

**BACHELOR OF TECHNOLOGY**  
**COMPUTER ENGINEERING**

**SYLLABI BOOK**  
**(2021 – 2022)**



Department of Computer Engineering  
Faculty of Technology  
Dharmsinh Desai University  
Nadiad – 387 001, Gujarat, India.

<http://www.ddu.ac.in>

**B. Tech. Semester I**

SUBJECTS	Teaching Scheme			Total	Credit	Examination Scheme (Marks)				
	Th	Sess	TW			Th	Sess	TW	Prac	Total
Mathematics I	3	1	0	4	4.0	60	40	0	-	100
Basic Electrical Engineering for ICT	3	1	2	6	5.0	60	40	50	-	150
Programming for Problem Solving I	4	0	3	7	5.5	60	40	50	-	150
Engineering Graphics & Design for ICT	1	0	4	5	3.0	0	0	100	-	100
Software Workshop	0	0	2	2	1.0	0	0	50	-	50
	11	2	11	24	18.5	180	120	250		550

**B. Tech. Semester II**

SUBJECTS	Teaching Scheme			Total	Credit	Examination Scheme (Marks)				
	Th	Sess	TW			Th	Sess	TW	Prac	Total
Mathematics II	3	1	0	4	4.0	60	40	0	-	100
Programming for Problem Solving II	4	0	3	7	5.5	60	40	50	-	150
Physics for ICT	3	1	2	6	5.0	60	40	50	-	150
Hardware Workshop	0	0	4	4	2.0	0	0	100	-	100
English	2	0	2	4	3.0	40	0	50	-	90
Environmental Sciences	2	0	0	2	0.0	40	0	0	-	40
	14	2	11	27	19.5	260	120	250		630

**B. Tech. Semester III**

SUBJECTS	Teaching Scheme			Total	Credit	Examination Scheme (Marks)				
	Th	Sess	TW			Th	Sess	TW	Prac	Total
Data Structure and Algorithms	4	0	2	6	5.0	60	40	25	25	150
Database Management Systems	4	0	2	6	5.0	60	40	25	25	150
Design of Digital Circuit	4	0	2	6	5.0	60	40	25	25	150
Probability and Statistics	2	0	0	2	2.0	40	0	0	0	40
Universal Human Values/ Financial and Managerial Accounting	3	0	0	3	3.0	60	0	0	0	60
Essence of Indian Knowledge Tradition	2	0	0	2	0.0	0	0	0	0	0
Web Development Workshop	0	0	2	2	1.0	0	0	25	25	50
	19	0	8	27	21	280	120	100	100	600

**B. Tech. Semester IV**

SUBJECTS	Teaching Scheme			Total	Credit	Examination Scheme (Marks)				
	Th	Sess	TW			Th	Sess	TW	Prac	Total
Discrete Mathematics	4	0	0	4	4.0	60	40	0	0	100
Design and Analysis of Algorithm	4	0	2	6	5.0	60	40	25	25	150
Computer System Architecture	4	0	2	6	5.0	60	40	25	25	150
Java Technology / Visual Technology	4	0	2	6	5.0	60	40	25	25	150
Software Engineering Principles and Practices	4	0	2	6	5.0	60	40	25	25	150
Software Project	0	0	2	2	1.0	0	0	25	25	50
	20	0	10	30	25	300	200	125	125	750

**B. Tech. Semester V**

SUBJECTS	Teaching Scheme			Total	Credit	Examination Scheme (Marks)				
	Th	Sess	TW			Th	Sess	TW	Prac	Total
Microprocessor Fundamental and Programming	4	0	2	6	5.0	60	40	25	25	150
Web Development in .NET	4	0	2	6	5.0	60	40	25	25	150
Operating Systems	4	0	2	6	5.0	60	40	25	25	150
Advanced Algorithms	4	0	2	6	5.0	60	40	25	25	150
Advanced Technologies	4	0	2	6	5.0	60	40	25	25	150
	20	0	10	30	25	300	200	125	125	750

**B. Tech. Semester VI**

SUBJECTS	Teaching Scheme			Total	Credit	Examination Scheme (Marks)				
	Th	Sess	TW			Th	Sess	TW	Prac	Total
Network & Information Security / Advanced Computer Architecture	4	0	2	6	5.0	60	40	25	25	150
Theory of Automata and Formal Languages	4	0	0	4	4.0	60	40	25	25	150
Service Oriented Computing	4	0	2	6	5.0	60	40	25	25	150
Machine Learning	4	0	2	6	5.0	60	40	25	25	150
Computer Networks	4	0	2	6	5.0	60	40	25	25	150
System Design Practice	0	0	2	2	1.0	300	200	125	125	750
	20	0	10	30	25	60	40	25	25	150

**B. Tech. Semester VII**

SUBJECTS	Teaching Scheme			Total	Credit	Examination Scheme (Marks)				
	Th	Sess	TW			Th	Sess	TW	Prac	Total
Artificial Intelligence	4	0	2	6	5.0	60	40	25	25	150
Elective I	4	0	2	6	5.0	60	40	25	25	150
Elective II	4	0	2	6	5.0	60	40	25	25	150
Elective III	4	0	2	6	5.0	60	40	25	25	150
Compiler Construction	4	0	2	6	5.0	60	40	25	25	150
	20	0	10	30	25	300	200	125	125	750

**B. Tech. Semester VIII**

SUBJECTS	Teaching Scheme			Total	Credit	Examination Scheme (Marks)				
	Th	Sess	TW			Th	Sess	TW	Prac	Total
Project/Industrial Training					14.0	0	0	100	300	400
Seminar					4.0	0	0	100	0	100
Effective Technical Communication	1	0	4	5	3.0	0	0	100	0	100
	1	0	4	5	21	0	0	300	300	600

Elective I, II and III in 7th semester are offered from the list of the following subjects

**PEC : Professional Elective Course**

**CS : Computer Science**

**S : System**

**A: Applications**

**D: Data Science**

Courses Name	Category
Cloud computing and IoT	PEC : CS-S
Image Processing	PEC : CS-A
Big Data Analytics	PEC : CS-D
Embedded Systems	PEC : CS-S
Computer Graphics	PEC : CS-A
Advanced Computer Network	PEC : CS-S
Knowledge Discovery	PEC: CS-D
Mobile Application Development	PEC : CS-A
Distributed Operating Systems	PEC : CS-S

**B. TECH. SEMESTER – I (EC/CE/IT)**  
**SUBJECT: MATHEMATICS - I**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
3	1	0	4	4	60	40	-	-	100

Reference Code BSC102

**DETAILED SYLLABUS**

**[1] CALCULUS**

Evolutes and involutes, Evaluation of definite and improper integrals; Beta and Gamma functions and their properties, Applications of definite integrals to evaluate surface areas and volumes of revolutions. Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; indeterminate forms and L'Hospital's rule, Maxima and minima.

**[2] MATRICES**

Matrices, Vectors: addition and scalar multiplication, matrix multiplication; Rank of a Matrix, Linear systems of equations, Determinants, Cramer's Rule, Inverse of a matrix, Gauss Elimination and Gauss Jordan method.

**[3] VECTOR SPACES**

Eigenvalues, Eigenvectors, Symmetric, Skew-symmetric, and Orthogonal Matrices, Linear Independence of vectors, Diagonalization.

**[4] MULTIVARIABLE CALCULUS (DIFFERENTIATION)**

Limit, Continuity and Partial derivatives, Directional derivatives, Total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Vector Differential Calculus; Gradient, curl and divergence.

**TEXT / REFERENCE BOOKS**

- 1) B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40<sup>th</sup> Edition, 2007.
- 2) G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
- 3) Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
- 4) D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
- 5) Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
- 6) Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
- 7) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
- 8) V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East-West press, Reprint 2005.

