTIVES OF THE COURSE

- Introduce concepts in automata theory and theory of computation
- Identify different formal language classes and their relationships
- Design grammars and recognizers for different formal languages
- Determine the decidability and intractability of computational problems

[C] DETAILED SYLLABUS

MAJOR TOPICS

- Formal languages, Automata, Computability, introduction to computational complexity, NP-completeness.

COURSE CONTENTS

1) REVIEW OF MATHEMATICAL BACKGROUND

- Sets, functions, logical statements, proofs, relations, languages, Mathematical induction, strong principle, Recursive definitions.

2) REGULAR LANGUAGES AND FINITE AUTOMATA

- Regular expressions, regular languages, applications, Finite automata, memory requirement in a recognizer, definition, representation,

extended notation, string recognition, union, intersection and complement of regular languages. Nondeterministic finite automata, lambda transitions, equivalence, algorithms, examples. Kleen's theorem. Minimization of Finite automata.

- Non-regular and regular languages, criterion, Pumping Lemma, decision problems and decision algorithms, Regular languages in relation to programming languages.

3) CONTEXT-FREE LANGUAGES AND PUSH-DOWN AUTOMATA

- Context-free languages, definition, union, concatenation, examples etc. derivation tree and ambiguity.
- Simplified and Normal forms, Chomsky normal form.
- Push-Down Automata, definition, examples, deterministic PDA, two types of acceptances and their equivalence.
- Equivalence of CFG and PDA.
- Introduction to parsing, top-down and bottom-up parsing.
- Non-CFL and CFL, Pumping Lemma for CFL, intersection and complement.

4) TURING MACHINES

- Models of computation, TM definition, combining TMs, computing a function with TMs. variations on Turing Machines, double infinite and more than one Tapes, non-deterministic and Universal TM, Recursively Enumerable languages, Unrestricted and context-sensitive grammars and their relation to TM, Linear Bounded Automata, Chomsky hierarchy, Unsolvability problems, Halting problem, Post's correspondence, applications to CFLs. Computability, Primitive recursive functions, computable functions, PR functions, bounded operations.
- Non-primitive recursive functions.

5) INTRODUCTION TO COMPUTATIONAL COMPLEXITY

- Tractable problems, growth rate, time complexity of TM. NP-completeness.

[D] LEARNING OUTCOMES

- Understand basic properties of formal languages and formal grammars.
- Understand basic properties of deterministic and nondeterministic finite automata
- Understand the relation between types of languages and types of finite automata
- Understanding the Context free languages and grammars, and Normalizing CFG.
- Understanding the minimization of deterministic and nondeterministic finite automata
- Understand basic properties of Turing machines and computing with Turing machines.
- Understand the concept of Pushdown automata and its application.

- Know the concepts of tractability and decidability, the concepts of NP-completeness and NP-hard problem.

[E] RECOMMENDED TEXT BOOKS

- 1) Introduction to Languages and Theory of Computation, by: John C. Martin, Publisher: McGraw-Hill 1991.

[F] REFERENCE BOOKS

- 1) Computation: Finite and Infinite, by: Marvin L. Minsky, Publisher: Prentice-Hall, 1967

[G] LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

NIL

IT 506 – (ELECTIVE - I) ADVANCED MICROPROCESSOR ARCHITECTURE
SEM-V (3rd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] COURSE PRE-REQUISITES

- It requires knowledge of digital electronics and basic Microprocessor Architecture and Programming.

[B] OBJECTIVES OF THE COURSE

- This course aims at teaching concept of programming with machine language. It also aims to train the student for automated system design with the programming intelligence. The objective of this course is to become familiar with the architecture and the instruction set of an Intel microprocessor. The accompanying lab is designed to provide practical hands-on experience with turbo assembler software with assembly language programming. To identify the techniques to improve the speed and performance of computers – Parallelism in Instruction level – Hardware approaches -pipelining, dynamic scheduling, superscalar processors, and multiple issues of instructions.

[C] DETAILED SYLLABUS

- 1) **8086 FAMILY PROCESSOR ARCHITECTURE INCLUDING 80286 /80386 /80486 /PENTIUM. 8086 FAMILY MICROPROCESSOR OVERVIEW INTRODUCTIONS TO PROGRAMMING THE 8086**
- 2) **8086 FAMILY ASSEMBLY LANGUAGE PROGRAMMING**
- 3) **STRINGS, PROCEDURES AND MACROS**
- 4) **8086 INSTRUCTION DESCRIPTIONS AND ASSEMBLER DIRECTIVES**
- 5) **8086 SYSTEM TIMING AND INTERFACING MEMORY AND I/OS**

6) 8086 INTERRUPTS

7) WRITING PROGRAMS WHICH CONTAIN C AND ASSEMBLY LANGUAGE

8) MULTI USER/MULTITASKING OPERATING SYSTEM CONCEPTS, INTRODUCTION TO 80286/80386/80486/PENTIUM PROCESSORS, REAL ADDRESS MODE AND PROTECTED VIRTUAL ADDRESS MODE OF 80286 /80386 /80486 /PENTIUM PROCESSORS.

9) INSTRUCTION LEVEL PARALLEL PROCESSING

- Pipelining of processing elements
- Delays in pipeline execution
- Difficulties in pipelining
- Superscalar processors
- Very Long Instruction Word (VLIW) Processor
- Multithreaded Processors

[D] LEARNING OUTCOMES

At the end of the course, a student will be able to:

- State the internal organization of some popular microprocessors (80286 /80386 /80486/Pentium).
- Describe the operations of virtual memory
- Compare the performance of different CPU architecture.
- Design interfacing circuits of various devices with the microprocessor.
- Describe the operations of performance such as pipelines, dynamic scheduling branch predictions.
- Describe the modern architecture such as RISC, Scalar, VLIW Multi core and multi CPU systems
- Conduct experiments in turbo assembler using assembly language programming.

[E] RECOMMENDED TEXT BOOKS

- 1) Microprocessors & Interfacing - Programming and Interfacing, by: Dogulas v. Hall, Publisher: Mcgraw Hill Higher Education.
- 2) Notes from INTEL
- 3) Parallel Computers – Architecture and Programming, by: V. Rajaraman and C. Siva Ram Murthy, Publisher: Prentice-Hall of India Pvt. Ltd

[F] REFERENCE BOOKS

- 1) Programming The 80286, 80386, 80486 and Pentium-based personal Computer, by: Barry B. Brey, Publisher: Prentice Hall.

[G] LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

- 1) Study of DOS Debug Commands.
- 2) Study of Turbo Assembler
- 3) Study of string related instructions
- 4) To study multi module program within divide 32bits number by 16bits number
- 5) Study of the response of Type-0 interrupts
- 6) To study the interfacing of C module with assembly module and calling C library functions from assembly module
- 7) Study of DOS and BIOS function calls
- 8) Study of implementation of Recursion in assembly language.
- 9) Study of various methods of passing parameters to a procedure
- 10) Study of implementation of TSR.

IT 506A – (ELECTIVE - I) EMBEDDED SYSTEM
SEM-V (3rd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] PRE-REQUISITES

- Computer Organization, Basics of Microprocessors, Digital Electronics

[B] 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.

[C] DETAILED SYLLABUS

- **OUTLINE OF THE COURSE**
 - 1) Introduction to Embedded Systems
 - 2) Typical Embedded Systems
 - 3) RISC microcontrollers
 - 4) Embedded product development life cycle

1) INTRODUCTION TO EMBEDDED SYSTEMS

History of embedded systems, Classification of embedded systems, Major application area of embedded systems, Purpose of embedded systems, Fundamental issues in hardware software co-design, Introduction to unified modeling language (UML)

2) TYPICAL EMBEDDED SYSTEMS

Core of the Embedded Systems, Memory, Sensors and actuators, Communication interface, Embedded firmware

3) RISC MICROCONTROLLERS

RISC and CISC architectures, AVR microcontroller family architecture and pin functions, Arduino board specifications, Arduino programming in C, I/O interfacing: LED, multiplexed 7-segment, LCD, GLCD, sensors, keypad, relay, buzzer, Arduino interrupt programming in C, Arduino serial programming in C, Communication protocol: I2C protocol and RTC interfacing, SPI protocol and max7221 interfacing, Wi-Fi shield for internet

4) EMBEDDED PRODUCT DEVELOPMENT LIFE CYCLE

Objective of EDLC, Different phases of EDLC, Approaches (Modeling the EDLC)

[D] LEARNING OUTCOMES

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

- Define what an embedded system is in terms of its interface
- Enumerate and describe the components of an embedded system
- Embedded System Design constraints
- Describe the interactions of embedded systems with the physical world
- Take IoT course.

