SHRI RAMDEOBABA COLLEGE OF ENGINEERING AND MANAGEMENT, NAGPUR

An Autonomous College of Rashtrasant Tukadoji Maharaj
Nagpur University, Nagpur, Maharashtra, India

TEACHING SCHEME & SYLLABUS
2015-16

B.E. INFORMATION TECHNOLOGY

Published by
Dr. R.S. Pande
Principal
Shri Ramdeobaba College of Engineering & Management
Ramdeo Tekdi, Gittikhadan, Katol Road, Nagpur - 440 013
Ph. : 0712-2580011 Fax : 0712 - 2583237
ISO 9001 : 2008 CERTIFIED ORGANISATION

About the department

The department, established in 2001 and accredited by National Board of Accreditation, AICTE, in 2008 and 2014 respectively, has an excellent infrastructure and well-qualified and experienced faculties with average teaching experience of 10 years.

Laboratories of the department are well equipped with computers of latest configuration and Internet facility. Latest software, wireless access point, LCD projectors and a separate router are used in the laboratories and for teaching purpose.

The department takes pride in highest number of placements in college during the session 2014-15 and has the distinction of consistently getting excellent results in the Final year. Students are encouraged to appear in GATE, CAT, GRE and other competitive examinations, which has resulted in increased number of students appearing and clearing these prestigious examinations. The department also coordinates Semicolon Tech Club of RCOEM, under which various national and college level technical and co-curricular activities are organized for the benefit of students.

Department Vision

To establish the department as a major source of manpower for the IT sector.

Department Mission

To produce engineering graduates with sound technical knowledge in Information Technology, good communication skills, ability to excel in professional career and possess high moral values

Programme Educational Objectives

1. To generate quality manpower to meet the requirements of IT industries by providing sound fundamental and core engineering knowledge and adequate exposure to emerging technologies.
2. To develop abilities in students to interpret, analyze and design effective solutions while working in a team and adapt to current trends by engaging in life long learning.
3. To make students understand the importance of environmental, societal, professional, ethical issues and effective communication skills.

Program Outcomes

a. An ability to apply the knowledge of mathematics, science and engineering to complex engineering problems in IT field.
b. An ability to identify, analyze and formulate solution to complex engineering problems.
c. An ability to design solution for complex engineering problems with appropriate consideration for cultural, societal, and environmental issues.
d. An ability to understand and design required components of a computer based solution.
e. An ability to visualize and effectively work in a team on multidisciplinary tasks.
f. Demonstrate skills to use latest hardware and software tools to analyze and solve the problems.
g. Demonstrate ability to effectively work as a team member or lead a team for successful completion of projects.
h. An ability to analyze the local and global impact of computing on individuals, organizations and society.
i. An ability to develop confidence for self-education and life-long learning.
j. An ability to communicate effectively in both verbal and written form.
k. Demonstrate knowledge of professional, ethical and social issues and responsibilities.
l. Demonstrate knowledge and implementation of engineering and management principles.

DEPARTMENT OF INFORMATION TECHNOLOGY

Teaching Scheme for First Year (Semester I and II) Bachelor of Engineering

GROUP 1: SEMESTER I / GROUP 2: SEMESTER II

Sr. No.	Code	Course	L	T	P	Credits	Maximum Marks			Exam Duration
							Internal Assessment	End Sem Exam	Total	
1	MAT101/ MAT102	Engineering Mathematics-I/II	4	1	0	9	40	60	100	3 Hrs.
2	PHT101	Engineering Physics	4	1	0	9	40	60	100	3 Hrs.
3	PHP101	Engineering Physics lab	0	0	3	3	25	25	50	-
4	EET101	Electrical Engineering	3	1	0	7	40	60	100	3 Hrs.
5	EEP101	Electrical Engineering lab	0	0	2	2	25	25	50	-
6	CST101	Computer Programming	2	0	0	4	40	60	100	3 Hrs.
7	CSP101	Computer Programming lab	0	0	2	2	25	25	50	-
8	HUT101	Communication Skills	2	0	0	4	40	60	100	3 Hrs.
9	HUP101	Communication Skills lab	0	0	2	2	25	25	50	-
10	PEP101	Sports/Yoga	0	0	2	0	-	-	-	-
		TOTAL	**15**	**3**	**11**	**42**	**300**	**400**	**700**	

Teaching Scheme for First Year (Semester I and II) Bachelor of Engineering

GROUP 1 : SEMESTER II / GROUP 2 : SEMESTER I

Sr. No.	Code	Course	L	T	P	Credits	Maximum Marks			Exam Duration
							Internal Assessment	End Sem Exam	Total	
1	MAT102/ MAT101	Engineering Mathematics-II/I	4	1	0	9	40	60	100	3 Hrs.
2	CHT101	Engineering Chemistry	4	1	0	9	40	60	100	3 Hrs.
3	CHP101	Engineering Chemistry lab	0	0	3	3	25	25	50	-
4	CET101	Engineering Mechanics	3	1	0	7	40	60	100	3 Hrs.
5	CEP101	Engineering Mechanics lab	0	0	2	2	25	25	50	-
6	MET101	Engineering Drawing	3	0	0	6	40	60	100	4 Hrs.
7	MEP101	Engineering Drawing lab	0	0	3	3	25	25	50	-
8	HUT102	Social Skills	2	0	0	4	40	60	100	3 Hrs.
9	INP102	Workshop	0	0	2	2	25	25	50	-
		TOTAL	**16**	**3**	**10**	**45**	**300**	**400**		

Scheme of Examination of Bachelor of Engineering (Information Technology) Semester Pattern - III Semester B. E. (Information Technology)

Sr. No.	Code	Course	L	T	P	Credits	Maximum Marks			Exam Duration
							Internal Assessment	End Sem Exam	Total	
1	MAT202	Engineering Mathematics-III	3	1	0	7	40	60	100	3 Hrs.
2	HUT203	Principles of Management	3	0	0	6	40	60	100	3 Hrs.
3	ITT201	Data Structures and Program Design	4	1	0	9	40	60	100	3 Hrs.
4	ITP201	Data Structures and Program Design	0	0	3	3	25	25	50	-
5	ITT202	Digital Circuits and Fundamentals of Microprocessor	4	1	0	9	40	60	100	3 Hrs.
6	ITP202	Digital Circuits and Fundamentals of Microprocessor	0	0	3	3	25	25	50	-
7	ITT203	Business Information System	4	1	0	9	40	60	100	3 Hrs.
8	CHT201	Environmental Studies-I (Audit Course)	2	0	0	0	-	-	-	-
		TOTAL	**20**	**4**	**6**	**46**			**600**	

Scheme of Examination of Bachelor of Engineering (Information Technology) Semester Pattern - IV Semester B. E. (Information Technology)

Sr. No.	Code	Course	L	T	P	Credits	Maximum Marks			Exam Duration
							Internal Assessment	End Sem Exam	Total	
1	MAT245	Discrete Mathematics	3	1	0	7	40	60	100	3 Hrs.
2	ITT204	Computer Architecture and Organization	4	1	0	9	40	60	100	3 Hrs.
3	ITT205	Object Oriented Programming	4	1	0	9	40	60	100	3 Hrs.
4	ITP205	Object Oriented Programming	0	0	3	3	25	25	50	-
5	ITT206	IT Infrastructure Services	4	1	0	9	40	60	100	3 Hrs.
6	ITP206	IT Infrastructure Services	0	0	3	3	25	25	50	-
7	HUT201	Technical Communication	3	0	0	6	40	60	100	3 Hrs.
8	CHT202	Environmental Studies-II (Audit Course)	2	0	0	0	-	-	-	-
		TOTAL	**20**	**4**	**6**	**46**			**600**	

Scheme of Examination of Bachelor of Engineering (Information Technology)
Semester Pattern - V Semester B. E. (Information Technology)

Sr. No.	Code	Course	L	T	P	Credits	Maximum Marks			Exam Duration
							Internal Assessment	End Sem Exam	Total	
1	ITT301	Microprocessor and Interfacing	4	1	0	9	40	60	100	3 Hrs.
2	ITP301	Microprocessor and Interfacing	0	0	2	2	25	25	50	-
3	ECT311	Digital Communications	3	1	0	7	40	60	100	3 Hrs.
4	ITT302	System Software	4	1	0	9	40	60	100	3 Hrs.
5	ITT303	Theory of Computation	4	1	0	9	40	60	100	3 Hrs.
6	ITT304	Software Engineering	4	1	0	9	40	60	100	3 Hrs.
7	ITP304	Software Engineering	0	0	2	2	25	25	50	-
		TOTAL	**19**	**5**	**4**	**47**			**600**	

Scheme of Examination of Bachelor of Engineering (Information Technology)
Semester Pattern - VI Semester B. E. (Information Technology)

Sr. No.	Code	Course	L	T	P	Credits	Maximum Marks			Exam Duration
							Internal Assessment	End Sem Exam	Total	
1	ITT305	Design and Analysis of Algorithms	4	1	0	9	40	60	100	3 Hrs.
2	ITT306	Database Management Systems	4	1	0	9	40	60	100	3 Hrs.
3	ITP306	Database Management Systems	0	0	2	2	25	25	50	-
4	ITT307	Elective - I	3	1	0	7	40	60	100	3 Hrs.
5	ITT308	Operating Systems	4	1	0	9	40	60	100	3 Hrs.
6	ITP308	Operating Systems	0	0	2	2	25	25	50	-
7	ITT309	Open Elective	3	1	0	7	40	60	100	3 Hrs.
8	ITP310	Animation Workshop (Audit Course)	0	0	4	0	-	-		-
		TOTAL	**18**	**5**	**08**	**45**			**600**	

Course Code	Elective - I	Course Code	Open Elective
ITT307-1	Software Project Management	ITT309-1	Internet Technologies
ITT307-2	Computer Graphics	ITT309-2	Information Systems
ITT307-3	Electronic Commerce		

Scheme of Examination of Bachelor of Engineering (Information Technology)
Semester Pattern - VII Semester B. E. (Information Technology)

Sr. No.	Code	Course	L	T	P	Credits	Maximum Marks			Exam Duration
							Internal Assessment	End Sem Exam	Total	
1	ITT401	Computer Networks	4	1	0	9	40	60	100	3 Hrs.
2	ITP401	Computer Networks	0	0	2	2	25	25	50	-
3	ITT402	Compiler	4	1	0	9	40	60	100	3 Hrs.
4	ITP402	Compiler	0	0	2	2	25	25	50	-
5	ITT403	Virtualization & Cloud Computing	4	1	0	9	40	60	100	3 Hrs.
6	ITT404	Elective - II	4	0	0	8	40	60	100	3 Hrs.
7	ITP405	Project Phase-I and Seminar-I	0	0	2	4	50	50	100	-
8	ITP406	Software Lab (Audit Course)	0	0	2	0	-	-		-
		TOTAL	**16**	**3**	**8**	**43**			**600**	

Scheme of Examination of Bachelor of Engineering (Information Technology)
Semester Pattern - VIII Semester B. E. (Information Technology)

Sr. No.	Code	Course	L	T	P	Credits	Maximum Marks			Exam Duration
							Internal Assessment	End Sem Exam	Total	
1	ITT407	Introduction to Distributed Systems	4	1	0	9	40	60	100	3Hrs.
2	ITT408	Computer System Security	4	1	0	9	40	60	100	3Hrs.
3	ITP408	Computer System Security	0	0	2	2	25	25	50	-
4	ITT409	Elective - III	4	0	0	8	40	60	100	3Hrs.
5	ITT410	Elective - IV	4	0	0	8	40	60	100	3Hrs.
6	ITP411	Project Phase-II and Seminar-II	0	0	6	12	75	75	150	-
		TOTAL	**16**	**2**	**8**	**48**			**600**	

Elective - II		Elective - III		Elective - IV	
ITT404-1	Data Warehousing & Mining	ITT409-1	Mobile Apps Development	ITT410-1	Enterprise Resource Planning
ITT404-2	Mobile Computing	ITT409-2	Business Intelligence	ITT410-2	Web Technologies
ITT404-3	Artificial Intelligence	ITT409-3	Soft Computing	ITT410-3	Information Retrieval

Syllabus of Group 1 - Semester I and Group 2 - Semester I, Bachelor of Engineering

Course Code : MAT101 **Course : Engineering Mathematics-I**

L: 4 Hrs., T: 1 Hrs., P: 0 Hrs., Per week **Total Credits : 09**

Course Outcomes

Upon successful completion of the course, the student should be familiar with and be able to

1. Formulate and analyze mathematical problems, precisely define the key terms, and draw clear and reasonable conclusions.
2. Read, understand, and construct correct mathematical model for simple electrical circuits, mechanical systems and other related engineering problems.
3. Apply techniques of differential calculus to obtain the solution of mathematical models of physical systems and use optimization technique.
4. Continue to acquire mathematical knowledge and skills appropriate to professional activities and demonstrate highest standards of ethical issues in mathematics

Syllabus

Unit - I:

Ordinary Differential Calculus: Successive differentiation, Taylor's and Maclaurin's series for function of one variable, indeterminate forms, curvature, radius of curvature and circle of curvature.

Unit - II:

Partial Differentiation: Functions of several variables, first and higher order derivative, Euler's Theorem, Chain rule and Total differential coefficient, Jacobians. Taylor's and Maclaurin's series for function of two variables, Maxima and minima for function of two variables, Lagrange's method of undetermined multipliers.

Unit - III:

Infinite Series: Convergence, divergence and oscillation of series, General properties, Tests of convergence, Alternating series.

Unit - IV:

First Order Differential Equation: First order first degree differential equations: Linear, reducible to linear, exact and reducible to exact differential equations; Non-linear differential equations.

Unit - V:

Higher Order Differential Equation: Higher order differential equations with constant coefficient, method of variation of parameters, Cauchy's and Legendre's homogeneous differential equations, simultaneous differential equations, differential equation of the type $d^2y/dx^2 = f(x)$ and $d^2y/dx^2 = f(y)$.

Unit - VI:

Applications of Differential Equation: Applications of first order first degree differential equations: Simple electrical circuits in series. Application of higher order differential equations: Mechanical and electrical Oscillatory circuits (free, damped, forced oscillations)

Text Books:

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, Delhi.
2. A text book of Applied Mathematics Volume I & II, by P. N. Wartikar and J. N. Wartikar, Pune Vidhyarthi Griha Prakashan, Pune-411030 (India)
3. Advanced Engineering Mathematics, 2 ed , Jain ,Iynger , Narosa publication

Reference Books:

1. Advanced Engineering Mathematics by Erwin Kreyszig, 8th edition, Neekunj print process, Delhi.
2. Schaum's Outline of Differential Equations, Richard Bronson , TMH, 3ed, New Delhi
3. Engineering Mathematics by Srimanta, Paul
4. A text book of Applied Mathematics I, T. Singh, K.L. Sarda, Professional Publishing House Pvt.Ltd., Nagpur.

Syllabus of Group 1 - Semester I and Group 2 – Semester II, Bachelor of Engineering

Course Code : PHT101 **Course : Engineering Physics**

L: 4 Hrs, T: 1 Hr, P : 0 Hr., Per week **Total Credits : 09**

Course Objectives :

1. To develop the ability to apply concepts in elementary physics to understanding of engineering applications;
2. To introduce more advanced physics concepts, which form the basis of modern engineering;
3. To provide a sound foundation in mathematical formulation of concepts learnt and their applications;
4. To elaborate the general nature of concepts learnt and of possibility of their cross-disciplinary application;
5. To develop skills for numerical problem solving in areas covered

Course Outcomes :

1. Develop a better understanding of physics as a fundamental discipline;
2. Gain understanding of the type of questions addressed by theories in and methods of physics in different fields of engineering;
3. Develop a deeper appreciation of the notion of applying knowledge of physical laws;
4. Deepen understanding of certain basic tools, such as state of a system, system response, resonance, coherence, superposition and interference, in thinking about and analyzing physical systems;
5. Gain an understanding of developing areas in physics and their possible engineering applications;
6. Develop ability to choose a physical approach to understanding of advanced areas in engineering;
7. Be comfortable with fundamental ideas in areas like semiconductor, electronic devices, fibre optic communication and quantum mechanics;
8. Gain familiarity with the language, fundamental concerns, techniques and applications of nanoscience and nanotechnology

Unit-I:

Optics:

Interference in thin films, division of amplitude and wavefront, wedge-shaped films, Newton's rings, antireflection coatings; Diffraction, single slit, double slit, grating; Bragg's law of crystal diffraction, Different types of polarization of light, Malus' law, Optically anisotropic materials, double refraction, wave-plates and compensators, production and analysis of polarized light.

Unit-II:

Quantum Physics:

Wave-particle duality, wave packets, Heisenberg uncertainty relations; Wave function, probability and probability current, Schrodinger's equation, time dependent equation and its separation; Infinite potential and finite potential wells, phenomenon of tunneling, application to tunneling diode.

Unit-III:

LASERs and Optical Fibres:

Interaction of matter and radiation, LASER, spontaneous and stimulated emission, population inversion; Common types of lasers and their applications; Optical fibres, structure, types, propagation in a fibre, modes of propagation, signal attenuation, signal distortion.

Unit-IV:

Elements of Crystal Structure, Mass Spectrograph and Particle Accelerators:

Lattice and basis, crystal systems, centering, Bravais lattices, cubic system, principles of electron optics, cathode ray oscilloscope, mass spectrographs, particle accelerators.

Unit-V:

Semiconductors:

Band structure of solids, band diagrams of insulators, semiconductors and conductors, Fermi level in conductors and semiconductors, carrier concentration, conductivity, effective mass; Junction diode and its band diagram, depletion region and barrier potential, bipolar junction transistor, band diagrams of pnp and npn transistors, transistor action.

Unit-VI:

Nanophysics:

What is Nanotechnology? Fullerenes and nanoparticles; Outline of methods of preparation; Elements of electron microscopy; Outline of properties – physical, thermal, optical, electrical, magnetic; Quantum size-effects; CNTs and molecular electronics; Applications.

Text Books:

1. Fundamentals of Physics: D. Halliday, R. Resnik and J. Walker, John Wiley.
2. Engineering Physics: S. Jain and G.G. Sahasrabudhe, Universities Press (2010).
3. Introduction to Nanoscience and Nanotechnology: K.K. Chattopadhyay and A.N. Banerjee, PHI Learning (2009)

Reference Books:

1. Electronic Engineering Materials and Devices: J. Allison, TMH.
2. Engineering Physics: P.K. Palaniswamy, Scietech (2005).
3. Engineering Physics: H. Malik and A.K. Singh, TMH (2010).
4. Engineering Physics: D.K. Bhattacharya and A.Bhaskaran, Oxford University Press (2010)
5. Materials Science and Engineering – A First Course, 5th Ed., V. Raghvan, PHI Learning.

Syllabus of Group 1 - Semester I and Group 2 – Semester II, Bachelor of Engineering

Course Code: PHP101 **Course: Engineering Physics Laboratory**

L: 0 Hrs., T: 0 Hrs., P: 3 Hrs., Per week **Total Credits: 03**

Course Outcomes :

1. Students should be able to perform tasks like leveling, alignment, reading vernier scales, do specific measurements, systematically record observations, do calculations from data collected and draw conclusions.
2. Students gain working familiarity with instruments like simple spectrometer, travelling microscope, lenses, prisms, ammeter, voltmeter, the CRO, power supplies etc.;
3. Students gain better understanding of concepts like interference, diffraction, polarization, energy band gap in semiconductor etc.
4. Students gain a working knowledge of estimating errors in an experiment for which background theory is known;
5. Students should be able to subject data collected to statistical and error analysis.

A minimum of 8 experiments to be performed from the following list of experiments.

List of Experiments :

1. Study of interference in thin films: Formation of Newton's rings
2. Study of diffraction: Transmission diffraction grating
3. Study of diode rectifier equation: Ordinary p-n junction and Zener diode characteristics
4. Study of transistor action: Transistor characteristics in common emitter configuration
5. Study of Hall effect: Determination of Hall coefficient of an extrinsic semiconductor
6. Study of energy bandgap in semiconductor: NTC thermistor bandgap determination
7. Study of rectifiers: Determination of ripple factor for half, full and bridge rectifiers
8. Linear least squares fit on a PC: Fitting a straight line to measured (x,y) sets
9. Study of double refraction: Quartz prism
10. Interference in wedge-shaped thin films: Refractive index of liquids, diameter of a wire
11. Use of CRO: Frequency and phase difference determination

Demo experiments: Laser kit to demonstrate diffraction, optical fibre to demonstrate signal attenuation, Interactive Mathematica demonstrations on polarization, wave packets, tunneling, charge particle dynamics and semiconductor devices.

