

B. TECH. SEMESTER I (EC/IC/CE/CH/CL/IT)
SCHEME & SYLLABUS FOR THE SUBJECT
AF111 - MATHS I

Teaching Scheme (Hours/Week)			Exam Scheme (Marks)				Total
Lecture	Tutorial	Practical	Theory (3 hrs.)	Sessional (1 hrs.)	Practical	Termwork	
3	1	--	60	40	--	--	100

[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 (EC/IC/CE/CH/CL/IT)
SCHEME & SYLLABUS FOR THE SUBJECT
AF 112 – BASIC ELECTRICAL & ELECTRONICS ENGINEERING

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

[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.Dslivshnsn, 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 - COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CT 115 - LINUX OPERATING SYSTEM & PROGRAMMING

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

Linux Architecture

Kernel, shell and applications - Role of kernel, role of shell, different types of shells, file system, directory, multitasking and multitasking and multi-user system, operating modes (RC scripts, init levels), important concepts in a Linux Environment - Login, login scripts and profiles, X window system, the GUI under linux, different window manager, file concepts.

Linux Basics

Basic commands : who, pwd etc. File manipulations under Linux - copy, rename, delete and move directory listing, file handling and IO redirection. Users and Groups - Concepts of users and groups, owner creator, primary and secondary group, types of file and directory permissions.

Command Line Interface - Additional text manipulation commands e.g. grep, links, find, locate. ed & vi editors, regular expressions & grep, pipes, filters, sed, awk.

Shell programming

Working with bash - login scripts and profiles

Understanding shells, using variables, examining linux configuration script files, working with the PATH and CDPATH variables.

Shell programming using sed, awk

Core shell programming

Creating a shell script, using variables, functions, parameters, control structures, test, parameter expansion.

Text Book :-

- 1) Unix : Concepts & Applications, Sumitabha Das, TMH

Reference Books :-

- 1) Linux Shell Script Programming by Lodd Meadors
- 2) UNIX Shell Programming, Revised Ed. by Stephen Kochan
- 3) Linux & Unix Shell Programming by David Tansley
- 4) Sams Teach yourself Shell Programming in 24 hours 2nd ed. by Sriranga Veeraraghavan

B. TECH. SEMESTER I (EC/IC/CE/CH/CL/IT)
SCHEME & SYLLABUS FOR THE SUBJECT
AF 114 – ENGINEERING MECHANICS

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

[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 (EC/IC/CE/CH/CL/IT)
SCHEME & SYLLABUS FOR THE SUBJECT
AF 116 – WORKSHOP-I

Lecture	Teaching Scheme (Hours/Week)				Exam Scheme (Marks)			Termwork	Total
	Tutorial	Practical			Theory (3 hrs.)	Sessional (1 hrs.)	Practical		
-	-	3			-	-	-	50	50

[A] INSTRUCTION :

Kinds of wood, types of carpentry tools, carpentry 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 carpentry ---- One job.
2. Simple carpentry joint ---- One job.
3. Threading of pipe and pipe fittings ---- One job.
4. Tin smithy and soldering ---- One job.

B. TECH. SEMESTER I (EC/IC/CE/CH/CL/IT)
SCHEME & SYLLABUS FOR THE SUBJECT
AF 115 – ENGINEERING GRAPHICS

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
3	1	4		60	40	-	50	150

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
OR

1) Engineering Drawing Vol : 1 By : P.J. Shah

2) Engineering Drawing Vol : 2 By : P.J. Shah

3) 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 II (EC/IC/CE/CH/CL/IT)
SCHEME & SYLLABUS FOR THE SUBJECT
AF 201 – MATHEMATICS-II

Lecture	Teaching Scheme (Hours/Week)				Exam Scheme (Marks)			Total
	Tutorial	Practical			Theory (3 hrs.)	Sessional (1 hrs.)	Practical Termwork	
4	0	-			60	40	-	100

[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 $\sin^n x$, $\cos^n x$ respectively, To expand $\sin^n x$, $\cos^n x$ and $\sin^n x$. $\cos^n x$ in a series of Sines or Cosines of multiples of x , 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 (EC/IC/CE/CH/CL/IT)
SCHEME & SYLLABUS FOR THE SUBJECT
AF 213 – ELECTRONIC PRINCIPLE

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

[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 – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CT 213 – COMPUTER PROGRAMMING IN 'C'