[E] RECOMMENDED TEXT BOOKS

- 1) Introduction to Embedded Systems, by: Shibu K. V., Publisher: Mcgraw hill
- 2) The AVR microcontroller and Embedded Systems, by: Muhammad Ali Mazidi, Sarmad Naimi, Sepehr Naimi. Publisher: PHI
- 3) Arduino Cook book, by: Michael Margolis, Publisher: O'Reilly Media, Inc.

[F] REFERENCE BOOKS

- 1) System Design: A Unified Hardware/Software Introduction, by: Frank Vahid and Tony D. Givargis, Publisher: Addison Wesley, 2002.
- 2) Computers as Components by: Wayne Wolf, Publisher: Morgan Kaufmann, 2001

3) Embedded C programming and the ATMEL AVR, by: Barnett, Cox and O'Cull, Thomson Publisher: Cengage

[G] **LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)**

CT 616 – SOFTWARE ENGINEERING
SEM-VI (3rd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[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

- The objective of Software Engineering is to learn different phases of software development, different life cycle models, software project management, designing of models for software, application of design patterns. Apart from this to learn testing, quality assurance and maintenance, which is helpful for industrial 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 subjects the student can learn the software development process (that covers the different life cycle models, design, testing, maintenance 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 TEXT BOOKS

- 1) Software Engineering - A practitioner's Approach by: Roger S. Pressman, Publisher: McGraw Hill Pub.

[F] REFERENCE BOOKS

- 1) Fundamentals of software engineering, by: Rajib Mall, 2nd ed., Publisher: Prentice Hall, Indian
- 2) Software Engineering, by: Ian Sommerville, 6th ed., Publisher: Pearson Edu.
- 3) UML Distilled: A brief guide to the standard object modeling language, by: Flower and Scott, Publisher: Addison-Wesley Professional
- 4) SOFTWARE ENGINEERING: Principles and Practice, by: Waman S Jawadekar, Publisher: Tata Mcgraw hill
- 5) Object-oriented Analysis and Design with Applications, by: Grady Booch; 2nd ed., Publisher: Pearson Edu.
- 6) Object oriented Analysis and Design, by: Andrew Haigh, Publisher: 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

IT 607 – APPLIED OPERATING SYSTEM
SEM-VI (3rd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] COURSE PRE-REQUISITES

- Data Structures and Algorithms, Advanced Programming (or good working knowledge of C), Fundamentals of Computer Architecture and Microprocessor

[B] OBJECTIVES OF THE COURSE

- Students should be able to use system calls for managing processes, memory and the file system. Students should understand the data structures and algorithms used to implement an OS.
- To understand the services provided by operating system.
- To understand the structure and organization of the file system.
- To understand about process how processes are synchronized and scheduled.
- To understand deadlock management in process.
- To understand different approaches to memory management.

[C] DETAILED SYLLABUS

1) INTRODUCTION

Role of an OS computer system, types of operating system.

2) OPERATING SYSTEM STRUCTURES

System documents, OS services, system calls, system structure, concept of virtual machines.

3) PROCESS MANAGEMENT

Process concept, process scheduling, cooperating processes, Inter process communication.

4) CPU SCHEDULING

Basic concept, scheduling criteria, scheduling algorithms.

5) PROCESS SYNCHRONIZATION

Critical section problem, synchronization hardware, semaphores, classical problems of synchronization, critical regions, monitors.

6) DEADLOCKS

Deadlock characteristics, methods for handling deadlocks, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlocks, combined approach for deadlock handling.

7) MEMORY MANAGEMENT

Logical versus Physical Address space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging

8) VIRTUAL MEMORY

Demand Paging, Performance of Demand Paging, Page Replacement, Page replacement algorithms, Allocation of frames, Thrashing, Other Considerations, Demand segmentation

9) FILE-SYSTEM INTERFACE

File concept, Access methods, Directory Structure, Protection, Consistency

10) FILE-SYSTEM IMPLEMENTATION

File-System Structure, allocation methods, Free-space Management, Directory Implementation, Efficiency and performance

11) I/O SUBSYSTEMS

I/O Hardware, Application I/O interface

12) SECONDARY-STORAGE STRUCTURE

Disk Structure, Disk scheduling, Disk Management, Swap-space management

13) PROTECTION

Goals of protection, domain of protection, access matrix, implementation of access matrix, revocation of access rights, capability-based systems, languages-based protection.

14) SECURITY

The problem, authentication, one-time password program threats, system threats, threat monitoring, encryption, computer security classification.

15) CASE STUDIES (UNIX, LINUX, WIN NT)

[D] LEARNING OUTCOMES

Upon successful completion of this course you should be able to:

- Describe how computing resources (such as CPU and memory) are managed by the operating system,
- Describe the basic principles and structure used in the design of modern operating systems.
- Describe various file allocation method in file systems,
- Describe techniques for achieving synchronization and deadlock management in an operation system,
- Describe various memory management techniques

[E] RECOMMENDED TEXT BOOKS

- 1) Operating System Concept by: Silberschatz, Galvin, 5th ed., Publisher: Addison Wesley.

[F] REFERENCE BOOKS

- 1) Operating system Concepts, by: Milan Malinkovic 2nd ed., Publisher: Tata Mcgraw Hill
- 2) Operating System, by: William Stallings, 2nd ed., Publisher: PHI.

[G] LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

- 1) Study of UNIX commands with all their important options
- 2) Program maintenance using make utility.
- 3) Study system calls related to process & process control
- 4) Study system calls related to file operations.
- 5) Study of functions related to threads (POSIX).
- 6) Inter process communication (POSIX-IPC) using pipe
- 7) Inter process communication (POSIX-IPC) using shared memory
- 8) Study system calls related to semaphore.

- 9) Simulation of Process scheduling algorithm: Feedback policy.
- 10) Simulation of I/O requests scheduling algorithm: Elevator algorithm
- 11) Simulation of deadlock handling algorithm: Banker's algorithm
- 12) Simulation of Memory management algorithm: LRU page replacement algorithm.

IT 608 – LANGUAGE TRANSLATOR
SEM-VI (3rd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] COURSE PRE-REQUISITES

- This course requires basic understanding of at least one programming language such as C, Java etc. It also requires basic understanding of lower level language like assembly programming with regular expression and automata.

[B] OBJECTIVES OF THE COURSE

This course mainly enriches knowledge of

- Concept areas of language translation and compiler design.
- To introduce Languages concepts of and Grammars, Parsing, Semantic Analysis, Intermediate code, Code Generation, Code optimization, Symbol Table management and Programming Paradigms.
- To extend the knowledge of parser by parsing LL parser and LR parser
- To provide practical programming skills necessary for constructing compiler.

[C] DETAILED SYLLABUS

1) LANGUAGE TRANSLATION OVERVIEW

Phases in language translation, overview of system software used during translation – language processors, linker, loader. Types of language processors –assembler, interpreter, compiler etc.

2) COMPILER STRUCTURE

Analysis-synthesis model of compilation, various phases of a compiler.

3) LEXICAL ANALYSIS

Interface with input, parser and symbol table, token, lexeme and patterns. Difficulties in lexical analysis. Error reporting. Implementation. Regular definition, Transition diagrams

4) SYNTAX ANALYSIS

CFGs, ambiguity, associativity, precedence, Top down parsing-recursive descent parsing, **LL Parser**, transformation on the grammars (**Left recursion, left factoring**), predictive parsing, Bottom up parsing, operator precedence grammars, LR parsers (SLR, LR)

5) SYNTAX DIRECTED TRANSLATION

Inherited and synthesized attributes, L- and S-attributed definitions, semantic stacks in bottom- up compilation, action symbols in top-down

6) INTERMEDIATE CODE GENERATION

Intermediate languages, Issues in implementation.

