

B. TECH. SEMESTER I  
SCHEME & SYLLABUS FOR THE SUBJECT  
AF111 - MATHS I

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
3	1	-	60	40	-	-	100	4

[A] 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.

[B] SUCCESSIVE DIFFERENTIATION :

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

[C] INTEGRAL CALCULUS :

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

[D] REDUCTION FORMULA FOR

$\sin x \, dx$ ,  $\cos x \, dx$ ,  $\sin x \cos x \, dx$ ,  $\tan x \, dx$  and  $\cot x \, dx$  etc.

[E] BETA AND GAMMA FUNCTION :

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

[F] CO-ORDINATE GEOMETRY OF THREE DIMENSIONS :

Direction cosines, angle between two straight lines, the plane and the straight line, the shortest distance between two skew Lines sphere.

**Text Books :-**

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

**Reference Books :-**

- 1) Engineering Mathematics-I, By : Shanti Narayan, S. Chand & Company (PVT.) Ltd.
- 2) Applied Mathematics, By : P.N. & J.N. Wartikar,
- 3) Engineering Mathematics-I By : I.B. Prasad

B. TECH. SEMESTER I  
SCHEME & SYLLABUS FOR THE SUBJECT  
AF 122 - BASIC ELECTRICAL & ELECTRONICS ENGINEERING

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
3	1	2	60	40	25	25	150	5

**[A] FUNDAMENTALS OF CURRENT ELECTRICITY AND DC CIRCUITS**

Introduction, Computation of Resistance at constant temperature, Temperature dependence of Resistance, Computation of Resistance at different temperatures, Ohm's law statement, Illustration and limitation, Kirchhoff's laws-statement and illustration, Resistance in parallel and current division technique, Method of solving a circuit by Kirchhoff's laws.

**[B] MAGNETIC CIRCUITS**

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

**[C] 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), and Coupling coefficient between two magnetically coupled circuits (K).

**[D] AC FUNDAMENTALS**

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

**[E] SINGLE PHASE AC CIRCUITS**

Introduction, j operator, Complex algebra, Representation of alternating quantities in rectangular and polar forms, RL series circuit, RC series circuit, RLC series circuit, Admittance and its components, Simple method of solving parallel AC circuits, Resonance.

**[F] ELECTRICAL MACHINES**

Working principles of DC generator, DC motor, Transformer, Three phase Induction Motor.

**[G] 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, DC resistance of a diode.

**[H] DIODE CIRCUITS**

The sine wave, The transformer, The half wave rectifier, The full wave rectifier, The bridge rectifier, The capacitor input filter, Diode clipper circuits, Diode clamper circuit.

**[I] SPECIAL PURPOSE DIODES**

The zener diode, The zener regulator, Optoelectronic devices.

**Text Books :-**

- 1) Basic Electrical, Electronics and Computer Engineering. By: R.Muthusubramanian, S.Dslivshsn, K.A.Muraleedharan  
Tata McGraw Hill Publishing Co Ltd (1994), New Delhi.
- 2) Electronics Principles By: Albert Paul Malvino Tata McGraw Hill Publishing Co.Ltd, New Delhi.

**Reference Books :-**

- 1) Electrical Engineering. By: B. L. Theraja
- 2) Electrical Machines By: B.L.Theraja

B. TECH. SEMESTER I  
SCHEME & SYLLABUS FOR THE SUBJECT  
CT 116 - ELE. OF LINUX OS & C PROG.-I

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
3	1	2	60	40	25	25	150	5

- **Basics of Operating System**
- **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, whatis, apropos
- **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.
- **General Purpose Utility**
  - cal, date, echo, bc, script, who, uname
- **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,
- **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.
- **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.
- **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.
- **Basics of Process**
- **Text Editor: vi**
- **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.
- **Overview of C**
- **Constants, Variables and Data Types**
- **Operators and Expressions**
- **Managing Input Output Operations**
- **Decision making and Branching**
- **Decision making and Looping**

**Text Books:**

1. Unix : Concepts and Applications by Sumitabha Das, 4<sup>th</sup> Ed., Tata McGraw Hill

2. Programming in ANSI C by Balaguruswamy, 5<sup>th</sup> Ed., Tata McGraw Hill

**Reference Books:**

1. Let Us C by Yashvant Kanetkar, 12<sup>th</sup> Ed., BPB Publication
2. Programming in C by Ashok N. Kamthane, 2<sup>nd</sup> Ed., Pearson Education
3. Linux Programming By Example : The Fundamentals 1st Edition, Pearson Education

B. TECH. SEMESTER I  
SCHEME & SYLLABUS FOR THE SUBJECT  
AF 114 - ENGINEERING MECHANICS

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	1	1	60	40	25	25	150	5.5

**[A] 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) Nonconcurrent 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.

**[B] DYNAMICS :**

Rectilinear motion, Circular motion, Projectiles, Relative velocity, Instantaneous centre 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.

Term work:-  
1) Experiments  
2) Problems based on theory .

**Text Books :-**

- 1) Mechanics for Engineers - Statics By : F.P.Beer and E.R.Johnston Jr.
- 2) Mechanics for Engineers - Dynamics By :F.P.Beer and E.R.Johnston Jr.
- 3) Engineering Mechanics: Statics & Dynamics By: A.K.Tayal

B. TECH. SEMESTER I  
SCHEME & SYLLABUS FOR THE SUBJECT  
AF 115 – ENGINEERING GRAPHICS

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
3	1	3	60	40	-	-	50	5.5

Syllabus of the subject is divided into following four equal parts.

**Part- I**

**[A] PLANE GEOMETRY :**

Construction of curves used in engineering such as conics, Cycloidal curves, involutes, spirals ,Loci of points of simple moving mechanisms.

**[B] MACHINE PARTS :**

Types of threads, Bolts & Nuts, Locking devices for nuts, Couplings ,Cotter and Knuckle joints, bearings, riveted joints.

**Part - II :**

**SOLID GEOMETRY :**

Projections of Points, Lines & Planes, right & regular solids (Prisms, Pyramids, cylinder and cone), Sections of Solids.

**Part - III :**

**[A] RTHOGRAPHIC PROJECTIONS :**

Conversion of pictorial views into orthographic projections with section. Types of section - Full ,section, half section ,Offset section , Local section, Partial Section, Conventions adopted for sectional views, interpretation of orthographic views , missing lines & views

**[B] ISOMETRIC PROJECTIONS :**

Conversion of orthographic views into isometric projections and views.

**[C] COMPUTER GRAPHICS :**

Introduction to Computer Graphics.

**Part - IV :**

**[A] BUILDING DRAWING :**

Preparation of working drawing (including plan , elevation and section ) of single storey buildings. go-downs and factories from a given line sketch or given measurements.

**[B] ELECTRICAL & ELECTRONIC DRAWING :**

Electric wiring diagrams for buildings of different types and domestic appliances, standard electrical symbols, main and distribution boards , simple earthing , Electronic symbols, Electronics circuit diagrams.

**Term Work:-**

The term work shall be based on the above syllabus.

**Text books :-**

- 1) Engineering Drawing. By : N.D. Bhatt
- 2) Engineering Drawing Vol : 1 By : P.J. Shah
- 3) Engineering Drawing Vol : 2 By : P.J. Shah
- 4) Machine Drawing -by N.D. Bhatt

**Reference book :-**

- 1) Fundamentals of Engineering Drawing. By : Luzadder
- 2) A Text Book of Geometrical Drawing. By : P.S.Gill
- 3) A Text Book of Machine Drawing. By : P.S.Gill

B. TECH. SEMESTER I  
SCHEME & SYLLABUS FOR THE SUBJECT  
AF 116 - WORKSHOP-I

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
-	-	3	-	-	-	50	50	1.5

[A] INSTRUCTION :

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

[B] DEMONSTRATIONS :

Operation of wood working machines.

[C] TERM WORK :

Each candidate shall submit the following term work.

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

B. TECH. SEMESTER II  
SCHEME & SYLLABUS FOR THE SUBJECT  
AF 201 - MATHEMATICS-II

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
3	1	-	60	40	-	-	100	4

[A] 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.

[B] 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.

[C] 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.

[D] 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  $\sin^n \theta \cos^n \theta$  in a series of Sines or Cosines of multiples of  $\theta$ , Hyperbolic functions, Formulae of hyperbolic functions, Inverse hyperbolic functions, Logarithm of complex quantities. Separation of real and imaginary parts.  $C + iS$  method.

[E] 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.