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

- 1 Introduction
- 2 Types, operators and expressions
Variable names, data types & sizes, constant, declarations, operators : arithmetic, relational, logical, bitwise, short hand, ternary & assignment, conditional expression & procedures.
- 3 Control flow & I/O operators :
If-else-if, switch,
Loops :
While, for, and do-while, goto, break and continue statement.
- 4 Arrays
- 5 Strings
- 6 User Defined Functions :
Need of user defined functions, multi-function program, calling a function, category of functions, no argument no return values, arguments but no return values, argument with return values, nesting of function, recursion
- 7 Structure and unions :
Introduction, structures definition, giving values to members, structure 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, case studies.
- 8 Pointers :
Introduction, understanding of pointers, accessing the address of a variable, declaring and initializing pointers, accessing a variable through its pointers, pointers expressions, expressions, pointer increments and scale factor, pointers and arrays, pointers and character strings, pointers on pointers, case studies.
- 9 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, case studies.

Text Book :-

- 1) Programming in ANSI C by Balaguruswamy, 2nd Ed., Tata McGraw Hill

B. TECH. SEMESTER II – (EC/IC/CE/CH/CL/IT)
SCHEME & SYLLABUS FOR THE SUBJECT
AF 204 – MECHANICS OF SOLID

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

[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, Correlation 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 – (EC/IC/CE/CH/CL/IT)
SCHEME & SYLLABUS FOR THE SUBJECT
AF 215 – HEAT POWER

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

[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.
- OR**
- 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 – (EC/IC/CE/CH/CL/IT)
SCHEME & SYLLABUS FOR THE SUBJECT
AF 206 – WORKSHOP-II

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
-	-	3		-	-	-	50	50

[A] INSTRUCTION :

Introduction to fitting shop tools, taps, dies, drills, drilling machines, welding process, welding equipment for arc welding, forging tools, forging, bending, upsetting, drawing, adhesive bonding.

[B] DEMONSTRATIONS :

Demonstration of general operation of drilling, turning, shaping.

[C] TERM WORK :

Each candidate shall submit the following term work.

1. Filing and fitting practice ---- One job.
2. Simple welding joint ---- One job.
3. Forging practice ---- One job.
4. Wooden utility job with adhesive bonding ---- One job.
5. PCB making ---- One job.

B. E. SEMESTER III - (EC/IC/CE/CH/CL/IT)
SCHEME & SYLLABUS FOR THE SUBJECT
AF 301 - MATHEMATICS-III

Lecture	Teaching Scheme (Hours/Week)				Exam Scheme (Marks)			Total
	Tutorial	Practical			Theory (3 hrs.)	Sessional (1 hrs.)	Practical Termwork	
4	0	-			60	40	-	100

[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. E. SEMESTER III – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 310 – DATA STRUCTURE & ALGORITHMS

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
4	0	2		60	40	25	25	150
<ol style="list-style-type: none"> 1. Basic concepts <ol style="list-style-type: none"> a) Algorithm specifications 2. Arrays <ol style="list-style-type: none"> a) Array as an abstract data type, representation of Arrays 3. Stacks & Queues <ol style="list-style-type: none"> a) Stack as an abstract data type, queue as an abstract type, evaluation of expressions 4. Linked Lists <ol style="list-style-type: none"> a) Singly linked lists, doubly linked list, circular list, linked stacks and queues, polynomials, generalized lists. 5. Trees <ol style="list-style-type: none"> a) Introduction, binary trees, binary tree traversal and tree iterators, additional binary tree operations, threaded binary trees, heaps, binary search tree, forests, Huffman algorithm. 6. Graphs <ol style="list-style-type: none"> a) The graph abstract data type, graph traversal, directed graph, weighted graph, shortest path-Dijkstra's algorithm, minimum spanning tree. 7. Sorting <ol style="list-style-type: none"> a) Insertion sort, quick sort, merge sort, heap sort, shell sort, count sort, sorting on several keys, list and table sort, summary of internal sorting. 8. Hashing <ol style="list-style-type: none"> a) Hash table, hash function, collision, collision resolution techniques. 9. Search Techniques <ol style="list-style-type: none"> a) 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. E. SEMESTER III – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 309 – OBJECT ORIENTED MODELLING