7) RUN TIME SYSTEM

Storage organization, activation tree, activation record, parameter passing, symbol table, static, dynamic and heap storage allocation, garbage collection.

8) SYMBOL TABLE MANAGEMENT

Symbol table organizations for blocked and non-blocked languages.

9) CODE OPTIMIZATIONS

Machine dependent, machine independent optimizations

10) ERROR DETECTION AND RECOVERY

[D] LEARNING OUTCOMES

Upon successful completion of course, a student will be able to:

- To apply the knowledge of lex tool and yacc tool to develop scanner and parser.
- To acquire the knowledge of modern compiler and its feature.
- To use the knowledge of patterns, tokens and regular expression for solving a problem in field of data mining
- To improve performance of program by using code optimization techniques in terms of speed and space.
- To deal with different translators.

[E] RECOMMENDED TEXT BOOKS

- 1) The theory and practice of Compiler, by: Jean Paul Tremblay and Paul G. Sorenson, Publisher: McGraw-Hill College
- 2) Compilers: Principles, Techniques and Tools, by: A. V. Aho, R. Sethi, and J. D. Ullman, Publisher: Addison-Wesley.

[F] REFERENCE BOOKS

- 1) Compiler design in C, by: Allen Holub, Publisher: PHI
- 2) Compiler Construction, by: Dhamdhere, Publisher: McMillan India

[G] LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

- 1) Study the translation process.
- 2) Study flex tool.
- 3) Using flex tool generate scanner for a language.
- 4) WAP for generating scanner s/w (w/o using any automated tools).
- 5) Study yacc tool.
- 6) Implement language processor, using yacc.
- 7) WAP for Left recursion problem Removal.
- 8) WAP for Left factoring problem Removal.
- 9) WAP for First and Follow set computation for LR parser.
- 10) WAP to implement predictive parser (RDP).

IT 617 – ADVANCED JAVA TECHNOLOGY
SEM-VI (3rd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[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

- MVC Architecture: JavaBean/EJB as model, servlet as controller and JSP as view

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
- 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

- 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 Dispatcher
- Status codes, errors, Response headers

4) ADVANCED SERVLETS: WEB APPLICATION SECURITY

- 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

- Intercepting: processing before request and after request
- Filter API: Filter, FilterChain, FilterConfig
- Filter configuration

6) 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

7) ENTERPRISE JAVA BEANS (2.X SESSION)

- 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

- 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. Database: 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 TEXT BOOKS

- 1) JSP and Servlets: A Comprehensive Study by: Mahesh P. Matha, Publisher: PHI

[F] REFERENCE BOOKS

- 1) J2EE Complete Reference By: Keogh, James Publication: McGraw-Hill
- 2) Head First Servlets & JSP, 2nd Edition, By: Bryan Basham, Kathy Sierra, Bert Bates, Publication: O-reilly

3) 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 an 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.

AF 601 - PROFESSIONAL COMMUNICATION - II
SEM-VI (3rd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

Teaching Scheme			Credit Structure			Exam Scheme				
LECTURE	TUTORIAL	PRACTICAL	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
1	--	2	1	1	2	50	--	50	--	100

[A] COURSE PRE-REQUISITES

[B] OBJECTIVES OF THE COURSE

[C] DETAILED SYLLABUS

1) COMMUNICATION SKILLS

Inter and Intrapersonal communication, Developing Positive Attitude, Importance of empathy in communication, Psychological dealings in communication

2) TEAM SPIRIT

Skills and Qualities, Techniques to be a team member

3) EFFECTIVE SELF PRESENTATION THROUGH LSRW

Listening: Active Listening, Reading: Speed Reading, Reading Practice, Levels of Comprehension (Evaluative and Applied), Comprehension Practice, Writing: minutes, notice, proposal, report writing, Speaking: Indianisms, Presentation

[D] LEARNING 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.

[E] RECOMMENDED TEXT BOOKS

- 1) Provided by the Language Lab Software
- 2) Will be specially designed for the target students

[F] REFERENCE BOOKS

- 1) Effective Technical Communication, by: M. Ashraf Rizvi, Publisher: Tata McGraw-Hill Education.
- 2) Effective Business Communication, by: Asha Kaul, 2nd ED., Publisher: PHI Learning Pvt. Ltd.

[G] LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

[H] 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.

IT 618 – (ELECTIVE - II) DESIGN PATTERNS AND APPLICATION FRAMEWORKS
SEM-VI (3rd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] COURSE PRE-REQUISITES

- Data structure
- Java Programming
- Database Management System
- JSP and Sevlet

[B] OBJECTIVES OF THE COURSE

- Students understand core design pattern concepts, which are used by industry in software and application developments
- Students get practical exposure to design pattern-based application development

[C] DETAILED SYLLABUS

1) DESIGN PRINCIPLES AND DESIGN PATTERNS

- Design principles
 - Interface
 - Abstract class
 - Inheritance
 - Polymorphism
 - Abstract class versus interface
 - Object composition versus inheritance
 - Generic

- Collection: List (ArrayList), Map (HashMap), Set (HashSet), Queue (PriorityQueue), and iteration
- Types of design patterns
 - Creational design pattern
 - Structural design patterns
 - Behavioral design patterns
- Design Patterns
 - Model View Controller
 - Singleton
 - Factory and Abstract Factory
 - Data Access Object
 - Prototype
 - Iterator and Composite
 - Decorator
 - Proxy
 - Adaptor and Facade
 - Interceptor
 - Front Controller
 - Observer and Strategy
- Functional Programming
 - Lambda Expression, Functional interface,
 - Default Methods, Default methods in Multilevel inheritance, interface inheritance and class inheritance, and multiple inheritance
 - Using Lambdas in Design Patterns: use in iterator and strategy design patterns

2) CLIENT-SIDE WEB APPLICATION FRAMEWORKS

- Web scripting technologies
 - Overview of HTML, CSS, and JavaScript
 - JavaScript Objects and methods
- Device Independent GUI design
 - Bootstrap
 - jQuery
- Client side “Model View Controller” framework
 - Angular JS: Controller design, model design
 - Angular JS services

- DOM manipulation
- Asynchronous communication with server
 - Working flow of AJAX
 - Client-side design and implementation
 - Server-side design and implementation

3) SERVER-SIDE WEB APPLICATION FRAMEWORKS

- Use of Object Relational Mapping
 - ORM framework, architecture, framework objects for database session and transaction, framework configuration, OR mapping configuration
 - ORM framework setup and use
 - Use of Annotations, framework properties, primary key generation
 - One-to-one mapping, cascade operation, unidirectional and bidirectional mapping
 - Many-to-one and Many-to-many mappings, bi-directional mapping, annotation for bi-directional mapping.
 - CRUD operations on entity object, entity state and state transitions
- Server side “Model View Controller” framework
 - Aspect oriented computing, inversion of control, dependency injection
 - Spring Framework, Spring container API, BeanFactory, ApplicationContext, framework configuration, initializing and injecting objects using constructor and setter methods,
 - Request intercepting, request filtering and routing
 - Spring MVC framework, control flow, framework configuration
 - Annotation based controller and URL path variables
 - Form submission, request parameters, model attribute
 - Data binding with primitive/object types, Data binding with user-defined types, Data binding Error
 - Customizing data binding with property editor concept: customizing date binding, create custom property editor
 - Form Validations:
 - Annotations Min, Max, Size, Pattern, Future, Past
 - Message Placeholders and MessageSource bean
 - Custom Validator
 - Interceptor
 - Session access

- Session attribute, session creation, and session termination
- Data access
 - Use of DAO design pattern with Integration of MVC (Spring MVC) and ORM framework (Hibernate)