Reference Books:

1. Physics Lab Manual written by the Teaching Faculty of Physics Department, RCOEM.

Syllabus of Group 1 - Semester I and Group 2 - Semester II, Bachelor of Engineering

Course Code : EET101 **Course : Electrical Engineering**

L:3 Hr., T:1 Hrs., P:0 Hrs., Per week **Total Credits : 07**

Course Outcomes :

Upon completion of this course, the students shall be able to,

1. Apply the basic laws of electric and magnetic circuits to obtain the unknown quantities.
2. Represent and interpret the sinusoidal electrical quantities mathematically as well as graphically in the form of waveforms/phasors and analyze the 1-phase/3-phase AC circuits to determine the unknown quantities.
3. Determine the power losses/efficiency and voltage drop/voltage regulation of a 1-phase transformer at full load condition and demonstrate the knowledge related with its need, construction, principle, types and applications.
4. Describe the construction, principle, applications and performance characteristics of DC machines and Induction motors.
5. Demonstrate the concept of electrical power generation, transmission, distribution and the understanding about conventional/renewable energy sources.
6. Demonstrate the understanding about necessity of electrical earthing, safety & protecting devices, electrical energy utilization, illumination sources and their selection.

Unit-I:

DC Electric Circuits: Definition of EMF, Current, Power, Energy Resistance, Variation of resistance with physical parameters viz. length, area, specific resistivity and temperature. Ohm's law, resistances in series and parallel, current and voltage division rules, KVL & KCL, star delta transformation and related numerical. Measurement of DC electrical quantities.

Magnetic Circuit: Concept of MMF, Flux, reluctance, analogy with electric circuits, B-H curve, simple numerical on series magnetic circuits.

Unit-II:

AC Circuits: Generation of single phase and three phase alternating EMF. Average and RMS values for sinusoidal waveform. Phasor representation of sinusoidal electrical quantities, Steady state behavior of RLC circuits with sinusoidal excitation. Reactance, impedance, Power & Energy in AC Circuits. Simple numerical on series and parallel AC circuits. Concept & importance of power factor & its improvement (with simple numerical).

Simple analysis of balanced three phase AC circuits, Star-delta resistive networks. Measurement of AC electrical quantities.

Unit-III:

Introduction to Electrical Power System :

Introduction to Power Generation (Thermal, Hydro, Nuclear, Wind and Solar) with block schematic representation only. Single line diagram for Generation, Transmission & Distribution through different voltage

levels; Low voltage radial distribution system (Over head & underground, single phase and three phase). Necessity of equipment earthings, Fuses (Rewirable and HRC), MCB, ELCB.Basic operation of UPS and Inverters (Block schematic representation).

Unit-IV:

Single phase Transformer :

Principle of operation, Construction Transformer ratings, No load and On load operation with leakage reluctance, losses, efficiency, Definition & formula for voltage regulation, OC/ SC test, equivalent circuit referred to primary side of transformer.

Unit-V:

Rotating Electric Machines :

DC Machines: DC Generator-Principle of working, construction (without details of armature winding), classification of DC generators. DC Motors-Back EMF, necessity of starters, speed and torque equations, characteristics of motors, speed control of DC motors (without numerical), Application of DC motors.

Three Phase Induction Motors: Working principles, types and construction of three phase Induction Motor, synchronous speed, torque, sleep, torque speed characteristics, applications of three phase Induction motor.

Single Phase Induction Motors: operating principle of capacitor start and run single phase induction motor and its applications.

Unit-VI:

Utilization of Electrical Energy :

Illumination: Definition of luminous flux, luminous intensity, Candle power, illumination, Luminance, Luminous efficiency (lumens/watt) of different types of lamps, working principle of Fluorescent/Sodium Vapour/ Mercury vapor & CFL Lamps. Simple numerical to determine number of lamps to attain a given average lux level in an area.

Electric Heating: Advantages of Electrically produced heat, types and applications of Electric heating equipment, transfer of heat (conduction, convection, radiation); Resistance ovens, Induction heating (Core & coreless type), Dielectric heating. (Note. Numerical excluded)

Tariff: One part (KWH based) tariff with simple numerical; to calculate the domestic electricity charges.

Text Books :

1. Elements of Electrical sciences: P. Mukhopadhyay, N. Chand & Bros Roorkee (1989).
2. Electrical Technology: B. L. Thareja, S. Chand Publications.
3. Basic Electrical Engineering: S. B. Bodkhe, N. M. Deshkar, P. P. H. Pvt. Ltd.

Reference Books :

1. Basic Electrical Engineering: T.K. Nagasarkar& M. S. Sukhija, Oxford Univ. Press.
2. Utilization of Electrical Energy: H. Pratab, Dhanpatrai& Sons.
3. Utilization of Electrical Energy: E. Openshaw Taylor, Orient Longman.
4. Websites: www.powermin.nic.in, www.mnes.nic.in, www.mahaurja.com.

Syllabus of Group 1 - Semester I and Group 2 - Semester II, Bachelor of Engineering

Course Code : EEP101 **Course: Electrical Engineering Lab**

L:0 Hr., T:0Hrs., P:2 Hrs., Per week **Total Credits : 02**

Course Outcomes :

Upon completion of this course, the students shall be able to,

1. Connect the electric circuits based on the syllabus of theory subject EET101 and test the performance by way of observation, calculations and conclusion.
2. Demonstrate the concept and significance of power factor and how it can be improved.
3. Conduct an electrical energy survey of connected load at residential premises and demonstrate the understanding of energy tariff by calculating the energy bill in accordance with the norms of State Electricity Distribution Company.

List of Experiments :

1. To verify Kirchoff's voltage and current law using D.C. source.
2. To study the R-L-C series circuit with AC source
3. To study R-L-C parallel circuit with AC source
4. To perform direct load test on 1-phase transformer for finding regulation and efficiency
5. To perform open circuit and short circuit tests on 1-phase transformer
6. To study 3-phase star delta connections and verify different relations of voltage ,current and power
7. To study the speed control techniques for DC shunt motor
8. To study the importance of power factor and improvement of power factor.
9. To analyze energy bill of residential category and prepare energy sheet.

Syllabus of Group 1 - Semester I and Group 2 - Semester II, Bachelor of Engineering

Course Code: CST101 **Courses: Computer Programming**

L: 2 Hrs. T: 0 Hrs. P: 0 Hrs. Per week **Total Credits: 4**

Course Outcomes

On successful completion of the course, students will be able to

1. Design and code well-structured C programs, flowcharts, algorithms etc.
2. Write program on the basis of decision control structures and loop control structures.
3. Perform sorting and various other operations on 1-D and 2-D array.
4. Perform operations on structures, functions and pointers.

Syllabus

Unit-I:

Computer Fundamentals: Basic Structure of a computer, Input/output devices and memories and types of computer. Introduction to DOS and Windows OS, Number Systems: Decimal, Binary, Octal, Hexadecimal and conversion from one to another. Algorithm – Conventions used in writing algorithm, Software Life Cycle, Program and Programming Language System Software- Translator, Compiler, Interpreter, Linker, Loader. Languages – Procedural, Object oriented, High level, assembly, Machine Language and Flowchart

Unit-II:

C Programming Language: Keyword, Constant, Variable, Data types, Operators, Types of Statements, Preprocessor Directives, Decision Control Statement-if, if-else, Nested if-else statement, Switch case.

Unit-III:

Loop Control Structure: go to, while, for, do while, break, continue Storage class, Enumerated Data types, Renaming Data types with typedef(), Type Casting, Bitwise Operators.

Unit-IV:

Array: Introduction, array Declaration, Single and multidimensional array Pointers: Introduction, Definition and use of pointer, Pointer arithmetic, pointer operators, pointer and array, pointer to pointer

Unit-V:

Structures and Union: Declaring and using structure, Structure initialization, Structure within structure, array of structure, pointer to structure.

Unit-VI:

Function Programming: Introduction, User Defined and Library Function, Parameter passing, Return value, Recursion, pointer and function

Text Books:

1. Mastering C: K. R. Venugopal and S. R. Prasad, Tata McGraw Hill
2. Programming in ANSI C,5th ed. : E. Balguruswami McGraw Hill

Reference Books:

1. Let Us C.9thed: Yashwant Kanetkar, BPB Publication
2. Programming with C: Byron Gottfried, Schaums Outline Series.

Syllabus of Group 1 - Semester I and Group 2 - Semester II, Bachelor of Engineering

Course Code: CSP 101 **Course: Computer Programming Lab**

L: 0 Hrs., T: 0 Hrs., P:2 Hrs. Per week **Total Credits: 2**

Course Outcomes :

On successful completion of the course, students will be able to

1. Implement programs based on if-else, switch and loop structure.
2. Implement programs based on 1-D and 2-D numeric and character arrays.
3. Perform operation on structure and pointer.
4. Design programs based on functions.

CSP101practicals based on above CST 101 syllabus

Syllabus of Group 1- Semester I and Group 2-Semester II, Bachelor of Engineering

Course Code : HUT101 **Course:-Communication Skills**

L:2 Hrs.,T:0Hrs.,P:0Hrs.,Per week **Total Credits:4**

Course Objectives:

The main objective of the subject is to enhance the employability skills of engineering students as well as communication skills at work place. The sub-objectives are:

1. To develop students' reading skills and pronunciation.
2. To develop technical communication skills through drafting, letter writing, and précis writing.
3. To develop literary skills through essay writing.
4. To develop public speaking skills of the students.
5. To expose the students to the ethics of English language by teaching grammar

Course Outcomes :

1. Students have better reading comprehension, pronunciation, and functional English grammar.
2. Students are able to write letters and resumes
3. Students are able to organize their thoughts for effective presentation and writing.
4. Students are able to learn skills to present themselves well in an interview, and handle a Group Discussion

Syllabus

Unit-I :

Communication:

What is Communication, the Media of Communication, Channels of Communication, Barriers to Effective Communication, Role of Communication Skills in Society.

Unit-II :

Reading Comprehension :

The Process of Reading, Reading Strategies Central idea, Tone and Intention, Comprehension Passages for practice.

Unit-III :

Professional Speaking:

Components of an effective talk, Idea of space and time in public speaking, Tone of voice, Body language, Timing and duration of speech, Audio-Visual Aids in speech. Presentation Skills, Group Discussion and Job Interviews

Unit IV :

Orientation to Literary and Scholarly Articles:

Preferably two fictional and two non-fictional texts (Selected by the teachers and the Head). The art of writing articles on social, cultural, scientific and technical issues (Paragraph Writing), Exercises.

Unit V :

Business Correspondence:

Types and Formats of Business letters, Routine Business Letters (Inquiry, Order, Instruction, Complaint, Adjustment), Sales Letters, Resumes and Job applications, Business Memos, Emails.

Unit VI:

Grammar:

Synonym and Antonym, Give one word for, Voice, Narration and Comparison of Adjectives and Adverbs, Transformation of sentences and Common Errors, Idioms and Phrases, Note Making, Précis writing.

Text Book :

1. M. Ashraf. Rizvi. Effective Technical Communication. Tata Mc Graw-Hill Publishing Company Limited.2009

Reference Books :

1. Sanjay Kumar and Pushp Lata. Communication Skills. Oxford Publication
2. Meenakshi Raman and Sangeeta Sharma. Technical Communication. Second Edition Oxford Publication.2011
3. Anne Nicholls. Mastering Public Speaking. Jaico Publishing House.2003
4. Dr Asudani .V. H An easy approach to English. Astha Publication Nagpur. 2009 , 3rd Edition.

Syllabus of Group 1- Semester I and Group 2-Semester II, Bachelor of Engineering

Course Code :-HUP101 **Course:-Communication Skills Practical**

L:0Hrs.,T:0Hrs.,P:2Hrs.,Per week **Total Credits:2**

Course Outcomes

On successful completion of the course, students will be able to

1. Learn presentation skills
2. Understand effective strategies for Personal Interview and Group Discussions
3. Learn and apply effective language skills – listening, speaking, reading and writing

Sr. No	Name of the Practical	Activities Taken	Medium of Practical
1	Speaking Skills	1. Introduction to effective ways of speaking 2. Oral presentations Extempore / Debate / JAM/Self-introduction	PPT Based, Activity Based
2	Presentation Skills	1. Preparing visual aids/PPTs on given topics	PPT Based, Activity Based, English Edge software
3	Group Discussion-Orientation	1. GD types 2. GD techniques/rules - videos 3. General/familiar topics for discussion	English Edge software Oxford Publication CD, PPT based Activity based
4	Group Discussion-Practice session	1. Divide in group of 6 2. Classification of topics 3. Feedback	PPT Based, Activity Based
5	Group Discussion-Mock	1. Divide in group of 6 2. Mock GDs - types 3. Feedback	Activity Based
6	Interview Techniques-Orientation	1. Various types of interviews 2. Types of interviews 3. Self-analysis 4. KYC sheet 5. Self-introduction	English Edge software Oxford Publication CD Activity Based
7	Interview Techniques Practice Sessions	1. Video 2. Non-verbal communication 3. Types of interview questions	Oxford Publication CD, Activity Based
8	Interview Techniques-Mock Interviews	1. Mock Interviews (One to One)	Activity Based
	Optional Practicals	**Teacher can decide any other Practical apart from the ones mentioned below**	
9	Listening Skills	1. Listening Barriers	PPT Based, Activity Based
10	Non Verbal Communication	1. Kinesics in com/interviews 2. Activities/Role play	English Edge software based, PPT based
11	Use Figurative Language	1. Intro phrases/ Idioms/proverbs/ pronunciation	PPT Based, Activity Based

Syllabus of Group 1 - Semester I and Group 2 - Semester II, Bachelor of Engineering

Course Code :PEP101 **Course: Sports/Yoga**

L:0 Hr., T:0Hrs., P:2 Hrs., Per week **Total Credits : 00**

Course Outcomes

On successful completion of the course, students will be able to

1. More number of students are participating in sports activities.
2. Students interest toward physical fitness has been increased.
3. Students are getting basic knowledge of yoga & sports.

BRIEF OBJECTIVES OF SPORTS/YOGA PRACTICAL CLASSES

It has long been proven that a healthy body leads to a healthy mind. With a strong belief in this, Physical Education department at RCOEM will conduct sports/yoga classes with the objective of maintaining health, fitness and wellness of students as well as create awareness about need for good health and physical fitness. The objective would also be todevelop team spirit, social skills as well as identify and develop leadership qualities in students through various sports group activities. Training of students to understand the rules of various national and international games would also be an important objective. Sport activities would also be conducted with the objective to provide recreation to the students which is an important neutralizer for stress. Additionally, the objective would be to evaluate fitness of students so as to recommend and conduct specific Yoga and Sport activities.

PROGRAMME OUTLINE

1. Sports

1. Introduction to sports i.e. volleyball, cricket, football, basketball, badminton, T.T., Athletics.
2. Health and safety issues related to sports; Knowledge, recognition and ability to deal with injuries and illnesses associated with sports.
3. Awareness about sports skills, techniques and tactics.
4. Rules, regulations and scoring systems of different games (Indoor & Outdoor).
5. Trials of students to participate in inter-collegiate/University level games.

2. Yoga: Includes asanas like sitting, standing and lying, Surayanamaskar, Pranayam.

3. Physical fitness test: this would include speed, Cardiovascular Endurance, strength, skill & flexibility, body composition (fat weight & lean body weight).

Syllabus of Group 1 - Semester II and Group 2 – Semester II, Bachelor of Engineering

Course Code: MAT102 **Course: Engineering Mathematics-II**

L: 4 Hrs., T: 1 Hrs., P: 0 Hrs., Per week **Total Credits: 09**

Course Outcomes

On successful completion of the course, students will be able to

1. Identify, formulate and analyze statistical problems, precisely define the key terms, and draw clear and reasonable conclusions.
2. Read, understand and analyze problems in Fluid dynamics, Electromagnetic fields and related topics using techniques of vector algebra and calculus.
3. To use the knowledge of multiple integrals in finding the area and volume of any region bounded by the given curves.
4. Continue to acquire mathematical and statistical knowledge and skills appropriate to professional activities and demonstrate highest standards of ethical issues in mathematics.

Syllabus

Unit-I:

Integral Calculus I: Beta and Gamma functions, Differentiation of definite integrals, Mean value and root mean square values.

Unit-II:

Integral Calculus II: Tracing of curves (Cartesian, polar and parametric curves), rectification of simple curve, quadrature, volumes and surface of solids of revolutions(Cartesian, polar and parametric forms).Theorem of Pappus and Guldin.

Unit-III:

Multiple Integrals and their Applications: Elementary double integrals, change of variable (simple transformation), change of order of integration (Cartesian and polar), application to mass, area, volume and centre of gravity (Cartesian and polar forms), elementary triple integrals.

Unit-IV:

Vector Calculus I: Scalar point function, Vector point function, vector differentiation, gradient, divergence and curl, directional derivatives with their physical interpretations, solenoidal and irrotational motions, Scalar potential function.

Unit-V:

Vector Calculus II: Vector integration: Line integrals, work done, conservative fields, surface integrals and volume integrals, Stoke's theorem, Gauss divergence theorem, Green's theorem and their simple applications.

Unit VI:

Statistics: Fitting of straight line, $y = a + bx$, parabola $y = a + bx + cx^2$ and the exponential curves by method of least squares, Coefficient of linear correlation, lines of regression , rank correlation, multiple regression and regression plane of the type $z = a + bx + cy$, coefficient determination.

Text Books:

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, Delhi
2. A text book of Applied Mathematics Volume I & II, by P. N. Wartikar and J. N. Wartikar, Pune Vidhyarthi Griha Prakashan, Pune-411030 (India)
3. Advanced Engineering Mathematics, 2 ed , Jain ,Iynger , Narosa publication

Reference Books:

1. Advanced Engineering Mathematics by Erwin Kreyszig, 8th edition, Neekunj print process, Delhi.
2. Engineering Mathematics: Principal and Applications Srimanta, Paul, Oxford Univ Press,(2011)
3. Higher Engineering Mathematics: B.V. Ramana, TMH

Syllabus of Group 1 - Semester I and Group 2 - Semester II, Bachelor of Engineering

Course No. CHT101 **Course : Engineering Chemistry**

L: 4 Hrs., T: 1 Hrs., P: 0 Hrs., Per week **Total Credits : 09**

Course Outcomes :

Upon successful completion of the course, the student should be familiar with and be able to gain:

1. Knowledge of water analysis, waste water analysis, boiler water chemistry and desalination of water enable the students to overcome the difficulties, to a larger extent; that often come across in the field of (i) Civil engineering, (ii) Public health and environmental engineering (iii) Ocean engineering (iv) Thermal and electrical power generation sectors and process engineering.
2. Better understanding to surmount over the difficulties faced in the selection of proper and economical constructional materials to be used; the impact of change in the physicochemical and mechanical properties of the concrete type composites due to variation in their chemical composition.
3. To apply the knowledge of 'Principles of Tribology' for reduction of friction and wear in the process engineering, manufacturing and production engineering and automotive engineering fields.
4. Knowledge for proper selection and design of engineering materials having better corrosion resistance and to implement effective measures to minimize corrosion.
5. Better insight in the selection of materials for modern technologies which demand with unusual combination of properties that cannot be met by any of the conventional metal alloys, ceramics and polymeric materials viz in aerospace applications, military warfare materials, nuclear installations, electrical electronic components devices, nano materials process engineering field etc.

Syllabus

Water Treatment :

Water Treatment for Industrial Applications: Brief introduction regarding sources, impurities in water, hardness of water and their types. Softening of water using lime-soda process: principles in hot and cold lime-soda process. Zeolite softener, demineralization by synthetic ion exchange resins. Boiler troubles: Carryover, Priming and Foaming, Scales and Sludges, Caustic Embrittlement, Boiler Corrosion-causes and effects on boiler operation and methods of prevention. External and Internal conditioning : Phosphate, Carbonate and Calgon conditioning.