**B. TECH. SEMESTER – I (EC/CE/IT)**  
**SUBJECT: BASIC ELECTRICAL ENGINEERING**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
3	1	2	6	5	60	40	50*	-	150

Reference Code ESC101

\*TW Marks includes Viva based on TW

**DETAILED SYLLABUS**

**[1] DC CIRCUITS**

Electrical circuit elements (R, L and C), impact of temperature, voltage and current sources, Kirchhoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first order RL and RC circuits.

**[2] AC CIRCUITS**

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three-phase balanced circuits, voltage and current relations in star and delta connections

**[3] ELECTRO-MAGNETIC INDUCTION**

Introduction, Magnetic effect of electric current, Current carrying conductor in magnetic field, Law of electromagnetic induction, Induced emf, Self-Inductance (L), Mutual Inductance (M), and Coupling coefficient between two magnetically coupled circuits (K), Inductances in series and parallel.

**[4] MAGNETIC CIRCUITS**

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

**[5] TRANSFORMERS**

Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections

**[6] ELECTRICAL MACHINES**

Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited DC motor. Construction and working of synchronous generators, Construction, Principles and working theory and Types of DC Motors & Generators, 1-Ph & 3-Ph Induction Motor, AC Generator

## **TEXT / REFERENCE BOOKS**

- 1) Basic Electrical, Electronics and Computer Engineering, R. Muthu Subramanian, S. Salvahanan, K. A. Muraleedharan, 2<sup>nd</sup> Edition, Tata McGraw Hill
- 2) Electronics Principles, Albert Paul Malvino, 6<sup>th</sup> Edition, Tata McGraw Hill
- 3) Electrical Technology (Vol: II), B. L. Theraja , A. K. Theraja, 23<sup>rd</sup> Edition, R. Chand & Company
- 4) Basic Electrical Engineering, D.P. Kothari, I. J. Nagrath, 3<sup>rd</sup> Edition, Tata McGraw Hill
- 5) Introduction to VLSI Circuit & Systems, John P. Uyemura, 1<sup>st</sup> Edition, John Willey & Sons Inc.
- 6) Basic Electrical Engineering, D.C. Kulshreshtha, 1<sup>st</sup> Edition, Tata McGraw Hill
- 7) Electrical and Electronics Technology, E. Hughes, 10<sup>th</sup> Edition, Pearson
- 8) Electrical Engineering Fundamentals, V.D. Toro, 2<sup>nd</sup> Edition, Prentice Hall India
- 9) Fundamentals of Electrical Engineering, L.S. Bobrow, , Oxford University Press

**B.TECH. SEMESTER – I (EC/CE/IT)**  
**SUBJECT: PROGRAMMING FOR PROBLEM SOLVING - I**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
4	0	3	7	5.5	60	40	50*	-	150

Reference Code ESC201

\*TW Marks includes Viva based on TW

### DETAILED SYLLABUS

**[1] OVERVIEW OF C**

Basic structure of C program, compiling and running C program

**[2] CONSTANTS, VARIABLES AND DATA TYPES**

Types of constants, basic data types, identifier, variable, enum, symbolic constant, typedef, keywords, overflow and underflow

**[3] OPERATORS AND EXPRESSIONS**

Arithmetic, relational, logical, assignment, bitwise, and sizeof() operators, operator precedence and associativity, expression evaluation

**[4] MANAGING INPUT OUTPUT OPERATIONS**

getchar() and putchar() functions, formatted I/O using printf() and scanf()

**[5] DECISION MAKING AND BRANCHING**

if and if...else statement, nested and ladder if...else, conditional operator, switch statement, goto statement with warning

**[6] DECISION MAKING AND LOOPING**

while, do...while, and for loops, nested loops, break and continue statements

**[7] ARRAYS AND STRINGS**

Introduction to arrays, declaration, initialization and access of one-dimensional and two-dimensional arrays, Introduction to multi-dimensional and variable length arrays, declaration and initialization of strings, printing and scanning strings to/from standard I/O, string handling functions, list of strings

**[8] USER-DEFINED FUNCTIONS**

Function prototype and function declaration, function definition, function call, actual and formal parameters/arguments, return type and return statement, Nested function call, recursion, scope, visibility, and lifetime of variables.

## **[9] STRUCTURES AND UNIONS**

Defining structure, declaring and initializing structure variables, typedef, accessing structure members, copying and comparing structure variables, nested structures, arrays and structures, structures and functions, unions

## **[10] POINTERS**

Introduction, accessing address of a variable, declaration and initialization of pointer variables, Accessing variable using pointer, chain of pointers, scale factor and pointer expressions, pointers and arrays, pointer to array Vs array of pointers, passing arrays and strings to the function, array of pointers, pointers and functions, pointers and structures, const pointer vs pointer to const

## **TEXT / REFERENCE BOOKS**

- 1) Programming in ANSI C by Balagurusamy, 8th Ed., Tata McGraw Hil
- 2) Programming with C by Byron Gottfried, 3rd Ed., McGraw Hill Education
- 3) The C Programming Language by Kernighan and Ritchie, 2nd Ed., PHI Learning
- 4) Expert C Programming: Deep C Secrets by Peter Van Der Linden, Pearson Education
- 5) Let Us C by Yashvant Kanetkar, 12th Ed., BPB Publication
- 6) Programming in C by Ashok N. Kamthane, 2nd Ed., Pearson Education

**B. TECH. SEMESTER – I (EC/CE/IT)**  
**SUBJECT: ENGINEERING GRAPHICS AND DESIGN**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
1	0	4	5	3	-	-	100*	-	100

Reference Code ESC102

\*TW Marks includes Viva based on TW

**DETAILED SYLLABUS**

- [1] Introduction to Engineering Drawing Covering, Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales –Plain, Diagonal and Vernier Scales;
- [2] Orthographic Projections Covering, Principles of Orthographic Projections-Conventions Projections of Points and lines inclined to both planes; Projections of planes inclined Planes - Auxiliary Planes;
- [3] Projections of Regular Solids Covering, those inclined to both the Planes- Auxiliary Views; Draw simple annotation, dimensioning and scale. Floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc.
- [4] Sections and Sectional Views of Right Angular Solids Covering, Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; Draw the sectional orthographic views of geometrical solids, objects from industry and dwellings (foundation to slab only)
- [5] Isometric Projections Covering, Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions;
- [6] Overview of Computer Graphics Covering, listing the computer technologies that impact on graphical communication, demonstrating knowledge of the theory of CAD software.
- [7] Customization & CAD Drawing consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerancing; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles;
- [8] Annotations, layering & other Functions Covering applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines

(extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques; Drawing sectional views of composite right regular geometric solids and project the true shape of the sectioned surface; Drawing annotation, Computer-aided design (CAD) software modeling of parts and assemblies. Parametric and non-parametric solid, surface, and wire frame models. Part editing and two-dimensional documentation of models. Planar projection theory, including sketching of perspective, isometric, multi view, auxiliary, and section views. Spatial visualization exercises. Dimensioning guidelines, tolerancing techniques; dimensioning and scale multi views of dwelling;

### **TEXT / REFERENCE BOOKS**

- 1) Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
- 2) Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
- 3) Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
- 4) Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
- 5) (Corresponding set of) CAD Software Theory and User Manuals

**B. TECH. SEMESTER – I (EC/CE/IT)**  
**SUBJECT: SOFTWARE WORKSHOP**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
0	0	2	2	1	-	-	50*	-	50

Reference Code ESC202

\*TW Marks includes Viva based on TW

### DETAILED SYLLABUS

**[1] OPERATING SYSTEM BASICS**

Introduction to Operating System and Linux Architecture

**[2] SOFTWARE INSTALLATION**

Installation of open source/freeware software using package manager for programming/simulation.

**[3] SHELL COMMANDS**

Linux usage, commands & shell scripting. Command structure and general purpose utility

**[4] FILE HANDLING**

basic of file handling. The file system, Handling ordinary files, File attributes and permission, file system details

**[5] SHELL SCRIPTING**

Basic Shell commands, Looping and Branching,

**[6] SHELL UTILITIES**

Find command and shell, simple filters, advance filters.