[D] LEARNING OUTCOMES

- Understanding of philosophy of design pattern (reusable solution pattern)
- Understanding of widely used design patterns
- Understanding and use of design patterns in applied application development frameworks
 - Learn framework-based client-side web-application development
 - Learn framework-based server-side web-application development

[E] RECOMMENDED TEXT BOOKS

- 1) Head First Design Patterns by: Eric Freeman, Publisher: O'Reilly.
- 2) Learning JavaScript Design Patterns, by: Addy Osmani, Publisher: O'REILLY
- 3) Spring MVC Beginner's Guide, by: Amuthan G., Publisher: Packt Publishing
- 4) Web Tutorials and e-materials

[F] REFERENCE BOOKS

- 1) Design Patterns Elements of Reusable Object-Oriented Software, by: Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, Publisher: Addison-Wesley

[G] LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

- 1) Implement programming solution that uses Abstract class, interface, Object composition, and inheritance
- 2) Implement programming solutions that use following design pattern
 - a. Singleton
 - b. AbstractFactory
 - c. Prototype
- 3) Implement programming solutions that use following design pattern
 - a. Composite
 - b. Decorator

c. Facade

- 4) Solving programming problems using Java-8 functional programming.
- 5) Designing and implementing web interface using JavaScript, and CSS
- 6) Designing and implementing web interface using Bootstrap and customizing CSS
- 7) Designing and implementing a single page web interface using Angular JS
- 8) Designing and implementing interactive web interface using AJAX
- 9) Implement data access using Hibernate
- 10) Implement relational data access using Hibernate
- 11) Implement form handling with data binding using SpringMVC
- 12) Implement form handling with form validation using SpringMVC

**IT 618A – (ELECTIVE - II) MOBILE COMPUTING
SEM-VI (3rd Year)**

**Department of Information Technology
Faculty of Technology, Dharmsinh Desai University**

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

[A] COURSE PRE-REQUISITES

[B] OBJECTIVES OF THE COURSE

[C] DETAILED SYLLABUS

- 1) Introduction to mobile computing. Convergence of Internet, digital communication and computer networks. Sharing of wireless channels: FDMA, TDMA, CDMA. MAC layer issues in wireless communication.
- 2) Impacts of mobility and portability in computational model and algorithms for mobile environment. Disconnected operation, handling handoffs. Analysis of algorithms and termination detection.
- 3) Types of Mobility. Mobility in cellular based wireless network: channel allocation, interferences, handoffs and location management. IP mobility: Mobile IP and IDMP
- 4) Wireless LAN-Infra red vs. radio transmission, infrastructure and ad hoc networks, IEEE 802.11 Personal Area Network: Bluetooth and ZigBee. Network layer issues ad hoc and sensor networks
- 5) Data delivery models: push and pull. Data dissemination in wireless channels. Broadcast disks. Effects of caching.
- 6) Indexing in Air, Mobile Databases and transaction

- 7) Mobile internet connectivity-WAP 1.1, Layers of WAP, Wireless Application Environment, WML and WML Script, wireless telephony application, WAP 2.0 architecture, XHTML-MP (Extensible Hypertext Markup Language Mobile profile)
- 8) Distributed file system for mobile environment
- 9) Mobile agents

[D] LEARNING OUTCOMES

[E] RECOMMENDED TEXT BOOKS

- 1) Wireless Communication: Principles and Practice, by: T. Rappaport, Publisher: Pearson Education.
- 2) Handbook of Mobile Middleware, by: Paolo Bellavista and Antonio Corradi (Eds.), Publisher: Auerbach Publication.
- 3) Mobile Computing Principles, by: Reza B'Far (Ed), Publisher: Cambridge University Press.

[F] REFERENCE BOOKS

[G] LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

IT 618B – (ELECTIVE - II) COMPUTER GRAPHICS
SEM-VI (3rd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] COURSE PRE-REQUISITES

[B] OBJECTIVES OF THE COURSE

[C] DETAILED SYLLABUS

1) OVERVIEW OF COMPUTER GRAPHICS, GRAPHICS HARDWARE DEVICES, OPENGL.

2) BASIC CONCEPTS: COLOR MODELS, ANIMATION

3) FUNDAMENTAL MATHEMATICS FOR COMPUTER GRAPHICS

Lines and line representations, Vector and affine spaces, Polygons and polygon interiors, Dot and cross products, Planes and plane representations, Line-line and line-plane intersections, Homogeneous coordinates.

4) ALGORITHMS FOR FUNDAMENTAL 2D GRAPHIC SHAPES; DOT, LINE, RECTANGLE, CIRCLE, ETC.

5) ALGORITHMS FOR FUNDAMENTAL 3D GRAPHIC SHAPES, WINDOWING AND 2D/3D CLIPPING.

6) 2D AND 3D GEOMETRICAL TRANSFORMATIONS: SCALING, TRANSLATION, ROTATION, REFLECTION

7) VIEWING TRANSFORMATIONS: PARALLEL AND PERSPECTIVE PROJECTION

8) CURVES AND SURFACES: CUBIC SPLINES, BEZIER CURVES, B-SPLINES, PARAMETRIC SURFACES

9) FRACTAL PROGRAMMING

[D] LEARNING OUTCOMES

[E] RECOMMENDED TEXT BOOKS

- 1) Interactive Computer Graphics: A Top-Down Approach with OpenGL, 5th edition, by: Edward Angel, Publisher: Addison-Wesley, 2008.

[F] REFERENCE BOOKS

- 1) OpenGL: A primer, 2nd edition, by: Edward Angel, Publisher: Addison-Wesley, 2005.
- 2) Computer Graphics: Principles & Practices, by: James D. Foley, Andries van Dam, Steven K. Feiner, John F. Hughes, Publisher: Addison Wesley, 2nd edition in C, 1995.

[G] LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

IT 618C – (ELECTIVE - II) DIGITAL SWITCHING SYSTEMS
SEM-VI (3rd Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] COURSE PRE-REQUISITES

[B] OBJECTIVES OF THE COURSE

[C] DETAILED SYLLABUS

- 1) Selector switching and dials.
- 2) Switching principle of step by step stronger system.
- 3) Telephone relays.
- 4) Subscriber's telephone set and its working.
- 5) Hunting and selecting circuits.
- 6) Traffic and trunking.
- 7) Digital switches.
- 8) The cellular concept - system design fundamentals.
- 9) Mobile radio propagation: Large-scale path loss.
- 10) Mobile radio propagation: Small-scale fading and multipath.
- 11) Modulation techniques for mobile radio.

12) Speech coding.

13) Wireless systems and standards (GSM system).

[D] LEARNING OUTCOMES

[E] RECOMMENDED TEXT BOOKS

1) Automatic Telephony, by: P. N. Das, Publisher: D. C. Bose, Modern Book agency Pvt. Ltd.

2) Digital Telephony, by: John C. Bellamy, Publisher: John Wiley & Sons.

3) Wireless Communications Principles and Practice, by: Theodore S. Rappaport, Publisher: Prentice Hall PTR.

[F] REFERENCE BOOKS

[G] LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

IT 704 – DATA ANALYSIS & INFORMATION EXTRACTION
SEM-VII (4th Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] COURSE PRE-REQUISITES

- The knowledge of the DBMS (Database management system), Artificial intelligence (AI) and the different types of data and the various concepts of RDBMS are required.

[B] OBJECTIVES OF THE COURSE

- This subject is useful in doing the data mining (extracting the information from the data) which can be used for deriving the information for various departments like sales, inventory management, promotions, productions etc. So that the maximum profit can be made.

[C] DETAILED SYLLABUS

1) INTRODUCTION

An Overview of data warehousing and data mining

2) A MULTI-DIMENSIONAL DATA MODEL

Multi-dimensional Data Cubes, Star, Star Flakes, & Fact Constellation Schema, Concept Hierarchies, OLAP

3) DATA WAREHOUSE ARCHITECTURE

Steps for design and construction of data warehouse, A 3-tier data warehouse architecture, ROLAP, MOLAP, HOLAP.