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
4	0	2		60	40	25	25	150

1. Introduction to Object Oriented Concepts
2. Modeling & Design Techniques
 - a) Modeling, Abstraction, Three Models (Class, State & Interaction)
3. Class Modeling
 - a) Object & Class Concepts, Link & Associations, Generalization & Inheritance
 - b) Properties, Multiplicity, Operations, Generalizations, Dependency
4. State Modeling
 - a) Events, States, Transitions & Conditions, State Diagram & Behaviour, Activity States, Super States, Concurrent States
5. Interaction Modeling
 - a) Use case
 - Diagrams, Levels of Use cases, Features
 - b) Sequence Diagram
 - Loops, Conditionals, Synchronous & Asynchronous Calls
 - c) Activity Models
 - Partitions, Signals, Tokens, Flows & Edges, Expansion Regions, Joins
6. An Introduction to Java
7. Fundamental Programming Structures in Java
8. Objects and Classes
9. Inheritance
10. Interfaces and Inner Classes
11. Event Handling
12. Deploying Applications and Applets
13. Exceptions, Logging, Assertions, and Debugging
14. Generic Programming
15. Collections

Text Book :-

- 1) Object Oriented Modeling & Design with UML, 2nd Edition, Micheal Blaha & James Rumbaugh, PHI
- 2) Core Java Volume I – Fundamentals, 8th Edition, Cay Horstmann and Gray Cornell, Pearson Education

Reference Books :-

- 1) Grady Booch, Object Oriented Analysis & Design, 3rd Ed., Addison-Wesley
- 2) Ivar Jacobson, Object Oriented Software Engineering, A Use Case Driven Approach, Addison Wesley
- 3) Thinking in Java, Bruce Eckel, Prentice Hall
- 4) An Introduction to Java, Y. Daniel Liang, PHI
- 5) UML Distilled, 3rd Edition, Martin Fowler, Pearson Education

B. E. SEMESTER III – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
EL 304 - NETWORK ANALYSIS

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
4	0	2		60	40	25	25	150

[A] DEVELOPMENT OF THE CIRCUIT CONCEPT

Introduction, Charge and Energy, The Relationship of Field and Circuit Concepts, The Capacitance Parameter, The Inductance Parameter, The Resistance Parameter, Units and scaling, Approximation of a Physical System as a circuit.

[B] CONVENTIONS FOR DESCRIBING NETWORKS

Reference Directions for Current and Voltage, Active Element Conventions, The Dot Convention for Coupled Circuits, Topological Description of Networks.

[C] NETWORK EQUATIONS

Kirchhoff's Laws, The Number of Network Equations, Source Transformations, Examples of the Formulation of Network Equations Loop Variable Analysis, Node Variable Analysis, Determinants: Minors and the Gauss Method, Duality.

[D] INITIAL CONDITIONS IN NETWORKS

Introduction, Initial Conditions in Elements, Geometrical Interpretation of Derivatives, A Procedure for Evaluating Initial Conditions, Initial State of a Network, Application of Laplace Transform to solution of 1st and 2nd order differential equations arising in electrical circuits.

[E] FIRST ORDER DIFFERENTIAL EQUATIONS

General and particular solutions, Time constants, the integrating factor.

[F] SOLUTION OF DIFFERENTIAL EQUATIONS

Classical method of solution of first order and second order differential equations. Solution of first order and higher order differential equations using Laplace Transformation.

[G] TRANSFORMS OF SPECIAL SIGNAL WAVEFORMS

The Shifted Unit Step Function, The Ramp and impulse Functions, Waveform Synthesis, The Initial and Final Value of $f(t)$ from $F(s)$, The Convolution Integral, Convolution as Summation.

[H] IMPEDANCE FUNCTIONS AND NETWORK THEOREMS

The Concept of Complex Frequency, Transform Impedance and Transform Circuits, Series and Parallel Combinations of Elements, Superposition and Reciprocity, Thevenin's Theorem and Norton's Theorem.

[I] NETWORK FUNCTIONS: POLES AND ZEROS

Terminal Pairs or Ports, Network Functions for One Port and Two port. The Calculation of Network Function (1) Ladder Networks (2) General Networks, Poles and Zeros of Network Functions, Restrictions on Pole and Zero Locations for Driving-Point Functions Restrictions on Pole and Zero locations for Transfer Functions, Time-domain Behavior from the Pole & zero plot

[J] TWO PORT NETWORKS

Relationship of two port variables, short circuit admittance parameters, the open circuit impedance parameters, transmission parameters, the hybrid parameters, relationship between parameter sets, parallel connection of two port networks.