**[7] EDITORS**

VI editor for basic text editing, LATEX for scientific documents and report writing.

### TEXT / REFERENCE BOOKS

- 1) Unix : Concepts and Applications, Sumitabha Das, 4<sup>th</sup> Edition, Tata McGraw Hill

**B. TECH. SEMESTER II (EC/CE/IT)**  
**SUBJECT: MATHEMATICS-II**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
3	1	0	4	4	60	40	0	0	100

Reference Code BSC301

**DETAILED SYLLABUS**

**[1] FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS AND INTRODUCTION TO HIGHER ORDER DIFFERENTIAL EQUATIONS**

Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type, second order linear differential equations with variable coefficients, Method of variation of parameters, Cauchy-Euler equation.

**[2] NUMERICAL METHODS**

Ordinary differential equations: Taylor's series, Euler and modified Euler's methods, Runge-Kutta method of fourth order for solving first order equations, Solution of algebraic and transcendental equations: Newton Raphson's Method, Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8 rules.

**[3] MULTIVARIABLE CALCULUS (INTEGRATION)**

Multiple Integration: Double integrals (Cartesian), Change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Triple integrals (Cartesian), Scalar line integrals, Vector line integrals, Scalar surface integrals, Vector surface integrals, Theorems of Green, Gauss and Stoke's.

**[4] LAPLACE TRANSFORM**

Laplace Transform, Properties of Laplace Transform, Laplace transform of periodic functions, Finding inverse Laplace transform by different methods, Convolution theorem. Evaluation of integrals by Laplace transform, Solving ODE by Laplace Transform method.

**TEXT / REFERENCE BOOKS**

- 1) B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2007.
- 2) G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Ed., Pearson, 2002.
- 3) Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
- 4) W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009.
- 5) S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
- 6) E. A. Coddington, An Intro. to Ordinary Differential Equations, Prentice Hall India, 1995.
- 7) J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., Mc- Graw Hill, 2004.

- 8) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

**B. TECH. SEMESTER – II (EC/CE/IT)**  
**SUBJECT: PROGRAMMING FOR PROBLEM SOLVING - II**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
4	0	3	7	5.5	60	40	50*	-	150

Reference Code ESC201

\*TW Marks includes Viva based on TW

**DETAILED SYLLABUS**

**[1] BASICS OF C++**

Overview, Program structure, keywords, identifiers, constants, data types, symbolic constants, declaration of variables, operators, namespaces, control structures, dynamic memory – C style – malloc(), calloc(), realloc() and free() Vs C++ style - new and delete keywords, reference and pointer

**[2] FUNCTIONS IN C++**

main function (variations in signature), function prototype, inline functions, call and return by reference, default parameters, function overloading

**[3] INTRODUCTION TO OBJECT ORIENTED PROGRAMMING**

Procedural Vs Object Oriented Programming, Principles of OOP, Benefits and applications of OOP

**[4] CLASSES AND OBJECTS – ENCAPSULATION AND ABSTRACTION**

Introduction, private and public members, Defining member functions, static members, Objects as function arguments and return type, friend functions, const member functions, Constructors and their types, Destructor, Operator overloading, type conversion

**[5] INTRODUCTION TO C++ STRING CLASS**

**[6] INHERITANCE**

Introduction, types of inheritance – single, multiple, multilevel, hierarchical, and hybrid inheritance, Protected members, overriding, virtual base class

**[7] POLYMORPHISM**

Introduction, Pointers and Objects, this pointer, pointer to derived classes, virtual and pure virtual functions, dynamic binding

**[8] INPUT/OUTPUT**

Introduction to streams, standard I/O stream objects, stream classes, unformatted and formatted I/O, manipulators

**[9] EXCEPTION HANDLING**

Basics of exception handling, try-catch-throw, rethrowing exceptions, user defined exceptions

## **[10] TEMPLATES**

Basics of class templates and function templates

### **TEXT / REFERENCE BOOKS**

- 1) Object-Oriented programming with C++, Seventh Ed., by E Balagurusamy, TMH publication
- 2) The C++ Programming Language, Fourth Ed., by Bjarne Stroustrup, Addison-Wesley publication
- 3) Object-Oriented Programming in C++, Fourth Edition, by Robert Lafore, SAMS publication
- 4) Accelerated C++: Practical Programming by Example, First Edition, by Andrew Koenig and Barbara E. Moo, Addison-Wesley publication
- 5) C++ Black Book, First edition, by Steven Holzner, Paraglyph Press
- 6) C++: The Complete Reference, Fourth Edition, by Herbert Schildt, McGraw Hill Education

**B. TECH. SEMESTER II (EC/CE/IT)**  
**SUBJECT: PHYSICS**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
3	1	2	6	5	60	40	50*	-	150

Reference Code BSC101

\*TW Marks includes Viva based on TW

**DETAILED SYLLABUS**

**[1] SEMICONDUCTORS**

Intrinsic and extrinsic semiconductors, Carrier generation and recombination, Carrier transport: diffusion and drift, p-n junction, Metal-semiconductor junction (Ohmic and Schottky), Semiconductor materials of interest for optoelectronic & other devices.

**[2] DIODE**

Introduction to P-N junction Diode and V-I characteristics, Half wave and Full-wave rectifiers, capacitor filter. Zener diode and its characteristics, Zener diode as voltage regulator, Special purpose diodes.

**[3] LIGHT-SEMICONDUCTOR INTERACTION**

Radiative transitions and optical absorption, LED and LASER, Photo detectors.

**[4] ACTIVE COMPONENTS AND APPLICATIONS**

BJT: Structure and input-output characteristics of a BJT, The Unbiased Transistor, Transistor Currents , Biased Transistor, a single stage voltage divider biasing, Emitter Bias, The CE Connections, The Base Curve, Collector curve, Transistor approximation Variation in current Gain, The Load Line, The Operating point, Recognizing Saturation, BJT as a switch & Amplifiers, LED Drivers.

**[5] OSCILLATORS**

General form of oscillator, Sinusoidal oscillator, phase shift oscillator, Crystal Oscillator.

**[6] MOSFET**

MOS physics and mode of operations, nFET current-voltage relationship, MOS pass characteristics and CMOS inverter, Dynamic RAM (DRAM) 1T bit-cell.

**[7] FIBER OPTICS**

Fiber Optics and Optoelectronics, Historical Developments, A Fiber-Optic Communication System, Advantages of Fiber-Optic Systems, Ray Propagation in Optical Fibers, Fundamental Laws of Optics, Ray Propagation in Step-Index Fibers, Ray Propagation in Graded-Index Fibers

## **[8] COMMUNICATION SYSTEMS**

Communication system components, Analog modulation- AM, FM, PM. Digital modulation- ASK, FSK, PSK

### **TEXT / REFERENCE BOOKS**

- 1) Electronics Principles, Albert Paul Malvino, 6<sup>th</sup> Edition, Tata McGraw Hill
- 2) David Griffiths, Introduction to Electrodynamics
- 3) S. M. Sze, Semiconductor Devices: Physics and Technology, Wiley (2008).
- 4) R.P Khare, Fiber Optics and Optoelectronics, Oxford University Press
- 5) Sanjay Sharma, Communication Systems: Analog and Digital
- 6) Halliday and Resnick, Physics
- 7) W. Saslow, Electricity, magnetism and light
- 8) Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-Hill Inc. (1995).
- 9) B. E. A. Saleh and M. C. Teich, Fundamentals of Photonics, John Wiley & Sons, Inc., (2007).
- 10) Yariv and P. Yeh, Photonics: Optical Electronics in Modern Communications, Oxford University Press, New York (2007).
- 11) P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997)
- 12) Behrouz A. Forouzan, Data communication and networking.
- 13) B. P lathi, Modern Digital and Analog Communication Systems, Third edition.