Water Treatment for Domestic Water:

Domestic water treatment : Brief discussion and Chemistry involved in the process of sedimentation, coagulation, filtration and sterilization by UV, Ozone, Chlorination including Break point chlorination. Desalination of water using reverse osmosis and electro dialysis.

Numericals Based on Water Softening: Numericals based on (1) lime-soda (2) zeolite / ion-exchange water treatment processes.

Cement :

Process parameters involved in the manufacturing of portland cement, manufacture of portland cement, microscopic constituents of cement and their effects on strength; setting and hardening of cement.

Types and uses of cement : Pozzolonic; Rapid hardening, Low heat and High alumina cements. Additives and admixtures used in cement: Accelerators, Retarders, Air entrainment agents, Water repellants.

Chemical approach to Nanomaterials :

General introduction to nanotechnology, timeline and milestone, overview of different nanomaterials available, potential use of nanomaterials in electronics, sensors, medical applications, catalysis, environment and cosmetics.

Physical chemistry related to nanoparticles such as colloids and clusters: conductivity and enhanced catalytic activity compared to the same materials in the macroscopic state.

Synthesis of nanomaterials: ' Top-Down'- photolithography and 'Bottom-Up'- sol-gel method .

Carbon nanotubes: Single-walled and multi-walled carbon nanotubes, their structures, properties and applications.

Potential risks of nanomaterials- Health and environmental impact.

Fuels and combustion :

Introduction, Calorific value, Higher and Lower calorific value, flame temperature and flame intensity , determination of calorific value by Bomb calorimeter and Boy's calorimeter, numericals based on the determination of calorific value by Bomb and Boy's Calorimater.

Solid Fuels:

Types of coals, proximate and ultimate analysis of coal, its significance, Carbonization of Coal.

Liquid and Gaseous Fuels:

Liquid fuels: mining & fractional distillation of crude petroleum, use of gasoline in internal combustion engine, octane number, cetane number, flash point of combustible liquid fuel, knocking. Fisher-Tropsch's process for manufacture of synthetic gasoline, thermal and catalytic cracking: fixed bed and fluid bed catalytic cracking, aviation gasoline.

Gaseous fuels:

CNG and Significance of flue gas analysis by Orsat apparatus.

Numericals based on Combustion Calculations:

Numericals based on combustion calculations for solid fuels. Numericals based on combustion calculations for liquid and gaseous fuels.

Friction, Wear and Lubricants :

Introduction, lubrication mechanism : Hydrodynamic, Boundary and Extreme pressure lubrication. Classification of lubricants- Solid, Semisolid and Liquid lubricants, Blended oils using different additives viz.:-

Anti-oxidants, E. P. additive, corrosion inhibitor, viscosity index improver, etc. synthetic lubricants viz.:- Dibasic acid esters, Polyglycol ethers and Silicones, Lubricating Emulsions. Properties of Greases: Drop point and consistency test, Properties of liquid lubricants: Viscosity and Viscosity Index, Aniline point, Cloud & Pour point and Decomposition stability. Criteria for selection of lubricants under different conditions of load and speeds.

Corrosion :

Electrochemistry and Theories of Corrosion :

Introduction to corrosion, Cause and Consequences of corrosion, Measurement of corrosion rate, Galvanic series, Dry and Wet corrosion, Pilling-Bedworth rule, factors affecting the rate of corrosion.

Types of corrosion and Preventive Methods; Different types of corrosion (Pitting, Stress, Intergranular and

Galvanic), protection against corrosion, design and selection of engineering materials, cathodic and anodic protection, Brief discussion about Protective Coatings: Metallic, Inorganic, Organic coatings, Corrosion inhibitors.

Text Books :

1. Text Book of Engineering Chemistry, S. S. Dara, S. Chand and Company Ltd., New Delhi.
2. Textbook of Engineering Chemistry, P. C. Jain and Monica Jain, Dhanpat Rai and Sons, New Delhi.
3. Text Book of Environmental Chemistry and Pollution Control, S. S. Dara; S. Chand and Company Ltd., New Delhi.
4. Textbook of Engineering Chemistry, S. N. Narkhede, R. T. Jadhav, A. B. Bhake, A. U. Zadgaonkar, Das Ganu Prakashan, Nagpur.
5. Applied Chemistry, A. V. Bharati and Walekar, Tech Max Publications, Pune.
6. Engineering Chemistry, Arty Dixit, Dr. Kirtiwardhan Dixit, Harivansh Prakashan, Chandrapur.

Reference Books :

1. Engineering Chemistry by Gyngell, McGraw Hill Publishing Company, New Delhi.
2. Engineering Chemistry (Vol I), Rajaram and Curiacose, Tata McGraw Hill Publishing Company, New Delhi.
3. Engineering Chemistry (Vol II), Rajaram and Curiacose, Tata McGraw Hill Publishing Company, New Delhi.
4. Engineering Chemistry, Saraswat and Thakur, Vikas Publication, New Delhi.
5. Engineering Chemistry, B. S. Sivasankar, Tata Mcgraw Hill Publishing Company, New Delhi.
6. Engineering Chemistry, O. G. Palan, Tata Mcgraw Hill Publishing Company, New Delhi.
7. Engineering Chemistry, R. Shivakumar, Tata Mcgraw Hill Publishing Company, New Delhi.
8. Chemistry of Cement, J. D. Lee, Mcgraw Hill Publishing Company, New Delhi.
9. Nanomaterials Chemistry, C. N. R. Rao, A. Muller, A. K. Cheetam, Wiley VCH verlag GmbH and Company, Weinheim.

Syllabus of Group 1 - Semester I and Group 2 - Semester II, Bachelor of Engineering

Course Code : CHP101 **Course: Engineering Chemistry Lab**

L:0 Hr., T:0Hrs., P:3 Hrs., Per week **Total Credits : 03**

Minimum of **Eight** practicals will be performed based on the theory.

Text Books :

1. Text Book on Experiments and Calculations in Engineering Chemistry: S. S. Dara; S. Chand and Company Ltd., New Delhi.
2. Practical Engineering Chemistry: S. N. Narkhede, R. T. Jadhav, A. B. Bhake, A. U. Zadgaonkar, Das Ganu Prakashan, Nagpur.

Reference Books :

1. Concise Laboratory Manual in Engineering Chemistry: R. Shivakumarand J. Prakasan, Tata McGraw Hill Publishing Company, New Delhi.

Syllabus of Group 1 - Semester II and Group 2 - Semester I, Bachelor of Engineering

Course Code: CET101 **Course: Engineering Mechanics**

L:3 Hr., T:1 Hrs., P:0 Hrs., Per week **Total Credits : 07**

Course Outcomes

After Completion of the course in Engineering Mechanics, the student should be able to

1. Define and Describe the various parameter related to statics and dynamics behaviour of the rigid bodies.
2. Understand and describe physical phenomenon with the help of various theories.
3. Explain and analyse various physical phenomenon with the help of diagrams.
4. Describe and analyse the engineering problems with the acquired knowledge of engineering mechanics

Syllabus

Unit-I:

Fundamental of Engineering Mechanics:

Fundamentals of Engineering Mechanics, axiom's of mechanics, resultant of concurrent force system. Moment of a force, couples, resultant of non-concurrent force system

Unit-II:

Equilibrium of Force System :

Equilibrium of concurrent force system, Equilibrium of non-concurrent force system Friction: Law's of friction, simple application, wedge friction, belt friction.

Unit-III:

3-D Force system & Analysis of trusses :

Moment of a force about a point and about an axis, resultant of spatial concurrent & Non concurrent force system, wrench, equilibrium of concurrent and non-concurrent force system. Analysis of simple trusses (Joint & Section Method)

Unit-IV:

Centroids and moment of inertia :

Centroids locating by first principle, centroid of composite areas, Second moment and product of inertia of plane areas. Moment of Inertia of composite areas. Transfer theorems for moment of Inertia and Product of Inertia.

Virtual work method

Virtual work principle, application of virtual work principle.

Unit-V

Kinematics & Kinetics of Particles :

Rectilinear motion of a particle with variable acceleration, Projectile motion, normal and tangential components of acceleration, kinetics of particle and several interconnected particles. D'Alembert's principle, problems on connected system of particles.

Unit-VI:

Collision of elastic bodies:

Principle of conservation of momentum, Impulse momentum equation, work energy equation, coefficient of restitution, impact of elastic bodies.

Text Books:

1. Engineering Mechanics: F. L. Singer Harper & Row Publications.
2. Fundamentals of Engineering Mechanics : A.K. Sharma, Sai Publications.
3. Engineering Mechanics :A.K.Tayal, Umesh Publications, New Delhi.
4. Engineering Mechanics : P.B. Kulkarni, Professional Publications.

Reference Books:

1. Engineering Mechanics: Timoshenko & Young, Tata McGraw Hill Publications, New Delhi.
2. Engineering Mechanics: Bear and Johnston, Tata McGraw Hill Publications, New Delhi.
3. Engineering Mechanics: I. H. Shames, Phi Pvt. Ltd., India.

Syllabus of Group 1 - Semester II and Group 2 - Semester I, Bachelor of Engineering

Course Code : CEP101 **Course : Engineering Mechanics Lab**

L:0 Hr., T:0Hrs., P:2 Hrs., Per week **Total Credits : 02**

Course Outcome

After Completion of the course in Engineering Mechanics Practical, the student should be able to

1. Define and explain different terminologies of simple lifting machines.
2. Understand and perform practicals on equilibrium of concurrent and non-concurrent force systems.
3. Describe various terminologies related to friction and mass moment of inertia.
4. Explain graphical solutions of equilibrium conditions in engineering mechanics.
5. Analyse the experimental data collected based on practicals and discuss the results.

Minimum of Eight Practical will be performed based on the theory

List of Experiment

Experiments On"Simple Lifting Machines"

1. Law of machine for Differential Axle and Wheel
2. Law of machine for Single Purchase Crab
3. Law of machine for Double Purchse Crab

Experiments On"Equilibrium of force systems"

4. Jib Crane (Equilibrium of concurrent Forces)
5. Simple Beam (Equilibrium of Non-concurrent Forces)
6. Shear Leg Apparatus(Equilibrium of 3-D concurrent forces)

Experiments On"Friction & Inertia"

7. Inclined Plane (Coefficient of friction using Inclined Plane)
8. Belt Friction(Coefficient of friction using coil friction set-up)
9. Fly-Wheel (Mass moment of Inertia of fly-wheel)

Graphical Methods in Engineering Mechanics

10. Resultant of concurrent force systems
11. Resultant of Non-concurrent force system
12. Reactions for simply supported beams
13. Forces in members of simple Trusses
14. Moment of Inertia (Mohr's Circle)

Syllabus of Group 1- Semester II & Group 2- Semester I, Bachelor of Engineering

Course Code: MET101 **Course : Engineering Drawing**

L: 3 Hrs. T: 0 Hrs. P: 0 Hrs. Per week **Total Credits: 06**

Course Outcomes

1. Ability to draw & interpret technical drawings.
2. Ability to plan the sheet layout for the given drawing.
3. Ability to convert 2-D drawing to 3-D drawing & vice-versa.
4. Ability to represent the various positions of planes & solids in different orientations.
5. Ability to develop the solid surface for sheet metal working.

Syllabus (Only First Angle Method of Projection)

UNIT 1

Introduction: Lines, Lettering & Dimensioning, Preparation of Sheet Layout.
Scales - Plain Scale, Diagonal Scale, Vernier Scale.
Engineering Curves; Ellipse: Directrix Focus, Concentric Circles & Rectangle Method.
Parabola: Directrix Focus, Rectangle Method, Tangent Method.
Hyperbola: Directrix Focus & Asymptote Method.

UNIT 2

Theory of Projections - Concept of Projection, First & Third angle projection methods.
Orthographic Projections: Conversion of given 3 dimensional View to 2 dimensional representation.

UNIT 3

Projections of Lines: Oblique Lines, Traces. Applications of lines.

UNIT 4

Projections of Planes - Polygonal Lamina, Circular Lamina.
Projections of Solids- Cube, Prism, Pyramid, Tetrahedron, Cylinder, Cone.

UNIT 5

Sections of Solids & Development of Lateral Surfaces- Cube, Prism, Pyramid, Tetrahedron, Cylinder, Cone.

UNIT 6

Isometric Projections: Isometric Scale, Conversion of given 2 dimensional views to Isometric Projection/View.

Books:

1. Engineering Drawing by N.D. Bhatt, Charotar Publishing House Pvt. Ltd.
2. Engineering Drawing by D. A. Jolhe, Tata McGraw Hill Publications
3. Engineering Graphics by H. G. Phakatkar, Nirali Publication.
4. Engineering Graphics by A. R. Bapat, Allied Publishers

References:

1. Engineering Drawing by R.K. Dhawan, S. Chand Publications
2. Engineering Drawing by K.L. Narayana & P. Kannaiah, SciTech Publication.

Syllabus of Group 1- Semester II & Group 2- Semester I, Bachelor of Engineering

Course Code: MEP101 **Course: Engineering Drawing Lab**

L: 0 Hrs. T: 0 Hrs. P: 3 Hrs. Per week **Total Credits: 03**

1. Ability to draw & interpret technical drawings.
2. Ability to plan the sheet layout for the given drawing.
3. Ability to convert 2-D drawing to 3-D drawing & vice-versa.
4. Ability to represent the various positions of planes & solids in different orientations.
5. Ability to develop the solid surface for sheet metal working.
6. Ability to use & demonstrate drafting package.

List of Sheets:

Sheet No.1: Engineering Scales & Curves
Sheet No.2: Orthographic Projections
Sheet No.3: Projection of Lines
Sheet No.4: Application of Lines
Sheet No.5: Projection of Planes
Sheet No.6: Projection of Solids
Sheet No.7: Section & Development of Solids
Sheet No.8: Isometric Projections

Books:

1. Engineering Drawing by N.D. Bhatt, Charotar Publishing House Pvt. Ltd.
2. Engineering Drawing by D. A. Jolhe, Tata McGraw Hill Publications
3. Engineering Graphics by H. G. Phakatkar, Nirali Publication.
4. Engineering Graphics by A. R. Bapat, Allied Publishers

References:

1. Engineering Drawing by R.K. Dhawan, S. Chand Publications
2. Engineering Drawing by K.L. Narayana & P. Kannaiah, SciTech Publication.
3. AutoCAD 14 for Engineering Drawing by P. Nageshwara Rao, Tata McGraw Hill Publications

Syllabus of Group 1- Semester II and Group 2-Semester I, Bachelor of Engineering

Course Code:-HUT102 **Course:-Social Skills**

L:2 Hrs.,T:0Hrs.,P:0Hrs.,Per week **Total Credits:4**

Course Outcomes

On successful completion of the course, students will be able to

1. Learn the basic concepts of personnel management or manpower planning and the process of recruitment and selection that they will go through as engineers.
2. Learn leadership skills, industrial relations, work organizations, and impact of industry on society.
3. Learn about the political systems and institutions working in India, laws and legislations affecting industry and the application of political principles like democracy in industry.
4. Learn the importance and application of Economics in Engineering.
5. Learn about culture/civilization and develop cross cultural capacity.
6. Learn about Personal, Professional and social ethics.

Syllabus

Unit-I:

Industrial Sociology:-

- Meaning and scope of Industrial Sociology
- Work Organization and its types.
- Concept of Leadership: Meaning, changing roles and its types.
- Concept of Power and Authority: Meaning, Importance, sources and Delegation
- Industrial Culture in India: Effects of Industrialization and Urbanization on Indian Society.

Unit-II:

Industrial Psychology:-

- Meaning and scope of Industrial Psychology
- Recruitment, Selection and Training
- Industrial fatigue
- Motivation, Theories of motivation: Maslow's Need Priority Theory, Macgregor's X And Y Theory, McClelland's Needs Theory
- Dealing with Self: Stress, health, and coping; interpersonal relationships; gender roles; environmental adjustments.

Unit-III:

Political Orientation:-

- Indian Constitution, features and federal structure.
- Fundamental rights
- Directive principles of state policy
- Industrial Democracy.
- Role of Bureaucracy in Modern Democratic states.

Unit-IV:

Economics:-

- Development of Indian Economy
- Infrastructure in the Indian Economy: Energy, power, transport system, road transport system, Rail-Road co ordination, water transport, Civil aviation, communication system, urban infrastructure, science and technology, private investment in infrastructure.
- Role of Public and Private sector in Indian Economy.
- Challenges before Indian Economy in 21st Century.
  Poverty, Unemployment, Corruption, Regional Imbalance, Growth of educational sector.

Unit-V:

Culture and Civilization:-

- Concept of Culture and Civilization.
- Study of engineering skills with special reference to Egyptian and Indus Valley Civilization.
- Role of Engineers as agent of change with specific reference to change in Indian Society during 20th and 21st century.
- Multiculturalism: Meaning, scope and significance especially in Indian context.

Unit-VI:

Ethics and social responsibility:-

- Personal and professional ethics
- Corporate social responsibility
- Social capital, social audit.
- Role of entrepreneurship in nation building.
- Developing scientific and humanitarian outlook for the welfare of nation and society.

Text Books :

1. S. Shabbir, A.M. Sheikh, and J. Dwadashiwar (2010 reprint) A New Look Into Social Sciences, (5th edition, 2008), S. Chand and Co. Ltd., New Delhi
2. RuddarDatt and K.P.M.Sundharam, (67th Revised edition-2013), Indian Economy, S .Chand and Company Ltd, New Delhi.
3. Edmund G. Seebauer and Robert L Barry (2010 reprint) Fundamental of Ethics for Scientists and Engineers, Oxford University Press,

Reference Books:

1. P.C. Tripathi and P.N. Reddy, Principles of Management, (4th edition, 2008), Tata MacGraw Hill Publishing Co. Ltd., New Delhi
2. Martand.T. Telsang, Industrial and Business Management, (2001), S.Chand and Co. Ltd. New Delhi
3. Dr. V.H. Asudani: An Easy Approach To Social Science, (3rd edition, 2008), Aastha Publications, Nagpur
4. Tariq Modood, Multiculturalism (Themes for 21st Century Series)(1st Publication 2007), Polity Press, Cambridge, U.K. ISBN-13:97807456-3288-9.

Syllabus of Groups 1- Semester II and Group 2 – Semester I, Bachelor of Engineering

Course Code : INP102 **Course: Workshop**

L: 0 Hr., T: 0 Hrs., Per week **Total Credits : 02**

List of Experiments

(A) Carpentry shop

1) Introduction of carpentry tools, equipments, machine, material & process.
2) Manufacturing of Carpentry joints.
3) Turning practice on wood working lathe.
4) Demonstration and practice on universal wood working machine.

(B) Fitting shop

1) Introduction of fitting tools, equipments, machine, material & process.
2) Manufacturing & fitting practice for various joints & assembly.
3) Drilling, tapping and pipe threading operations.

(C) Welding shop

1) Introduction of welding tools, equipments, machine, material & process.
2) Fabrication of joints like Lap, Butt, Corner, 'T' etc.
3) Fabrication of Lap joint by spot welding process.

(D) Smithy shop

1) Introduction of smithy tools, equipments, machine, material & process.
2) Forging of combined circular/square/hexagonal cross section.

Text Books:

1. Elements of Workshop Technology Vol -I by Hajra Choudhari
2. A course in Workshop Technology Vol -I by B. S. Raghuwanshi
3. Production Technology (Manufacturing process) by P.C Sharma

Reference Book:

1. Workshop Manuals
2. Manufacturing Technology by P.C Sharma
3. Workshop Manual by Kannaiah Narayanan

Syllabus of Groups 1- Semester II and Group 2 – Semester I, Bachelor of Engineering

Course Code : INP102 **Course: Workshop**

L: 0 Hr., T: 0 Hrs., Per week **Total Credits : 02**

List of Experiments

(A) Carpentry shop

1) Introduction of carpentry tools, equipments, machine, material & process.
2) Manufacturing of Carpentry joints.
3) Turning practice on wood working lathe.
4) Demonstration and practice on universal wood working machine.

(B) Fitting shop

1) Introduction of fitting tools, equipments, machine, material & process.
2) Manufacturing & fitting practice for various joints & assembly.
3) Drilling, tapping and pipe threading operations.