Text Book:

- 1) Network Analysis By: M.E. Van Valkenburg.

Ref. Book:

- 1) Network Analysis By: G. K. Mithal

B. E. SEMESTER III – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 308 – DESIGN OF DIGITAL CIRCUITS

Lecture	Teaching Scheme (Hours/Week)				Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical			Theory (3 hrs.)	Sessional (1 hrs.)			
4	0	2			60	40	25	25	150

[A] 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.

[B] 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.

[C] 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.

[D] COMBINATIONAL LOGIC :

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

[E] 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.

[F] 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.

[G] REGISTERS, COUNTERS AND THE MEMORY UNIT :

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

[H] 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.

[I] VERILOG

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

Text Book:

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

Ref Book:

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

B. E. SEMESTER IV – (EC/IC/CE/CH/CL/IT)
SCHEME & SYLLABUS FOR THE SUBJECT
AF 401 – MATHEMATICS-IV

Lecture	Teaching Scheme (Hours/Week)				Exam Scheme (Marks)			Total
	Tutorial	Practical			Theory (3 hrs.)	Sessional (1 hrs.)	Practical Termwork	
4	0	-			60	40	-	100

[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 - sieidal 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, poission 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. E. SEMESTER IV – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 410 – JAVA TECHNOLOGY

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
4	0	2		60	40	25	25	150

1. Introduction

Introduction to J2EE technology, Web Server, N-tier Architecture, Introduction to web Container and Structure of web Application

2. Java Beans

JavaBeans Concept, Bean Persistence, Introspection

3. 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

4. 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

5. Introduction to XML and XML usage

Introduction to XML, Schema, DTD, DOM, XML Parsers in Javax

6. Security

Different level of Authentication, Security APIs

7. Java Remote Method Invocation

Introduction to RMI technology, Writing RMI Server & Client

8. 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. E. SEMESTER IV – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 411 – VISUAL TECHNOLOGY

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
4	0	2		60	40	25	25	150

Topic

1. Introduction to windows programming
2. Introduction to Vc++ IDE
3. Windows GUI programming (SDI & MDI Application)
 - a) Messages (Message passing and handling)
 - b) GDI Objects (Pen, Brush, etc.)
 - c) Mouse Handling
 - d) Keyboard Handling
 - e) Mapping Modes
 - f) Menu, Tool bar and Status bar
 - g) Scrolling and Splitting views
4. Document / View Architecture
 - a) Serialization (storing and retrieving to and from disk)
5. Multithreaded Programming
6. Dialog Based Application
 - a) Model and Modeless dialogs
 - b) Windows dialog controls
 - c) Buttons, Edit box, Check box
 - d) Radio Button, combo box, list box
 - e) Animation control, spin control, slider control,
 - f) Tree view control, List view control.
7. Active x controls
 - a) Using Active x controls
 - b) Creating Active x controls
8. Database Connectivity using DAO
9. 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. E. SEMESTER IV – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 414 – DESIGN & ANALYSIS OF ALGORITHM

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
4	0	2		60	40	25	25	150

Topics to be covered

- 1) Introduction to algorithms
- 2) Elementary Data Structures
- 3) Methods for solving recurrence relations for finding time complexity
- 4) Overview of searching & sorting techniques
- 5) The Greedy Methodology
- 6) Dynamic Programming
- 7) Graph Traversal & Searching
- 8) Backtracking Techniques
- 9) Branch & Bound Techniques
- 10) Lower bound theory
- 11) NP-hard & NP-complete problems

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 Cormen, Tata McGraw Hill.
- 3) Design & Analysis of Computer Algorithms, Aho, Ullman, Addison Wesley.
- 4) The art of Computer Programming Vol.I & III, Knuth, AddisonWesley.

B. E. SEMESTER IV – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 408 – DIGITAL & ANALOG COMMUNICATION SYSTEMS

Lecture	Teaching Scheme (Hours/Week)				Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical			Theory (3 hrs.)	Sessional (1 hrs.)			
4	0	2			60	40	25	25	150

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 (Third Edition), B. P. Lathi Publication : OXFORD

Reference Book :-

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

B. E. SEMESTER IV – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 409 - COMPUTER PERIPHERALS

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
-	-	2		-	-	25	25	50

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

Reference Books :-

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

B. E. SEMESTER IV – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 415 – DISCRETE MATHEMATICS

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)			Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)	Practical		
4	0	2		60	40	25	25	150

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. Winitz, Computer Science Series, McGraw-Hill.