4) DATA PRE-PROCESSING

Overview, need for pre-processing, Issues related to efficient data handling (Extraction, Transformation, and updating of large databases

(ADDED), Data Cleaning, Data Integration & Transformation, Data Reduction, Discretization & Concept Hierarchy Generation

5) DATA WAREHOUSE IMPLEMENTATION

Efficient Computation of Data Cubes, Indexing OLAP Data, Efficient Processing of OLAP Queries, Metadata, Data warehouse Backend Tools & Utilities

6) DATA MINING PRIMITIVES, LANGUAGE, & SYSTEM ARCHITECTURE

What defines a data mining task? A data mining Query Language Architecture of a Data mining System

7) 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

8) MINING ASSOCIATION RULES

Basic Concepts, Market Basket Analysis, mining single-dimensional Boolean Association Rules from transactional database, Mining Multi-level Association Rules from transaction database, Mining multi-dimensional association rules from relational databases and data warehouses. From Association Mining To correlation analysis

9) 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

10) CLUSTER ANALYSIS

An overview & basic concepts partitioning methods hierarchical method, Density-Based methods, Grid-based methods, Model-based clustering methods, Outlier analysis

11) MINING COMPLEX TYPES OF DATA

Mining Time Series & Sequence Data, Mining Text Databases.

12) TIME SERIES ANALYSIS

Trend analysis Forecasting, Smoothing techniques, Cyclical variation, Seasonal variation, Uses of seasonal index, Irregular variation

[D] LEARNING OUTCOMES

- After learning this subject, the student will be able to learn how to mine the different kinds of data by using the mining algorithms. The information can be retrieved from the data and it can be used to take the managerial decisions. This subject can also be useful to the students in the industry job where one can work with the ETL (Extraction, transformation, load) tools.

[E] RECOMMENDED TEXT BOOKS

- 1) Data Mining – Concepts & Techniques, by: Jiawei Han & Micheline Kamber, Publisher: Morgan Kaufmann Publishers (2001)

[F] REFERENCE BOOKS

- 1) Data Warehousing in the Real World, by: Sam Ananory & Dennis Murray, Publisher: Addison-Wesley, (2000)
- 2) Information Retrieval: Data Structures & Algorithms, by: W. B. Frakes & R. Baeza - Yates, Publisher: Prentice-Hall, New Jersey, (1992).
- 3) Data mining techniques: For Marketing, Sales, Customer Support, by: Michael J. A. Berry, & Gordon Linoff, Publisher: John Wiley & Sons.
- 4) Data Mining, by: Pieter Adriaans, & Dolf Zantinge, Publisher: Pearson Education Asia (2001).
- 5) Statistics for Business & Economics, by: Jit S. Chandan, Publisher: Vikas Publishing. (1999)

[G] LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

- 1) Introduction to python programming for data mining
- 2) To perform data pre-processing using pandas package in python
- 3) To perform statistical analysis and visualization of data using pandas and matplotlib in python. (mean, mod, median, standard deviation, variance, correlation, bar chart, line chart, pie graph, histogram, box plot, scatter plot)
- 4) To build multi-dimensional data warehouse model using relational database system (Generate sales fact table and item, location, and time dimension tables, add no. of units sold and total revenue as measures, Populate model with suitable database)
- 5) To perform various OLAP operations on data warehouse using SQL queries (slice, dice, roll up, drill down, pivot)
- 6) To perform association rule mining using orange and mlexend packages in python
- 7) To perform Decision Tree Classification (DCT) using sklearn package in python
- 8) To perform Navie Bayes and K-NN (k-nearest neighbor) classification using sklearn package in python
- 9) To perform KMeans and DBSCAN clustering using sklearn package in python
- 10) To perform text mining using textblob in python (TF-IDF generation, sentiment analysis, word-cloud, POS tagging)

LAB WORK BEYOND CURRICULA

- 11) To perform Classification using neural network with tensorflow package in python
- 12) To perform Hierarchical clustering using sklearn package in python.

IT 707 – SYSTEM DESIGN PRACTICE
SEM-VII (4th Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

Teaching Scheme			Credit Structure			Exam Scheme				
LECTURE	TUTORIAL	PRACTICAL	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
--	--	2	--	1	1	--	--	25	25	50

- Students have to develop in-house mini project. This will help them to get prepare for their final semester project. They are supposed to prepare and submit a project report as a part of their term work.
- They are to be examined based on viva and/or demonstration.

IT 714 – KNOWLEDGE SYSTEM
SEM-VII (4th Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] COURSE PRE-REQUISITES

- Understanding of Basic Computer programming
- Should be familiar with concepts of data structures and object-oriented Programming
- Should be familiar with concepts of algorithms, such as sorting and searching algorithms
- Discrete Mathematics (concepts of set theory, reasoning, logic and probability)

[B] OBJECTIVES OF THE COURSE

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

- Understand various AI searching techniques (uninformed (Blind), informed, heuristic, constraint satisfaction, Minimax algorithm, genetic algorithms).
- Understand the characteristics of the problems and their solutions.
- Apply knowledge representation, reasoning techniques to real-world problems.
- Deal with uncertain, fuzzy and probabilistic data.
- Understand work and purpose of expert system.
- Understand the work and role of each phase of Natural Language Processing.
- Use PROLOG programming language to implement expert systems.

[C] DETAILED SYLLABUS

1) INTRODUCTION TO ARTIFICIAL INTELLIGENCE

Introduction problems, problem space, production systems, problem characteristics

2) PROBLEM SOLVING BY SEARCH

Uninformed search techniques (Breadth-first search, Depth-First search, Depth Limited Search, iterative deepening search), Heuristic search techniques (Generate and test, Hill climbing, Simulated annealing, Best first search A* algorithm, Constraint satisfaction, Means-end-analysis), Adversarial search techniques (Game playing, MINIMAX algorithm, alpha- Beta pruning)

3) KNOWLEDGE REPRESENTATIONS AND REASONING

Propositional Logic, predicate logic, Instance and is a relationship, representation in slot and filter systems: semantic net, frames, Conceptual dependency, scripts. Rule based system, procedure versus declarative knowledge, forward versus backward reasoning, unification, resolution, Knowledge representation in data processing & conventional database system, functional approach, Monotonic and Non-Monotonic logic, theory of dealing with uncertainty.

4) FUZZY LOGIC

Definition, need fuzzy set, fuzzy operators, fuzzy control systems, limitations

5) NATURAL LANGUAGE PROCESSING

Introduction to NLP, NLU, phases of NLP (Morphological analysis, syntactic analysis, semantic analysis, discourse integration), introduction to Machine Translation.

6) EXPERT SYSTEM

ES architectures, representation and use of domain knowledge, expert system shells, knowledge acquisition.

7) KNOWLEDGE REPRESENTATIONS IN PROGRAMMING LANGUAGE: PROLOG

Facts and predicate, data types, goal finding, backtracking, simple object, compound objects, use of cut and fail predicates, recursion, lists, simple input/output, Static and dynamic database, arithmetic and string operations, file handling.

[D] LEARNING OUTCOMES

After completing this course, the student must demonstrate the knowledge and ability to:

- Understand the fundamentals of knowledge representation techniques (logicbased (Propositional and predicate), rule-based, frame-based, script- based, semantic nets), inference and theorem proving.
- Represent the real-world problem using difference knowledge representation techniques and finding solution using one of the search techniques with respect to the type of problem.
- Demonstrate working of reasoning in the presence of incomplete and/or uncertain information (data).
- Distinguish between backward and forward chaining.

- Use data structures and predicates provided by PROLOG.
- Know how to design rules for knowledge-based systems or Expert System and implement it in PROLOG by defining rules, clauses, and predicates.
- Use PROLOG as an artificial intelligence programming language to implement simple rule-based expert system.
- Design and implement a simple Fuzzy Control System.