**B. TECH. SEMESTER II (EC/CE/IT)**  
**SUBJECT: HARDWARE WORKSHOP**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
0	0	4	4	2	-	-	100*	-	100

Reference Code ESC202

\*TW Marks includes Viva based on TW

## DETAILED SYLLABUS

**[1] ELECTRONIC COMPONENTS**

Digital Multi-meter, Power Supply, Function Generator, Cathode Ray Oscilloscope, Digital Oscilloscope, Measurement of Phase Difference in single phase circuit, Various Electrical and Electronics component like LED, LDR, Photo-diode, MOSFET, MCB and Relay.

**[2] COMPUTER HARDWARE**

Introduction to a personal computer and its basic peripherals, installation of Operating System Software and the required device drivers. Students are suggested to perform similar tasks on the Laptop scenario wherever possible.

**[3] PERIPHERALS**

Programming of Computer Ports & Interfacing of Electronic Components, Cables and Connectors like RJ45, RS232 and CRO probe.

**[4] INTERNET**

Introduction to Internet & World Wide Web modules, Making a PC Internet ready: Introduction to Internet and TCP/IP, Ethernet Connection, WiFi connection, configure TCP/IP (IP, Gateway, DNS, and Proxy), and use of ping command, Information sharing and data transfer over Local Area Network and Internet.

**[5] WEB INFRASTRUCTURE**

Basic Components of Web Sites, Front end & back end tools and technology. HTML & CSS, Developing, Configuring and deploying a website.

**[6] IOT BOARDS AND CIRCUIT SIMULATION**

Introduction to IOT boards like Arduino, Raspberry Pie etc. Interfacing, Circuit designing and PCB designing.

**[7] MINI PROJECT**

Student will develop a mini project related to the topics listed above.

## **TEXT / REFERENCE BOOKS**

- 1) Electronic Components and Materials Principles, Dr. Madhuri A Joshi, 2nd Edition, Shroff Publishers & Distributors PVT. LTD.
- 2) A Textbook of Computer Hardware and Networking, Jyotika Deshmukh, D J Publications
- 3) Learning Web Design, Jennifer Robbins, 4<sup>th</sup> edition, O'Reilly Media

**B.TECH. SEMESTER II (EC/CE/IT)**  
**SUBJECT: ENGLISH**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
2	0	2	4	3	40	-	50*	-	90

Reference Code HSMC201

\*TW Marks includes Viva based on TW

**DETAILED SYLLABUS**

**[1] VOCABULARY BUILDING**

The concept of Word Formation, Root words from foreign languages and their use in English, Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives, Synonyms, antonyms, and standard abbreviations.

**[2] BASIC WRITING SKILLS**

Sentence Structures, Use of phrases and clauses in sentences, Importance of proper punctuation, Creating coherence, Organizing principles of paragraphs in documents, Techniques for writing precisely

**[3] IDENTIFYING COMMON ERRORS IN WRITING**

Subject-verb agreement, Noun-pronoun agreement, Misplaced modifiers, Articles, Prepositions, Redundancies, Clichés

**[4] NATURE AND STYLE OF SENSIBLE WRITING**

Describing, Defining, Classifying, Providing examples or evidence, Writing introduction and conclusion

**[5] WRITING PRACTICES**

Comprehension, Précis Writing, Essay Writing

**[6] ORAL COMMUNICATION**

(This unit involves interactive practice sessions in Language Lab) Listening Comprehension, Pronunciation, Intonation, Stress and Rhythm, Common, Everyday Situations: Conversations and Dialogues, Communication at Workplace, Interviews, Formal Presentations

**TEXT / REFERENCE BOOKS**

- 1) Practical English Usage. Michael Swan. OUP. 1995.
- 2) Remedial English Grammar. F.T. Wood. Macmillan.2007
- 3) On Writing Well. William Zinsser. Harper Resource Book. 2001
- 4) Study Writing. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press. 2006.
- 5) Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
- 6) Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

**B. TECH. SEMESTER – II (EC/CE/IT)**  
**SUBJECT: ENVIRONMENTAL STUDIES**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
2	0	0	2	0	40	--	--	--	40

Reference Code MC-II

**DETAILED SYLLABUS**

**[1] THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES**

Definition, scope and importance & Need for public awareness

**[2] NATURAL RESOURCES**

Renewable and non-renewable resource: Natural resources and associated problems, Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams, and their effects on forests and tribal people, Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefit and problems, Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies, Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies, Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies, Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification, Role of an individual in conservation of natural resources. Equitable use of resources of sustainable lifestyles

**[3] ECOSYSTEMS**

Concept of an ecosystem, Structure and function of an ecosystem, producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids, Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem and Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries)

**[4] BIODIVERSITY AND ITS CONSERVATION**

Introduction definition: Genetic, species and ecosystem diversity, Bio-geographical classification of India, Value of biodiversity: Consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, national and local levels, India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity, habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity

**[5] ENVIRONMENTAL POLLUTION**

Definition, Causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste management, causes, effects and control measures of urban and industrial wastes, Role of an

individual in prevention of pollution, Pollution case studies, Disaster management: floods, earthquake, cyclone and landslides

#### **[6] SOCIAL ISSUES AND THE ENVIRONMENT**

From unsustainable to sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people: its problems and concerns. Case studies, Environmental ethics: Issues and possible solutions, Climate change: Global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Case studies, Wasteland reclamation, Consumerism and waste products, Environment Protection Act: Air (Prevention and Control of Pollution) Act, Water (Prevention & Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness

#### **[7] HUMAN POPULATION AND THE ENVIRONMENT**

Population growth, variation among nations, population explosion, Family Welfare Program, environment and human health, human rights, Value education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environmental and human health, Case studies

#### **[8] FIELD WORK**

Visit to a local area to document environmental assets (river/forest/grassland/hill/mountain), Visit to a local polluted site - Urban/Rural/Industrial/Agricultural, Study of common plants, insects, birds, Study of simple ecosystems – pond, river, hill, slopes etc.

### **TEXT / REFERENCE BOOKS**

- 1) Erach Bharucha Textbook of Environmental Studies; Second Edition, Universities Press:Hyderabad, 2013.
- 2) Rajagopalan, R. Environmental Studies; Oxford University Press: India, 2015.
- 3) Varandani, N. S. Basics of Environmental studies; Lambert Academic Publishing: Germany,2013.
- 4) Rao, C. S. Environmental Pollution Control Engineering; Wiley publishers: New Delhi, 2006.
- 5) Clark, R. S. Marine Pollution; Clarendon Press Oxford: Bath, 2001.
- 6) Cunningham, W.P.; Cooper; Gorhani, T. H. E.; Hepworth, M.T., Environmental Encyclopedia;Jaico Publ. House: Mumbai, 2001.
- 7) De, A. K. Environmental Chemistry; Wiley Eastern: New Delhi, 2006.

**B. TECH. SEMESTER – III (CE)**  
**SUBJECT: DATABASE MANAGEMENT SYSTEMS**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
4	0	2	6	5	60	40	25	25	150

Reference Code CS501

**A. DETAILED SYLLABUS**

**[1] BASIC CONCEPTS**

Purpose of database system, View of data, Database abstraction and Models, Database Languages, Transaction management, Storage management, Database administrator, Database users, Overall system structure.

**[2] ENTITY RELATION MODEL**

Entity sets, Relationship sets, Attributes, Constraints, Keys, Entity relationship diagrams, Weak entity sets, Generalization, Specialization, Aggregation, Design of an E-R database schema, Reduction of an E-R schema to tables.