**Text Book :-**

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

**Reference Books :-**

- 1) Applied Mathematics for Engineers and Physicists. By : Pipes & Harvill, Mc-Graw Hill Kogakusha Ltd.
- 2) Applied Mathematics By : P.N. & J.N. Wartikar



B. TECH. SEMESTER II  
SCHEME & SYLLABUS FOR THE SUBJECT  
AF 212 - ELECTRONIC PRINCIPLE

Teaching Scheme (Hours/Week)			Exam Scheme					Credit
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	
3	1	2	60	40	25	25	150	5

**[A] BIPOLAR TRANSISTOR**

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

**[B] TRANSISTOR BIASING CIRCUITS**

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

**[C] 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, Introduction to h - Parameters & Comparison with T & PI models.

**[D] CC AND CB AMPLIFIERS**

The CC amplifier, the AC model of an Emitter Follower, Types of coupling, Direct coupling.

**[E] CLASS A AND B POWER AMPLIFIER**

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

**[F] OSCILLATORS**

Theory of sinusoidal oscillation.

**[G] FREQUENCY DOMAIN**

The Fourier series, the spectrum of a signal.

**[H] FREQUENCY MIXING**

Nonlinearity, Medium-signal, operation with one sine wave, Medium signal operation with Two sine waves.

**[I] AMPLITUDE MODULATION**

Basic idea, Percent modulation, AM spectrum, the envelope detector, the super heterodyne Receiver.

**[J] DIGITAL CIRCUITS**

Number systems, Complements, Error detecting codes, Boolean algebra, Logic gate ICs, RTL & DTL logic circuits, and Simple Combinational circuits.

**Text book :-**

- 1) Electronic Principles (Sixth Edition) By: A. P. Malvino Tata McGraw Hill Publishing Co.Ltd, New Delhi.
- 2) Digital and logic circuits By: Morris Mano

B. TECH. SEMESTER II  
SCHEME & SYLLABUS FOR THE SUBJECT  
CT 215 - C PROGRAMMING II

Lecture	Teaching Scheme (Hours/Week)		Exam Scheme (Marks)				Total
	Tutorial	Practical	Theory (3 hrs.)	Sessional (1 hrs.)	Practical	Termwork	
3	1	2	60	40	25	25	150

- **Arrays**
  - One-dimensional arrays, Multi-dimensional arrays, Dynamic arrays
- **Character Arrays and Strings**
  - String variables, Arithmetic Operations on Characters, Comparison of Strings, String handling functions, Table of Strings
- **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
- **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.
- **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.
- **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.
- **Dynamic Memory Allocation**
  - Allocating memory, Releasing the used space, Altering size of a block
- **The Preprocessor**
  - Macro substitution, File Inclusion, Compiler control directives

**Text Book:**

- 1) Programming in ANSI C by Balagurusamy, 5<sup>th</sup> Ed., Tata McGraw Hill

**Reference Books:**

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

B. TECH. SEMESTER II  
SCHEME & SYLLABUS FOR THE SUBJECT  
AF 204 - MECHANICS OF SOLID

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
3	1	2	60	40	25	25	150	5

[A] 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.

[B] MECHANICAL PROPERTIES OF MATERIALS :

Ductility, Brittleness, Toughness, Malleability, Behaviour of ferrous and non ferrous 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, Corelation between different mechanical properties, Effect of temperature.

Testing machines and special features, Different types of extensometers and compressometers, Measurement of strain by electrical resistance strain gauges.

[C] 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.

[D] 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.

[E] 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.

[F] 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 springs.

[G] 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.

Term work:-This will consists of experiments and solution of problems based on syllabus.

**Text Book :-**

- 1) Strength of Materials - by Timoshanko (Vol.1 & 2)
- 2) Strength of Material - by Popov
- 3) Mechanics of structure -by Junnarkar S.B.
- 4) Strength of Materials- by S.Ramamrutham.

B. TECH. SEMESTER II  
SCHEME & SYLLABUS FOR THE SUBJECT  
AF 215 - HEAT POWER

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
3	1	2	60	40	25	25	150	5

[A] PROPERTIES OF STEAM :

Distinction between gas and vapour, sensible heat, latent heat, total heat and superheat of steam, conditions of steam, dryness fraction, Methods of determination of dryness fraction, internal energy of steam, specific volume, critical pressure and temperature.

[B] FUELS :

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

[C] BOILERS :

Classifications of boilers, Cochran and Babcock & Wilcox boilers, Boiler mountings and accessories, Draught- natural and artificial.

[D] PROPERTIES OF GASES :

Zeroth, first and second laws of thermodynamics, Laws of perfect gases, Boyle's Law, Charles's law, Regnault's law, Joule's law, Characteristic equation, gas constant, internal energy, specific heat at constant pressure and at constant volume, relation between specific heats, thermodynamic processes of perfect gases.

[E] I.C.ENGINE :

Prime-movers, classification of prime-movers with examples of each class. Advantages of I.C. Engines over E.C. engines, classification of I.C. engines, Thermodynamic air cycles, Carnot cycle, constant volume Otto cycle, constant pressure Joule cycle, Diesel cycle, Air-standard efficiency, construction and working of two stroke and four stroke cycle engines, P-V diagrams, determination of I.P., B.P., Mechanical thermal and relative efficiency, Scavenging of I.C. engines, fuel supply in I.C. engines, ignition systems of I.C. engines, cooling of I.C. engines, lubrication of I.C. engines and Governing of I.C. engine.

[F] SOLAR ENERGY :

Introduction, Solar energy systems.

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

**Text Book:**

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

**Ref. Books:**

- 1) Heat Engine By : P.L.Ballaney
- 2) A Course in thermodynamics & heat engines By : Kothandaraman

B. TECH. SEMESTER II  
SCHEME & SYLLABUS FOR THE SUBJECT  
CT 216 - ELECTRONIC WORKSHOP

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
-	-	3	-	-	-	50	50	1.5

- Introduction to Electrical Components : Switches, MCB, ELCB, Tube-light, Bulb, parallel connection of electrical components, wiring in fan and motor
- Introduction to Electronic Components : active and passive components
- Use of basic source & measuring instruments (Power supply, function generator, CRO, DMM)
- Measure voltage, current, frequency, phase difference, power, power factor for single and three phase supply
- Identify various types of ports, cables and connectors
- Linux installation
- Network cabling and crimping for wired and wireless network
- PCB layout design (like proteus) Software installation and layout design using the same
  - Solder and de-solder electronic components on PCB
  - Identify and rectify open circuit and short circuit faults in PCB/system.
- Test assembled electronic circuit for various parameters and faults

**MINI Project :**

Apart from above experiments a group of students has to undertake a mini project.

Following are some examples for the same :

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

**Ref. Books :**

- 1) Electronic Principles, Albert Malvino and David J. Bates , McGraw Hill (7<sup>th</sup> Edition)
- 2) Electronic Devices, Thomas L. Floyed, Pearson (7<sup>th</sup> Edition)

B.TECH. SEMESTER III  
SCHEME & SYLLABUS FOR THE SUBJECT  
AF 301 - MATHEMATICS-III

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	-	60	40	-	-	100	4

[A] 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, practical harmonic analysis.

[B] INTEGRAL TRANSFORMS :

Definition, Fourier integral, Fourier sine & cosine integrals, Complex form of Fourier integral, Fourier transform, Fourier sine & cosine transforms, finite Fourier sine & cosine transform, Fourier transform of the derivative of a function, Inverse Laplace transform by method of residues, Application of transforms to boundary value problems.

[C] MATRICES :

Fundamental concepts, operations, associated matrices, matrix method of solution of simultaneous equations, Rank of matrix, Linear dependence of vectors, consistency of a system of linear equations, characteristic equation, Eigen vectors & Eigen roots, Cayley - Hamilton theorem. Reduction of quadratic form to canonical form.

[D] ORDINARY DIFFERENTIAL EQUATIONS :

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

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.

Series solution of differential equations of the second order with variable coefficients.

[E] PARTIAL DIFFERENTIAL EQUATIONS :

Introduction, formation, linear equation of first order, non-linear equations of first order-Charpit's method, homogeneous linear equations with constant coefficient to find the complementary functions & the particular integral, non-homogeneous linear equations with constant coefficients. Method of separation of variables - vibrating string problem, Heat flow equation etc.