[E] RECOMMENDED TEXT BOOKS

- 1) Artificial Intelligence by: Elaine Rich and Kevin Knight, Publisher: TMH
- 2) Introduction to Turbo PROLOG by: Carl Townsend, Publisher: BPB
- 3) Introduction to knowledge base systems by: R. A. Frost, Publisher: Macmillan

[F] REFERENCE BOOKS

- 1) Artificial Intelligence: A Modern Approach, by: Stuart Russell and Peter Norvig, Publisher: PHI
- 2) Artificial Intelligence and Expert System, by: D. W. Patterson, Publisher: PHI
- 3) Introduction to Applied Fuzzy Logic, by: Ahmad Ibrahim, Publisher: PHI
- 4) Introduction to Artificial Intelligence, by: Charniak and Mcdermott, Publisher: Addison-Wesley, 1985.
- 5) Essentials of Artificial Intelligence, by: Matt Ginsberg, Publisher: Morgan Kaufmann, 1993.
- 6) Artificial Intelligence, 3rd Edition, by: Winston, Publisher: Addison Wesley, 1992.
- 7) Artificial Intelligence: A Modern Approach, by: Stuart Russell and Peter Norving Publisher: Prentice Hall, 1995

[G] LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

- 1) Study of Turbo Prolog features and format
- 2) WAP [write a program(s)] Using variables in Prolog.
- 3) WAP for Usage of rules in Prolog.
- 4) WAP for Using Input, Output and fail predicates in prolog.
- 5) Write programs for studying Usage of arithmetic operators in Prolog.
- 6) Write a program to study Usage of cut(!), not, fail predicates in prolog.
- 7) Write a program to study usage of recursion in prolog.
- 8) Write programs to study usage of logical, arithmetic and string operators in Prolog
- 9) Write programs to study Usage of compound object and lists in prolog.
- 10) WAP to study Usage of dynamic database in prolog

IT- 717 – DISTRIBUTED COMPUTING
SEM-VII (4th Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] COURSE PRE-REQUISITES

- Computer Networks
- Operating System, Inter-Process communication
- Java, JSP, Webservices

[B] OBJECTIVES OF THE COURSE

- Students understand different paradigms to implement distributed applications, Service Oriented Architecture, Grid Computing and Grid Services, which are widely used by industry in software and application developments.
- Students get practical exposure to Distributed Paradigms, Service Oriented Architecture and CORBA.

[C] DETAILED SYLLABUS

- 1) TCP, UDP
- 2) Socket Programming on Unix Socket Options
- 3) Fundamentals of Distributed Computing
- 4) Event Synchronization
- 5) Distributed Computing Paradigms
- 6) Distributed Objects
- 7) Advanced Distributed Computing Paradigms
- 8) Value Of SOA, Characteristics Of SOA
- 9) SOA Concepts (XML Standards, Web Services Service Design Principles, SOAP, WSDL, UDDI, Security)

- 10) Basic SOA Architecture [SERVICES, BPEL, ESB, SOA Life Cycle, Open Standards]
- 11) Building SOA Applications
- 12) RESTful web-services
- 13) Microservices
- 14) Data-intensive Computing (Hadoop Distributed File System, Map-Reduce Programming)
- 15) Message Driven Programming (Using JMS)

[D] LEARNING OUTCOMES

- Understanding of philosophy of Distributed Paradigms (reusable solutions to application development)
- Understanding of widely used Service Oriented Architecture, Web Services and Service composition.
- Understanding and use of different distributed paradigm in applied application development frameworks (Open Source).

[E] RECOMMENDED TEXT BOOKS

- 1) UNIX Network Programming, by: W. Richard Stevens, Publisher: Prentice Hall Publication
- 2) Distributed Computing: Concepts & Applications, by: M. L. Liu, Publisher: Addison Wesley.
- 3) Distributed Computing in Java 9 by: Raja Malleswara Rao Pattamsetti, Publisher: Packt Publishing Limited.

[F] REFERENCE BOOKS

- 1) SOA: Principles of Service Design, by: Thomas Erl, Publisher: Prentice Hall.
- 2) Distributed Operating Systems: Concepts and Design, by: Pradeep K. Sinha, Publisher: PHI Publication.
- 3) Distributed Systems: Concepts and Design, 4th Ed., by: George Coulouris, Jean Dollimore and Tim Kindberg, Publisher: Addison Wesley.

[G] LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

- 1) a) Implement concurrent echo client-server application
b) Implement concurrent day-time client-server application.
- 2) Configure following options on server socket and tests them: SO_KEEPALIVE, SO_LINGER, SO_SNDBUF, SO_RCVBUF, TCP_NODELAY
- 3) Data Representation and Data Validation: XML Schema and XML instance document, JSON
- 4) WSDL based webservice and its monitoring: Implement ArithmeticService that implements add and subtract operations / Java based: Implement TrigonometricService that implements sin, and cos operations. Monitor SOAP request and response packets. Analyze parts of it and compare them with the operations (java functions) headers.

- 5) Design and test BPEL module that composes ArithmeticService and TrigonometricService.
- 6) Deployment of a HADOOP cluster and monitoring status of its components
- 7) Perform data intensive computing using map-reduce based programming on a HADOOP cluster.
- 8) Create Restful Webservice and test it using Postman
- 9) Create Microservice based application using Spring Boot
- 10) Implementation JMS based application using Publish-Subscribe paradigm

LAB WORK BEYOND CURRICULA

- 11) Test open source ESB using web service.
- 12) Implementing Stateful grid services using Globus WS-Core-4.0.3
- 13) Configuring reliability and security options.

IT 716 – WEB TECHNOLOGY
SEM-VII (4th Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] COURSE PRE-REQUISITES

- Students have basic knowledge of C and C++ programming language. Students also have good understanding of database management in terms of dealing with DML, DDL and stored-procedures.

[B] OBJECTIVES OF THE COURSE

- Objectives of the course are to give understating of ASP.NET, C#.NET, MVC framework, .Net framework.

[C] DETAILED SYLLABUS

1) INTRODUCTION .NET PLATFORM

Featuring of .Net Platform Components of the .Net Platform

2) INTRODUCTION TO ASP.NET

Creating ASP.NET application Managing Application State, Using Applications Events during Http protocol request, configuring sessions, Store & retrieves data using a cookie, Pass user information between pages

3) INTRODUCTION C#.NET

Developing application using C#.NET, Partial class, Collection, Lists, Arrays, Strings, Events, Delegates, Threading, Exception handling, Networking, File I/O, Generic

4) SEPARATE CODE FROM CONTENT WITH HTML CONTROLS

Implement Post back Form, increase code separation with code-behind file, increase modularity with a user control, Creating a subscription post back form with a user control

5) WORKING WITH MASTER PAGE IN WEB APPLICATION

Building and consuming Xml Web services Transport protocols for Web services Overloading web methods, Caching web services for responses

6) ASP.NET SERVER CONTROLS

Server-side processing in ASP.NET Using HTML controls, Using ASP.NET Standard controls (BulletedList, Multiview and View, ImageMap, Wizard, Substitution, HiddenField, FileUpload), Using ASP.NET and Login Controls Using ASP.NET Validation controls Using ASP.NET Navigation controls

7) DATA BINDING IN ASP.NET USING DATA SOURCE CONTROLS

Using bound list controls with data source controls, GridView, DetailView, FormView, DataList, DropDownList, TreeView, Menu, Adrotator

8) CONFIGURE AN ASP.NET APPLICATION

Debugging and Error handling Techniques for ASP.NET application, Common configuration settings like authentication, authorization, custom errors, connection strings

9) DATA MANAGEMENT WITH ADO.NET

Basic ADO.NET features, Using Connection, Command, DataReader, DataAdapter object Using Parameters, DataSet and DataTable, Display data from Database, Usage of Web control to access database Customize data bound result using style sections Modify data with SQL statements, Manipulating data within ADO.NET

10) CACHING

Cache page output, cache object data, Cache user control, Web Designing and Testing

11) PACKAGING AND DEPLOYING ASP.NET WEB APPLICATION

[D] LEARNING OUTCOMES

After completion of the course students should be able understand following

- Microsoft Framework Architecture
- OOP using C#.NET
- Create a web application using .NET
- Developing Website using MVC and three-tier architecture.
- Development of Web Service and Consume Web Service