**[3] RELATIONAL DATABASE MANAGEMENT SYSTEM**

Relational Model, Structure of database, Relational algebra, Extended relational algebra operation, tuple relational calculus, Domain relational calculus, Modification of database, Views, Structured Query Language, Background, Basic structure, Integrity Constraints, Domain constraints, Referential integrity, Assertions, Triggers, Functional Dependencies, Database Pitfalls in relational database design, Decomposition, Normalization, I,II,III normal Forms, Normalization using functional dependencies, Normalization using multi valued dependencies, Domain key normal form, Alternative approach to database design

**[4] FILE SYSTEM STRUCTURE**

Indexing & Hashing, File organization, Organization of records in files, Data dictionary storage, Basic concepts of indexing, Order indices, B- Tree index files, B+ -Tree index files, Static hashing & Dynamic Hashing.

**[5] QUERY PROCESSING**

Overview, Catalog information for cost estimation, Measures of query cost, Selection operation, Sorting, Join operation, Other operations, Choice of evaluation plans

**[6] TRANSACTION PROCESSING**

Transaction concepts, Transaction state, Implementation of atomicity & durability, Concurrent executions, Serializability, Conflict serializability, View serializability, Testing of conflict and view serializability.

**[7] CONCURRENCY CONTROL**

Lock based protocols, Time-stamp based protocol, Validation based protocol, Multiple granularity, Multi-version schemes, Deadlock handling, Insert & delete operations, Concurrency in index structures.

**[8] RECOVERY SYSTEM**

Failure classification, Storage structure, Recovery & Atomicity, Log-based recovery,

Shadow paging, Recovery with concurrent transactions, Buffer management, Failure with loss of non-volatile storage, Advance recovery techniques.

[9] **DISTRIBUTED DATABASE**

Security and Integrity of data base

**B. RECOMMENDED TEXT / REFERENCE BOOKS**

1. "Data Base System Concepts", Henry F. Korth and A. sIberschatz 2<sup>nd</sup> Edition, McGraw-Hill 1991.
2. "An Introduction to Database Systems", C.J.Date, Pearson Publication

**B. TECH. SEMESTER – III (CE)**  
**SUBJECT: DESIGN OF DIGITAL CIRCUITS**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
4	0	2	6	5	60	40	25	25	150

Reference Code ESC302

**A. DETAILED SYLLABUS**

[1] **BINARY SYSTEMS**

Introduction to Digital Computers and Digital Systems, Binary Numbers, Number Base Conversion, Octal and Hexadecimal Numbers, complements, binary Codes, Binary Storage and Registers, Binary Logic, Integrated Circuits.

[2] **BOOLEAN ALGEBRA AND LOGIC GATES**

Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates, IC Digital Logic Families.

[3] **SIMPLIFICATION OF BOOLEAN FUNCTIONS**

The Map Method, Two and Three Variable Maps, Four-Variable Map, Five and Six Variable Maps, Product of Sums Simplification, NAND and NOR Implementations, Don't-Care Conditions, The Tabulation Method, Determination of Prime-Implicants, Selection of Prime-implicants, Concluding Remarks.

[4] **COMBINATIONAL LOGIC**

Introduction, Design Procedure, Adders, Subtractors, Code Conversion, Analysis Procedure, Multilevel NAND Circuits, Multilevel NOR Circuits, Exclusive OR and Equivalence Functions.

[5] **COMBINATIONAL LOGIC WITH MSI AND LSI**

Introduction, Binary Parallel Adder, Decimal Adder, Magnitude Comparator, Decoders, Multiplexers, Read-Only Memory (ROM), Programmable Logic Array (PLA), Concluding Remarks.

[6] **SEQUENTIAL LOGIC**

Introduction, Flip-Flops, Triggering of Flip-Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Flip-Flop Excitation Tables, Design Procedure, Design of Counters, Design with State Equations.

[7] **REGISTER, COUNTERS AND THE MEMORY UNIT**

Introduction, Registers, Shift Registers, Ripple Counters, Synchronous Counters, Timing Sequences, The Memory Unit, Examples of Random Access Memories.

[8] **DIGITAL INTEGRATED CIRCUITS**

Introduction, Bipolar Transistor Characteristics, RTL and DTL Circuits, Integrated-Injection Logic, Transistor-Transistor Logic, Emitter-Coupled logic, Metal-Oxide Semiconductor, Complementary MOS.

[9] **VERILOG**

Introduction, Overview of Digital Design with Verilog HDL, Gate-level Modeling ( full addre, multiplexer, full subtractor, comparator, decoder, demultiplexer, Flip-flops)

**B. RECOMMENDED TEXT / REFERENCE BOOKS**

1. Digital Logic and Computer Design, M.Morris Mano
2. VERILOG HDL, Samir Palmitkar, Pearson Education

B. TECH. SEMESTER – III (CE)  
**SUBJECT: PROBABILITY AND STATISTICS**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
2	0	0	2	2	40	-	-	-	40

Reference Code BSC201

### A. DETAILED SYLLABUS

[1] **BASIC PROBABILITY**

Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, the multinomial distribution, Poisson approximation to the binomial distribution, infinite sequences of Bernoulli trials, sums of independent random variables; Expectation of Discrete Random Variables, Moments, Variance of a sum, Correlation coefficient, Chebyshev's Inequality.

[2] **CONTINUOUS PROBABILITY DISTRIBUTION**

Continuous random variables and their properties, distribution functions and densities, normal, exponential and gamma densities.

[3] **BIVARIATE DISTRIBUTION**

Bivariate distributions and their properties, distribution of sums and quotients, conditional densities, Bayes' rule.

[4] **BASIC STATISTICS**

Measures of Central tendency: Moments, skewness and Kurtosis – Probability distributions: Binomial, Poisson and Normal – evaluation of statistical parameters for these three distributions, Correlation and regression – Rank correlation.

### B. RECOMMENDED TEXT / REFERENCE BOOKS

1. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 2000.
2. E. Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, 2006.
3. P. G. Hoel, S. C. Port and C. J. Stone, "Introduction to Probability Theory", Universal Book Stall, 2003.
4. S. Ross, "A First Course in Probability", Pearson Education India, 2002.
5. W. Feller, "An Introduction to Probability Theory and its Applications", Vol. 1, Wiley, 1968.
6. N.P. Bali and M. Goyal, "A text book of Engineering Mathematics", Laxmi Publications, 2010.
7. T. Veerarajan, "Engineering Mathematics", Tata McGraw-Hill, New Delhi, 2010.

**B. TECH. SEMESTER – III (CE)**  
**SUBJECT: UNIVERSAL HUMAN VALUES**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
3	0	0	3	3	60	-	-	-	60

Reference Code HSMC301

**A. DETAILED SYLLABUS**

**[1] COURSE INTRODUCTION**

**Need, Basic Guidelines, Content and Process for Value Education** Self Exploration–what is it? - its content and process; ‘Natural Acceptance’ and Experiential Validation- as the mechanism for self exploration, Continuous Happiness and Prosperity- A look at basic Human Aspirations, Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority, Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario, Method to fulfill the above human aspirations: understanding and living in harmony at various levels

**[2] UNDERSTANDING HARMONY IN THE HUMAN BEING**

**Harmony in Myself!** Understanding human being as a co-existence of the sentient ‘I’ and the material ‘Body’, Understanding the needs of Self (‘I’) and ‘Body’ - Sukh and Suvidha, Understanding the Body as an instrument of ‘I’ (I being the doer, seer and enjoyer), Understanding the characteristics and activities of ‘I’ and harmony in ‘I’, Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure Sanyam and Swasthya

**[3] UNDERSTANDING HARMONY IN THE FAMILY AND SOCIETY**

**Harmony in Human-Human Relationship** Understanding Harmony in the family – the basic unit of human interaction, Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship, Understanding the meaning of Vishwas; Difference between intention and competence, Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship, Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals, Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha )- from family to world family!