(C) Welding shop

1) Introduction of welding tools, equipments, machine, material & process.
2) Fabrication of joints like Lap, Butt, Corner, 'T' etc.
3) Fabrication of Lap joint by spot welding process.

(D) Smithy shop

1) Introduction of smithy tools, equipments, machine, material & process.
2) Forging of combined circular/square/hexagonal cross section.

Text Books:

1. Elements of Workshop Technology Vol -I by HajraChoudhari
2. A course in Workshop Technology Vol -I by B.S. Raghuwanshi
3. Production Technology (Manufacturing process) by P.C Sharma

Reference Book:

1. Workshop Manuals
2. Manufacturing Technology by P.C Sharma
3. Workshop Manual by Kannaiah Narayanan

III SEMESTER

Syllabus for Semester III, B.E. (Information Technology)

Course Code: MAT202 **Course: Engineering Mathematics-III**

L: 3 Hrs. T: 1 Hr., P: 0 Hrs., Per week **Total Credits:07**

Course Objectives:

1. To understand mathematical models corresponding to engineering problems.
2. To understand problems and analyze their physical and graphical interpretation.
3. To understand methods for variation & standard deviation techniques.
4. To understand Matrices, Eigen Value problem and Differential Equation.

Syllabus

Unit I:

Matrices : Rank of matrix, consistency of system of equations. Linear dependence, Linear and orthogonal transformations.Characteristics equations, eigen values and eigen vectors. Reduction to diagonal form, Cayley Hamilton theorem, Sylvester's theorem, determination of largest eigen values and eigen vector by iteration method.

Unit II:

Numerical Methods: Errors in numerical calculations, errors in series approximation. Rounding off errors, solution of algebraic and transcendental equations. Iteration method, False position method, Newton Raphson method and their convergence. Solution of system of linear equations, Gauss Seidal method, Crout's method. Numerical solution of ordinary differential equation by Taylor's series method, Euler modified method, Runge Kutta method.

Unit III:

Z- Transform: Definition and properties of Z- Transform, Inverse Z-transform Application of Z-Transform to solve difference equations with constant coefficient.

Unit IV:

Random Variable and Probability distribution: Random Variables: Discrete and Continuous, Probability density function, probability distribution function for Discrete and continuous random variables, joint distributions.

Unit V:

Mathematical expectations: Mathematical expectations, variance and standard deviation, moment generating function, other measures of central tendency and dispersion, skewness and kurtosis.

Unit VI:

Probability distribution: Bernoulli distribution, Poisson distribution, relation between binomial and Poisson distribution, Normal distribution, relation between binomial and normal distribution. The central limit theorem, exponential distribution

Text Books:

1. Theory and problems of Probability and statistics: *M. R. Spiegal (Mc Graw hill) Schaum Series.*
2. Higher Engineering Mathematics: *Dr.B.S.Grewal, Khanna Pub. Delhi INDIA.*
3. Introductory Numerical Analysis: S. S. *Sashtry, PHI, 4th Edition.*

Reference Books:

1. Advanced Engineering Mathematics: *Erwin Kreyszig, tjh edition, Wiley, India, Delhi.*
2. Advanced Engineering Mathematics: *Jain, Iyengar, Narosa publication, 2 nd edition.*
3. Fundamentals of Mathematical statistics: *S. C. Gupta, V. K. Kapoor.*

Course Outcomes:

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

1. Form mathematical modal corresponding to engineering problems.
2. Solve the problems and analyze their physical and graphical interpretation.
3. Analyze results by using variation & standard deviation.
4. Understand Matrices, Eigen Value problem and Differential Equation.
5. Apply Computer programming to solve system of Equation and Differential equation.

Syllabus for Semester III, B.E. (Information Technology)

Course Code: HUT203 **Course : Principles of Management**

L: 3 Hrs., T:0 Hr., P:0 Hrs., Per week **Total Credits : 06**

Course Objectives:

1. To present a thorough and systematic coverage of management theory, the basic roles, skills and functions of management, with special attention to managerial task and responsibility for effective and efficient achievement of goals.
2. To draw student's attention towards social responsibility, managerial ethics, and the importance of various types of management.
3. To emphasize on basic areas which are required as prerequisites for understanding subjects like Organizational Behavior, Human Resource Management, etc.
4. To cover in details the foundations of planning and decision-making, organizational design, managing change and innovation, leadership, motivation, communications, supervision and control of operations.

Syllabus

Unit I:

Foundation of Management: Meaning and nature of Management, Development of Management thought, Levels of Management, Role of managers, Managerial skills.

Unit II:

Functions of Management: Planning, Decision-making, Directing and supervision, Coordination, Communication, Managerial control.

Unit III :

Marketing Management : Marketing and concepts of Marketing, Marketing Management, Marketing environment, Marketing Research, Market Segmentation, Marketing Planning.

Unit IV:

Human Resource Management : Human resource planning; Analyzing work and Designing Job, Performance appraisal and Incentive-Based Payments, Job safety, and health; Work Stress.

Unit V:

Financial Management: Meaning and nature of financial management, Financial Statements, Budget, Ratio analysis.

Unit VI:

Organization behavior : Meaning and elements of organization behavior, Individual behavior, group behavior, Organizational Change and Development.

Text Books:

1. Principles of Management: *P. C. Tripathi and P.N. Reddy, Tata McGraw Hill Publisher, New Delhi.*
2. Marketing Management : Global Perspective Indian Context : *V. S. Ramaswamy and S. Namakumari, MacMillian Publishers India Ltd, New Delhi.*
3. Industrial and Business Management: *Martand T Telsang,* S.*Chand Co. Ltd, New Delhi.*
4. Human Resource Management: *K. Aswathappa; Tata-McGraw-Hill Publishing Co. Ltd, New Delhi.*

Reference Books:

1. Industrial Engineering and Management: 0. *P. Khanna and A. Sarup, Dhapat Rai Publication, New Delhi.*
2. Financial Management: *Ram M Kishore, Taxman Allied Services Pvt Ltd, New Delhi.*

Course Outcomes:

Upon completion of the course, students are expected to:

1. Describe and discuss the various components of management.
2. Identify and explain issues involved in managing a diverse workforce.
3. Discuss and apply the planning, organizing and controlling the processes in the organization.
4. Identify, discuss and/or describe various theories related to the development of leadership skills, motivation techniques, teamwork and effective communication.
5. Work effectively as a team member through group projects, case studies and problem analysis.

Syllabus for Semester III, B.E. (Information Technology)

Course Code: ITT201 **Course: Data Structures And Program Design**

L: 4 Hrs. T: 1 Hr., P: 0 Hrs., Per week **Total Credits:09**

Course Objectives:

1. To make the students aware of important concepts of algorithm, complexity theory and design aspects of Algorithm
2. To provide students with basic understanding of Searching and Sorting Techniques and their implementation
3. To enable the students to understand the basic concepts of Linear Data Structures and their applications in Real Life problems
4. To enable the students to understand the basic concepts of Non-Linear Data Structures and their applications to Real Life Problems

Syllabus

Unit I:

Introduction to Algorithms: Analysis of Algorithms, Asymptotic notations, Features of structured program, Recursion, Top-down and Bottom-up programming techniques, Divide & Conquer strategy.

Unit II:

Arrays: Introduction, Memory Representation, Applications: Stacks & Queues: Fundamentals, Evaluation of expressions, Polish expressions & their compilation, Application of stacks, multiple stacks & queues, De-queues, Priority queues.

Unit III:

Linked List: Single linked list, linked stacks & queues, Polynomial addition, Examples on linked lists, Equivalence relation, Circular linked list, doubly linked list and generalized list.

Unit IV:

Sorting & Searching Methods: Internal & External sort, Bubble sort, Exchange, Insertion, Selection, Merge, Heap, Radix and Quick sorts, Comparison with respect to their efficiency.

Searching Methods: Sequential, Binary, Indexed search, Hashing techniques and Collision-handling mechanisms.

Unit V:

Trees: Definition & Terminology, Representation, Tree traversal, Examples on trees, Threaded trees, Binary tree, Binary search tree, Operation on Multi-way trees, B-Trees and B + Trees.

Unit VI:

Graphs and their applications: Computer representation of graphs, Traversal techniques like Depth-first search technique & Breadth-first search technique, Greedy algorithms-study with respect to shortest-path, minimum-cost spanning tree.

Text Books:

1. Fundamentals of Data Structures in C: *Horowitz, Sahani and Anderson-Freed, 2nd Edition, University Press.*
2. An Introduction to Data Structures with Applications: *J.P.Tremblay & P.G.Sorenson, 2nd Edition, MGH.*
3. Data Structure: *R. K. Kruse.*

Reference Books:

1. Data Structures: *P.S.Deshpande, O.G.Kakde 1st Edition,Wiley Dream Tech.*
2. Data Structures Using C/C++: *Tanenbaum, 3rd Edition, Pearson.*

Course Outcomes:

At the end of the course student will be able to

1. Understand important concepts of algorithm, complexity theory and design aspects of Algorithm.
2. Understand the basic concepts of Linear Data Structures like Arrays and Link List, their representation in memory and applications in real life problems.
3. Understand, compare and apply the standard Searching / Sorting Algorithms to real world problems.
4. Understand the basic concepts of Non-Linear Data Structures and their applications to real Life Problems.
5. Identify data structuring strategies that are appropriate to a given contextual problem and able to design, develop, test and debug programs in C language.

Syllabus for Semester III, B.E. (Information Technology)

Course Code: ITP201 **Course: Data Structures And Program Design**

P: 3 Hrs., Per week **Total Credits:03**

Course Objectives:

1. To understand time and space complexities of given algorithm & write a program for it.
2. To write optimal programs.
3. To write programs to solve real world problems.

Course Outcomes:

1. Given an algorithm, students will be able to write a program for it.
2. Students will be able to judge the time and space complexities of given algorithm.
3. Student will be able to write optimal programs.
4. Students will be able to write programs to solve real world problems.
5. Students will be able to document the lab work in the form of lab report.

Minimum eight practical should be taken, based on above syllabus.

Syllabus for Semester III, B.E. (Information Technology)

Course Code: ITT202 **Course: Digital Circuits and Fundamentals of Microprocessor.**

L: 4 Hrs. T: 1 Hr., P: 0 Hrs., Per week Total Credits: 09

Course Objectives:

1. To introduce number system and logic gates.
2. To understand combinational and sequential circuits.
3. To understand design of hardware components like memory.
4. To introduce 8085 microprocessor and its programming

Syllabus

Unit I:

Introduction to digital systems: Logic and Boolean Algebra, Number Systems. Logic Gates & Truth Tables, Demorgan's law, Minimization of combinational circuits using Karnaugh maps upto five variables. Map manipulation-essential prime implicants, non essential prime implicants.

Unit II:

Building Blocks of Digital System: Design procedure, Multiplexers, Demultiplexer, Encoders, Decoders, Code Converters, Adders, Subtractor (Half, Full), BCD Adder/ Subtractor, ripple and carry look-ahead addition.

Unit III:

Storage elements: Flip-flops and latches: D, T, J/K, S/R flip-flops. Master Slave Conversion of one of type of F/F to another. Sequential ckt. Analysis –Input equations, state table, analysis with J-K Flip flops. Sequential ckt Design- Design procedure, Designing with D & J-K Flip flop.

Unit IV:

Counters: Counters, asynchronous and synchronous-design using state and excitation tables. Registers & Shift registers.

Unit V:

Memories: Memory & Programmable logic Devices- RAM, Array of RAM IC's, Read only Memory, PLA, PAL

Unit VI :

Microprocessor 8085: Introduction to Microprocessor 8085, Addressing modes, Instruction set, Programming of p 8085.

Text Books:

1. Digital Logic Design: *M. Mano, 2nd edition.*
2. Modern Digital Electronic: *R.P.Jain, 4th edition.*
3. 8 bit microprocessor & controller: *V.J.Vibhute, 5th Edition.*

Reference Books:

1. Fundamental Of Digital Electronics: *A. anand Kumar.*
2. Digital circuit & design: *A.P.Godse.*
3. 8 bit Microprocessor: *Ramesh Gaonkar.*

Course Outcomes:

Upon completion of the course students will be able

1. To understand basic number systems and gates.
2. To understand building blocks of digital systems.
3. To use storage elements and analyze sequential circuits.
4. To understand 8085 architecture and Instruction set.

Syllabus for Semester III, B.E. (Information Technology)

Course Code: ITP202 **Course: Digital Circuits and Fundamentals of Microprocessor.**

P: 3 Hrs., Per week **Total Credits: 03**

Course Objectives:

1. To understand working of digital ICs.
2. To design different combinational & sequential circuits.
3. To write assembly language programs using 8085 microprocessor.

Course Outcomes:

Upon completion of the course students will be able to

1. Design combinational circuits.
2. Design sequential circuits.
3. Design basic memory elements by using flip flops.
4. Implement 8085 Assembly Language Programs.

Minimum eight practical should be taken, based on above syllabus.

Syllabus for Semester III, B.E. (Information Technology)

Course Code: ITT203 **Course: Business Information System**

L: 4 Hrs. T: 1 Hr., P: 0 Hrs., Per week **Total Credits: 09**

Course Objectives:

1. To understand information and use of information system in businesses.
2. To understand need for selecting and managing projects for organization and importance of SDLC.
3. To study strategic analysis of information system with the help of tools.
4. To know importance of security for managing and handling information along with ethical and moral constraints.

Syllabus

Unit I:

Introduction to Business Information System: Basic concepts-Data and Information, Qualities of Information ,Business environment, Management decision making, Types of system, resources Supports BIS, Hardware, Software.

Unit II:

Networks, Telecommunication and Internet: Introduction, Network components, Wide Area Network, Small scale network. Enterprise and Functional BIS: Enterprise systems, Operation Information System.

Unit III:

Introduction to acquiring and developing BIS: How and why Information system acquired, Waterfall, RAD model. Initiating system development: Reasons for project initiation, Feasibility study, Risk management. BIS Project management: The project management process, Steps in project management, Project management methodology.

Unit IV:

System analysis: Identifying the requirements, documenting the findings System design: Aims of system design Constraints of System design, Elements of design, Design of Input/output, User interface design. System builds implementation and maintenance

Unit V:

Information system strategy: Introduction to BIS strategy, Tools for strategic analysis and definition, Information system management.

Unit VI:

Managing Information security: The need for control, Control strategies, Types of control. Ethical, Legal and Moral constraints on Information system: Professionalism, ethics and morality Codes of conduct, Social issues, Legal issues.

Text Books:

1. Business Information System: *Paul Bocij, Andrew Greasley, Simon Hickie, Pearson Education.*
2. Business Information Systems: *Analysis, Design and Practice: Mr. Graham Curtis, Dr. David Cobham. Pearson Education, 6th Edition.*

Reference Books:

1. Business Information System: *Elizabeth Hardcastle, BookBoon.com.*
2. Principles of Business Information Systems: Ralph Stair, George Reynolds, Thomas Chesney, *Cengage Learning.*

Course Outcomes:

At the end of the course student will be able to

1. Evaluate BIS IT solutions for deployment within functional parts of business.
2. Apply technological innovations to improve competitive advantage in business projects.
3. Use controlling techniques to protect computer based information system and guiding principles of data protection act.

Syllabus for Semester III, B.E. (Information Technology)

Course Code: CHT201 **Course: Environmental Studies-I**

L: 2 Hrs. T: 0 Hr., P: 0 Hrs., Per week **Audit course**

Course Objectives:

1. This course on the Environment focuses on the awareness about the problems related to the degradation of the Environment and the measures that an individual should take to safeguard it.
2. It is about the way students should live to protect the environment
3. It is expected to give students information about the environment that will lead to a concern for the environment.
4. To develop concern, for the environment so that students will begin to act at their own level to protect the environment they all live in.

Syllabus

Unit I:

Multidisciplinary Nature of Environmental Studies: Definition, scope and importance; Need for public awareness.

Unit II:

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

Unit III:

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

Unit IV:

Biodiversity and its Conservation: Introduction - Definition: genetic, species and ecosystem diversity; Biogeographical classification ofIndia; Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values; Biodiversity at global, National and local levels; India as a mega-diversity nation; Hot-sports of biodiversity; Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; Endangered and endemic species of India; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Text Books:

1. Environmental Chemistry and Pollution Control: *N. W. Ingole, D. M Dharmadhikari,* S. S. *Patil, Das Ganu Prakashan, Nagpur.*
2. Environmental Chemistry: *K. Bhute, A. Dhamani, A. Lonkar,* S. *Bakare, Celebration Infomedia, India.*

Reference Books:

1. Text Book of Environmental Chemistry and Pollution Control: S. S. *Dara;* S. *Chand and Company Ltd, New Delhi.*

Course Outcomes:

1. Student will get the wealth of information that will clearly clarify modern environment concept like equitable use of natural resources, more sustainable life style etc.
2. Student will realize the need to change the way in which we view our own environment using practical approach based on observation and self learning
3. Students will be aware about the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.
4. By studying environmental science, students may develop a breadth of the interdisciplinary and methodological knowledge in the environment field that enable them to facilitate the definition and solution of environmental problem
5. At the end of the course, it is expected that students will be able to identify and analyze environmental problem as well as the risk associated with these problem and understand what it is to be a steward in the environment, study how to live their lives in a more sustainable manner.

IV SEMESTER

Syllabus for Semester IV, B.E. (Information Technology)

Course Code: MAT245 **Course: Discrete Mathematics**

L: 3 Hrs. T: 1 Hr., P: 0 Hrs., Per week **Total Credits: 07**

Course Objectives:

1. To express statements in the language of formal logic and draw conclusions
2. To find and interpret recursive definitions for mathematical sequences.
3. To place on solid foundations the most common structures of Computer Science and Information Technology, to illustrate proof techniques, to provide the background for an introductory course in computational theory.
4. Use combinatorial methods to approach counting problems.

Syllabus

Unit I:

Relation and Function: Basic concepts of Set theory, Power set, some operations on Sets, Venn diagram, some basic set identities, Cartesian products. Properties of binary relation in a set, Relation matrix and the graph of the relation, Partition and covering of a set. Equivalence relations, Compatibility relations Compositions of binary relations. Definition and composition of functions, inverse functions and characteristic function of a set.

Unit II:

Mathematical Logic: Statement and notations, connectives, Negation, conjunction, disjunction, conditional & biconditional, statement formulas & truth tables. Tautologies, equivalence of formulas, Duality law, Tautological implications. Normal Forms -Principal disjunctive and principal conjunctive normal forms. Theory of inference for statement calculus. Theory of inference for predicate calculus.

Unit III:

Algebraic structures: Semigroups, monoids - (definition and examples), Group definitions and examples, Cyclic group, permutation groups, subgroups and homomorphism, co sets and Lagrange's theorem and Normal subgroup.

Unit IV:

Rings and field: Ring (definition and examples), subrings, Ring homomorphism, ideals and Quotient rings, polynomial rings. Finite field, Galois field, Integral domain.

Unit V:

Lattice theory and Boolean Algebra: Lattices as partially ordered set, Definitions and examples, some properties of Lattices, Lattices as algebraic system, sub lattices, direct product, homomorphism, some special Lattices. Boolean Algebra: Definitions and examples, Application of Boolean Algebra to switching circuits.

Unit VI:

Advanced counting Techniques: Pigeonhole principle, Generating functions, Binomial identities using generating functions, Solutions of Recurrence relations using generating functions.

Text Books:

1. Discrete Mathematical Structures with Applications to Computer Science: *J. P. Tremblay and R. Manohar , Tata McGraw-hill.*
2. Discrete Mathematics: *Babu Ram, Pearson Publication.*
3. Combinatorial Mathematics: C. *L. Liu & D. P. Mohapatra, 3rd edition, Tata McGraw-hill.*

Reference Books:

1. Foundations of Discrete Mathematics: *K. D. Joshi, New age international Publication.*
2. Discrete Mathematics: *Kolman, Busby & Ross, Pearson Publication.*

Course Outcomes:

Upon completion of the course, students will be able to

1. Analyze discrete data structure such as sets, relations, sequences and discrete functions.
2. Compare discrete mathematics algorithms that solve engineering and technology problems
3. Derive formulas using recurrence relations and generating functions applied to sets of objects.
4. Develop ability to coding algorithms to encrypt and decrypt data for secure transfer on public networks

Syllabus for Semester IV, B.E. (Information Technology)

Course Code: ITT204 **Course: Computer Architecture and Organization**

L: 4 Hrs. T: 1 Hr., P: 0 Hrs., Per week **Total Credits: 09**

Course Objectives:

1. To make students understand the organization of basic functional units of a computer system.
2. To make students understand the concepts and design of memory, ALU, hardwired and micro-programmed control units.
3. To make them learn different techniques for handling input output operations.
4. To make them understand issues and solutions in a pipelined execution.