[F] LAPLACE TRANSFORMS :

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

**Text Book :-**

- 1) Higher Engineering Mathematics, Dr. B.S.Grewal

**Reference Books :-**

- 1) A Text Book of Applied Mathematics, P.N. & J.N. Wartikar
- 2) Mathematics for Engineering, Chandrika Prasad
- 3) A Text Book of engineering Mathematics, Dr. K.N.Srivastva & G.K.Dhawan

B.TECH. SEMESTER III  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 310 - DATA STRUCTURE & ALGORITHMS

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

- Basic concepts
  - Algorithm specifications
- Arrays
  - Array as an abstract data type, representation of Arrays
- Stacks & Queues
  - Stack as an abstract data type, queue as an abstract type, evaluation of expressions
- Linked Lists
  - Singly linked lists, doubly linked list, circular list, linked stacks and queues, polynomials, generalized lists.
- Trees
  - Introduction, binary trees, binary tree traversal and tree iterators, additional binary tree operations, threaded binary trees, heaps, binary search tree, forests, Huffman algorithm.
- Graphs
  - The graph abstract data type, graph traversal, directed graph, weighted graph, shortest path-Dijkstra's algorithm, minimum spanning tree.
- Sorting
  - Insertion sort, quick sort, merge sort, heap sort, shell sort, count sort, sorting on several keys, list and table sort, summary of internal sorting.
- Hashing
  - Hash table, hash function, collision, collision resolution techniques.
- Search Techniques
  - Sequential search, Binary search, AVL trees, 2-3 trees, 2-3-4 trees, read-black trees, B-trees, Digital search trees, Tries.

**Text Book :-**

1) Data Structures and Algorithms in Java (4th edition) by Michael T. Goodrich and Roberto Tamassia Publisher: John Wiley & Sons, Inc

**Reference Books :-**

- 1) Data Structures and Program Design in C, Second Edition, by Robert L. Kruse, Bruce P. Leung, Pearson Education.
- 2) Data Structures And Algorithms Made Easy In JAVA by Narasimha Karumanchi, Publisher: Careermonk Publications (Sep 2011).
- 3) An Introduction to Data Structures with Applications, Second Edition, by Tremblay and Sorenson, McGraw Hill.

B. TECH. SEMESTER III  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 311 - OBJECT ORIENTED PROGRAMMING WITH JAVA

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

- **Introduction**
  - Programming language Types and Paradigms, Flavors of Java, Java Designing Goal, Features of Java Language, JVM –The heart of Java, Java’s Magic Bytecode
- **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
- **Object Oriented Programming**
  - Class Fundamentals, 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, Generic Class Types
- **Extending Classes and Inheritance**
  - Use and Benefits of Inheritance in OOP, 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.
- **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
- **Exception Handling:**
  - The Idea behind Exception, 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 Un-Checked Exceptions
- **Array & String :**
  - Defining an Array, Initializing & Accessing Array, Multi -Dimensional Array, Operation on String, Using Collection Bases Loop for String, Tokenizing a String, Creating Strings using StringBuffer
- **Thread :**
  - Understanding Threads, Needs of Multi-Threaded Programming, Thread Life-Cycle, Thread Priorities, Synchronizing Threads, Inter Communication of Threads
- **Applet**
  - Applet & Application, Applet Architecture, Parameters to Applet
- **A Collection of Useful Classes**
  - Utility Methods for Arrays, Observable and Observer Objects, Date & Times, Using Scanner, Regular Expression
- **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
- **GUI Programming**
  - GUI Features Using Swing Components
- **Java Utilities (java.util Package) The Collection Framework :**
  - Collections of Objects, Collection Types, Sets, Sequence, Map, Understanding Hashing Use of ArrayList & Vector
- **Event Handling**
  - Event-Driven Programming in Java, Event- Handling Process, Event-Handling Mechanism, The Delegation Model of Event Handling, Event Sources Event Listeners, Adapter Classes as Helper Classes in Event Handling, Event Types and Classes



**Text Book:**

- 1) Core Java Volume I - Fundamentals, 8th Edition, Cay Horstmann and Gray Cornell, Pearson Education

**Reference Books:**

- 1) Thinking in Java by Bruce Eckel, 4<sup>th</sup> Ed., Pearson Education
- 2) Learning Java by By Patrick Niemeyer and Jonathan Knudsen, 4<sup>th</sup> Ed., O'reilly Media

B. TECH. SEMESTER III  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 312 - DIGITAL AND ANALOG COMMUNICATION SYSTEMS

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

### 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. INTRODUCTIONS TO SIGNALS

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

### 3. ANALYSES 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) MODULATIONS

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.

### 8. ERROR CORRECTING CODES

#### Text Book :-

- 1) Modern Digital & Analog Communication Systems (ThirdEdition), B. P. Lathi Publication : OXFORD

#### Reference Book :-

- 1) Digital Communications, Banard Sklar (Pearson education edition)
- 2) Communication System, Bruce Carlson (Tata McGraw Hill)

B. TECH. SEMESTER III  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 308 - DESIGN OF DIGITAL CIRCUITS

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

- **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.
- **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.
- **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.
- **Combinational Logic:**
  - Introduction, Design Procedure, Adders, Subtractors, Code Conversion, Analysis Procedure, Multilevel NAND Circuits, Multilevel NOR Circuits, Exclusive OR and Equivalence Functions.
- **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.
- **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.
- **Registers, Counters and The Memory Unit:**
  - Introduction, Registers, Shift Registers, Ripple Counters, Synchronous Counters, Timing Sequences, The Memory Unit, Examples of Random Access Memories.
- **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.
- **Verilog:**
  - Introduction, Overview of Digital Design with Verilog HDL, Gate-level Modeling ( full adder, multiplexer, full subtractor, comparator, decoder, demultiplexer, Flip-flops)

**Text Book:**

- 1) Digital Logic and Computer Design, M.Morris Mano

**Reference Books:**

- 1) Microelectronics, Jacob Millman & Arvin Grabel, Second Edition, McGraw - Hill International Edition
- 2) VERILOG HDL, Samir Palmitkar, Pearson Education

B.TECH. SEMESTER IV  
SCHEME & SYLLABUS FOR THE SUBJECT  
AF 401 - MATHEMATICS-IV

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	-	60	40	-	-	100	4

[A] 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.

[B] 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.

[C] FINITE DIFFERENCES & DIFFERENCE EQUATIONS :

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

[D] 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.

[E] STATISTICAL METHODS :

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

**Text Book :-**

- 1) Higher Engg. Mathematics, Dr. B.S.Grewal

**Reference Books :-**

- 1) A Text Book of Applied Mathematics, P.N. & J.N. Wartikar & Chandrika Prasad.

B.TECH. SEMESTER IV  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 410 - JAVA TECHNOLOGY

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

- Introduction
  - Introduction to J2EE technology, Web Server, N-tier Architecture, Introduction to web Container and Structure of web Application
- Java Beans
  - JavaBeans Concept, Bean Persistence, Introspection
- Java Servlets
  - A simple Web Application, HTTP Protocol, Servlet Interface, Servlet LifeCycle, Servlet Configuration and Exceptions, Servlet Request and Responses, Session Tracking with Java Servlet, Servlet Context
- Java Server Pages
  - JSP Directives, scripting elements, Standard Actions and using Beans, Implicit Objects, Scope, Application Design using JSP, JSP tag Extensions, Tag Handlers, Tag Library Descriptors, Using Tag Extensions in JSP Pages, Writing tag extensions, Introduction to JSPTL, obtaining JSPTL
- Introduction to XML and XML usage
  - Introduction to XML, Schema, DTD, DOM, XML Parsers in Javax
- Security
  - Different level of Authentication, Security APIs
- Java Remote Method Invocation
  - Introduction to RMI technology, Writing RMI Server & Client
- Introduction of Below Mentioned Topics
  - Java Persistence API (JPA), Java Email API, Java Database Connectivity (JDBC), STURTS Web MVC Framework, Hibernate ORM, Spring - Dependency Injection & Aspect Oriented Programming.

**Text Book:**

- 1) Professional Java Server Programming, SPD, Subrimanyan & Cedric

**Reference Books:**

- 1) J2EE Complete Reference, TMH, Herbet Schitz
- 2) J2EE Bible

B.TECH. SEMESTER IV  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 411 - VISUAL TECHNOLOGY

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

- Introduction to windows programming
- Introduction to Vc++ IDE
- Windows GUI programming (SDI & MDI Application)
  - 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
- Document / View Architecture
  - Serialization ( storing and retrieving to and from disk)
- Multithreaded Programming
- Dialog Based Application
  - Model and Modeless dialogs
  - 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.
- Active x controls
  - Using Active x controls
  - Creating Active x controls
- Database Connectivity using DAO
- DLL Development

**Text Book :-**

- 1) Mastering Visual C++ 6.0, By: Michael J. Young.