**[4] UNDERSTANDING HARMONY IN THE NATURE AND EXISTENCE**

**Whole existence as Co-existence :** Understanding the harmony in the Nature, Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature, Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence

**[5] IMPLICATIONS OF THE ABOVE HOLISTIC UNDERSTANDING OF HARMONY ON PROFESSIONAL ETHICS**

Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order, Competence in Professional Ethics, Case studies of typical holistic technologies, management models and production systems, Strategy for transition from the present state to Universal Human Order

**B. RECOMMENDED TEXTBOOK/ REFERENCE BOOKS**

1. R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics, Excel books, New Delhi, 2010, ISBN 978-8-174-46781-2
2. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
3. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J C Kumarappa
8. Bharat Mein Angreji Raj - Pandit Sunderlal

**B. TECH. SEMESTER – III (CE)**  
**SUBJECT: FINANCIAL & MANAGERIAL ACCOUNTING**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
3	0	0	3	3	60	-	-	-	60

Reference Code HSMC401

**A. DETAILED SYLLABUS**

**[1] FINANCIAL ACCOUNTING – AN INTRODUCTION**

Introduction,,Meaning of Accountancy,,Book-keeping and Accounting, Accounting Process, Objectives for accounting, Differences between book-keeping and accounting, Users of accounting information, Limitations of Accounting, Basic terminologies

**[2] ACCOUNTING CONCEPTS, PRINCIPLES, BASES AND POLICIES**

Introduction, Accounting Concepts, Principles, Policies and Standards, Types of accounting concepts, Business Separate entity concept, Going concern concept, Money measurement concept, Periodicity concept, Accrual concept, Accounting Principles, Principle of Income recognition, Principle of expense, Principle of matching cost and revenue, Principle of Historical costs, Principle of full disclosure, Double aspect principle, Modifying Principle, Principle of materiality, Principle of consistency, Principle of conservatism or prudence, Accounting Policies, Changes in Accounting Policies, Disclosure in case of changes in Accounting Policies, Accounting Standards, Scope and functions of Accounting Standards Board, International Financial Reporting System

**[3] DOUBLE ENTRY ACCOUNTING**

Introduction, Meaning of double entry accounting, Classification of accounts under Traditional approach, Classification of accounts under Accounting Equation approach, Comparison of traditional approach with Modern approach equal approach, Accounting Trail, Transactions and events, Meaning and roles of debit and credit, Accounting equation

**[4] SECONDARY BOOKS**

Introduction, Secondary books, Purchases Book/Purchases Day book, Cash discount, Trade discount, Difference between cash discount and trade discount, Sales Book or Sales Day book, Purchase Returns Book, Sales Returns Book, Bills receivable book, Bills payable book , Cash book, Posting to Ledger accounts

**[5] TRIAL BALANCE**

Introduction, Meaning, Objectives of preparing a trial balance, Methods of preparing a trial balance, Preparation of Trial balance, Adjusting Entries, Errors and their rectification, Errors disclosed by Trial Balance,Errors not disclosed by Trial Balance,Steps to locate the errors

**[6] FINAL ACCOUNTS**

Introduction, Adjustments before preparing final accounts, Depreciation, Bad Debts and accounting treatment of bad debts, Provision for doubtful debts, Reserves for Discount on

Debtors, Reserve for Discount on Creditors, Closing Stock, Trading Account, Profit and Loss Account, Balance Sheet

**[7] INTRODUCTION TO MANAGEMENT ACCOUNTING**

Introduction, Meaning of Management accounting, The Role of Management Accounting, Management Accounting Framework, Functions of Management Accounting, Tools of Management Accounting, The Balanced Scorecard, Cost Management System, Value Added Concept, Merits of Management Accounting, Demerits of Management Accounting, Distinction between Management Accounting and Financial Accounting

**[8] FINANCIAL STATEMENT ANALYSIS**

[9] 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

**B. RECOMMENDED TEXTBOOK/ REFERENCE BOOKS**

1. Bhattacharya, S. K.; Dearden, J. Accounting for Management – Text book & cases; Vikash Publishing House: New Delhi, 2009.
2. Kishore, R. M. Advanced Management Accounting; Taxman: New Delhi, 2018.
3. Arora, M. N. A Text Book of Cost Accountancy; Vikas Publishing: Mumbai, 2010.
4. Horngren, C. T.; Foster, S. M.; Datar, G. Cost Accounting – A Managerial Emphasis; Prentice Hall: New Jersey, 1997.
5. Prasad, N. K.; A.K. Prasad Cost Accounting; Book Syndicate: Kolkata, 2016.
6. Edmonds, T. P.; Edmonds, C. D.; Tsay, B.-Y Fundamental Managerial Accounting Concept; Irwin McGraw Hill: Boston, 2013.
7. Bhattacharya, A. Principles and Practice of Cost Accounting; Sultan Chand: New Delhi, 2004.

8. Pillai, R. S. N.; Bhagavati, V. Cost and Management Accounting; Sultan Chand: New Delhi, 2010.
9. Banerjee, B. Cost Accounting – Theory & Practices; Sultan Chand: New Delhi, 2014.
10. Saxena V. K.; Vashist, C. D. Advanced Cost & Management Accounting – Problems & Solutions; Prentice Hall of India: New Delhi, 2015.
11. Maheshwari, S. N. Studies in Cost Management; Sultan Chand & Sons: New Delhi, 2013.
12. Rao, M. E. T. Cost and Management Accounting; New Age International: New Delhi 2004.
13. Rao, M. E. T. Management Accounting; New Age International: New Delhi 2003.

**B.TECH. SEMESTER – III (CE)**  
**SUBJECT: ESSENCE OF INDIAN KNOWLEDGE TRADITION**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
2	0	0	2	0	-	-	-	-	-

Reference Code MC-1

**A. DETAILED SYLLABUS**

**[1] BASIC STRUCTURE OF INDIAN KNOWLEDGE SYSTEM**

Ashtadashvidya, 4 - Ved, 4 - Upved, (Ayurved, dhanurved, gandharvved, sthapatya, etc), 6 – Vedang (shiksha, kalp, nirukti, vyakaran, jyotish, chhand) 4 upang (dharmshastra, mimansa, purana, tarkshastra)

**[2] MODERN SCIENCE AND INDIAN KNOWLEDGE SYSTEM**

Relating modern science with Tradition Indian knowledge, Relevance of Indian Knowledge System

**[3] YOGA AND HOLISTIC HEALTH**

Different types of Yoga, Role of Yoga in building holistic health

**[4] CASE STUDIES**

**B. RECOMMENDED TEXT / REFERENCE BOOKS**

1. V. Sivaramakrishnan (Ed.), Cultural Heritage of India-course material, Bharatiya Vidya Bhavan, Mumbai. 5 th Edition, 2014
2. Swami Jitatmanand, Modern Physics and Vedant, Bharatiya Vidya Bhavan
3. Swami Jitatmanand, Holistic Science and Vedant, Bharatiya Vidya Bhavan
4. Fritz of Capra, Tao of Physics
5. Fritz of Capra, The Wave of life
6. VN Jha (Eng. Trans.), Tarkasangraha of Annam Bhatta, International Chinmay Foundation, Velliarnad, Arnakulam
7. GN Jha (Eng. Trans.), Ed. RN Jha, Yoga-darshanam with Vyasa Bhashya, Vidyanidhi Prakashan, Delhi 2016
8. RN Jha, Science of Consciousness Psychotherapy and Yoga Practices, Vidyanidhi Prakashan, Delhi 2016
9. P B Sharma (English translation), Shodashang Hridayan

**B. TECH. SEMESTER – III (CE)**  
**SUBJECT: WEB DEVELOPMENT WORKSHOP**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
0	0	2	2	1	-	-	25	25	50

Reference Code --

**A. DETAILED SYLLABUS**

**[1] JAVASCRIPT**

Variable Naming Rules and JavaScript Data Types, let vs var, ‘use strict’, operators and expressions, Javascript – flow control (branching and looping)