Syllabus

Unit I:

Basic Structure of Computer Hardware & Software: Functional units, Basic operational concepts, Bus structures, Addressing Methods & Machine Program Sequencing: Memory locations, Addresses & encoding of information, Main memory operations, Instructions & instruction sequencing, Addressing methods, their application in implementation of HLL constructs and data, Stacks, Subroutines, Subroutine linkage subroutine linkage in 68000 and PDP-11, zero address machines such as HP3000, expanding opcode method.

Unit II:

The Processing Unit: Some fundamental concepts, bus architecture Execution of complete instruction, Hardwired control, Micro programmed control, microinstruction format, microinstruction sequencing, bit slice concept.

Unit III:

Arithmetic: Number representation, Addition of positive numbers, Logic design of fast adders, Addition & subtraction, Arithmetic & branching conditions, Multiplication of positive numbers, Signed operand multiplication, Fast multiplication, Integer division, Floating point numbers & operations, IEEE standard, guard bits and rounding.

Unit IV:

The Main Memory: Some basic concepts, Semiconductor RAM memories, Memory system considerations, Semiconductor ROM memories, Multiple-module memories and interleaving, Cache memories, mapping functions, replacement algorithms.

Unit V:

I/O Interfacing: Input-output organization, I/O mapped I/O and memory mapped I/O, Direct Memory Access, interrupts and interrupts handling mechanisms, device identification, vectored interrupts, interrupt nesting, I/O interfaces, synchronous vs. asynchronous data transfer, I/O channels. Computer peripherals, I/O devices such as video terminals, video displays, graphic input devices, printers, magnetic disk, magnetic tape, CDROM systems.

Unit VI:

Processors: RISC philosophy, pipelining, basic concepts in pipelining, delayed branch, branch prediction, data dependency, influence of pipelining on instruction set design, multiple execution units, performance considerations, basic concepts in parallel processing & classification of parallel architectures.

Text Books:

1. Computer Organization: *Hamacher, Carl V. et al, 5th Edition, MGH.*
2. Structured Computer Organization: *Tanenbaum A.S, Prentice Hall of India Ltd.*

Reference Books:

1. Computer Architecture & Organization: *J.P.Hayes, 3rd Edition MGH.*
2. Computer Organization and Architecture*: Designing for Performance, William Stallings, 8th Edition*

Course Outcomes:

At the end of the course, student will understand

1. The role, organization and interaction of different hardware units of a computer system.
2. To design memory unit, adder, subtractor, multiplication circuit and circuit for division.
3. To design and compare the performance of hardwired and micro-programmed control units.
4. To compare different techniques for handling I/O.
5. The benefits of pipelined execution.

Syllabus for Semester IV, B.E. (Information Technology)

Course Code: ITT205 **Course: Object Oriented Programming**

L: 4 Hrs. T: 1 Hr., P: 0 Hrs., Per week **Total Credits: 09**

Course Objectives :

1. To make students understand the basic difference in object oriented programming and procedure oriented programming.
2. To make them understand the OO concepts like classes, objects, inheritance, polymorphism and abstraction.
3. To make them understand the concept of streams and exception handling.
4. Students should understand the design of UML class diagrams.

Syllabus

Unit I:

Introduction to Object Oriented Programming: Features of object oriented programming languages like data encapsulation, inheritance, polymorphism and late binding.

Unit II:

Basic Concept of OOP.'s: Concept of a class, Access control of members of a class, instantiating a class, static and non-static members, overloading a method.

Unit III:

Building the Classes: Deriving a class from another class, access control of members under derivation, different ways of class derivation, overriding of a method, run time polymorphism.

Unit IV:

Interfaces & Exception Handling: Concept of an abstract class. Concept of an interface. Implementation of an interface. Exception and exception handling mechanisms. Study of exception handling mechanisms in object-oriented languages

Unit V:

Streams: Introduction to streams, use of stream classes. Serialization and de-serialization of objects. Templates, Implementation of data structures like linked lists, stacks, queues, trees, graphs, and hash table etc. using object oriented programming languages.

Unit VI:

UML: Introduction to concept of refactoring, modeling techniques like UML, Design patterns.

Text Books:

1. Complete Reference-java 2*: Herbert Schildt, TMH.*
2. The Object-Oriented Thought Process: *Matt Weisfeld, Pearson Education*

Reference Books:

1. Object - Oriented Programming: An Evolutionary Approach*: Cox Brad, Addison –Wesley.*
2. Object - Oriented Programming with C + + : *E Balagurusamy, MGH.*

Course Outcomes:

Upon completion of the course students will be able to

1. Understand the features of Object Oriented Programming.
2. Understand the concept of a class, instantiating a class and deriving a class.
3. Understand interfaces and exception handling.
4. Understand the streams and implementation of data structures in OOP.
5. Design UML diagrams.

Syllabus for Semester IV, B.E. (Information Technology)

Course Code: ITP205 **Course: Object Oriented Programming**

P: 3Hrs., Per week **Total Credits: 03**

Course Objectives:

1. To make students learn translation of object oriented concepts into implementation.
2. Students should be able to apply object oriented concepts on real world software projects.
3. Students should be able to use UML tools for designing purpose.
4. To make students learn the documentation of the work done in the lab.

Course Outcomes:

1. Given a problem definition, students will be able to write object-oriented program for it in C+ +/ Java Language.
2. To write programs using object-oriented concepts to solve the real world problems.
3. To write extensible and reusable programs.
4. To document the lab work in the form of lab report.

Minimum eight practical should be taken, based on above syllabus.

Syllabus for Semester IV, B.E. (Information Technology)

Course Code: ITT206 **Course: IT Infrastructure Services**

L: 4 Hrs. T: 1 Hr., P: 0 Hrs., Per week **Total Credits: 09**

Course Objectives:

1. To understand the architecture and use of Linux operating system.
2. To understand the different services provided by Linux operating system and to configure those services.
3. To learn configuration of different servers on Linux operating system, like FTP, DNS, MAIL and Web.
4. To understand the importance of backup and recovery and to configure backup and recovery method on Linux operating system.

Syllabus

Unit I:

Introducing Linux: History, Linux distribution, Linux basics: Linux Vs Microsoft Windows, Linux Basic commands, Linux file system, File handling commands, file permission, Users and groups: Working with Users and Groups.

Unit II:

Startup and services: Services and Processes, GRUB boot loader, Managing services, Networking and Firewalls: Introduction to Network and Networking, General Network troubleshooting.

Unit III:

Package Management: Introduction to Package management, Package Management, Storage management: Storage basics, Logical volume management, Recovering from failure.

Unit IV:

Infrastructure services: NTP, DNS, Mail services: Configuring email, Configuring IMAP and POP3 Virtual domain and Users.

Unit V:

Web services: Apache web Server, File and print sharing: File sharing with Samba and NFS, Managing documents, Print servers.

Unit VI:

Backup and Recovery: Disaster recovers planning, Backup process, Network backups, Using Rsync, Using Bacula.

Text Books:

1. Pro Linux System Administration: *James Turnbull, Peter Lieverdink and Dennis Matotek, Apress Publication*

Reference Books:

1. Linux - The Complete Reference, *TMH Publication*

Course Outcomes:

At the end of the course, students will have good understanding of

1. Linux architecture, different Linux installation and commands.
2. Concept of GRUB loader services, network basic and network troubleshooting.
3. Package management, storage management and failure recovery.
4. Configuration of important services like FTP, DNS, MAIL and WEB.
5. Backup and recovery methods in Linux using tools like Rsync and Bacula.

Syllabus for Semester IV, B.E. (Information Technology)

Course Code: ITP206 **Course: IT Infrastructure Services**

P: 3 Hrs., Per week **Total Credits: 03**

Course Objectives:

1. To make students learn the distributions and components of Linux operating systems.
2. Students should learn basic and administrative commands to operate Linux operating system.
3. Students should learn configuration of different servers like FTP, DNS, Web, Mail etc.
4. Students should learn backup, recovery procedure and configure backup and recovery process using Rsyn and Bacula tools.

Course Outcomes:

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

1. Install, configure and use different commands to operate Linux system.
2. Do package and storage management under Linux environment.
3. Start, Configure and use different services like Mail, DNS, Web and FTP.
4. Use tools for network troubleshooting and perform backup and recovery.

Minimum eight practical should be taken, based on above syllabus.

Syllabus for Semester IV, B.E. (Information Technology)

Course Code: HUT201 **Course: Technical Communication**

L: 3 Hrs., T: 0 Hr., P: 0 Hrs. Per week **Total Credits: 06**

Course Objectives:

1. To improve technical English among engineers.

Syllabus

Unit I:

Introduction: Defining technical communication, Objectives of technical communication, Promoting the product, Audience recognition and involvement.

Unit II:

Business Correspondence: Memos, Letters, Reports, Job search.

Unit III:

Preparation of Documents: Visual appeal: Document design, graphics, tables, User manual.

Unit IV:

Orientation in Research: Preparation of abstract, writing proposals, writing articles for journals, preparing papers for conferences.

Unit V:

Presentation Skills: Effective professional presentations, Interviews, Group discussions, Negotiation.

Unit VI:

Functional Grammar: Punctuations, Mechanics, Spellings, Parts of speech, Use of articles, Uses of prepositions/prepositional phrases, Modals, Tenses- active/passive forms, Concord, Transformation of sentences.

Text Books:

1. Technical Writing: Process and Product: S. *J. Gerson and* S. *M Gerson, Pearson Education Inc., Singapore (printed in India by AnandSons)*

Reference Books:

1. Basic Communication Skills for Technology: *A. J. Rutherfoord, Darling Kindersley (India) Pvt. Ltd, India (Printed in India by Saurabh Printers Pvt. Ltd)*
2. Effective Technical Communication: *Rizvi. M Ashraf, Tala, MC, India.*
3. Communication Skills: *Sanjay Kumar and Pushp Lata, Oxford University Press.*

Course Outcomes:

Upon completion of the course students will be able to

1. Develop proficiency in technical communication.
2. Draft and give presentation.

Syllabus for Semester IV, B.E. (Information Technology)

Course Code: CHT202 **Course: Environmental Studies-II**

L: 2 Hrs. T: 0 Hr., P: 0 Hrs., Per week **Audit course**

Course Objectives:

1. This course on the Environment focuses on the awareness about the problems related to the degradation of the Environment and the measures that an individual should take to safeguard it.
2. It is about the way students should live to protect the environment
3. It is expected to give students information about the environment that will lead to a concern for the environment.
4. To develop concern, for the environment so that students will begin to act at their own level to protect the environment they all live in.

Syllabus

Unit I:

Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, and Nuclear hazards. Solid waste Management: Causes, effects and control measures of urban and industrial wastes; Role of an individual in prevention of pollution, Pollution case studies; Disaster management: floods, earthquake, cyclone and landslides.

Unit II:

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

Unit III:

Human Population and the Environment: Population growth, variation among nations, Population explosion - Family Welfare Programme; Environment and human health; Human Rights; Value Education, HIV/AIDS; Women and Child Welfare; Role of Information Technology in Environment and human health, Case Studies.

Field Work

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

Text Books:

1. Environmental Chemistry and Pollution Control: *N. W. Ingole, D. M Dharmadhikari,* S. S. *Patil, Das Ganu Prakashan, Nagpur.*
2. Environmental Chemistry: *K. Bhute, A. Dhamani, A. Lonkar,* S. *Bakare, Celebration Infomedia, India.*

Reference Books:

1. Text Book of Environmental Chemistry and Pollution Control:S. S. *Dara;* S. *Chand and Company Ltd., New Delhi.*
2. Environmental Studies-From Crisis to Cure, Second Edition:R. *Rajagopalan, Oxford University Press, New Delhi.*
3. Text Book of Environmental Studies:E. *Bharucha, University Press (India) Private Ltd., Hyderabad, India.*

Course Outcomes:

1. Student will get the wealth of information that will clearly clarify modern environment concept like equitable use of natural resources, more sustainable life style etc.
2. Student will realize the need to change the way in which we view our own environment using practical approach based on observation and self learning.
3. Students will be aware about the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.
4. By studying environmental science, students may develop a breadth of the interdisciplinary and methodological knowledge in the environment field that enable them to facilitate the definition and solution of environmental problem.
5. At the end of the course, it is expected that students will be able to identify and analyze environmental problem as well as the risk associated with these problem and understand what it is to be a steward in the environment, study how to live their lives in a more sustainable manner.

V SEMESTER

Syllabus for Semester V, B.E. (Information Technology)

Course Code: ITT301 **Course: Microprocessor and Interfacing**

L: 4 Hrs. T: 1 Hr., P: 0 Hrs., Per week **Total Credits : 09**

Course Objectives:

1. To understand the structure and working of 8086 microprocessor.
2. Students will be introduced to assembly language programming of 8086.
3. To study different peripheral IC and it's interfacing with 8086.
4. To study characteristics of advanced processors and brief introduction to microcontroller.

Syllabus

Unit I:

Introduction to 8086: overview of 8085, Pin diagram of 8086-Minimum mode and maximum mode of operation. Architecture of 8086 Microprocessor. Addressing modes of 8086, Timing diagram, Interfacing 8086 to memory.

Unit II:

8086 Assembly Language Programs: 8086 instruction set, Assembler directive, program development method, writing simple 8086 programs for use with an assembler. Procedures and macros

Unit III:

Interrupt structure of 8086: Interrupt Vector Table (IVT), Interrupt service routines. Introduction to DOS and BIOS interrupts. 8255 PPI – various modes of operation and interfacing to 8086. Interfacing Keyboard, Displays, 8279

Unit IV:

Multiprocessor Configuration: Co processors configurations, the 8087 numeric data processors, The 8089 I/O processor – Programming aspects.

Unit V:

Review of evolution of advanced microprocessors: 8086/8088, 186 / 286 / 386 / 486 / Pentium. Salient features of advanced microprocessors. RISC & CISC Processors. Introduction to 80286, Salient Features of 80386, Real and Protected Mode Segmentation & Paging, Salient Features of Pentium, Branch Prediction, and Overview of RISC Processors.

Unit VI:

Introduction to microcontrollers: Microcontroller families, Architecture of 8051 micro controller, Register organization. Addressing modes, Instruction Set, Assembler Directives, simple programs on 8051 microcontroller

Text Books:

1. Microprocessors and Interfacing: *Douglas U. Hall, 2007.*
2. Microcomputer Systems: *The 8086/8088 Family Architecture, Programming and Design, PHI, 2nd Edition- Yu-Cheng Liu and Glenn A. Gibson*
3. Advanced microprocessor and peripherals: *A.K. Ray and K. M. Bhurchandi, TMH 2000.*
4. The 8051 Microcontroller, Architecture, programming & applications: *K.J.Ayala, Penram International, 2nd Edition.*

Reference Books:

1. Pentium Processor : *James Antanakos*
2. The 8051 micro controller and embedded systems:using assemblers and c: *Mazidi & Mc. Kinley. 2nd edition*
3. Micro Controllers: Ajay *Deshmukh, Tata McGraw Hill Edition.*

Course Outcomes:

Upon completion of the course, students will be able to

1. Understand basic architecture and functions of each block of 8086 Microprocessor.
2. Write Assembly Language Programs for 8086 based system.
3. Understand the utility of supporting peripheral IC's and their interfacing with microprocessor.

Syllabus for Semester V, B.E. (Information Technology)

Course Code: ITT302 **Course: System Software**

L: 4 Hrs. T: 1 Hr., P: 0 Hrs., Per week **Total Credits: 09**

Course Objectives:

1. To make students aware of system programs, their importance and inter dependency.
2. To introduce the general machine architecture (SIC/SICXE).
3. To understand the design of assemblers, Macro processors for SIC/SICXE.
4. To understand the working of linkers and loaders for SIC/SICXE.

Syllabus

Unit I:

Assemblers: Basic Assembler functions, Machine dependent Assembler features, Machine independent Assembler features, Assembler Design options, Implementation.

Unit II:

Loaders and Linkers: Basic loader functions, Machine Dependent loader features, Machine independent loader features, Loader design options, Implementation.

Unit III:

Macroprocessor: Basic Macroprocessor functions, Machine Dependent Macroprocessor features, Machine independent Macroprocessor features, Macroprocessor design options, Implementation.

Unit IV:

Files Formats: Common Object Files Format & System Utilities, Structure of object file and executable file, section or segment headers, symbol table, Source code Control System, make, link editor, Symbolic debugger.

Unit V:

Device Drivers: for windows and Linux/Unix.

Unit VI:

CASE STUDY: GCC.

Text Books:

1. System Software: *Leland Beck, Pearson Ed.*
2. UNIX device drives: *George Pajari, Pearson Education.*
3. Device Drives for Windows: *Norton, Addison Wesley.*

Reference Books:

1. System Programming: *John Donovan , MacGrawhill*
2. Systems Programming & Operating Systems: *D.M.Dhamdhare, 2nd Edition, TMH.*

Course Outcomes:

At the end of the course student will be able to

1. Know various system software and their functionality in detail
2. Have understanding of architecture of SIC and SIC/XE machines.
3. Be able to design assemblers, Macro processors, linkers and loaders for SIC and SIC/XE machines.
4. Be able to design and install the device drivers for various devices.
5. Have an understanding of GCC and COFF.

Syllabus for Semester V, B.E. (Information Technology)

Course Code: ITP301 **Course: Microprocessor and Interfacing**

P: 2 Hrs., Per week **Total Credits:02**

Course Objectives:

1. To explore 8086 simulator for understanding basic structure of 8086 Processor.
2. To implement the assembly language programs.
3. To study interfacing of I/O devices with microprocessor.

Course Outcomes:

Upon completion of the course, students would be able to

1. Understand working of microprocessor on simulator.
2. Write assembly language programs.
3. Know the working of Interrupts on simulator.
4. Apply programming learned to solve real world problems.

Minimum eight practical should be taken, based on above syllabus.

Syllabus for Semester V, B.E. (Information Technology)

Course Code: ECT311 **Course : Digital Communications**

L: 3 Hrs., T: 1 Hr., P:0 Hrs., Per week **Total Credits : 07**

Course Objectives:

1. Introduce concepts in integrated devices as applied to the telecommunication industry.
2. To introduce the fundamentals of amplitude, frequency and phase modulation and demodulation systems.
3. To introduce Frequency shift keying, Phase shift keying, Probability, random variables & stochastic processes.
4. To introduce error detecting and correcting codes and time division Multiplexing.

Syllabus

Unit I

Introduction: Introduction to Anolog & Digital communication systems, Block Diagram of DCOM System. Concept of Channel, Channel noise, data rate & Bandwidth. Noise Types & sources.

Unit II

Information Theory & Source Coding

Concept of Uncertainty, Surprise & Information. Measure of Information-entropy, DMS, Discrete Memeoryless Channel, Loss in Information, Data Transmission rate, BSC., Channel Capacity. Souce Coding-Its needs, Huffman Encoding and LZ Coding

Unit III

Advance Source Coding- Subband Coding, Transform Coding, Linear Predictive Coding, Code excited Linear Predictive Coding. Audio & Video Coding Formats, MPEG & JPEG

Unit IV

Digital Modulation Techniques:, Digital Modulation types- PCM, Delta Modulation, DPCM. Digital CW Modulation ASK, FSK, PSK. Modulator & Demodulator Circuits.

Unit V

Error Detecting and Correcting codes: Error control coding, hamming distance, Need of Error Control Coding, Repitition Code, convolution codes, distance properties of Convolution Codes, viterbi & Fano decoding.