**Reference Books :-**

- 1) Programming with Microsoft visual C++ 6.0, By Devid J. Kruglicnski, George Shepherd., Scot Wings.

B.TECH. SEMESTER IV  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 414 - DESIGN & ANALYSIS OF ALGORITHM

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

Topics to be covered

- Introduction to algorithms
- Elementary Data Structures
- Methods for solving recurrence relations for finding time complexity
- Overview of searching & sorting techniques
- The Greedy Methodology
- Dynamic Programming
- Graph Traversal & Searching
- Backtracking Techniques
- Branch & Bound Techniques
- Lower bound theory
- NP-hard & NP-complete problems

**Text Book :-**

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

**Reference Books :-**

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

B. TECH. SEMESTER IV  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 417 - COMPUTER SYSTEM ARCHITECTURE

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

- **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
- **Data representation:** signed number representation, fixed and floating point representations, character representation, IEEE 754 standard of representation
- **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.
- **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
- **Control unit design:** Hardwired control, micro programmed control, nano programmed control
- **Programming the basic computer:** Introduction, machine language, assembly language, the assembler, program loops, programming arithmetic and logic operations, subroutines, I/O programming.
- **Central Processing unit:** Register organization, stack organization, instruction format, addressing mode, data transfer and manipulation, program control, RISC processors.
- **Pipelining:** Basic concepts of pipelining, throughput and speedup, pipeline hazards.
- **Input-Output organization:** Peripheral devices, I/O interface, asynchronous data transfer, modes of transfer, priority interrupt, DMA, I/O processors, serial communication
- **Memory organization:** Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs. block size, mapping functions, replacement algorithms, write policy.
- **Case study:** 8085 Microprocessor

**Text 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

**Reference Books:-**

- 1) Computer Organization and Design: The Hardware/Software Interface by David A. Patterson and John L. Hennessy, Elsevier.
- 2) Computer Organization by Carl Hamacher, Zvonko Vranesic and Safwat Zaky, McGraw Hill.
- 3) Computer Organization and Architecture: Designing for Performance by William Stallings, Pearson Education.



B.TECH. SEMESTER IV  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 409 - COMPUTER PERIPHERALS

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
-	-	2	-	-	25	25	50	1

- Assembling of computer.
- Study of various motherboards (8088/XT, 286, 386,...P-III)
- Study of CMOS - setup options
- Hard disk partitioning
- Creation of DOS and windows-95/98 Bootable disk
- Installation of DOS and windows - 95/98
- Installation of sound and display drivers.
- Study of floppy disk drive,(show norton format), hard disk Drive
- Study of keyboard, monitor, mouse and printer
- Study of IDE, Display and network cards.
- Study of virus and anti-virus packages.
- Study of network topologies & win98 peer to peer networking

**Reference Books :-**

- 1) PC Upgrade and Maintainance, by Mark Minasi
- 2) IBM PC and clones, by Govind Rajalu

B.TECH. SEMESTER IV  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 415 - DISCRETE MATHEMATICS

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

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, uncountably 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 : Russel'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 behavior, 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.

**Laboratory work :** The students will design, implement in a programming language like C, PASCAL or PROLOG and test various algorithms based on the concepts as above.

**Text Book :-**

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

**Reference Books :-**

- 1) "Modern Applied Algebra", Birkoff and Bartee, McGraw-Hill, CBS.
- 2) "Discrete Mathematics - A Unified Approach", Stephen A. Witala, Computer Science Series, McGraw-Hill.

**B.TECH. SEMESTER IV  
SCHEME & SYLLABUS FOR THE SUBJECT  
CT 416 - YOGA & MEDITATION**

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
2	-	1	50	-	50	-	100	2.5

**PART-1: TRAINING IN YOGIC ASANAS, PRANAYAM AND MUDRAS**

1. Kapalbhathi, Anulom vilom pranayam, Omkar Pranayam, Bhramari, Pranayam. Body rotations, Shavasa, Suryanamaskar.
2. Asanas for Meditations  
Padmasan, Swastikasan, Sidhhasan, Bhadrasan, Vajrasan, Makarasan, Savasa
3. Asanas to be performed in standing position  
Trikonasan, Pervatasan, Utkatukasan, Hastapadasan
4. Asanas to be performed while lying in supine position  
Sevangasan, Halasan, Savasan, Kosthavishramasan, Matshendrasan, Suptavajrasan
5. Asanas to be performed while lying in prone position  
Uttanapadasan, Uttanadhadasan, Serpasan, Bhujasan, salabhasan, Dhanurasan, Makarasan
6. Asanas to be performed in sitting position  
Pavanmuktasan, Hastapadasan, Vajrasan, Ardhamatshyendrasan, Shishuasan, Saptamudrasan, Gomukhasan
7. Yoga Mudras (seven types)
8. Pranayams (seven types)

**PART-2: RAJYOGA MEDITATION - THEORY AND PRACTICE**

1. CONCEPT OF YOGA  
Various misconceptions regarding yoga  
Various definitions of yoga according to Indian scriptures  
True concept of Rajyoga  
Objectives of Rajyoga  
Steps of yoga sadhana  
Rajyoga is a Holistic system of yoga
2. SCIENCE OF CONSCIOUSNESS  
Concept of self / consciousness  
Characteristics of consciousness  
Functional aspects of consciousness  
Seat of consciousness in the physical body  
Types of personality  
Dynamics of mind
3. CONCEPT OF GOD  
Various hypotheses regarding god  
Basic points to identify the god  
Characteristics of god  
Different opinions of religious and spiritual leaders about god  
Similarities between human soul and supreme soul  
Differences between human soul and supreme soul
4. PRINCIPLES / LAWS OF SPRITUAL SCIENCE  
Law of eternity of world drama  
Law of transformation of world drama  
Law of cyclicity of world drama  
Law of Identical Repetitive Nature of world drama  
Law of Aging / Increasing Disorder of world drama  
Law of Rebirth of world drama  
Law of Cause and Effect of world drama
5. PRACTICAL MEDITATION

**PART-3: MORAL, ETHICAL AND SPRITUAL DIMENSIONS IN DEVELOPMENT OF  
INNER PERSONALITY**

1. HOLISTIC HEALTH AND ITS DIMENSIONS  
Importance of health in life  
Concept of health  
Various aspects / dimensions of holistic health  
Check points for physical, Mental and Social health  
Principles of Physical, Mental and Social health
2. STRESS MANAGEMENT AND RELAXATION THECHNIQUES  
What is stress?

Effect of stress on Physical health Mental health Emotions Behavior Causes of stress / Stressors General causes Physical causes Family causes Career and Job oriented causes Social causes Global problems Types of personality Techniques to cope with stress Physical techniques Intellectual techniques Yogic techniques / Meditation Principles for stress free life

3. ADDICTION FREE LIFE

Definition of Addiction Classification of Drugs Adverse effects of tobacco consumption on physical health Harmful effects of alcohol consumption on physical, mental and social health Techniques to get rid of addiction consumption. Various steps taken by Government and non-Governmental organizations against addiction consumption.