**[2] JAVASCRIPT FUNCTIONS & ARRAYS**

Javascript functions, function expression, and arrow functions. Javascript template literals, and tagged template literals, Javascript arrays, object literals and constructor functions, avascript: spread operator, destructuring arrays and objects, closure

**[3] DOM & BASIC JQUERY**

**[4] BOOTSTRAP**

Introduction to Bootstrap, Bootstrap Grid, Bootstrap Components, Bootstrap Plug-Ins

**B. RECOMMENDED TEXT / REFERENCE BOOKS**

1. Web Design with HTML, CSS, JavaScript and jQuery Set, by John Ducket, Wiley
2. Javascript: The Good Parts, first edition, by Douglas Crockford, O’Reilly
3. Bootstrap 4 quick start, by Jacob D. Lett, Bootstrap Creative

**B. TECH. SEMESTER – IV (CE)**  
**SUBJECT: DISCRETE MATHEMATICS**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
4	0	0	4	4	60	40	-	-	100

Reference Code CS 401

**A. DETAILED SYLLABUS**

**[1] SETS AND PROPOSITIONS**

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

**[2] PERMUTATION, COMBINATION, DISCRETE PROBABILITIES**

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

**[3] RELATION AND FUNCTIONS**

Relational model of data bases, properties of binary relations, equivalence relation, partitions, partial ordering, lattices, chains and antichains, functions and pigeon-hole principle.

**[4] GRAPHS**

Basic terminology, multi- and weighted graphs, paths, circuits, shortest path, Eulerian path, Traveling Salesman problem, factors of a graph, planar graphs.

**[5] TREES**

Trees, rooted trees, path length, prefix codes, binary search trees, spanning trees and cut-sets, minimum spanning trees, transport networks.

**[6] FINITE STATE MACHINE**

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

**[7] COMPUTABILITY AND FORMAL LANGUAGES**

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

**[8] DISCRETE NUMERICAL FUNCTIONS**

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

**[9] GROUP**

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

## **[10] LATTICES AND BOOLEAN ALGEBRA**

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

### **B. RECOMMENDED TEXT / REFERENCE BOOKS**

1. "Elements of Discrete Mathematics", C.L. Liu, 2nd Ed., McGraw-Hill
2. "Modern Applied Algebra", Birkoff and Bartee, McGraw-Hill, CBS.
3. "discrete mathematics - a unified approach", stephen a. Wiitala, computer science series, mcgraw-hill.

**B. TECH. SEMESTER IV (CE)**  
**SUBJECT: DESIGN & ANALYSIS OF ALGORITHM**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
4	0	2	6	5	60	40	25	25	150

Reference Code CS404

**A. DETAILED SYLLABUS**

- [1] **Introduction to algorithms**
- [2] **Elementary Data structures**
- [3] **Methods for solving recurrence relation for finding time complexity**
- [4] **Overview of searching & sorting techniques**
- [5] **The Greedy Methodology**
- [6] **Dynamic Programming**
- [7] **Graph Traversal & Searching**
- [8] **Backtracking Techniques**
- [9] **Branch & Bound Techniques**
- [10] **Lower bound theory**
- [11] **NP-Hard & NP-Complete problems**

**B. RECOMMENDED TEXT / REFERENCE BOOKS**

1. **Fundamentals of Computer Algorithms** by Horowitz, Sahni, Galgotia Pub.
2. **Fundamentals of Algorithms** by Brassard & Bratley, PHI.
3. **Introduction to Algorithms** by Coreman, Tata McGraw Hill.
4. **The art of Computer Programming Vol.I & III**, Kunth, AddisonWesley.

**B. TECH. SEMESTER – IV (CE)**  
**SUBJECT: COMPUTER SYSTEM ARCHITECTURE**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
4	0	2	6	5	60	40	25	25	150

Reference Code CS402

**A. DETAILED SYLLABUS**

**[1] BASIC FUNCTIONAL BLOCKS OF A COMPUTER**

CPU, memory, input-output subsystems, control unit, datapath design, interconnection structure, register transfer language, register transfer, bus and memory transfers, arithmetic logic shift unit

**[2] DATA REPRESENTATION**

signed number representation, fixed and floating point representations, character representation, IEEE 754 standard of representation

**[3] BASIC COMPUTER ORGANIZATION AND DESIGN**

Instruction codes, computer registers, computer instructions, timing and control, instruction cycle, memory reference instructions, I/O instructions, design of accumulator logic.

**[4] DATAPATH DESIGN**

Computer arithmetic - integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication - shift-and-add, Booth multiplier, carry save multiplier, etc. Division - non-restoring and restoring techniques, floating point arithmetic

**[5] CONTROL UNIT DESIGN**

Hardwired control, micro programmed control, nano programmed control

**[6] PROGRAMMING THE BASIC COMPUTER**

Introduction, machine language, assembly language, the assembler, program loops, programming arithmetic and logic operations, subroutines, I/O programming.

**[7] CENTRAL PROCESSING UNIT**

Register organization, stack organization, instruction format, addressing mode, data transfer and manipulation, program control, RISC processors.

**[8] PIPELINING**

Basic concepts of pipelining, throughput and speedup, pipeline hazards.

**[9] INPUT OUTPUT ORGANIZATION**

Peripheral devices, I/O interface, asynchronous data transfer, modes of transfer, priority interrupt, DMA, I/O processors, serial communication

**[10] MEMORY ORGANIZATION**

Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs. block size, mapping functions, replacement algorithms, write policy.

**[11] CASE STUDY : 8085 MICROPROCESSOR**

## **B. RECOMMENDED TEXT / REFERENCE BOOKS**

1. Computer System Architecture by Morris Mano, 3<sup>rd</sup> Ed., PHI
2. Computer Architecture and Organization by John P. Hayes, Computer science series, McGRAW-HILL
3. Microprocessor Architecture, Programming and Applications With The 8085 by R.S. Gaonkar 5<sup>th</sup> Ed., CBS Publisher
4. Computer Organization and Design: The Hardware/Software Interface by David A. Patterson and John L. Hennessy, Elsevier.
5. Computer Organization by Carl Hamachar, Zvonco Vranesic and Safwat Zaky, McGraw Hill.
6. Computer Organization and Architecture: Designing for Performance by William Stallings, Pearson Education.

**B. TECH. SEMESTER - IV (CE)**  
**SUBJECT: JAVA TECHNOLOGIES**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
4	0	2	6	5	60	40	25	25	150

Reference Code CS503

**A. DETAILED SYLLABUS**

**[1] LANGUAGE FUNDAMENTALS**

The Java Environment: Java Program Development, Java Source File Structure, Compilation Executions, Basic Language Elements: Lexical Tokens, Identifiers, Keywords, Literals, Comments, Primitive Data-types, Operators

**[2] CLASSES & OBJECTS IN JAVA**

Class, Object and Object reference, Object Life time and Garbage Collection, Creating and Operating Objects, Constructor and initialization code block, Access Control, Modifiers, Nested class, Inner Class, Anonymous Classes, Abstract Class and Interfaces, Defining Methods, Method Overloading, Dealing with Static Members, Use of “this” reference, Use of Modifiers with Classes & Methods.

**[3] IMPLEMENTING INHERITANCE & POLYMORPHISM**

Types of Inheritance in Java, Inheriting Data Members and Methods, Role of Constructors in inheritance, Overriding Super Class Methods, Use of “super”, Polymorphism in inheritance, Type Compatibility and Conversion, Implementing interfaces.