**B. E. SEMESTER IV – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CT 416 – YOGA & MEDITATION**

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
2	-	1		50	-	50	-	100

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

1. Kapalbhati, Anulom vilom pranayam, Omkar Pranayam, Bhramari, Pranayam. Body rotations, Shavasa, Suryanamaskar.
2. Asanas for Meditations
Padmasan, Swastikasan, Sidhdhasan, 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 Carrier 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. E. SEMESTER V – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 502 – MICROPROCESSOR FUNDAMENTALS & PROGRAMMING

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
4	0	2		60	40	25	25	150

[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. E. SEMESTER V – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 509 – WEB DEVELOPMENT IN .NET

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
4	0	2		60	40	25	25	150

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. E. SEMESTER V – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 510 – SOFTWARE ENGINEERING**

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
4	0	2		60	40	25	25	150

- 1) Phases in Software Development Project
- 2) Overview, Need, Coverage of topics
- 3) Project feasibility analysis
- 4) Software Process Models
Incremental Process Models, Evolutionary Process Models, Specialized Process Models, Unified Process
- 5) Software Project management
Cost Estimation, Loc based estimation, FP- based Estimation, COCOMO II
- 6) Project Scheduling
Timeline chart, Earned value analysis
- 7) Risk Management
Risk identification, Risk assessment & refinement, Risk mitigation, Monitoring & management, RMMM plan
- 8) Change Management
Software configuration management, Software configuration process
- 9) Requirement engineering
Requirement engineering tasks, Initiating the requirement engineering Process ,Eliciting requirements, System Engineering, System analysis: SRS, Use cases
- 10) System design
Design concepts and principles, Architectural design, User interface design ,Component level design, Object oriented design
- 11) Software Testing
Software Testing strategies, Software Testing techniques, White box testing Basis path testing, Control structure testing, Black box testing, Object oriented testing
- 12) Software Quality Assurance
ISO, CMM, Software reliability

Text & Reference Books :-

- 1) Software Engineering - A practitioner's Approach by Roger S. Pressman, McGraw Hill Pub.
- 2) Fundamentals of software engineering by Rajib Mall, II ed. Prentice Hall, Indian
- 3) Software Engineering by Ian Sommerville, 6 ed., Pearson Edu.
- 4) UML Distilled: A brief guide to the standard object modeling language by Flower and Scott
- 5) SOFTWARE ENGINEERING: Principles and Practice by Waman S Jawadekar, Tata McGraw hill
- 6) Object-oriented Analysis and Design with Applications by Grady Booch; II ed. Pearson Edu.
- 7) Object oriented Analysis and Design by Andrew Haigh, Tata McGraw-Hill

**B. E. SEMESTER V – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 508 – DATABASE SYSTEMS**

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)			Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)	Practical		
4	0	2		60	40	25	25	150

1. Basic Concepts:

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

2. Entity Relationship Model:

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

3. Relational Database Management System :

a) 3.1 Relational Model

Structure of database, Relational algebra, Extended relational algebra operation, tuple relational calculus, Domain relational calculus, Modification of database, Views.

b) Structured Query Language

Background, Basic structure

c) Integrity Constraints

Domain constraints, Referential integrity, Assertions, Triggers, Functional Dependencies.

d) Database Design

Pitfalls in relational database design, Decomposition, Normalization, I,II,III normal Forms, Normalization using functional dependencies, Normalization using multi valued dependencies, Domain key normal form, Alternative approach to database design.

4. File System Structure :

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

5. Query Processing :

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

6. Transaction Processing :

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

7. Concurrency Control :

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

8. Recovery System:

Failure classification, Storage structure, Recovery & Atomicity, Log-based recovery, Shadow paging, Recovery with concurrent transactions, Buffer management, Failure with loss of non-volatile storage, Advance recovery techniques.