B.TECH. SEMESTER V  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 502 – MICROPROCESSOR FUNDAMENTALS & PROGRAMMING

Teaching Scheme (Hours/Week)			Exam Scheme					Credit
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	
4	-	2	60	40	25	25	150	5

- [A] INTRODUCTION  
Basic micro-processor architecture, ALU, registers, system bus, Peripherals. Introduction to assembly language.
- [B] 8086 ASSEMBLY LANGUAGE PROGRAMMING TECHNIQUES  
Objectives, Program Development Steps, Constructing the Machine Codes for 8086 Instructions, Writing Programs for Use with an Assembler, Assembly Language Program Development Tools, Flags, Jumps and WHILE-DO Implementation, REPEAT-UNTIL Implementation and Examples, Debugging Assembly Language Programs.
- [C] IF-THEN-ELSE STRUCTURES, PROCEDURES & MACROS  
Objectives, IF-THEN, IF-THEN-ELSE, & Multiple IF-THEN-ELSE Programs, Writing and Using Procedures, Writing and Using Assembler Macros.
- [D] 8086 INSTRUCTION DESCRIPTION & ASSEMBLER DIRECTIVES  
Instruction Description, Assembler Directives.
- [E] 8086 SYSTEM CONNECTIONS, TIMING AND TROUBLESHOOTING  
Objectives, 8086 Hardware Review, Addressing Memory and Ports in Microcomputer Systems, 8086 Timing Parameters, Troubleshooting a Simple 8086-based Microcomputer
- [F] Interfacing  
Interfacing RAM, ROM and I/O with the microprocessor
- [G] INTERRUPTS AND INTERRUPT SERVICE PROCEDURES  
Objectives, 8086 Interrupts and Interrupt Response, Hardware Interrupt Applications
- [H] GENERAL-PURPOSE PROGRAMMABLE PERIPHERAL DEVICES  
Basic Programming Concepts & Programmable Devices  
8259 - Programmable Interrupt Controller  
8251 - Programmable Interface device - Serial I/O  
8255 - Programmable Peripheral Interface  
8254 - Programmable Interval Timer  
8279 - Programmable Keyboard/Display Interface  
8237 - DMA Controller
- [I] Introduction to Microcontroller  
8051 architecture, pin diagram, instruction set, memory interfacing

**Text Book :-**

- 1) Microprocessors And Interfacing (Programming & Hardware), Douglas V. Hall, McGraw Hill
- 2) 8086 Programming and Advance Processor Architecture, M. T. Savaliya, WIND Series, 2012

**Reference Books :-**

- 1) INTEL MICROPROCESSORS 8086/8088, 80186/80188, 80286, 80386, 80486, PENTIUM AND PENTIUM PRO PROCESSOR BY BARRY B. BREY
- 2) Architecture, Programming & applications with 8085/8-8080A, R. S. Gaonkar
- 3) 8051 Microcontroller. by K.J.Ayela, Penron publication

B.TECH. SEMESTER V  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 509 - WEB DEVELOPMENT IN .NET

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

1) Introduction to ASP.NET

a) How ASP.NET works with IIS, Evolution of .NET Framework, Assembly, Page Processing life cycle. Global .aspx. Pre-compilation of application., ASP.NET html server and web controls.

2) Programming in C#.NET

a) Introducing C#., Understanding .NET: C# Environment.,Literals, Variables and Data Types.,Operators and Expressions,Handling arrays, Manipulating strings.,Classes and objects, Inheritance.,Interfaces, Delegates, Events.,Exception handling.

3) Introduction to Files and Streams.,Session Management in ASP.NET Using ASP.NET rich controls

a) Different technique for client side and server side state management.

b) Web Application which demonstrates the use of File handling and session management.

4) Database Handling with ADO.NET

a) Three tier architecture. Using stored procedure. Complete web application demonstrating the industry standard for developing dynamic website.

b) LINQ

5) Introduction to Web Security. User Control and Custom Controls. Website Deployment.

a) Understanding asp.net security model. Different types of authentication and Secured Socket Layer. Using Login controls of asp.net 2.0. Master pages. Membership and user role handling.

6) Introduction to XML and XML usage, Introduction to Web Services and AJAX

a) Introduction to XML, Schema, Implementation and using web services in ASP.NET 2.0 Use of AJAX with ASP.NET 2.0

**Text Book :-**

1) Beginning ASP.NET 4 in C# 2010 By: Matthew MacDonald, Publisher: Apress

**Reference Books :-**

1) Programming in C# A Primer by E. Balaguruswamy (Third Edition), Publisher: Tata McGraw-Hill

2) Professional C# 4.0 and .NET 4 By Christian Nagel, Bill Evjen, Jay Glynn, Karli Watson, Morgan Skinner

B. TECH. SEMESTER V  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 510 - SOFTWARE ENGINEERING

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

- **Introduction to Software Engineering**
- **Process Models:**
  - Incremental Process Models, Evolutionary Process Models, Specialized Process Models, Unified Process
- **An Agile view of a Process**
- **Project Management and Estimation**
- **Project Scheduling**
- **Requirement engineering:**
  - Requirement engineering tasks, initiating the requirement engineering Process, Eliciting requirements, SRS
- **Design Engineering:**
  - Design concepts and principles, Architectural design, User interface design, Component level design, Deployment-level Design Elements, Pattern-Based Software Design
- **Risk Management:**
  - Risk identification, Risk Projection, Risk Refinement, Risk mitigation, Monitoring and management, RMMM plan
- **Change Management:**
  - Software configuration management, The SCM process
- **Testing Strategies and Tactics**
  - Software Testing strategies, White box testing, Basis path testing, Control structure testing, Black box testing, Object oriented testing
- **Quality Management**
- **Component-Based Development**

**Text Book:-**

- 1) Software Engineering - A practitioner's Approach by Roger S. Pressman, 7<sup>th</sup> Ed., McGraw Hill Pub.

**Reference Books:-**

- 1) Fundamentals of software engineering by Rajib Mall, II ed. Prentice Hall, Indian
- 2) Software Engineering by Ian Sommerville, 6 Ed., Pearson Education
- 3) SOFTWARE ENGINEERING: Principles and Practice by Waman S Jawadekar, Tata Mcgraw hill

B.TECH. SEMESTER V  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 508 - DATABASE SYSTEMS

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

- 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.
- 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.
- Relational Database Management System :
  - 3.1 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.
- 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.
- Query Processing :
  - Overview, Catalog information for cost estimation, Measures of query cost, Selection operation, Sorting, Join operation, Other operations, Choice of evaluation plans.
- Transaction Processing :
  - Transaction concepts, Transaction state, Implementation of atomicity & durability, Concurrent executions, Serializability, Conflict serializability, View serializability, Testing of conflict and view serializability.
- 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.
- 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.
- Distributed Data Bases
- Security and Integrity of data base

**Text Book :-**

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



B. TECH. SEMESTER V  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 513 - OPERATING SYSTEMS

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

1. Introduction  
What is an OS?, Simple Batch Systems, Multi programmed Batched Systems, Time Sharing Systems, Personal-Computer Systems, Parallel Systems, Distributed Systems, Real-Time System
2. Computer-System Structure  
Computer-System Operation, I/O Structure, Storage Structure, Storage Hierarchy, H/W protection, General System Architecture
3. Operating Systems Structures  
System components, OS services, System calls, System programs, system structure, Virtual machines, System Design & implementation, System Generation
4. Processes  
Process concept, Process Scheduling, Operation on Processes, Cooperating processes, Interprocess Communication
5. CPU Scheduling  
Basic concepts, Scheduling criteria, Scheduling algorithms
6. Process Synchronization  
Background, The critical-section Problem, Synchronization H/W, Semaphores, classical problems of synchronization, Critical Regions, Monitors
7. Deadlocks  
System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from deadlocks, Combined Approach to deadlock handling
8. Memory Management  
Background, Logical versus Physical Address space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging
9. Virtual Memory  
Background, Demand Paging, Performance of Demand Paging, Page Replacement, Page-replacement algorithms, Allocation of frames, Thrashing, Other Considerations, Demand segmentation
10. File-System Interface  
File concept, Access methods, Directory Structure, Protection, Consistency semantics
11. File-System Implementation  
File-System Structure, allocation methods, Free-space Management, Directory Implementation, Efficiency and performance, Recovery
12. I/O Systems  
Overview, I/O H/W, Application I/O interface, Kernel I/O subsystem, Transforming I/O Requests to H/W operations. Performance
13. Secondary-Storage Structure  
Disk Structure, Disk scheduling, Disk Management, Swap-space management, Disk reliability
14. Distributed System Structures  
Network operating Systems, Distributed Operating Systems, Remote services, Robustness, Design issues
15. Distributed File Systems  
Features of good DFS, Naming and Transparency, Remote File Access, Stateful Versus stateless service, File replication, Example systems

Case studies on :

1. UNIX operating system
2. LINUX operating system

### 3. Windows NT

**Text Book :-**

- 1) Operating Systems, internals and design principles by William Stallings, PHI

**Reference Books :-**

- 1) Operating System Concepts : Silberschatz, Galvin, Addison Wesley.
- 2) Modern Operating System : Design and Implementation Tanenbaum, PHI
- 3) Operating system Concepts : Milan Malinkovic, TMI.