Unit VI

Spread spectrum communication systems: Introduction to spread spectrum communication systems, direct sequence spread spectrum communication system, frequency hoped spread spectrum systems, DSSS-BPSK system, M-aryFHSS System

Text Books:

1. Digital and analog communication system: *K.S. Shanmugam, John Wiley & Sons*.
2. Digital communication: *J. G. Proakis, MGH(Asia).*
3. Digital communication: *Simon Haykin, Wiley Pub.*

Reference Books:

1. Principals of Digital communication: *P. Chakravarti*
2. Wireless Digital communication: *Kamilo Feher, Prentice Hall PTR.*
3. Digital communication system design: *M. S. Roden, Prentice Hall Pub*

Course Outcomes:

At the end of the course student will be able to understand the

1. Fundamental concepts of digital communication system.
2. Concepts of multiplexing.
3. Concepts of probability theory.
4. Fundamentals of channel capacity and channel coding.

Syllabus for Semester V, B.E. (Information Technology)

Course Code: ITT303 **Course: Theory of Computation**

L: 4 Hrs., T: 1 Hr., P: 0 Hrs., Per week **Total Credits:09**

Course Objectives:

1. To introduce the theory of computation through a set of abstract machines that serves as models for computations and help to solve problems in science and engineering.
2. To learn relative power of models such as finite automata, pushdown automata and turing machine and examine the relationship between these automata.
3. To introduce concept of Grammars and languages and their relationship with automata.
4. To understand the concept of undecidability and recursive function theory.

Syllabus

Unit I:

Introduction: Strings, Alphabet, Language, Operations, Finite state machine, Definitions, Finite automation model (FA), Acceptance of strings and languages, Non-deterministic finite automation, Deterministic finite automation, Equivalence between NFA & DFA, Conversion of NFA into DFA, Minimization of FSM, Equivalence between two FSM's, Two Way finite automata, Myhill-Nerode Minimization theorem, Moore & Mealy machines.

Unit II:

Regular Expressions: Regular sets, Regular expressions (RE), Identity rules, Manipulation of regular expressions, Equivalence between RE and FA, Pumping lemma, Closure properties of regular sets, Regular grammars (RG), Right linear and Left linear grammars, Equivalence between regular linear grammar and FA, Interconversion between RE and RG.

Unit III:

Grammars: Context-free grammar, Derivation trees, Chomsky normal form, Greibach normal form, Pushdown Automata, Definition, Model, Acceptance of CFL, Equivalence of CFL & PDA, Interconversion, Enumeration of properties of CFL.

Unit IV:

Push down automata (PDA): Non determinism, acceptance by two methods and their equivalence between PDA and CFG, closure and decision properties of CFLs.

Unit V:

Turing machine: variants, recursively enumerable set; recursive sets TM as a computer function, decidability and solvability, Halting Problem, Post correspondence Problems (PCP) and unsolvability of ambiguity problem of CFGs, Church's hypothesis.

Unit VI :

Recursive Function Theory: Introduction to recursive function theory, primitive recursive and partial recursive functions.

Text Books:

1. Introduction to Languages and the Theory of Automata : *John C.Martin, 3rd Edition , MGH .*
2. Introduction to Automata Theory, Languages and Computation : *J.E.Hopcroft, Rajeev Motwani 2nd Edition, Pearson Education.*
3. Theory of Computation : *Michael Sipser, India Edition, Cengage Learning.*

Reference Books:

1. An Introduction to Formal Languages and Automata : *Peter Linz, 3rd Edition*, Narosa Pub.
2. Theory of Computer Science : *K.L.P.Mishra & N.Chandrasekaran, PHI.*

Course Outcomes:

At the end of the course students will be able to

1. Have ability to apply knowledge of computing and mathematics, appropriate to the discipline.
2. Evaluate computational power of given problem and its complexity.
3. Compute problems on different models.
4. Have proficiency in key topics of theory of computation and will be in position to explore current topics in this area.
5. Identify different un-decidable problems.

Syllabus for Semester V, B.E. (Information Technology)

Course Code: ITT304 **Course: Software Engineering**

L: 4 Hrs., T: 1 Hr., P:0 Hrs., Per week **Total Credits: 09**

Course Objectives:

1. To plan & develop the framework of project as well as compare various project process models
2. To use the principles of communication, planning, modeling construction & deployment.
3. To apply testing strategies & methods on software projects and compare various testing methods.
4. To identify the duties & responsibilities of People, team leader & stakeholders while planning the software project and schedule the project according to time, size, shape, utility & application.

Syllabus

Unit I:

Introduction to Software Engineering, Software Myths, Software Engineering a Layered Technology, Software Process Framework, Software Process Models, The Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, The Unified Process Model, Agile Development: Agility, XP (Extreme Programming), Other Agile process models.

Unit II:

Software project estimation and planning, Decomposition techniques, LOC and FP estimation, Effect estimation, Identification, Projection, Assessment, Management and monitoring, Software reengineering, Requirement analysis, Tasks, Analyst, Software prototyping, Specification, Principles, Representation and the software requirements specification.

Unit III:

Object oriented analysis and data modeling, Object oriented concepts, Identifying objects, Specifying attributes, Defining operations, OO analysis modeling and Designing: DFD, Use case Diagram, Sequence diagram, Activity diagram, ER Diagram.

Unit IV:

Risk management - Risk strategies, Software risks, Risk identification, Risk refinement, RMMM Quality Management - Quality Concepts, Software Quality Assurance, Software Reviews, Formal Technical Review, Statistical Software Quality Assurance, Software Reliability, Change Management - Software Configuration Management, SCM Repository, SCM Process, Reengineering - Software reengineering, Reverse engineering, Restructuring, Forward Engineering.

Unit V:

Software design fundamentals- process, fundamentals, Effective modular Design, Dataflow oriented design, Transform analysis, Transaction analysis, Design heuristics, Object oriented- design, concepts, methods, Refining operations, Program components and interfaces, Implementation detail design, User interface design, Human factors, Human computer interface design, guidelines, standards.

Unit VI:

Software quality assurance, Software quality factors, Quality metrics, Halstead's S/W science, Software testing - techniques, fundamentals, White box testing, Black box testing, Validation testing, System testing, Debugging software maintenance maintainability, Maintenance tasks, Reverse engineering and reengineering.

Text Books:

1. Software Engineering: *Roger S. Pressman,7th Edition, TMH.*
2. Software Engineering: D.Bell & I.Morrey, 2nd Edition, PHI.

Reference Books:

1. Software Engineering: *Kassem A. Saleh, India Edition, Cengage Learning.*
2. Software Engineering: *Schach, Special Indian Edition, TMH.*

Course Outcomes:

Upon completion of the course the students will be able to

1. Use different software development process for their mini and major project.
2. Use different graphical tools like DFD, Flowchart for presenting their project.
3. Able to apply different estimation method for there project and select best solution.
4. Estimate the cost, time and effort or their project and also identify different risk associated with project.
5. Test their project for required output using different testing technique and also check for quality assurance.

Syllabus for Semester V, B.E. (Information Technology)

Course Code: ITP304 **Course: Software Engineering**

P: 2 Hrs., Per week **Total Credits: 02**

Course Objectives:

1. To develop skills that will enable them to construct software of high quality – software that is reliable, and that is reasonably easy to understand, modify and maintain.
2. To use different graphical tools like DFD, Flowchart for presenting their project.
3. They should understand the software development life cycle and its basic economics.

Course Outcomes:

Upon completion of the course the students will be able to

1. Work on developing skills that will enable them to construct software of high quality.
2. Work on Rational Rose Software (IBM-RSA) to create different UML Diagrams.
3. Use different software development processes for projects.
4. To apply different estimation method for their project and select best solution and also check for quality assurance.

Minimum eight practical should be taken, based on above syllabus.

VI SEMESTER

Syllabus for Semester VI, B.E. (Information Technology)

Course Code: ITT305 **Course: Design And Analysis of Algorithms**

L: 4 Hrs., T: 1 Hr., P: 0 Hrs. Per week **Total Credits: 09**

Course Objectives:

1. To learn analysis of algorithms using various techniques.
2. To understand different programming paradigms.
3. To understand the concept of NP-completeness.

Syllabus

Unit I:

Mathematical foundations, summation of arithmetic and geometric series, bounding summations using integration, Asymptotic notations of analysis of algorithms, analyzing control structures, worst case and average case analysis, recurrence relations, solutions of recurrence relations using technique of characteristic equation and generating functions, amortized analysis, application of amortized analysis.

Unit II:

Divide and conquer basic strategy, binary search, and quick sort, merge sort, matrix operations, Greedy method basic strategy, application to job sequencing with deadlines problem, minimum cost spanning trees, single source shortest path.

Unit III:

Dynamic Programming basic strategy, multistage graphs, all pairs shortest path, optimal binary search trees, traveling salesman problem, String Editing, Longest Common Subsequence problem and its variations.

Unit IV:

Basic Traversal and Search Techniques, breadth first search and depth first search, connected components. Backtracking basic strategy, 8-Queen's problem, Graph coloring, Hamiltonian cycles.

Unit V:

Branch and Bound Technique. Implementation of Branch and Bound Technique.

Unit VI:

Non-deterministic algorithms, NP-hard and NP-complete problems, decision and optimization problems, graph based problems on NP Principle. Introduction to Approximation algorithms.

Text Books:

1. Introduction to Algorithms: *Thomas H. Cormen et.al, Prentice Hall India.*
2. Computer Algorithms: *Horowitz, Sahani, Rajsekharam, Galgotia Publications Pvt. Ltd.*
3. *Foundations of Algorithms: Dr. S. R. Sathe , Penram Publications.*

Reference Books:

1. Fundamentals of Algorithms : Brassard, Bratley, *Prentice Hall India.*
2. The Design and Analysis of Algorithms : *Dexter C. Kozen, Springer*
3. Design and Analysis of Algorithms, *I. Chandra Mohan, PHI*

Course Outcomes:

At the end of the course students will be able to understand

1. The analysis of complexity of algorithms.
2. Different programming paradigms and popular algorithms based on them.
3. The concept of NP completeness.

Syllabus for Semester VI, B.E. (Information Technology)

Course Code: ITT306 **Course: Database Management System**

L:04 Hrs., T: 01 Hr., P: 0 Hrs. Per week **Total Credits: 09**

Course Objectives:

1. To understand the characteristic of DBMS and advantages of file system over DBMS.
2. To know various data models, and to access information from them by using SQL
3. To understand various types of file organization, indexing techniques, query optimization and evaluation techniques.
4. To learn the concepts of concurrency control and recovery in DBMS.
5. To know applications of databases.

Syllabus

Unit I:

Introduction to database systems: Overview, File systems Vs DBMS, Various data models, Levels of abstraction, Structures of DBMS, Relational model, Relations and Integrity constraints, Relational algebra.

Unit II:

Database design: Overview of database design, ER model, Features of ER model, Conceptual design using ER model, Scheme refinement and normal forms, Scheme refinement, Use of decompositions, Functional dependencies, Multi-valued dependencies

Unit III:

SQL-basics, SQL query, Nested queries, Aggregate operators, Embedded SQL, Dynamic SQL, Security, Views

Unit IV:

Query optimization and evaluation: Introduction to query processing, Selection operation, Projection operation, Join operation, Set operation and Aggregate operation, Relational query optimization, Translating SQL queries, estimating the cost, Relational algebra equivalence.

Unit V:

File organization: Storage media, Buffer management, Record and page formats, File organizations, various kinds of indexes and external sorting**.**

Unit VI:

Concurrency control and recovery: Concepts of transaction, Transactions and schedules, Lock based concurrency control, Lock management, specialized locking techniques, Concurrency control without locking, Crash recovery, Introduction to crash recovery, Log recovery, Check pointing.

Text Books:

1. Database Systems Concepts - Henry Korth & Others, 6th Edition, TMH.
2. Fundamental of database system - Elmasiri, Navathe & Gupta, 4th Edition, Pearson Education.

Reference Books:

1. An Introduction to Database Systems : *C.J. Date,O'Reilly Media Pub.*
2. An Introduction to Database System : *Bipin C. Desai, Galgotia Pub.*
3. Database Management Systems : *Raghu Rama Krishnan.PL/SQL, Oracle Press.*

Course Outcomes:

At the end of the course students will be able to understand

1. Identify various data models, their advantages and disadvantages.
2. Know characteristics of DBMS along with their architecture.
3. Learn various file organization and indexing techniques.
4. Optimize query and evaluate them at minimum cost.
5. Learn to design good database
6. Know various concurrency and recovery techniques.

Syllabus for Semester VI, B.E. (Information Technology)

Course Code: ITP306 **Course: Database Management Systems**

P: 2 Hrs. Per week **Total Credits: 02**

Course Objectives:

1. To give hands on experience of all the concepts of Database management.

Course Outcomes:

Upon completion of the course, students will be able to

1. Understand concept of SQL, DML and DDL commands.
2. Write simple and nested SQL queries.
3. Apply concept of views, index and transactions on database.

Minimum eight practical should be taken, based on above syllabus

ELECTIVE-I

Course Code: ITT307-1 **Course: Software Project Management**

L: 3 Hrs., T: 1 Hr., P: 0 Hrs. Per week **Total Credits: 07**

Course Objectives:

1. To discuss the various aspects of project management.
2. To understand the tasks in software project management.
3. To describe the requirements of a project plan.

Syllabus

Unit I:

Introduction to Project Management: Stages of Project, Project Management Framework, and Software tools for Project management, Project Planning, Integration management, Scope Management.

Unit II:

Project Scheduling: Time Management, Project Network Diagrams.

Unit III:

Project Cost Management: Importance & Principles of Project cost management, Resource planning, cost estimating, Cost budgeting, cost control.

Unit IV:

Project quality management: quality of information Technology Project, stages of software quality management, quality planning, quality assurance, quality control quality standards, project human resource management: Keys of managing people, organizational planning.

Unit V:

Project communication management: communication planning, information distribution, performance reporting, administrative closure, suggestions for improving project communication, project risk management: importance of project risk management, common sources of risk in IT projects, risk identification, risk quantification, risk response development & control.

Unit VI:

Project Procurement Management: importance of project Procurement Management, procurement/ planning, solicitation, source selection, contract administration, contract close-out, project management process groups.

Text Books:

1. Information Technology Project Management : *Kathy Schwalbe.*
2. International student Edition : *THOMSON Course Technology, 2003.*
3. Software Project Management : *Bob Huges & Mike Cotterell, 3rd Edition, TMH.*

Reference Books:

1. Microsoft Office Project 2003 Bible : *Elaine Marmel,Wiley Publishing Inc.*
2. Basics of Software project Management : *NIIT 2004, PHI.*
3. Software Project Management in practice : *Pankaj Jalote, Pearson Education 2002.*
4. Software Project Management : *A concise study by S.A. Kelkar, Revised Edition, 2003, PHI.*

Course Outcomes:

Upon completion of the course, students will be able to understand the

1. Development process of software project.
2. Different project management tools.
3. Concept and importance of project cost management and communication management
4. Various quality standards and incorporate them in the project.
5. Risk associated with project and make action plan for identified risk.

ELECTIVE-I

Course Code: ITT307-2 **Course: Computer Graphics**

L:03 Hrs., T:01 Hr., P: 0 Hrs. Per week **Total Credits: 07**

Course Objectives:

1. To learn various display devices.
2. To learn and implement different algorithms to generate lines and arcs, filling of polygons, 2D transformations, various clipping algorithms, hidden surface algorithms.
3. To learn various types of curves and surfaces along with their properties.
4. Hands on programming implementation of various algorithms and study open GL programming.

Syllabus

Unit I:

Geometry & line generation: Points, Lines, Planes, Pixels and Frame buffers, Types of display devices, DDA and Bresenham's line algorithms, Bresenham's algorithms for circle generation, algorithm for ellipse generation, Aliasing and anti aliasing.

Unit II:

Polygon filling algorithms, NDC (Normalized Device Co-ordinates), Pattern filling. 2D transformations: Scaling, Rotation, Translation, Rotation about arbitrary point, Reflections, Zooming.

Unit III:

Segment tables, Operations on segments, Data structures for segments and display files. Windowing and clipping: Window, View port, Viewing transformations, Clipping, Line and polygon clipping.

Unit IV:

3D Graphics: 3D primitives, Projections, Parallel, Perspective, Isometric, Viewing transformations, Hidden surfaces and line removal, Painter's algorithm, Z-buffers, Warnock's algorithm.

Unit V:

Curves and surfaces: Bezier and B-Spline, Sweeping method of interpolation, Raster graphics architecture: simple Raster-display system, Display processor system, Standard graphics pipeline.

Unit VI:

Programming in OpenGL / GPGL / Postscript.

Text Books:

1. Procedural Elements for Computer Graphics : *David F. Rogers.*
2. Principles of Interactive Computer Graphics : *Newman & Sproul.*
3. Interactive Computer Graphics: A top-down Approach using OpenGL, *Edward Angel, 5th Edition, Pearson Education.*

Reference Books:

1. Mathematical Elements for Computer Graphics : *David F. Rogers & Adams.*
2. Schaum's outline of Theory and Problems of Computer Graphics: Zhigang Xiang, Roy A. Plastock, *2nd Edition, Tata MGH.*

Course Outcomes:

At the end of the course students will

1. Know about various display devices.
2. Be able to apply various techniques to generate lines, arcs, filling of polygon and clipping
3. Learn different types learn of curves along with their properties.
4. Learn animation.
5. Understand open GL/GPGL/Post script programming techniques.

ELECTIVE-I

Course Code: ITT307-3 **Course: Electronic Commerce**

L:03 Hrs., T: 1 Hr., P:0 Hrs. Per week **Total Credits: 07**

Course Objectives:

1. To have a general understanding of the Internet and related technologies.
2. To understand policy issues related to privacy, content selection and intellectual property rights
3. To recognize and understand ways of using electronic commerce technologies to improve intra and inter - organizational processes.

Syllabus

Unit I:

Introduction to electronics-commerce: The scope of E-COM, definition of E-COM, E-COM and trade cycle, electronic market, electronic data interchange, internet commerce, E-commerce in perspective, the value chain, supply chains. Electronic Commerce Software: What kind of software solutions Do you need? Marketing smarts, hosting services, basic packages, midrange packages, enterprise solutions for large firms.

Unit II:

Business to Businessman Electronic-commerce: Inter-organizational transactions, electronic markets, electronic data interchange (EDI), EDI-technology, EDI and business, inter organizational e-com.

Unit III:

Business to consumer electronic commerce: consumer trade transactions, the elements of E-commerce: elements, e-visibility, the e-shop, online payment, delivering the goods, after sales service, internet e-com security, a website evaluation mode.

E-business: Internet book shops, grocery supplier, software supplies and support, electronic newspapers, internet banking, virtual auctions, on-line share-dealing, e-diversity.

Unit IV:

Security threats to E-commerce: Security overview, intellectual property threats. Electronic commerce threats. CERT (Computer Emergency Response Team) Implementing security for E-COM: protecting E-COM assets, Protecting intellectual property, protecting client computers protecting E-COM channels, Ensuring transaction integrity, Protecting the commerce software.

Unit V:

Electronic payment system: The basics of electronic payment system, electronic cache, electronic wallets, smart cards, credit and charge cards. The environment of electronic commerce: international legal.

Unit VI:

Ethical and tax issues: International nature of electronic commerce, the legal environment of electronic commerce, taxation and E-COM, business plans for implementing E-COM: Planning the E-commerce project, managing electronic commerce implementation.

Text Books:

1. E-Commerce : *David Whiteley, TMH.*
2. Electronic Commerce : *Gary P. Schneider & James T. Perry, Course Technology.*

Reference Books:

1. Electronic Commerce : *Greenstein and Feinman, TMH.*
2. E-commerce : *Bhushan Dewan, S. Chand Pub.*
3. Introduction to Computers : *Peter Norton's, 4th Edition, TMH.*
4. E-Business, A beginners Guide : *Elsenpeter, TMH.*
5. E-commerce : *The cutting Edge of Business By Bajaj & Nag, TMH.*

Course Outcomes:

Upon successful course completion, students will

1. Be familiar with e-commerce concepts.
2. Have knowledge of E-Banking and E-Business.
3. Be able to analyze the impact of electronic commerce on key sectors of the economy and assess the strategic implications this analysis holds for an organization.

Syllabus for Semester VI, B.E. (Information Technology)

Course Code: ITT308 **Course : Operating Systems**

L:04 Hrs., T: 01 Hr., P: 0 Hrs. Per week **Total Credits:09**

Course Objectives:

1. To make students learn different types of operating systems.
2. Students should understand process management, memory management, disk management, File system and deadlock handling.
3. To make them understand different algorithms for designing the above mentioned modules of an operating system.
4. To make them learn protection and security concepts related to operating system.