9. Distributed Data Bases

10. Security and Integrity of data base

Text Book :-

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

B. E. SEMESTER V – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 505 – COMPUTER ORGANIZATION

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
4	0	2		60	40	25	25	150

1. COMPUTING AND COMPUTERS
 - a) The nature of computing
 - b) The evolution of computers
 - c) The VLSI Era
2. DESIGN METHODOLOGY
 - a) The system design
 - b) Register level
 - c) The processor level
3. PROCESSOR BASICS
 - a) CPU organization
 - b) Data representation
 - c) Instruction sets
4. DATAPATH DESIGN
 - a) Fixed point arithmetic
 - b) Arithmetic logic units
 - c) Advanced topics
5. CONTROL DESIGN
 - a) Basic concepts
 - b) Micro programmed control
 - c) Pipeline control
6. MEMORY ORGANISATION
 - a) Memory technology
 - b) Memory systems
 - c) Caches
7. SYSTEM ORGANISATION
 - a) Communication methods
 - b) IO and system control
 - c) Parallel Processing

Text Book :-

- 1) "COMPUTER ARCHITECTURE AND ORGANISATION", JOHN .P. HAYES, Computer science series , McGRAW-HILL

Reference Books :-

- 1) "COMPUTER SYSTEM ARCHITECTURE ", MORRIS MANO, Prentice Hall.
- 2) "COMPUTER ORGANISATION", HMACHER, VRANESIC and ZAKY., Computer Science Series, McGRAW- HILL

B. E. SEMESTER V – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CT 516 – SELF DEVELOPMENT

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
2	-	-		50	-	-	-	50

- 1) Paradigm Shift
- 2) Production / Production-Capability balance
- 3) Principles of Pro-activity
- 4) Mission Statement
- 5) Principles of Personal Management
- 6) Paradigms of inter-dependence
- 7) Concept of win-win
- 8) Concept of empathic listening
- 9) Synergy
- 10) Renewal
- 11) CREATIVITY :
Ways to develop it, Importance of intuition and art of doing nothing for creativity, Creativity in Interrelationship
- 12) Importance of Witness fullness
- 13) Assumption v/s Self experience
- 14) Child-Adult-Parent Balance of trails in Individual
- 15) Responsive Communication: Discussion v/s Argument
- 16) Concept of Character and its importance in life
- 17) Success v/s worth whileness, Importance of failure
- 18) Competition and Co-operation

References :-

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

B. E. SEMESTER VI – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 610 – ADVANCED COMPUTER ARCHITECTURE

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)			Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)	Practical		
4	0	2		60	40	25	25	150

[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. E. SEMESTER VI – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 618- NETWORK & INFORMATION SECURITY

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
4	0	2		60	40	25	25	150

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. E. SEMESTER VI – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CT 614 – THEO. OF AUTOMATA AND FORMAL LANGUAGES

Lecture	Teaching Scheme (Hours/Week)				Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical			Theory (3 hrs.)	Sessional (1 hrs.)			
4	0	0			60	40	-	-	100

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, Unsolvability problems, Halting problem, Post's correspondence, applications to CFLs.

Computability, Primitive recursive functions, computable functions, PR functions, bounded operations.
Non-primitive recursive functions.

5. Introduction to Computational complexity :

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

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. E. SEMESTER VI – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CT – SERVICE ORIENTED ARCHITECTURE

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)			Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)	Practical		
4	0	2		60	40	25	25	150

- 1) Roots of SOA – Characteristics of SOA - Comparing SOA to client-server and distributed internet architectures – Anatomy of SOA- How components in an SOA interrelate - Principles of service orientation
- 2) Web services – Service descriptions – Messaging with SOAP –Message exchange, Patterns – Coordination –Atomic Transactions – Business activities – Orchestration – Choreography- Service layer abstraction – Application Service Layer – Business Service Layer – Orchestration Service Layer
- 3) Service oriented analysis – Business-centric SOA – Deriving business services- service modeling - Service Oriented Design – WSDL basics, SOAP basics, XML Schema, Directory Service basics, Introduction to LDAP, JNDI APIs, Namespaces, UDDI basics- SOA composition guidelines – Entity-centric business service design – Application service design – Taskcentric business service design
- 4) SOA platform basics – SOA support in J2EE – Java API for XML-based web services (JAX-WS) - Java architecture for XML binding (JAXB) – Java API for XML Registries (JAXR) - Java API for XML based RPC (JAX-RPC)- Web Services Interoperability Technologies (WSIT)
- 5) WS-BPEL basics – WS-Coordination overview - WS-Choreography, WS-Policy, WSSecurity

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) Dan Woods and Thomas Mattern, “Enterprise SOA Designing IT for Business Innovation” O’REILLY.