B.TECH. SEMESTER V  
SCHEME & SYLLABUS FOR THE SUBJECT  
CT 516 - SELF DEVELOPMENT

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
2	-	-	50	-	-	-	50	2

- Paradigm Shift
- Production / Production-Capability balance
- Principles of Pro-activity
- Mission Statement
- Principles of Personal Management
- Paradigms of inter-dependence
- Concept of win-win
- Concept of empathic listening
- Synergy
- Renewal
- CREATIVITY :
  - Ways to develop it, Importance of intuition and art of doing nothing for creativity, Creativity in Interrelationship
- Importance of Witness fullness
- Assumption v/s Self experience
- Child-Adult-Parent Balance of trails in Individual
- Responsive Communication: Discussion v/s Argument
- Concept of Character and its importance in life
- Success v/s worth whileness, Importance of failure
- Competition and Co-operation

**References :-**

- 1) 7 Habits of highly effective people by Stephen Covey

B.TECH. SEMESTER VI  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 610 - ADVANCED COMPUTER ARCHITECTURE

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

[A] 80286-80287 A micro-processor with memory management and protection

Salient features, Internal Architecture, Signal description, Real addressing Mode, PVAM, privilege ad protection, 80286 bus operations, System configurations, Interfacing memory and IO devices with 80286, Instruction set features, 80287 Math Coprocessor.

[B] 80386-80387 and 80486 the 32-bit Processors

Salient features of 80386DX, Architecture and Signal descriptions, register organization of 80386, Addressing modes, Data Types Of 80386, Real address mode, protected mode, segmentation and paging, Virtual 8086 mode, Enhanced instruction set of 80386, the co-processor 80387, The CPU with numeric Coprocessor-80486DX

[C] The Pentium and Pentium Pro Micro-processors

Introduction and Salient features of Pentium 4, Special Pentium Registers, Pentium Memory management, new Pentium instructions, introduction to Pentium pro microprocessor, Special Pentium Pro features.

[D] The Pentium II, Pentium III and Pentium 4 microprocessor

Introduction to Pentium II microprocessor, Pentium II s/w changes The Pentium III, The Pentium 4

[E] Parallel Processor and Computing

Introduction to Parallel Processing-Shared Memory Multiprocessing  
Distributed Memory-Parallel, Processing Architectures- Introduction-  
Parallelism in sequential Machines--Abstract Model of, Parallel  
Computer Multiprocessor Architecture- Array Processors, Details of  
Pipelining and Super Scalar Techniques

[F] Processor Architectures

RISC Architecture  
SMP Architecture  
VLIW Architecture

**Text Book :-**

- 1) INTEL MICROPROCESSORS 8086/8088, 80186/80188, 80286, 80386, 80486, PENTIUM AND PENTIUM PRO PROCESSOR BY BARRY B. BREY
- 2) "Parallel Computers Architecture and Programming", V.Rajaraman, C. Siva Ram Murthy, PHI, New Delhi

**Reference Books :-**

- 1) Advance Microprocessor and Peripherals -by A K RAY, K M BHURCHANDI, Second-Edition, The McGraw-Hill
- 2) "Parellel Processing" BY V.RAJARAMAN AND C.SIVA RAM MURTHY1 , Learning Material Series, Indian Society for Technical Education, New Delhi, 1996.

B.TECH. SEMESTER VI  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 618- NETWORK & INFORMATION SECURITY

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

**1. Conventional Encryption:**

Conventional Encryption Model, Steganography, Classical Encryption Techniques

**2. Conventional Encryption Techniques:**

Simplified Des, Block Cipher Principles, Data Encryption Standards, Differential And Linear Cryptography Principles, Block Cipher Design Principles, Modes Of Operations, Algorithms Like Triple Des, International Data Encryption Algorithm, Blowfish, Rc5, Cast-128, Rc2, Characteristics Of Advanced Symmetrical Block Cipher, Issues Of Conventional Encryption Like Traffic Distribution, Random Number Generation, Key Distribution

**3. Public Key Cryptography:**

Principles Of Public-Key Cryptography, RSA Algorithm, Key Management, Elliptic Curve Cryptography, Diffie-Hellman Key Exchange

**4. Number Theory:**

Prime And Relative Prime Numbers, Modular Arithmetic, Euler's Theorem, Euclid's Algorithm, Discrete Logarithm Tics

**5. Message Authentication And Hash Functions:**

Authentication Requirement, Functions, Message Authentication Code, Hash Functions, Security Of Hash Functions And Macs, MD5 Message Digest Algorithm, Secure Hash Algorithm, Ripemd-160, Hmac

**6. Introduction To E-Commerce:**

Introduction To E-Commerce, Transactions On E-Commerce, Requirement Of Security On E-Commerce

**7. Network Security:**

Digital Signatures, Authentication Protocols, Digital Signature Standards, Application Authentication Techniques Like Kerberos, X.509 Directory Authentication Services, Active Directory Service Of Windows NT/Windows 2000

**8. IP Security E-Mail Security:**

IP Security Overview, Architecture, Authentication Header, Encapsulation Security Payload, Combining Security Association, Key Management, Pretty Good Privacy, S/Mime And Types

**9. Web Security:**

Web Security Requirement, SSL And Transport Layer Security, Secure Electronic Transactions, Firewall Design Principles, Trusted Systems

**Text Book :-**

- 1) Cryptography And Network Principles And Practice Fourth Edition, William Stallings, Pearson

B.TECH. SEMESTER VI  
SCHEME & SYLLABUS FOR THE SUBJECT  
CT 614 - THEO. OF AUTOMATA AND FORMAL LANGUAGES

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	-	60	40	-	-	100	5

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. Non-deterministic 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, doubly 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, Unsolvable 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.

**Text Book :-**

- 1) "Introduction to Languages and Theory of Computation", John C. Martin, McGraw-Hill.

**Reference Books :-**

- 1) "Computation : Finite and Infinite", Marvin L. Minsky, Prentice-Hall

B. TECH. SEMESTER VI  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE617 - SERVICE ORIENTED ARCHITECTURE

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

**[Part 1]**

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

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

C) Web Services and contemporary SOA part I-Service activity, Atomic transactions , coordination, business activities, orchestration, choreography

**[Part 2]**

A) Web Services and contemporary SOA part II- addressing, reliable messaging, correlation, policies, metadata exchange, security, notification and eventing.

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

C) Service Layers- abstraction with configuration of layers -application business and orchestration layers

**[Part 3]**

A) SOA delivery strategies- Delivery life cycle, comparing top-down, bottom-up and agile strategies.

B) Introduction to Service-Oriented Analysis- Business-centric SOA, Deriving business services, service modeling.

C) Introduction to Service-Oriented Design- WSDL basics, SOAP basics, XML Schema, SOA composition guidelines – Entity-centric business service design – Application service design – Task centric business service design

D) WS-BPEL basics, Introduction to fundamental WS-\* Extensions.

E) Introduction of SOA platforms- SOA support in J2EE, SOA support in .NET along with Windows Communication Foundation

**Text Book:**

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

**Reference Books:**

- 1) Thomas Erl, “SOA Principles of Service Design “(The Prentice Hall Service-Oriented Computing Series from Thomas Erl).
- 2) Newcomer, Lomow, “Understanding SOA with Web Services”, Pearson Education.
- 3) Sandeep Chatterjee, James Webber, “Developing Enterprise Web Services, An Architect’s Guide”, Pearson Education.
- 4) Scott Klein, “Professional WCF Programming”, Wiley Publishing, Inc.

Bipin Joshi, “Beginning XML with C# 2008”, Apress (5

B. TECH. SEMESTER VI  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 620 - OBJECT ORIENTED SOFTWARE ENGINEERING

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

### 1. Introduction

Object Oriented Principles, Introduction to class and objects, Introduction to basic object oriented concepts e.g. encapsulation, abstraction, inheritance, Object oriented systems development life cycle

### 2. Object Oriented Methodology

Modeling design Technique, Class Model, State model and Interaction model, Rumbaugh methodology, Booch methodology, Jacobson methodology, Unified approach, Unified modeling language (UML), Introduction to UML model.

### 3. Object Oriented Analysis

Overview of Object oriented analysis, UML notations for object oriented analysis, User requirement elicitation using UML, Functional Modeling: Use-Case diagram, Activity Diagram, Static Modeling: Approaches to identify classes and Objects, relationship between classes and objects, class modeling, object modeling

### 4. Object Oriented Design

Domain Analysis, Domain class model, domain state model, domain interaction model, Iterating and analysis, Application Interaction model, Application class model, Application state Model, Adding operation

### 5. State Modeling

State diagram: State Diagram Notations, events (signal events, change events, Time events)  
State Diagram states (composite states, parallel states, History states), transition and condition, state diagram behavior(activity effect, do activity, entry and exit activity), completion transition, sending signals.