Syllabus

Unit I:

Introduction, basic hardware support necessary for modern operating systems - Services provided by OS, System programs and System Calls - brief discussions of evolution of OS Multiprogramming systems, Time sharing, Real time systems, Multiprocessor system - and distributed systems: a brief overview of issues.

Unit II:

Processes and 3 levels of scheduling, process control block and context switch, goals of scheduling and different scheduling algorithms, threads: user-level and kernel level.

Unit III:

Process cooperation and synchronization, mutual exclusion, the critical section problem, semaphores, monitors - classical inter - process communication problems.

Unit IV:

Deadlocks and strategies for handling them: Deadlock characterization, Deadlock prevention, Deadlock avoidance, Deadlock Detection and Recovery, Combined approach to deadlock handling.

Unit V:

Memory management techniques, contiguous and non-contiguous, paging and segmentation, translation look-aside buffers (TLB) and overheads, virtual memory and demand paging, page faults and instruction restart, problems of large address spaces, page tables, page replacement algorithms and working sets, miscellaneous issues.

Unit VI:

File systems, user interface, disk space management and space allocation strategies, examples from UNIX, DOS, Windows etc, directory structures, disk caching, file system consistency and logs, disk arm scheduling strategies.

Protection and security: protection and security issues, access lists, capabilities, cryptographic techniques

Text Books:

1. Operating System Concepts: *Silberchatz & Galvin, 6th Edition, Addison Wesley.*
2. *Operating Systems: Internals and Design Principles, William Stallings, 5th Edition, Pearson Education.*

Reference Books:

1. Operating System by Concept & Design: *Milan Milenkovic.*
2. Operating System: *Madnick & Donovan.*
3. Modern Operating Systems: *Tanenbaum, 2nd Edition, PHI.*

Course Outcomes:

At the end of course, Student will understand

1. The role of Operating Systems and their types.
2. The concept of a process, thread and scheduling algorithms.
3. Need of process synchronization and how it is achieved.
4. The concept of deadlock and different ways to handle it.
5. Various memory management techniques.
6. The concept of File system, protection and security.

Syllabus for Semester VI, B.E. (Information Technology)

Course Code: ITP308 **Course: Operating Systems**

P: 2 Hrs. Per week **Total Credits: 02**

Course Objectives:

1. To evaluate the performance of various disk and CPU scheduling algorithm through programming.
2. To make students understand process synchronization and deadlock handling through programming.
3. To evaluate the performance of memory and disk space management algorithm through programming.
4. To document the lab work.

Course Outcomes:

Upon completion of the course the students will

1. Be able to choose and implement appropriate algorithm for designing the disk scheduler and CPU scheduler for the given operating system.
2. Be able to write programs consisting of cooperating processes.
3. Be able to write and analyze the programs for memory and disk space management.
4. Be able to prepare a report consisting of work done in the lab.

Minimum eight practical should be taken, based on above syllabus.

OPEN ELECTIVE

Course Code: ITT309-1 **Course: Internet Technologies**

L:03 Hrs., T: 01 Hr., P: 0 Hrs. Per week **Total Credits: 07**

Course Objectives:

1. To study various types of Networks, Protocol Hierarchies and OSI model of Network.
2. To understand the working of Internet.
3. To study various languages for designing webpage.
4. To understand tables, frames and CSS for designing Web page to discuss techniques for publishing websites.

Syllabus

Unit I:

Introduction, Network hardware, LAN, MAN, WAN, Wireless networks, Internetworks, Network software, Protocol hierarchies, Design issues for layers, Interfaces and services, Relationships of Services to Protocols, The OSI reference model, Example networks.

Unit II:

Evolution and growth of the Internet, working of the internet, Getting Online, E Mail and WWW.

Unit III:

Building Websites and making Dynamic webpages. Hosting and promoting Websites.

Unit IV:

Hypertext Markup Language, Designing Webpages using Webpages, Physical styles of text, Logical styles of Texts, creation of List. Tables in HTML: Creation of tables, Including Images in Webpages : Image Tag, Image mapping.

Unit V:

Frames in HTML, creation of Forms, Introduction to Cascading style sheet (CSS).

Unit VI:

Managing Information security: The need for control, Control strategies, Types of control. Ethical, Legal and Moral constraints on Information system: Professionalism, ethics and morality Codes of conduct, Social issues, Legal issues.

Text Books:

1. Computer Networks and Internet: *Douglas Comer, Pearson Education.*
2. Internet, The: A User's Guide: K.L. James, 2 nd edition, PHI learning.
3. HTML: A Beginners Guide: *Wendy Willard, 4th Edition, MGH.*
4. HTML, XML, CSS, and XHTML: *Teodom Gugoin, 1st Edition, Firewall Media.*

Reference Books:

1. Web Design: A Beginners Guide: *Wendy Willard, 2nd Edition, MGH*

Course Outcomes:

The student will be able to

1. Understand the basic internetworking concept and technologies.
2. Understand the issues related to ethics and privacy related to Internet.
3. To create web pages using HTML.
4. To plan, design and publish websites.

OPEN ELECTIVE

Course Code: ITT309-2 **Course: Information Systems**

L: 03 Hrs., T: 01 Hr., P: 0 Hrs. Per week **Total Credits: 07**

Course Objectives:

1. To understand Information System concepts
2. To study information system for business organization.
3. To understand functioning of Internet and Web Applications.
4. To understand the System design and its implementation.

Syllabus

Unit I:

Introduction to Information System: Information concepts, System concepts, Definition and business information system, System Development Information System in organization: Organizations and Information System, Performance based Information System.

Unit II:

Information Technology Concepts: Hardware, Software's: System and application software, Data organization and Management.

Unit III:

Telecommunication and Internet: Overview of telecommunication, Networks and Distributed processing. Use and functioning of INTERNET, World Wide Web, Internet and Web Applications.

Unit IV:

Business Information System: Electronics and Mobile Commerce, Enterprise Systems: Transaction Processing System, Enterprise Resource Planning.

Unit V:

Information and Decision Support Systems, System Development: Investigation, Analysis, Design and implementation, Information Audit.

Unit VI:

Case Study: Study and design and information System for any business Organization.

Text Books:

1. Principles of Information Systems- *A Managerial Approach*: Ralph Stair, George Reynolds, Thomas Chesney, *5th Edition, Cengage Learning (India Edition).*

Reference Books:

1. Business Information System : *Elizabeth Hardcastle, BookBoon.com.*
2. An Introduction to Database Systems : *C.J. Date, O'Reilly Media Pub.*
3. Computer Networks *: Andrew Tanenbaum, 4th Edition, PHI*

Course Outcomes:

The student will be able to understand

1. The Information System concepts.
2. The concept and importance of data organization and management.
3. The role of telecommunication and Internet in the context of Information System.
4. Concept of Decision support systems and development.

Syllabus for Semester VI, B.E. (Information Technology)

Course Code: ITP310 **Course: Animation Workshop**

P: 4 Hrs. Per week **Audit course**

Course Objectives:

1. To study Concepts of Animation.
2. To study Animation tools.

Syllabus

1. Study of MAYA software.
2. Study of Microsoft Flash software.
3. Study of Dream Weaver software.

Course Outcomes:

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

1. Use different graphics tool like Microsoft Flash and Dream Weaver.
2. Create 2- Dimensional graphic designs.
3. Create short animated film.

Students are expected to perform small projects using the above tools.

VII SEMESTER

Syllabus for Semester VII, B.E. (Information Technology)

Course Code: ITT401 **Course: Computer Networks**

L: 4 Hrs., T: 1 Hr., P: 0 Hrs. Per week **Total Credits: 09**

Course Objectives:

1. To make students aware of the hardware and software aspects of Networking
2. To demonstrate the significance of Layered approach in Networking model and understand the Communication between the networked computers
3. To explain the different issues and their solutions at different layers in a network architecture.
4. To make students understand TCP/IP model and working of its protocols

Syllabus

Unit I:

Introduction, Network hardware, LAN, MAN, WAN, Network software, Protocol hierarchies, Design issues for layers. The OSI reference model. TCP/IP model. Physical Layer: Issues, Transmission Impairments, Data Rate Limits, Performance. Bandwidth Utilization: Multiplexing, Transmission Media: Guided and Unguided.

Unit II:

Data Link Layer - Design issues, Services, Error Detection and Correction, Data Link Control, Elementary Data Link Layer protocols, Simplex stop and wait, Simplex protocol for noisy channel, Sliding window protocols- one bit protocols, Go back protocol, Selective repeat protocol. The Medium Access Sub Layer: Multiple Access Protocols, IEEE standards 802 for LANs – Ethernet (802.3), Token Ring (802.5), Wireless LAN (802.11).

Unit III:

The Network Layer design issues, Internal organization, Comparison of Virtual Circuit and Datagram subnets, Routing algorithms, Congestion control algorithms, General principles, Prevention policies, Congestion control in Virtual Circuit subnets.

Unit IV:

Global Addresses, datagram forwarding in IP, Address Translation (ARP), Host Configuration (DHCP), Error Reporting (ICMP), Subnetting, CIDR Notation.

Unit V:

Transport layer- Services, Addressing, Establishing a connection, Releasing a connection, Flow control/buffering, Multiplexing and Crash recovery. Congestion control and Quality of Service. Introduction to UDP and TCP.

Unit VI:

Application Layer: Name Service (DNS) application ,Introduction to traditional applications like Electronic Mail and World Wide Web.

Text Books:

1. Computer Networks - Andrew Tanenbaum, PHI.
2. Computer Networks: A systems approach – Larry. L. Peterson, Bruce. S. Davie, 3rd edition, Morgan Kaufmann publishers
3. Data Communication and Networking - Behrouz Forouzan, 4th Edition, TMH.
4. Computer Networks and Internet - Douglas Comer, 4th Edition, PHI.

Reference Books:

1. Introduction to Data Communications and Networking, Wayne Tomasi, Pearson Education.

Course Outcomes:

At the end of the course students will

1. Have an understanding of hardware and software aspects of networking.
2. Be able to understand the layered approach to networking.
3. Be able to understand and compare different algorithms for designing each layer in network architecture.
4. Have an understanding of working of TCP/IP model and its protocols.

Syllabus for Semester VII, B.E. (Information Technology)

Course Code: ITP401 **Course: Computer Networks**

P: 2 Hrs. Per week **Total Credits : 02**

Course Objectives:

1. To demonstrate students with hardware components of Networking.
2. To be able to implement and analyze the performance of various algorithms of different layers.
3. To make students learn the configuration of different devices in a network like routers, host machines etc.
4. To make students learn the different networking tools like Wireshark, Network Visualizer etc.

Course Outcomes:

At the end of the course students will be able to

1. Recognize and know the functionality of various hardware components of networking.
2. Implement and analyze various algorithms of different layers.
3. Configure different devices like routers, host machines etc. for setting up a network.
4. Use different networking tools like Wireshark, Network Visualizer etc.

Minimum eight practical should be taken, based on above syllabus.

Syllabus for Semester VII, B.E. (Information Technology)

Course Code: ITT402 **Course : Compiler**

L: 4 Hrs., T: 1 Hr., P: 0 Hrs. Per week **Total Credits: 09**

Course Objectives:

1. To introduce the concept of language translation.
2. To enrich the knowledge of various phases of compiler.
3. To extend the knowledge of parsers, code optimization and code generation techniques.
4. To provide theoretical background necessary for constructing a compiler.

Syllabus

Unit I:

Introduction to Compilers: Compilers and Translators, Phases of compiler design, cross compiler, Bootstrapping, Design of Lexical analyzer, LEX.

Unit II:

Syntax Analysis: Specification of syntax of programming languages using CFG, Top-down parser, design of LL (1) parser, bottom up parsing technique, LR parsing algorithm, Design of SLR, LALR, CLR parsers.

Unit III:

Syntax directed translation: Study of syntax directed definitions & syntax directed translation schemes, implementation of SDTS, intermediate notations: postfix, syntax tree, TAC, translation of expression, controls structures, declarations, procedure calls, and Array reference.

Unit IV:

Storage allocation & Error Handling: Run time storage administration, stack allocation, symbol table management, Error detection and recovery: lexical, syntactic, semantic.

Unit V:

Code optimization: Important code optimization techniques, loop optimization, control flow analysis, data flow analysis, Loop invariant computation, Induction variable removal, Elimination of Common sub expression.

Unit VI:

Code generation: Problems in code generation, Simple code generator, Register allocation and assignment, Code generation from DAG, Peephole optimization.

Text Books:

1. Principal of Compiler Design : *Alfred V. Aho & Jeffery D. Ullman, Narosa Pub.*
2. Principles and Practice of Compiler Writing : *Aho, Sethi & Ullman, Addison Wesley.*

Reference Books:

1. Compiler Design : *O.G.Kakde, 4th Edition, University Science Press.*
2. Principles of Compiler Design : V.*Raghavan, MGH.*

Course Outcomes :

At the end of the course students will know

1. Different phases of compiler.
2. The concept of parsers, syntax directed translation and semantic analysis.
3. The concept of storage management, symbol table management and error handling.
4. Code optimization techniques to improve the performance of a program in terms of speed and space.

Syllabus for Semester VII, B.E. (Information Technology)

Course Code: ITP402 **Course: Compiler**

P: 2 Hrs. Per week **Total Credits: 02**

Course Objectives:

1. To implement tokenization.
2. To study LEX tool for lexical Analysis.
3. To study YACC tool for parsing.
4. To explore new tools and technologies used for designing a compiler

Course Outcomes:

Upon completion of the course, students will be able to

1. Implement program for lexical analysis (Tokenization)
2. Implement programs for different parsers.
3. Use compiler tools as LEX and YACC.

Minimum eight practical should be taken, based on above syllabus.

Syllabus for Semester VII, B.E. (Information Technology)

Course Code: ITT403 **Course: Virtualization and Cloud Computing**

L: 04 Hrs., T: 1 Hr., P: 0 Hrs. Per week **Total Credits: 09**

Course Objectives:

1. To make students understand the concept of Virtualization and Cloud computing
2. To make students understand the technical capabilities of Virtualization and Cloud computing
3. To make students understand risk and problems associated with Virtualization and Cloud computing.

Syllabus

Unit I:

Introduction: Common Terminology, Need of Virtualized Technology, Benefits of Virtualization.

Unit II:

Virtualization Technologies: Software Virtualization, VMware, Linux Virtualization, Hardware Virtualization, Resource Virtualization, Application Virtualization, Storage Virtualization, OS Virtualization. Virtualization Software.

Unit III:

Data storage Virtualization, Comparison between Technologies.

Accomplishing Virtualization: Things to do before migration, Things to do after migration, Migration consideration, Risk associated with Virtualization, Problem associate with Virtualization.

Unit IV:

Cloud Computing Fundamental: Cloud Computing definition, private, public and hybrid cloud. Cloud types; IaaS, PaaS, SaaS. Benefits and challenges of cloud computing, public vs private clouds

Unit V:

Cloud Applications: Technologies and the processes required when deploying web services; Deploying a web service from inside and outside a cloud architecture, advantages and disadvantages

Application Development: Service creation environments to develop cloud based applications. Development environments for service development; Amazon, Azure, Google App.

Unit VI:

Managing a Virtualized environment: Support issues, Measuring capacity and performance, Contract and agreement, Organizational consideration.

Case study and implementation of one virtualization technology.

Case study and implementation of a small app for Windows Azure or Google Apps

Text Books:

1. Distributed and Cloud Computing, Kai Hwang, Geoffrey C. Fox, Jack J. Dongarra, Elsevier
2. Cloud Computing Bible, Barrie sosinsky, Wiley- India Edition
3. Cloud Computing: A Practical approach for learning and Implementation, A. Srinivasan, J. Suresh, Pearson Publication

Reference Books:

1. The Complete Cornerstone Guide to Virtualization Best Practices, *Ivanka Menken*, Paperback, 2nd Edition
2. Cloud Computing Explained: Implementation Handbook for Enterprise, *Recursive Press Publication*.
3. Enterprise Cloud Computing: Technology, Architecture, Applications, *Gautam Shroff*
4. Cloud Computing, 2nd Edition, Dr. Kumar Saurabh, *Wiley- India Edition*

Course Outcome:

At the end of the course students will be able to

1. Understand the concept of Virtualization and Cloud computing
2. Understand the technical capabilities of Virtualization and Cloud computing
3. Understand risk and problems associated with Virtualization and Cloud computing.

Elective II

Course Code: ITT404-1 **Course: Data Warehousing & Mining**

L: 4 Hrs., T: 0 Hr., P: 0Hrs.Per week **Total Credits: 08**

Course Objectives:

1. To understand the overall architecture of a data warehouse methods for data gathering and data pre-processes using OLAP tools.
2. To understand different data mining models and techniques.
3. To understand data visualization.
4. To understand Data mining and data warehousing applications like big data.

Syllabus

Unit I:

Foundation: Introduction to DATA Warehousing. Client/Server Computing model & Data Warehousing. Parallel processors & Cluster Systems. Distributed DBMS implementations. Client/Server RDBMS Solutions.

Unit II:

Data Warehousing: Data Warehousing Components. Building a Data Warehouse. Mapping the Data Warehousing to a Multiprocessor Architecture. DBMS Schemas for Decision Support. Data Extraction, cleanup & Transformation Tools. Metadata.

Unit III:

Business Analysis: Reporting & Query Tools & Applications. On line Analytical Processing (OLAP). Patterns & Models. Statistics. Artificial Intelligence.

Unit IV:

Data Mining: Introduction to Data Mining. Decision Trees. Neural Networks. Nearest Neighbor & Clustering. Genetic Algorithms. Rule Induction. Selecting & Using the Right Technique.

Unit V:

Data visualization & Overall Perspective. Data Visualization. Putting it All Together.

Unit VI:

Mining Complex Types of Data: Mining Spatial Databases, Mining Multimedia Databases, Mining Time Series and Sequence Data, Mining Text Database, Mining World Wide Web, Data Mining Applications, Additional themes on Data Mining, Social Impacts of Data Mining.

Text Books:

1. Data Warehousing, Data Mining & OLAP: *Berson, 2nd Edition, TMH.*
2. Data Warehousing System: *Mallach, TMH.*

Reference Books:

1. Data Mining: Concepts and Techniques : *Jiawei Han and Micheline Kamber, 2nd edition Morgan Kaufmann Publishers, 2006.*
2. Data Mining and Knowledge Discovery Technologies (Advances in Data Warehousing and Mining : **David Taniar** *, IGI Publication*

Course Outcomes:

At the end of the course students will

1. Understand architecture of a data warehouse techniques and methods for data gathering and data pre processing using OLAP tools.
2. Have knowledge about different data mining models and techniques.
3. Be aware of data visualization technique.
   Understand data mining and data warehousing applications.

Syllabus for Semester VII, B.E. (Information Technology)

Course Code: ITT404-2 **Course: Mobile Computing**

L: 4 Hrs., T: 0 Hr., P: 0Hrs.Per week **Total Credits:08**

Course Objectives:

1. To make student understand the basics of Wireless Communications.
2. To make student understand GSM network, satellite systems, wireless LAN.
3. To introduce various protocols associated with mobile communication.
4. To introduce emerging technologies and security issues in mobile computing.

Syllabus

Unit I:

Introduction to wireless communication, frequency spectrum for radio transmission, signal prorogation, modulation techniques for mobile communication, spread spectrum, introduction to cellular system.

Unit II:

Medium Access control: Motivation for a specialized MAC, SDMA, FDMA, TDMA, CDMA. GSM: System architecture, protocols, localization and calling, handover.

Unit III:

Satellite systems, Wireless LAN: IEEE 802.11, HIPERLAN, Bluetooth.

Unit IV:

Wireless Application Protocol, General Packet Radio Service, Voice over Internet Protocol

Unit V:

Mobile Network Layer: Mobile IP, dynamic host, configuration protocol, Adhoc networks. Mobile transport layer: Traditional TCP, Indirect TCP, Snoopy TCP, mobile TCP, Transaction oriented TCP.

Unit VI:

Security Issues in Mobile Computing, Introduction to 3G technologies, Introduction to Emerging technologies: RFID, WiMax, IPv6.