B. E. SEMESTER VI – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 612 – OPERATING SYSTEMS

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
4	0	2		60	40	25	25	150

Major Topics:

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. E. SEMESTER VI – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 611 – COMPUTER NETWORKS

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
4	0	2		60	40	25	25	150

1) Introduction

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

2) The Physical Layer

Transmission Media – magnetic media, twisted pair, baseband & broadband, fiber optics. Wireless Transmission – radio, microwave, infrared & lightwave. Narrowband ISDN, Broadband ISDN & ATM. Cellular Radio- Paging systems, cordless telephones, analog & digital telephones.

3) 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.

4) 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.

5) The Network Layer

Network layer Design issues. Routing Algorithms. Congestion Control Algorithms - general policies, congestion prevention policies, traffic shaping, flow specifications, congestion control in VC subnets, choke packets, load shedding, jitter control and congestion control for malfunctioning. The network layer in the internet - the IP protocol, IP addresses & subnets

6) 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).

7) 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. E. SEMESTER VII – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 701 – ARTIFICIAL INTELLIGENCE

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
4	0	2		60	40	25	25	150

1) Introduction to Artificial Intelligence

Introduction problems, problem space, production systems, problem characteristics

2) 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)

3) Knowledge Representative

Propositional Logic, predicate logic, Instance and isa relationship, semantic net, frames.

4) Fuzzy Logic

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

5) Inference techniques

Representing knowledge using rules, procedure versus declarative knowledge, forward versus backward reasoning, unification, resolution.

6) Natural Language Processing

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

7) Expert System

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

8) 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. E. SEMESTER VII – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 710 – EMBEDDED SYSTEMS**

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
4	0	2		60	40	25	25	150

1) 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.

2) Performance analysis of embedded systems :

software timing characterization and analysis methods.

3) 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.

4) 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, embeddability metrics.

5) Compilation techniques for embedded software :

code generation, re-targetability, code optimization.

6) 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, Kluwer 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. E. SEMESTER VII – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 713 – ADVANCED COMPUTER NETWORKS

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
4	0	2		60	40	25	25	150

1) Introduction

Introduction to internetworking, TCP/IP protocol stack, Internetworking concepts.

2) 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.

3) Sockets interface

Introduction to socket function, connect, accept, listen, bind function calls, TCP client server, concurrent server to server multiple clients.

4) I/O multiplexing

I/O models : blocking, polling, signal driven, multiplexed. Select system call, multiplexed TCP server to serve clients, use of p select.

5) UDP socket:

UDP socket functions, difference : blocking, polling, signal driven, multiplexed. Select system call, multiplexed TCP server to serve clients, use of p select.

6) Domain name server

Introduction to DNS, resource record and resolver function, mapping between IP address and domain name.

7) IPv4 and IPv6 interoperability

Introduction, IPv4 client-server, IPv-6 address testing macro, source code portability.

8) Daemon process

Introduction to daemon process, syslog, creating a daemon process, i net daemon.

9) Advance UDP socket

Receiving flags, destination address and interface info, adding reliability to UDP, concurrent UDP server.

10) 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. E. SEMESTER VII – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 714 – IMAGE PROCESSING

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
4	0	2		60	40	25	25	150

- 1) Introduction
- 2) Image Transformation Techniques
- 3) Image Enhancement Algorithms
- 4) Image Restoration Methods
- 5) Image Compression Techniques
- 6) 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. E. SEMESTER VII – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 716 - DISTRIBUTED OPERATING SYSTEMS

Lecture	Teaching Scheme (Hours/Week)				Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical			Theory (3 hrs.)	Sessional (1 hrs.)			
4	0	2			60	40	25	25	150

- 1) Intro to Distributed Systems
- 2) Interprocess Communication and Coordination
- 3) State Maintenance
- 4) Distributed Mutual Exclusion Algorithms
- 5) Election Algorithms
- 6) Fault Tolerance and Distributed Agreement
- 7) Database Techniques
- 8) Check Point and Recovery
- 9) Distributed Deadlock Detection
- 10) Load Balancing & Scheduling
- 11) Security