### 6. Interaction Modeling

Sequence diagram - Sequence diagram notations and examples, iterations, conditional messaging, branching, object creation and destruction, time constraints, origin of links, Activations in sequence diagram. Collaboration diagram- Collaboration diagram notations and examples, iterations, conditional messaging, branching, object creation and destruction, time constraints, origin of links, activations in sequence diagram

### 7. Design Patterns

Introduction, Creational design patterns: Singleton, Factory, Builder, etc. Behavioral Design Patterns: Chain of responsibility, interpreter, mediator, observer etc. Structural Design Patterns: adapter, bridge, composite etc.

### Text Books:

- 1) Object oriented modeling and design with UML, M. Blaha and J. Rumbaugh

### References:

- 1) Ivar Jacobson, Object Oriented Software Engineering, A Use Case Driven Approach, Addison Wesley, 1992
- 2) Grady Booch, Object Oriented Analysis & Design, Benjamin/Cummings, 1994



B.TECH. SEMESTER VI  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 611 - COMPUTER NETWORKS

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

- 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.
- The Physical Layer
  - Transmission Media – magnetic media, twisted pair, baseband & broadband, fiber optics. Wireless Transmission – radio, microwave, infrared & lightwave. Narrowband ISDN, Broadband ISDN & ATM. Cellular Radio- Paging systems, cordless telephones, analog & digital telephones.
- The Data Link Layer
  - DLL Design issues, Error Detection & Correction. Elementary Data link Protocols - Utopia, Stop N Wait, Automatic Repeat Request. Sliding Window Protocols - 1 bit sliding window, Go Back N, Selective Repeat Protocols.
- Medium Access Sublayer
  - Channel Allocation Problem - Static & Dynamic. Multiple Access protocols - ALOHA, CSMA, Collision Free Protocols, Limited contention protocols, WDMA protocol, wireless LAN protocols. IEEE standards 802 for LAN & MAN - 802.2, 802.3, 802.4, 802.6 & related numericals. Bridges - From 802.x to 802.y, transparent Bridges, Spanning Tree, Source Routing Bridges, remote bridge & problems. Comparison of 802 bridges, High Speed LANs - FDDI, fast ethernet.
- 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, choke packets, load shedding, jitter control and congestion control for malfunctioning. The network layer in the internet - the IP protocol, IP addresses & subnets
- The Transport Layer
  - The Transport Service, 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. Performance Issues - Performance problems in Computer Networks (case study), Measuring Network Performance (case study).
- The Application Layer
  - Network Security - Traditional Cryptography, Two Fundamental Cryptographic Principles, Secret-Key Algorithms, Public-key Algorithms, Authentication protocols, Digital Signatures, Social Issues., E-mail (case study), SNMP (case study).

**Text Book :-**

- 1) Computer Networks - Andrew Tanenbaum, 3ed, PHI.

**Reference Books :-**

- 1) Data & Computer Communications - William Stallings, 2ed, Maxell Macmillan Int.
- 2) Communication Networks, Fundamental Concepts & key Architecture - Leon-Garcia & Widjaj, Tata-McGraw Hill

B. TECH. SEMESTER VI  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 621 - SYSTEM DESIGN PRACTICE (MINI PROJECT)

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
-	-	2	-	-	25	25	50	1

B.TECH. SEMESTER VII  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 701 - ARTIFICIAL INTELLIGENCE

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

- Introduction to Artificial Intelligence
  - Introduction problems, problem space, production systems, problem characteristics
- Search Techniques
  - Uniformed search techniques (best-first search, Depth-First search), Heuristic search techniques (General and test, Hill climbing, Simulated anncalling, A\* algorithm, Constraint satisfaction, Means-end-analysis) Adverserial search techniques (Game playing, MINIMAX algorithm, alpha-Beta pruning)
- Knowledge Representative
  - Propositional Logic, predicate logic, Instance and isa relationship, semantic net, frames.
- Fuzzy Logic
  - Definition, need fuzzy set, fuzzy operators, fuzzy control systems, limitations
- Inference techniques
  - Representing knowledge using rules, procedure versus declarative knowledge, forward versus backward reasoning, unification, resolution.
- Natural Language Processing
  - Introduction NLP, NLU, phase of NLP (Morphological analysis, syntactic analysis, semantic analysis, discourse integration), introduction to Machine Translation.
- Expert System
  - ES architectures, representation and use of domain knowledge, expert system shells, knowledge acquisition.
- PROLOG
  - Facts and predicate, data types, goal finding, backtracking, simple object, compound objects, use of cut and fail predicates, recursion, lists, simple input/output.

**Text Books :-**

- 1) Artificial Intelligence by Elaine Rich and Kevin Knight, TMH
- 2) Introduction to Turbo PROLOG by Carl Townsend, BPB

**Reference Books :-**

- 1) Artificial Intelligence : A Modern Approach by Stuart Russell and Peter Norvig, PHI
- 2) Artificial Intelligence and Expert System by D.W. Patterson, PHI
- 3) Introduction to Applied Fuzzy Logic by Ahmed Abraham, PHI

B.TECH. SEMESTER VII  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 710 - EMBEDDED SYSTEMS

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

- Programming languages for embedded systems :
  - Desirable characteristics of programming languages for embedded systems, low-level versus high-level language, main language implementation issues : control, typing, exception handling, modularity and multithreading, major programming languages for embedded systems : Assembly, C/C++, Java and Esterel. Timing characteristics of embedded systems : hard, soft and firm systems : fail-safe and fail-operational systems, guaranteed- response, best-effort, event and time-triggered systems, timing constraints in embedded systems.
- Performance analysis of embedded systems :
  - software timing characterization and analysis methods.
- Runtime and operational systems design :
  - Real time and non-real time applications, task assignment and scheduling : characteristics of tasks, task assignments and multi-tasking, Static and dynamic scheduling under constraints.
- Memory management and synchronization for embedded software :
  - Mutual exclusion, deadlock, starvation and lockouts : priority assignments, inversion, event flags and signals, software optimization techniques under constraints : size, performance, embeddedability metrics.
- Compilation techniques for embedded software :
  - code generation, re- targetability, code optimization.
- Examples of embedded and real-time software systems, real time applications.

**Text & Reference Books :-**

- 1) Software design methods for concurrent and real-time systems by Gomaa, Addison-Wesley 1993.
- 2) Real-time systems by H. Kopetz, Kluwer 1997
- 3) Co-synthesis of hardware and software for Embedded Systems by R. Gupta, Kluwer 1995
- 4) Introduction to real-time software design by S. Allworht, Springer-Verlag, 1984.
- 5) Real Time Systems by C.M. Krishna, Mc-Graw Hill 1997
- 6) Code generation for Embedded Processors by Peter Marwedel, G. Goosens, Kluner Academic Pub. 1993.
- 7) Embedded system design : Aunified hardware software introduction by Frank Vahid and Tony Givargis, John Wiley & Sons
- 8) Additional reading from selected journal papers.

B.TECH. SEMESTER VII  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 702 – COMPUTER GRAPHICS

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

B.TECH. SEMESTER VII  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 713 - ADVANCED COMPUTER NETWORKS

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

- Introduction
  - Introduction to internetworking, TCP/IP protocol stack, Internetworking concepts.
- TCP/IP Protocols
  - Addressing scheme ( classful and classless), subnetting and supernetting, Ipv6, ARP, RARP, ICMP, IGMP, RIP, OSPF, BGP, DNS, application layer protocols : FTP, TFTP, NFS.
- Sockets interface
  - Introduction to socket function, connect, accept, listen, bind function calls, TCP client server, concurrent server to server multiple clients.
- I/O multiplexing
  - I/O models : blocking, polling, signal driven, multiplexed. Select system call, multiplexed TCP server to serve clients, use of p select.
- UDP socket:
  - UDP socket functions, difference : blocking, polling, signal driven, multiplexed. Select system call, multiplexed TCP server to serve clients, use of p select.
- Domain name server
  - Introduction to DNS, resource record and resolver function, mapping between IP address and domain name.
- IPv4 and IPv6 interoperability
  - Introduction, IPv4 client-server, IPv-6 address testing macro, source code portability.
- Daemon process
  - Introduction to daemon process, syslog, creating a daemon process, i net daemon.
- Advance UDP socket
  - Receiving flags, destination address and interface info, adding reliability to UDP, concurrent UDP server.
- Broadcasting and multicasting
  - Broadcast address structure, broadcast client-server, multicasting address structure, multicasting on WAN, multicasting v/s broadcasting, multicast example.