**[4] PACKAGE**

Organizing Classes and Interfaces in Packages, Package as Access Protection, Defining Package, CLASSPATH Setting for Packages, Making JAR Files for Library Packages, Import and Static Import, Naming Convention for Packages

**[5] EXCEPTION HANDLING**

Exceptions & Errors, Types of Exception, Control Flow In Exceptions, JVM reaction to Exceptions, Use of try, catch, finally, throw, throws in Exception Handling, In-built and User Defined Exceptions, Checked and Unchecked Exceptions

**[6] ARRAY & STRING HANDLING**

Array basics, String Array, String class, StringBuffer and StringBuilder class, String Tokenizer Class and Object Class

**[7] MULTI-THREADED PROGRAMMING**

Understanding Threads, Needs of Multi-Threaded Programming, Thread Life-Cycle, Thread Priorities, Synchronizing Threads, Inter Communication of Threads

**[8] INPUT/OUTPUT OPERATION IN JAVA**

Streams and the new I/O Capabilities, Understanding Streams, The Classes for Input and Output, The Standard Streams, Working with File Object, File I/O Basics, Reading and Writing to Files, Buffer and Buffer Management, Read/Write Operations with File, Channel,

Serializing Objects

**[9] COLLECTION FRAMEWORK & GENERICS**

Collections of objects, Collections: Sets, Sequence, Map, Understanding Hashing, Use of Array List & Vector, Generics Class, Lambda Expression, Functional Reference, Method Reference, Optional Classes, Processing data with streams

**[10] NEW APIS (JAVA 8) AND JDBC CONCEPTS**

Lambda Expressions, Method References, Default method, Stream API, Date Time API  
Introduction to Java Database Connectivity(JDBC), Types of JDBC Drivers, Steps to create JDBC Application, JDBC API Classes and Interfaces

**[11] INTRODUCTION TO JAVAEE**

Web Server, N-tier Architecture, Introduction to web Container and Structure of web Application

**[12] JAVA SERVLETS**

A simple Web Application, HTTP Protocol, Servlet Interface, Servlet LifeCycle, Servlet Configuration and Exceptions, Servlet Request and Responses, Session Tracking with JavaServlet, Servlet Context, Servlet Listeners

**[13] JAVA SERVER PAGES**

Introduction to JSP, its lifecycle, Scripting Elements, Comments, Implicit objects, JSP Directives, JSP Standard Actions and JSTL

**[14] HIBERNATE FRAMEWORK**

Introduction to O-R Mapping Hibernate Basics, Hibernate Architecture, Hibernate Configurations, POJO (Plain Old Java Objects) classes and O/R Mapping Object Identifier, Hibernate mapping (One-to-One Association, One-to-Many Association Many-to-One Association, Many-to-Many Association, Collection Mapping, Component mapping), Inheritance Mapping, Hibernate Query Language, Criteria Queries, Hibernate in Web Application.

**[15] SPRING FRAMEWORK**

Introduction, The IoC Container and Beans, The Application Context, Dependency Injection, Data Validation and Type Conversion, Package Dependencies and Build Tool (Maven / Gradle), Spring Boot with Initializer, Test Driven development with Spring Boot, Aspect Oriented Programming, Spring Web MVC, Spring and Persistence, Securing a Web Application

**B. RECOMMENDED TEXT / REFERENCE BOOKS**

1. Core Java Volume I –Fundamentals, 8th Edition by Cay Horstmann and Gray Cornell, Pearson Education
2. Java 8 in Action: Lambdas, Streams, and Functional-style Programming by Raoul-Gabriel Urma, Mario Fusco, and Alan Mycroft, Manning publications
3. Professional Java Server Programming by Subrimanyan & Cedric, SPD Publications
4. Spring in Action , 5<sup>th</sup> edition , by Craig Walls, MANNING Publications
5. Hibernate in Action by Christian Bauer and Gavin King, MANNING Publications

6. Thinking in Java by Bruce Eckel, 4thEd., Pearson Education.
7. Learning Java by By Patrick Niemeyer and Jonathan Knudsen, 4thEd., O'reilly Media.
8. Head First Servlets and JSP, 2<sup>nd</sup> edition, by Bert Bates, Kathy Sierra & Bryan Basham, O'Reilly Media.
9. J2EE Complete Reference, James Keogh, TMH.

## B. TECH. SEMESTER – IV (CE)

### SUBJECT: VISUAL TECHNOLOGY

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
4	0	2	6	5	60	40	25	25	150

Reference Code CS503

#### A. DETAILED SYLLABUS

**[1] INTRODUCTION**

Introduction to Windows programming, introduction to VC++ IDE

**[2] WINDOWS GUI PROGRAMMING**

Messages (Message passing and handling), GDI Objects (Pen, Brush, etc.), Mouse Handling, Keyboard Handling, Mapping Modes, Menu, Tool bar and Status bar, Scrolling and Splitting views

**[3] DOCUMENT/VIEW ARCHITECTURE**

Serialization ( storing and retrieving to and from disk)

**[4] MULTI-THREADED PROGRAMMING**

**[5] DIALOG BASED APPLICATION**

Model and Model-less dialogues, Windows dialog controls, Buttons, Edit box, Check box, Radio Button, combo box, list box, Animation control, spin control, slider control, Tree view control, List view control.

**[6] ACTIVE X CONTROL**

Using Active X control, Creating Active X control

**[7] DATABASE CONNECTIVITY USING DAO**

**[8] DLL DEVELOPMENT**

#### B. RECOMMENDED TEXT / REFERENCE BOOKS

1. Mastering Visual C++ 6.0, By: Michael J. Young.
2. Programming with microsoft visual c++ 6.0, by devid j. kruglicnski, george shepherd., scot wings.

**B. TECH. SEMESTER – IV (CE)**  
**SUBJECT: SOFTWARE ENGINEERING PRINCIPLE AND PRACTICES**

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess	TW	Prac	Total
4	0	2	6	5	60	40	25	25	150

Reference Code CS-S

**A. DETAILED SYLLABUS**

**[1] INTRODUCTION TO SOFTWARE ENGINEERING**

**[2] PROCESS MODELS**

Traditional Models, Unified Process models and Agile Models

**[3] PROCEDURAL MODELING**

Requirement engineering: Requirement engineering Process, Eliciting requirements, SRS, Design concepts and principles, Architectural design, User interface design, Component level design, Deployment-level Design Elements

**[4] OBJECT ORIENTED MODELING**

Classes, Object, UML Diagrams: Use case, Sequence, Class, State, Activity, Sequence, Component, and Deployment.

**[5] TESTING STRATEGY AND TACTICS**

Software Testing strategies, White box testing, Basis path testing, Control structure testing, Black box testing, Object oriented testing.

**[6] AGILE SOFTWARE DEVELOPMENT**

Scrum, Xtreme Programming, Continuous Integration and Continuous Delivery, Test driven development.

**[7] VERSION CONTROL AND SOFTWARE DEVELOPMENT PLATFORM**

Version Control and change management, git, introduction to online tools and platforms, GitHub, Jira, DevOps, Azure, and Jenkin

**B. RECOMMENDED TEXT / REFERENCE BOOKS**

1. Software Engineering, Pressman, McGraw-Hill, 1992
2. Object oriented modeling and design with UML, M. Blaha and J. Rumbaugh
3. Agile Software Development with SCRUM, Ken Schwaber and Mike Beedle
4. Grady Booch, Object Oriented Analysis & Design, Benjamin/Cummings, 1994

## B. TECH. SEMESTER – IV (CE)

### SUBJECT: SOFTWARE PROJECT

Teaching Scheme (Hours/Week)				Credits	Examination Scheme				
Lect	Tut	Prac	Total		Ext	Sess.	TW	Pract.	Total
0	0	2	2	1	-	-	25	25	50

Reference Code CS601

#### A. DETAILED SYLLABUS

##### [1] PROJECT BASED LEARNING

- Student at the beginning of a semester may be advised by his/her supervisor (s) for recommended courses.
- Students will work together in a team (at most three)
- Students are required to get approval of project definition from the department.
- After approval of project definition students are required to report their project work on weekly basis to the respective internal guide.
- Project will be evaluated at least once per week in laboratory Hours during the semester and final submission will be taken at the end of the semester as a part of continuous evaluation.

#### B. RECOMMENDED TEXT / REFERENCE BOOKS

NA