Text Book :-

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

B. E. SEMESTER VII – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 703 – LANGUAGE PROCESSOR

Lecture	Teaching Scheme (Hours/Week)			Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical		Theory (3 hrs.)	Sessional (1 hrs.)			
4	0	2		60	40	25	25	150

- 1) Structure of compiler
Block diagram, functions of each phase
- 2) Lexical analysis
Scanning process, elementary scanner design and its implementation
- 3) Top-down parsing
General strategies, RDP and LR(1) algorithm, Top-down parsing with no back up (simple LL(1), LR(1) W/O E-rules LL(1) with E-rules)
- 4) Bottom-up parsing
LR(0), SLR(1), LALR(1), parsing augmented grammar, attributed translation grammar (ATG)
- 5) Syntax directed translation
Implicit stacking in RDP, semantic stacks in bottom-up compilation, action symbols in top-down
- 6) Intermediate code
Polish Notation
N-tuple
Abstract syntax trees
Threaded code (P-code abstract machine for Pascal)
- 7) Memory allocation
Static allocation
Dynamic allocation
Heap storage allocation
Garbage collection
- 8) Symbol table management
Symbol table organisation for non-block structured languages
- 9) Optimization
M/C dependent optimization
M/C independent optimization
- 10) Real time environment
- 11) Error detection and recovery

Text Book :-

- 1) "Theory and Practice of Compiler Writing", Jean-Paul Tremblay, Paul G. Sorenson, McGraw Hill
- 2) "Principles of Compiler Design", Aho, Ullman and Sethi, Addison Wesley

Reference Book :-

- 1) "Construction--Principles and Practice", D. M. Dhamdhere Compiler, Macmillan India
- 2) "Systems Programming", J.J. Donovan, McGraw Hill

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

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

1. Introduction
 - a) An Overview of data warehousing and data mining
2. Data Pre-Processing
 - a) Overview, Need for pre-processing
 - b) Issues related to efficient data handling (Extraction, Transformation, And updating of large databases (ADDED) Data Cleaning
 - c) Data Integration & Transformation
 - d) Data Reduction
 - e) Discretization & Concept Hierarchy Generation
3. Data warehouse and OLAP technology
 - a) Multi-dimensional Data Cubes
 - b) Star, Snow Flakes, & Fact Constellation Schema
 - c) Concept Hierarchies
 - d) OLAP
 - e) Data Warehouse Architecture
 - f) Steps for design and construction of data warehouse
 - g) A 3-tier data warehouse architecture
 - h) ROLAP, MOLAP, HOLAP.
 - i) Data Warehouse Implementation
4. Mining Frequent Patterns, Association and Correlation
 - a) Basic Concepts,
 - b) Item set mining methods
 - c) Mining association rules
 - d) Correlation analysis
5. Classification & prediction
 - a) An Overview & Basic Concepts
 - b) Classification by decision tree induction
 - c) Bayesian Classification
6. Cluster Analysis
 - a) An Overview & Basic Concepts
 - b) Partitioning methods
 - c) Hierarchical methods
 - d) Density-Based methods
 - e) Outlier analysis
7. Graph Mining
 - a) Methods for Mining Frequent Subgraphs
 - b) Mining Variant and Constrained Substructure Patterns
 - c) Applications: Graph Indexing, Similarity Search, Classification and Clustering
8. Mining Multimedia, Text, and Web Data
 - a) 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
- b) Text Mining
 - Text Data Analysis and Information Retrieval
 - Dimensionality Reduction for Text
 - Text Mining Approaches
- c) 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", 2nd 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. E. SEMESTER VII – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 706 – SYSTEM DESIGN PRACTICE (MINI PROJECT)

Lecture	Teaching Scheme (Hours/Week)				Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical			Theory (3 hrs.)	Sessional (1 hrs.)			
-	-	2			-	-	25	25	50

B. E. SEMESTER VIII – COMPUTER ENGINEERING
SCHEME & SYLLABUS FOR THE SUBJECT
CE 801 – PROJECT/INDUSTRIAL TRAINING

Lecture	Teaching Scheme (Hours/Week)				Exam Scheme (Marks)		Practical	Termwork	Total
	Tutorial	Practical			Theory (3 hrs.)	Sessional (1 hrs.)			
-	-	30			-	100	300	100	500

Each students has to give two seminar 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 a employee should behave and work in the company.