**Text Book :-**

- 1) Unix network programming vol. 1 by W.R. Stevens
- 2) TCP/IP protocol suite by B.A. Forouzan

**Reference Books :-**

- 1) TCP/IP vol. 1 by D.E. Comer
- 2) TCP/IP Vol. 1 by W.R. Stevens

B.TECH. SEMESTER VII  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 716 - DISTRIBUTED OPERATING SYSTEMS

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

- Intro to Distributed Systems
- Interprocess Communication and Coordination
- State Maintenance
- Distributed Mutual Exclusion Algorithms
- Election Algorithms
- Fault Tolerance and Distributed Agreement
- Database Techniques
- Check Point and Recovery
- Distributed Deadlock Detection
- Load Balancing & Scheduling
- Security

**Text Book :-**

- 1) "Distributed Operating Systems and Algorithms" by Randy Chow and Theodore Johnson, Addison Wesley, 1997

B.TECH. SEMESTER VII  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 714 - IMAGE PROCESSING

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

- Introduction
- Image Transformation Techniques
- Image Enhancement Algorithms
- Image Restoration Methods
- Image Compression Techniques
- Image Segmentation Schemes

**Text & Reference Books :-**

- 1) R.C.Gonzalez and R.E.Woods, "Digital Image Processing", Addison-Wesley Longman, Inc, 1999
- 2) A.K.Jain, "Digital Image Processing", PHL
- 3) M.Sonka, V.Hlavac, and R.Boyle – Image processing, Analysis and Machine vision, Thomson Asia pvt. Ltd, 1999.



B. TECH. SEMESTER VII COMPUTER ENGINEERING  
SYLLABUS & TEACHING SCHEME  
CE 715 - KNOWLEDGE DISCOVERY

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

- Introduction
  - An Overview of data warehousing and data mining
- 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
- Data warehouse and OLAP technology
  - Multi-dimensional Data Cubes
  - Star, Snow Flakes, & Fact Constellation Schema
  - Concept Hierarchies
  - OLAP
  - Data Warehouse Architecture
  - Steps for design and construction of data warehouse
  - A 3-tier data warehouse architecture
  - ROLAP, MOLAP, HOLAP.
  - Data Warehouse Implementation
- Mining Frequent Patterns, Association and Correlation
  - Basic Concepts,
  - Item set mining methods
  - Mining association rules
  - Correlation analysis
  -
- Classification & prediction
  - An Overview & Basic Concepts
  - Classification by decision tree induction
  - Bayesian Classification
- Cluster Analysis
  - An Overview & Basic Concepts
  - Partitioning methods
  - Hierarchical methods
  - Density-Based methods
  - Outlier analysis
- Graph Mining
  - Methods for Mining Frequent Subgraphs
  - Mining Variant and Constrained Substructure Patterns
  - Applications: Graph Indexing, Similarity Search, Classification and Clustering
- Mining Multimedia, Text, and Web Data

- Multimedia Data Mining
  - Similarity Search in Multimedia Data
  - Multidimensional Analysis of Multimedia Data
  - Classification and Prediction Analysis of Multimedia Data
  - Mining Associations in Multimedia Data
  - Audio and Video Data Mining
- Text Mining
  - Text Data Analysis and Information Retrieval
  - Dimensionality Reduction for Text
  - Text Mining Approaches
- Mining the World Wide Web
  - Mining the Web Page Layout Structure
  - Mining the Web's Link Structures to Identify
  - Authoritative Web Pages
  - Mining Multimedia Data on the Web
  - Automatic Classification of Web Documents
  - Web Usage Mining

**Text Book :-**

- 1) Jiawei Han & Micheline Kamber, "Data Mining – Concepts & Techniques", 2<sup>nd</sup> edition, Morgan Kaufmann Publishers

**Reference Books :-**

- 1) Data mining: multimedia, soft computing, and bioinformatics By Sushmita Mitra, Tinku Acharya, published by John Wiley and Sons
- 2) Introduction to Data Mining. Tan, Steinbach, Kumar. Addison-Wesley. 2006.

B. TECH. SEMESTER VII COMPUTER ENGINEERING  
SYLLABUS & TEACHING SCHEME  
CE 717 - MOBILE APPLICATION DEVELOPMENT

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

- **Getting started with Mobility**
  - Mobility landscape, Mobile platforms, Mobile apps development, Overview of Android platform, setting up the mobile app development environment along with an emulator, a case study on Mobile app development
- **Building blocks of mobile apps**
  - App user interface designing – mobile UI resources (Layout, UI elements, Draw-able, Menu), Activity- states and life cycle, interaction amongst activities. Application functionality beyond user interface - Threads, Async task, Services – states and life cycle, Notifications, Broadcast receivers, Telephony and SMS APIs. Native data handling – on-device file I/O, shared preferences, mobile databases such as SQLite, and enterprise data access (via Internet/Intranet)
- **Sprucing up mobile apps**
  - Graphics and animation – custom views, canvas, animation APIs, multimedia – audio/video playback and record, location awareness, and native hardware access (sensors such as accelerometer and gyroscope)
- **Testing mobile apps**
  - Debugging mobile apps, White box testing, Black box testing, and test automation of mobile apps, JUnit for Android, Robotium, MonkeyTalk
- **Taking apps to Market**
  - Versioning, signing and packaging mobile apps, distributing apps on mobile market place

**Text Book: -**

- 1) Android – Wireless Application Development by Lauren Darcey and Shane Conder, 3<sup>rd</sup> Ed., Pearson Education

**Reference Books: -**

- 1) Beginning Android Application Development by Wei-Meng-Lee, Wiley Publication
- 2) Professional Android 4 Application Development by Reto Meier, Wiley Publication

B. TECH. SEMESTER VII  
SCHEME & SYLLABUS FOR THE SUBJECT  
CE 718 - COMPILER CONSTRUCTION

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External (3 Hrs.)	Sessional (1:15 Hrs.)	Practical	Termwork	Total	Credit
4	-	2	60	40	25	25	150	5

- **Introduction**
  - Language processor, Structure of compiler, the science of building compilers, Applications of language processors
- **Lexical analysis**
  - The role of lexical analyzer, input buffering, specification of tokens, recognition of tokens, lexical analyzer generator (lex)
- **Syntax Analysis**
  - Top-down parsing, Bottom-up parsing, Introduction to LR parsing, More powerful LR parsers, Using ambiguous grammars, Parser generators (yacc)
- **Syntax directed translation (SDT)**
  - Syntax directed definitions (SDD), Evaluation order of SDD's, Applications of SDT, SDT schemes
- **Intermediate code generation**
  - Variants of syntax tree, three-address code, types and declarations, translation of expressions, type checking
- **Runtime Environments**
  - Storage organization, stack allocation of space, access to non-local data on the stack, heap management
- **Code Generation**
  - Issues in the design of code generator, the target language, addresses in the target code, basic blocks and flow-graphs, optimization of basic blocks, peephole optimization, register allocation and assignments

**Text Book:**

- 1) Compilers: Principles, techniques and tools by Aho, Ullman and Sethi, 2<sup>nd</sup> Ed., Pearson Education

**Reference Book:**

- 1) Theory and Practice of Compiler Writing, Jean-Paul Tremblay, Paul G. Sorenson, McGraw Hill

B.TECH. SEMESTER VIII  
SCHEME & SYLLABUS FOR THE SUBJECT  
AF 801 - PROJECT/INDUSTRIAL TRAINING

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External	Sessional	Practical	Termwork	Total	Credit
-	-	30	-	-	300	100	400	14

SCHEME & SYLLABUS FOR THE SUBJECT  
AF 802 - SEMINAR

Teaching Scheme (Hours/Week)			Exam Scheme					
Lecture	Tutorial	Practical	External	Sessional	Practical	Termwork	Total	Credit
-	-	-	-	100	-	-	100	4

Each student has to give two seminars on project/ given topic during their project duration.

The students will undertake project work for the period of full semester. They should design/develop the hardware and/or software system. They may also undertake project involving study and analysis of hardware and system in the organisation.

They are supposed to prepare and submit a project report as a part of their term work and give seminars on their project work. The students may be sent to the industry / organisation for their project and they are to timely report to the Institute regarding monitoring and necessary guidance. The faculties should arrange visits at the places of projects.

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

The main purpose of industrial training is to acquaint students with the administrative and organisational details of a company. They should know what are the basic rules followed in a company and how an employee should behave and work in the company.