[E] RECOMMENDED TEXT BOOKS

- 1) Professional ASP.NET 2.0, by: Bill evjen, Scott hanselman, Farhan muhammad, Srinivasa sivakumar, Devin rader, Publisher: Wrox Pub.
- 2) Complete Reference C#, by: Herbert Schildt, Publisher: McGraw-Hill Education

[F] REFERENCE BOOKS

- 1) Beginning ASP.NET 2.0 with Visual C#.NET 2005, by: Chris Hart, John Kauffman, David Sussman, and Chris Ullman, Publisher: Wrox Pub
- 2) Beginning ASP.NET 2.0 in C# 2005: From Novice to Professional, by: Matthew MacDonald, Publisher: Apress

[G] LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

- 1) Create an application in which you are required to get the user profile information with help of standard asp.net server controls.
- 2) Extend the User profile Application which allow user to select the Material Status and Hobbies.
- 3) Implement the calculator with the help of the Command argument and command name properties of the button control.
- 4) Create Run time Table Control as per user requirement and display it on the page.
- 5) Create an Application which has Image, Image map and Image Button.
- 6) Extend the user Profile Application in which user is Allowed to select the Date of Birth from the Calendar Control.
- 7) Extend the User Profile Application where User must have to Pass All the validation.
- 8) (i) Create A master page and content Page Application for the University which enables user to see the faculty list according to department.
(ii) Create an application in which user is allowed to upload the file on the server.
- 9) Create an application in which user has to display records in the Grid View Control from Table created in access data base. (With the Help of Oledb Classes or AccessDataSource Control).
- 10) Create the Sign In, Sign Up and Update Application
- 11) Create Application in which user is able to Submit his Profile with help of the Wizard and Multi View Control.
- 12) (i) Use the Asp Navigation control that allows user to navigation and selection facility the pages of Web site.
(ii) Create an application which display the advertisement through Ad rotator Server Contrl.
- 13) (i) Create cache application in which, there should be implementation of File-based dependency, key-based dependency, Time-based dependency.
(ii) Create application which uses Standard Login Control to The Web Application.
- 14) (i) Create the Application which gets the user profile from the user with the help of the user control.
(ii) Create An application which allows user to have Chat on two different pages.
- 15) (i) Create A simple windows Application.
(ii) Deploy a web site on Local IIS server.

IT -718 – (ELECTIVE- III) E-COMMERCE AND E-SECURITY
SEM-VII (4th Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] COURSE PRE-REQUISITES

- Computer Networks.
- Database Management.
- For programming perspective students should have good knowledge of C, C++ or Java.

[B] OBJECTIVES OF THE COURSE

- The objective of this course is to learn what is ecommerce and how it works including e-commerce terminology and various security algorithms that to be use in practice of integrated tools for web development, database management, electronic signatures and encryption.

[C] DETAILED SYLLABUS

1) INTRODUCTION TO E-COMMERCE

Introduction to E-Commerce, Transactions on E-Commerce, Requirements of Security on E-Commerce

2) E-COMMERCE TERMINOLOGY, FRAMEWORK, PAYMENT SCHEME ETC.

Concept of terms related to commerce in general & E-commerce in particular Buyer seller market. Framework of B2B, B2C, C2C, E-Com models.

3) SECURITY POLICY AND SECURITY OVERVIEW.

4) CONVENTIONAL ENCRYPTION TECHNIQUES

Introduction, Basic encryption techniques, simplified DES, block cipher mode of operation, traffic confidentiality and key distribution, Random Number Generation.

5) PUBLIC KEY CRYPTOGRAPHY

RSA algorithm, Key management, Elliptic Curve Cryptography, Diffie-Hellman Key Exchange

6) MESSAGE AUTHENTICATION AND HASH FUNCTIONS

Authentication requirement, Functions, Message Authentication Code (MAC), Hash Functions (SHA-1), Digital signature standard DSS).

7) NETWORK SECURITY

Authentication Protocols Like Kerberos, X.509 Directory Authentication Services.

8) IP SECURITY E-MAIL SECURITY

IP security overview, architecture, authentication header, Encapsulation security payload, S/Mime, Web security, Firewall.

9) SAFE ELECTRONIC COMMERCE

Secure transport protocol, secure E-payment protocol, secure electronic transaction.

10) ELECTRONIC PAYMENT AND BANKING SYSTEM

Security Issues in E-commerce, Digital token based Electronics Payment System (EPS), Risks involved in designing EPS, Applications of Electronic Data Interchange (EDI) in Business, Introduction of Electronic Banking in Business (Definition of Electronic Banking, Types of Electronic Banking, Advantages and Drawbacks of Electronic Banking, Risks and Challenges of Electronic Banking), Emerging technologies in E-commerce (Block Chain).

[D] LEARNING OUTCOMES

- The student must be able to present an e-commerce project by creating a business plan and discuss about how different actors within electronic trade earn money and apply this within the own project. Students should handle technical aspects in the creation of electronic trade by using tools for electronic trade such as databases, platforms/frameworks for web applications and electronic signatures.

[E] RECOMMENDED TEXT BOOKS

- 1) Cryptography and Network Principles and Practice, by: William Stallings, Publisher: Pearson Edu. 2003
- 2) Web Commerce Technology Handbook, by: Daniel Minoli and Emma Minoli, Publisher: TMH (1999)

[F] REFERENCE BOOKS

- 1) E-commerce: Business, Technology, Society, by: Kenneth C. Laudon, Publisher: Pearson Edu. Asia
- 2) E-Commerce: A managerial Perspective, by: P. T. Joseph, Publisher: PHI (2003).
- 3) E-Commerce with Net. Commerce, by: Samantha Shurety, Publisher: Pearson Edu. Asia.
- 4) Current Trends of I. T. and Cyber Security by: Er. Kailash Aseri and Mr. O.P. Gera. Publisher: Horizon books.

[G] LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

- 1) Implement Ceaser and mono alphabetic cipher
- 2) Implementation of Play Fair cipher
- 3) Implementation of Hill cipher.
- 4) Implementation of S-DES algorithm for data encryption along with key generation of S-DES
- 5) Write a program to generate and exchange keys using client server mechanism.
- 6) Perform Encryption, Authentication and both using RSA. (Use public key shared in above practical)
- 7) Write a program to implement Diffie-Hellman Key exchange algorithm and perform encryption and decryption
- 8) Write a program to authenticate a user with system using MD5 or SHA-1 Hashing technique.
- 9) Configure VPN using packet tracer and demonstrate the importance of IPSec
- 10) Create Self Signed Certificate and configure it for website.

LAB WORK BEYOND CURRICULA

- 11) Study of Kerberos protocol using Linux.
- 12) Study of HMCA hash function and implement the hash code using HMAC

IT 718A – (ELECTIVE- III) INTRODUCTION TO NEURAL NETWORKS
SEM-VII (4th Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] COURSE PRE-REQUISITES

[B] OBJECTIVES OF THE COURSE

[C] DETAILED SYLLABUS

1) INTRODUCTION

Human brain and models of neuron, neural network architecture, knowledge representation, artificial intelligence and neural network.

2) LEARNING PROCESS

Introduction to machine learning, error correction, memory-based learning, Hebbien learning, competitive learning, Boltzmann, learning, self-learning, memory and adoption, statistical learning theory.

3) SINGLE LAYER PERCEPTION

Introduction adaptive filtering problem, unconstrained optimization techniques, perception, perception convergence theorem, relation between perception and Bays classifier for a Gaussian environment.

4) MULTILAYER PERCEPTION

Back propagation algorithm, output representations and decision rule, feature detection, back propagation and differentiation, Hessien matrix, accelerated convergence of back propagation learning, supervised learning, convolutional networks.

5) RADIAL BASIS FUNCTION NETWORKS

Cover's theorem and separability of patterns, interpolation problem, regularization networks, radial basis function (RBF) networks, comparison of RBF network and multi-layer perception.

6) SUPPORT VECTOR MACHINE

Optimal hyper plane linear separability patterns, optimal hyper plane for non-separable patterns, support vector machine for pattern recognition, e-insensitive loss function, support vector machine for nonlinear regression

7) SELF-ORGANIZATION MAPS

Two basic feature-mapping models, self-organization Map(SOM), SOM algorithms, linear vector quantization, hierarchical vector quantization.

8) STOCHASTIC MACHINES

Statistical mechanics, Markov chain, metropolis algorithm, simulated annealing, Gibbs sampling, Boltzmann machine, sigmoid belief networks, deterministic machines.

9) NEURAL NETWORK APPLICATIONS

Signature recognition, voice recognition, netALk etc.

[D] LEARNING OUTCOMES

[E] RECOMMENDED TEXT BOOKS

- 1) Neural Network, 2nd edition, by: Simon Haykin, Publisher: Pearson Edu.

[F] REFERENCE BOOKS

[G] LIST OF EXPERIMENTS TO BE PERFORMED UNDER THIS SUBJECT HEAD (IF APPLICABLE)

IT 718B – (ELECTIVE- III) DIGITAL IMAGE PROCESSING
SEM-VII (4th Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] COURSE PRE-REQUISITES

[B] OBJECTIVES OF THE COURSE

[C] DETAILED SYLLABUS

1) INTRODUCTION

Fundamentals, Applications; Image processing system components, Image sensing and acquisition, Sampling and quantization, Neighbors of pixel adjacency connectivity, regions and boundaries; Distance measures

2) IMAGE ENHANCEMENT

Frequency and Spatial Domain, Contrast Stretching, Histogram Equalization, Low pass and High pass filtering.

3) IMAGE RESTORATION

Noise models, mean, order-statistics, adaptive filters. Band reject, Band pass and notch filters.

4) COLOUR IMAGE PROCESSING

Colour models; Pseudo colour, Image processing; colour transformation, segmentation.

5) WAVELETS AND MULTI-RESOLUTION PROCESSING

Image pyramids, sub-band coding, Harr transform; multi resolution expression, Wavelet transforms.

6) IMAGE COMPRESSION

Fundamentals; models; error free and lossy compression; standards.

7) MORPHOLOGICAL IMAGE PROCESSING

Boundary extraction; region filtering; connected component extraction; convex hull; Thinning; Thickening; skeletons; pruning;

8) IMAGE SEGMENTATION

Boundary detection-based techniques, Point, line detection, Edge detection, Edge linking, local processing, regional Processing

[D] LEARNING OUTCOMES

[E] RECOMMENDED TEXT BOOKS

1) Digital Image Processing, Second Edition, by: Rafael C. Gonzalez and Richard E. Woods, Publisher: Pearson Education

[F] REFERENCE BOOKS

1) Fundamentals of Digital Image Processing, by: A. K. Jain, Publisher: PHI

IT 718C – (ELECTIVE- III) CLOUD COMPUTING
SEM-VII (4th Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] PREREQUISITES

- Basics of Computer Networking, Basics of Operating System, Basic understanding about Storage System, Basic understanding about Distributed Computing

[B] OBJECTIVES OF THE COURSE

- To understand and analyze the components of cloud computing.
- To introduce the various levels of services that can be achieved through cloud computing.
- To understand the concept of Virtualization and cloud data storage.
- To analyze the case studies to derive the best practice model to apply when developing and deploying cloud-based applications.

[C] DETAILED SYLLABUS

1) 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.

2) 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

3) 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

4) Unit - IV

- **Case Study**

Eucalyptus, Open Nebula, Open Stack and others.

[D] COURSE OUTCOME

- Understanding of different layers of cloud computing and the various deployment and service models of Cloud Computing.
- To provide insights into the virtualization technologies: Hypervisor, emulation, and application VM. Platform virtualization, storage virtualization, and network virtualization.
- To understand security concerns of Cloud Computing
- To develop ability to create cloud computing environments.

[E] RECOMMENDED TEXT BOOKS

- 1) Cloud Computing Principles and Paradigms, by: Rajkumar Buyya, James Broberg, Andrzej Goscinski, Publisher: Wiley.
- 2) Cloud Computing: Implementation, Management, and Security, by: John W. Rittinghouse and James F. Ransome, Publisher: CRC Press.
- 3) Mastering Cloud Computing, by: Rajkumar Buyya, Christian Vecchiola, and Thamarai Selvi, Publisher: Tata McGraw Hill.
- 4) Virtualization: A Beginner's Guide, by: Danielle Ruest and Nelson Ruest, Publisher: McGraw Hill.
- 5) Cloud computing Black Book, by: Kailash Jayaswal, Jagannath Kallakurchi, Donald J. Houde, Deven Shah, Publisher: Dreamtech Publication.
- 6) Cloud Computing Bible, by: Barrie Sosinsky, Publisher: Wiley.
- 7) Enterprise Cloud Computing, by: Gautam Shroff, Publisher: Cambridge.

[F] REFERENCE BOOKS

[G] 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

IT 718D – (ELECTIVE- III) MOBILE APP. DEVELOPMENT
SEM-VII (4th Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

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

[A] PREREQUISITES

- 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

- Architecture of Android OS
 - 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
 - Android SDK and components
 - Emulator

- Android Studio
- Gradle build
- Android Project structure and files

UNIT 2: BUILDING BASIC INTERACTIVE APPLICATION

- 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

- Menus
- Data organization using Views and Adapters
 - List View
 - Grid View
 - Adapters
- Modular design using Fragments
 - Fragment lifecycle
 - Various fragments
 - Layout
- Other interaction Components
 - Action bars
 - Activity, Intent, and Application Navigation
 - Tabs
 - Dialog boxes
- Android Services
 - Log
 - Toast messages

- Notification

UNIT 4: DATA PERSISTENCE: FILE, DATABASE

- Database
 - SQLite
- Storage of user data
 - Read/write files (internal storage, SD card)
 - Preferences

UNIT 5: GRAPHICS, IMAGE, AND MULTIMEDIA

- Graphics
 - Canvas and 2D drawing
 - Manipulating Graphics
 - Animation
- Image & Video handling handling
 - 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

- GPS, Accelerometer, Compass
- Wi-Fi, Bluetooth

UNIT 7: EXTERNAL SERVICES

- 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] COURSE OUTCOME

- 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 TEXT BOOKS

- 1) Head First Android Development, by: Dawn Griffiths and David Griffiths, Publisher: O'Reilly.
- 2) Beginning Android Programming with Android Studio, by: J F DiMarzio, Publisher: 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 Wi-Fi devices
- 9) Implement an app to demonstrate use of Web Service using JSON data format
- 10) Perform debugging using Android Debug Bridge

AF 801 – PROJECT/INDUSTRIAL TRAINING
SEM-VIII (4th Year)

Department of Information Technology
Faculty of Technology, Dharmsinh Desai University

Teaching Scheme			Credit Structure			Exam Scheme				
LECTURE	TUTORIAL	PRACTICAL	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
--	--	28	--	14	14	--	--	300	100	400

[A] DETAILED SYLLABUS

The students will undertake project work for the period of full semester. They should design/develop a software system, which may involve integration with hardware also. They may also undertake project work involving study and analysis of existing systems in the industry and suggest and implement for improvement. The students may be sent to the industry for their project work. Students have to follow standard software development process of software, which include phases such as requirements gathering, system analysis, system design, implementation, testing, user manual preparation and documentation. The faculty may arrange visits at the places where the students are performing their project work.

Students are supposed to prepare and submit a project report as a part of their term work and are required to give seminars on their work. Students have to timely report to the institute regarding monitoring and necessary guidance.

Students are to be examined based on viva and/or demonstration. Students should arrange for demonstration of the project work, if any.

**AF 802 – SEMINAR
SEM-VIII (4th Year)**

**Department of Information Technology
Faculty of Technology, Dharmsinh Desai University**

Teaching Scheme			Credit Structure			Exam Scheme				
LECTURE	TUTORIAL	PRACTICAL	L+T	P	TOTAL	THE.	SESS.	PRAC.	T/W	TOTAL
--	4	--	4	--	4	--	100	--	--	100

[A] DETAILED SYLLABUS

Students need to give seminars of their project/industrial training work.