Text Books:

1. Mobile Communication: *Jochen Schiller, 2nd Edition, Pearson Education.*
2. Mobile Computing: *Asoke Talukder, Roopa Yavagal, TMH.*

Reference Books:

1. Wireless Communication: *Theodore S. Rappaport, Pearson Education.*
2. Principles of Mobile Computing: *Uwe Hansmann, Lothar Merk, Martin Nicklous, Thomas Stober, Wiley Pub.*

Course Outcomes:

At the end of the course students will

1. Have knowledge of concepts and principles in mobile computing.
2. Understand GSM network, satellite systems, wireless LAN.
3. Possess knowledge of various protocols associated with mobile communication.
4. Know emerging technologies and security issues in mobile computing

Syllabus for Semester VII, B.E. (Information Technology)

Course Code: ITT404-3 **Course: Artificial Intelligence**

L:04 Hrs., T: 0 Hr., P: 0 Hrs. Per week **Total Credits: 08**

Course Objectives:

1. To study various heuristic techniques for solving AI problems.
2. To study various knowledge representation techniques.
3. To study various reasoning techniques and natural language processing.
4. To design expert system for solving AI problems

Unit I:

Introduction: What is AI? , History, Overview, Intelligent Agents, Performance Measure, Rationality, Structure of Agents, Problem-solving agents, Problem Formulation, Uninformed Search Strategies

Unit II:

Informed (Heuristic) Search and Exploration, Greedy best first search, A* search, RBFS, Memory bounded heuristic search, Heuristic functions, inventing admissible heuristic functions, Local Search algorithms, Hill-climbing, Simulated Annealing, Genetic Algorithms.

Unit III:

Constraint Satisfaction Problems, Backtracking Search, variable and value ordering, constraint propagation, intelligent backtracking, local search for CSPs, Adversarial Search, Games, The minimax algorithm, Alpha-Beta pruning, Games that include an Element of Chance.

Unit IV:

Knowledge Based Agents, Logic, Propositional Logic, Inference, Equivalence, Validity and satisfiability, Resolution, Forward and Backward Chaining, DPLL algorithm, Local search algorithms, First Order Logic, Syntax and Semantics of FOL, Inference in FOL, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution.

Unit V:

Introduction to Natural Language Processing: Word Level Analysis, POS Taggers, Syntax Analysis, Parsing techniques, Semantic Analysis, Discourse Context and World Knowledge, Application areas of NLP.

Unit VI:

Expert system: Introduction to Expert System, major characteristics of Expert Systems, knowledge representation, inference techniques, and rule based architecture, Expert system shell, Knowledge acquisition, Knowledge system building tools.

Text Books:

1. Artificial Intelligence: A Modern Approach : Stuart Russel and Peter Norving, Prentice Hall Series in AI.
2. Expert Systems: D*esign & Development John Durkin, PHI.*
3. Natural Language Processing and Information Retrieval: U.S. Tiwary, Tanveer Siddique, Oxford University Press.

Reference Books:

1. Principles of Artificial Intelligence : *J.Nilsson, Narosa Pub.*
2. Introduction to Artificial Intelligence & Expert system : *W.Patterson, PHI.*

Course Outcomes:

At the end of the course students will be able to

1. Understand the concepts of heuristic search.
2. Analyze AI problems with respect to several problem characteristics.
3. Understand knowledge representation, reasoning technique and Natural Language Processing
4. Design the process of Expert system creation for a given problem.

Syllabus for Semester VII, B.E. (Information Technology)

Course Code ITP 406 **Course: Software Lab**

L: 0 Hrs., T: 0Hr., P: 2 Hrs. Per week **(Audit Course)**

Course Objectives:

1. To study various web tools
2. To understand different programming tools
3. To understand different testing tools

Syllabus

Web Technology tools:

Internet Information Services (IIS), Apache Tomcat, WebSphere, Weblogic, PWS, LDAP Server, Web Services, lighttpd, Jigsaw, AOLserver, AppWeb Web Server, IBM HTTP Server.

Programming Tools & Technology:

Eclipse, NetBeans, Build tool of Java-ANT, Hybernet, Spring, Structs, JSF(JAVA SERVER FACES), EJB(Enterprise Java Beans), MVC(Model, View, Control), JSP(Java Server Pages), Servlets .

Software Testing tools:

C/C++ unit testing tools, Web testing tools, Java Testing tools, Unit testing tools, Functional testing, Acceptance testing, Install/uninstall testing, Regression testing.

Text Books:

1. The Complete Reference JAVA : *Herbert Schildt, 7th edition, TMH.*
2. Introducing Software Testing : *Louise Tamres, Pearson Education*

Reference Books:

1. Complete Reference: HTML & CSS- Thomas Powell, TMH

Course Outcomes:

At the end of the course students will have skills to use

1. Various web technology tools
2. Programming tools
3. Different software testing tools

VIII SEMESTER

Syllabus for Semester VIII, B.E. (Information Technology)

Course Code: ITT407 **Course: Introduction To Distributed System**

L: 4 Hrs., T: 1 Hr., P: Hrs. Per week **Total Credits: 09**

Course Objectives:

1. To discuss characteristics and issues in distributed systems.
2. To study various algorithms for deadlock handling.
3. To study concept of distributed scheduling.
4. To understand various recovery techniques and security algorithms.

Syllabus

Unit I:

Motivation and goals, broad overview and advantages of distributed systems main characteristics: absence of global clock and state and possibility of large network delays.

Issues in distributed systems such as transparency, scalability, security, resource management etc. Theoretical foundation Lamport's clocks Chandy Lamport Global State recording algorithm termination detection.

Unit II:

Distributed mutual exclusion Lamport, Ricart Agrawal non-token based algorithm token based algorithms comparative performance analysis.

Unit III:

Distributed deadlock detection issues central and distributed detection algorithm agreement protocols model of processor failures Byzantine agreement and other problems solutions and applications.

Unit IV

Distributed file systems design issues case studies with emphasis on NFS distributed shared memory coherence and coherence protocols design issues and case studies.

Unit V:

Distributed scheduling issues, load distributing algorithms load sharing policies and case studies task migration and issues.

Unit VI:

Recovery: introduction and basic concepts backward and forward error recovery, check pointing: synchronous and asynchronous atomic actions and commit protocols voting protocols reliable communication cryptography: private and public implementation issues, RSA algorithm, authentication in distributed systems Kerberos case study.

Text Books:

1. Advanced concepts in Operating Systems*: Singhal and Shivratri, TMH*.
2. Distributed Systems: *Colouris, 3rd Edition, AWL Press. Pearson Education*.

Reference Books:

1. Modern Operating Systems: *Tanenbaum, 2nd Edition, PHI*.
2. Distributed Systems (2nd Edition) : Sape Mullender*, Addison Wesley*

Course Outcomes:

At the end of the course students will be able to understand

1. The distinguishing features of distributed operating systems.
2. Necessary conditions and avoidance methods for deadlock.
3. Various distributed scheduling algorithms.
4. Basic concepts of recovery and security protocols for reliable communication.

Syllabus for Semester VIII, B.E. (Information Technology)

Course Code: ITT408 **Course: Computer System Security**

L: 4 Hrs., T: 1 Hr., P: 0Hrs.Per week **Total Credits:09**

Course Objectives:

1. To make students understand the conventional and modern methods of cryptography.
2. To understand the role of public key cryptography and study various algorithms for providing confidentiality, authentication and key exchange.
3. To study the protocols for providing security to various applications like email, e-commerce etc.
4. To learn to secure a system against intruders, malicious codes and understand the role of firewalls and trusted systems in securing a system.

Syllabus

Unit I:

Security goals, Cryptographic Attacks, Services and Mechanisms, Steganography, Classical Encryption Techniques: Substitution ciphers, Transposition ciphers, Modern Symmetric key ciphers: DES, Triple DES, IDEA, Blowfish, AES, Differential & linear cryptanalysis, Block cipher mode of operation.

Unit II:

Mathematics of Cryptography: Modular Arithmetic, Algebraic Structures, Primes, Primality Testing, Chinese Remainder theorem, Exponentiation and Logarithm.

Asymmetric-key Cryptography: RSA, Rabin, ElGamal and Elliptic curve Cryptosystems

Unit III:

Message Integrity and Message Authentication : Requirement of Authentication, Hash functions, Mac, Algorithms: MD5, SHA, Whirlpool, HMAC

Digital Signatures: Digital Signature schemes, Attacks, Variations and Applications.

Unit IV:

Entity Authentication: Password, Challenge-Response, Zero- Knowledge.

Key Management: Symmetric key distribution, Symmetric-key Agreement, Public-key distribution. Introduction to Stream Ciphers.

Unit V:

Security at Application layer: PGP, S/MIME, SET, Security at Network Layer: IPSec

Unit VI:

Security at Transport Layer: SSL and TLS. Basic Concept of SNMP. System Security: Intruders, Viruses and worms. Firewalls.

Text Books:

1. Cryptography & Network Security : *Behrouz A. Forouzan, Debdeep Mukhopadhyay. Mc Graw Hill*
2. Cryptography & Networks Security Principles & Practice : *William Stallings, Pearson Education.*

Reference Books:

1. Network Security and Cryptography : *Bernard Menezes, CENGAGE Learning*
2. Computer Security Basics : Rick Lehtinen, G.T. Gangemi Sr. *: O REILLY Publication*

Course Outcomes:

At the end of the course students will have

1. Knowledge of conventional and modern ways of providing confidentiality.
2. Knowledge to differentiate between private key and public key cryptography.
3. Knowledge of different security protocols at various layers.
4. Knowledge of various attacks on a computer system and their countermeasures.

Syllabus for Semester VIII, B.E. (Information Technology)

Course Code: ITP408 **Course: Computer System Security**

P: 2 Hrs. Per week **Total Credits: 02**

Course Objectives:

1. To implement various cryptographic algorithms.
2. To implement standard security protocols.

Course Outcomes:

At the end of the course students will be able to understand working and implementation of

1. Various cryptographic algorithms.
2. Various standard protocols for providing security.

Minimum eight practical should be taken, based on above syllabus.

Syllabus for Semester VIII, B.E. (Information Technology)

Course Code: ITT409-1 **Course: Mobile Apps Development**

L: 4 Hrs., T: 0 Hr. P:0 Hrs. Per week **Total Credits: 08**

Course Objectives:

1. To know the Mobility landscape.
2. To study Mobile apps development aspects.
3. To design and develop mobile apps.
4. To be aware of hardware play, location awareness, graphics and multimedia.
5. To perform testing signing, packaging and distribution of mobile apps.

Syllabus

Unit I: 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.

Unit II: Building blocks of mobiles apps

App user interface designing –mobile UI resources (Layout, UI elements, Draw-able, Menu), Activity-state and life cycle, interaction amongst activities.

App functionality beyond user interface – Threads, Async task, Services – States and life cycle, Notification, Broadcast receivers, Telephony and SMS APIs.

Unit III: Native data handling

On device file I/O, shared preferences, Mobile databases such as SQLite, and enterprise data access (via Internet /Internet)

Unit IV: 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)

Unit V: Testing mobile apps Debugging mobile apps , White box testing, Black box testing and test automation of mobile apps, JUnit for Android, Robotium, Monkey Talk

Unit VI: Taking apps to market, Versioning signing and packaging mobile apps, distributing apps on mobile market place

Text Books:

1. Android Application Development all in one for Dummies by Barry Burd, First edition
2. Mobile Apps Development by Anubhav Pradhan , Anil V. Deshpande, First Edition

Reference Books :

1. Teach Yourself Android Application Development 24 Hours

Course Outcomes:

At the end of the course students will

1. Appreciate the Mobility landscape
2. Familiarize with Mobile apps development aspects
3. Design and develop mobile apps using android as development platform with key focus on user experience design, native data handling and background tasks and notifications.
4. Appreciation of nuances such as native hardware play, location awareness, graphics and multimedia.
5. Perform testing signing, packaging and distribution of mobile apps

Syllabus for Semester VIII, B.E. (Information Technology)

Course Code: ITT409-2 **Course: Business Intelligence**

L: 4 Hrs., T: 0 Hr. P:0 Hrs. Per week **Total Credits: 08**

Course Objectives:

1. To understand difference between Transaction Processing and Analytical applications.
2. To understand technology and processes associated with Business Intelligence framework.
3. To understand Data Warehouse implementation methodology and project life cycle.
4. To design an enterprise dashboard.

Syllabus

Unit I

Introduction to Business Intelligence:

Introduction to OLTP and OLAP, BI Definitions & Concepts, Business Applications of BI, BI Framework, Role of Data Warehousing in BI, BI Infrastructure Components – BI Process, BI Technology, BI Roles & Responsibilities

Unit II

Basics of Data Integration (Extraction Transformation Loading)

Concepts of data integration need and advantages of using data integration, introduction to common data integration approaches, introduction to ETL, Introduction to data quality, data profiling concepts and applications.

Unit III

Introduction to Multi-Dimensional Data Modeling,

Introduction to data and dimension modeling, multidimensional data model, ER Modeling vs. multi dimensional modeling, concepts of dimensions, facts, cubes, attribute, hierarchies, star and snowflake schema, introduction to business metrics and KPIs, creating cubes using SSAS

Unit IV

Basics of Enterprise Reporting

Introduction to enterprise reporting, concepts of dashboards, balanced scorecards, and overall architecture.

Unit V

Data Mining Functionalities:

Association rules mining, Mining Association rules from single level, multilevel transaction databases, Classification and prediction, Decision tree induction, Bayesian classification, k-nearest neighbor classification, Cluster analysis, Types of data in clustering, categorization of clustering methods.

Unit VI

Case studies.

Text Books:

1. R N Prasad, Seema Acharya: Fundamentals of Business Analytics, Wiley India, First Edition, 2011
2. J.Han and M. Kamber : Data Mining: Concepts and Techniques By Morgan Kaufman publishers, Harcourt India pvt. Ltd.

Reference Books:

1. Business Intelligence by David Loshin
2. Business intelligence for the enterprise by Mike Biere
3. Business intelligence roadmap by Larissa Terpeluk Moss, Shaku Atre
4. Successful Business Intelligence: Secrets to making Killer BI Applications by Cindi Howson
5. Delivering business intelligence with Microsoft SQL server 2008 by Brain, Larson
6. Foundations of SQL Server 2005 Business Intelligence by Lynn Langit
7. Information dashboard design by Stephen Few

Course Outcomes:

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

1. Differentiate between Transaction Processing and Analytical applications and describe the need for Business Intelligence.
2. Demonstrate understanding of technology and processes associated with Business Intelligence framework.
3. Demonstrate understanding of Data Warehouse implementation methodology and project life cycle.
4. Design an enterprise dashboard that depicts the key performance indicators which helps in decision making.

Syllabus for Semester VIII, B.E. (Information Technology)

Course Code: ITT409-3 **Course: Soft Computing**

L: 4 Hrs., T: 0Hr., P: 0Hrs.Per week **Total Credits: 08**

Course Objectives:

1. To give fundamentals of non-traditional technologies and approaches for solving artificial neural networks, fuzzy sets and fuzzy logic.
2. To introduce Soft computing application areas particularly to intelligent systems.
3. To introduce soft computing techniques and promote their abilities in designing and implementing soft computing based solutions for real-world problems.
4. To introduce the concept of Training for verification and recognition applications

Syllabus

Unit I:

Basics of artificial neural networks, Characteristics of neural networks, Historical developments of neural network principles, Model of neuron, Basic learning laws, Learning in ANN: Supervised learning, Unsupervised learning, Reinforced learning, Competitive learning, The delta rule, Gradient descent rule, Hebbian learning, Parameters of ANN.ANN Topologies-Modeling ANN's, ANN learning & program, learning algorithms. Discrimination ability: Learning separable ANN's, Multilinear ANN's and nonlinear separable ANN's.

Unit II:

McCulloch Pitts model, Perceptron, Original Perceptron, Perceptron learning procedure, Logic operations with simple layer Perceptron, Delta learning algorithms, ADALINE, MADALINE models, Winner-Takes-All learning algorithm, Backpropagation learning algorithm - mathematical analysis, Application and criticism.

Unit III:

Hopfield model: Mathematical analysis, Hopfield learning algorithm, Discrete time Hopfield net, and competitive learning model. Simulated annealing, Boltzman machine.

Unit IV:

Fuzzy logic: Prepositional logic, Membership function, Fuzzy logic, Fuzzy rule generation, Defuzzification of fuzzy logic, Time dependant fuzzy logic.

Unit V:

Temporal Fuzzy Logic(TFL): Time invariant membership function, Time variant membership function, Intervals, Semi large intervals, Internal operators, Temporal fuzzy logic syntax, Defuzzification of temporal fuzzy logic.

Unit VI:

Fuzzy Neural Networks(FANN) - Fuzzy neural example, Neuro fuzzy control - traditional control, Neural control, Fuzzy neural control, Applications.

Text Books:

1. Introduction to Artificial Neural Networks : *M. Zurada, 3rd Edition, Jaico Publishers.*
2. Understanding Neural Networks and Fuzzy Logic, Basic Concepts and Applications : *Stamatios V. Kartalopoulos, PHI .*
3. Fuzzy Sets Uncertainty and Information : *George Klir, PHI .*

Reference Books:

1. Neural Networks and Fuzzy System : *B.Kosko, PHI.*
2. Neural Networks, Algorithms, Application and Programming Techniques *: J.P.Freeman & David M. Skapura, Pearson.*
3. Fuzzy Neural Control, Principles, Algorithms and Applications *: Junhong Nie & Derek Linkens, PHI.*

Course Outcomes:

At the end of the course students will have understanding of

1. Soft computing techniques and their roles in building intelligent machines.
2. Applying a soft computing methodology for a particular problem.
3. Applying fuzzy logic and reasoning to handle uncertainty and solve engineering problems.

ELECTIVE-IV

Course Code: ITT410-1 **Course: Enterprise Resource planning**

L: 4 Hrs., T: Hr., P: Hrs. Per week **Total Credits: 08**

Course Objectives:

1. To describe the concept of ERP and ERP model.
2. To use ERP for integrating business processes for different organization.
3. To identify the methods of implementing and sustaining the change for existing ERP systems.
4. To apply management capability of an ERP system to sustain competitive advantage.

Syllabus

Unit I:

Introduction: Business needs and ERP, ERP as an overview, entries as an overview, Benefits of ERP, ERP and related technologies. ERP architecture.

Unit II:

Business process reengineering, data warehousing, data mining on the analytical processing supply choice management

Unit III:

ERP Implementation: Client server architecture and ERP, ERP implementation life cycle, implementation, methodologies, ERP implementation – The Hidden cost, organizing implementations, vendors consultants and users, contracts with vendors consultants and employees, project management and monitoring. After ERP implementation.

Unit VI:

The Business Module: Business Models in an ERP package, finance manufacturing human resource, plant maintenance, materials management quality, management sales and distribution.

Unit V:

Selection of ERP, SWOT analysis of various ERP products supply chain enabled ERP.

Unit VI:

ERP and Electronic Data Interchange (EDI) integration, ERP in manufacturing and non-manufacturing industries.

Text Books:

1. ERP Demystified: *Alexis Leon, 1st Edition, TMH.*
2. E Business and ERP: Transforming the Enterprise: *Grant Noris, James R. Hurley, Prce Waterhouse Coopee Publication.*

Reference Books:

1. Enterprise Resource Planning: *Parag Diwan and Sunil Sharma, PHI.*
2. Class A ERP implementation: *Donald H. Sheldon, J. Ross Publishing*

Course Outcomes:

At the end of the course students will

1. Understand the structure of an ERP system.
2. Know how process chains in materials management, production, controlling and sales are implemented in an ERP system.
3. Be able to plan implementation and customization of an ERP system using appropriate modeling methods.
4. Understand customization of an ERP system.

Syllabus for Semester VIII, B.E. (Information Technology)

Course Code: ITT410-2 **Course: Web Technologies**

L:04Hrs., T :0Hr., P: Hrs. Per week **Total Credits: 08**

Course Objectives:

1. Understand different tools, protocols used to access Internet.
2. Understand HTML web development markup language and socket programming.
3. Understand development of secure web sites.
4. Understand the PHP and MySQL advanced web development languages to design dynamic web site.

Syllabus

Unit I:

Basic tools of Internet accesses: email, ftp, www. Standard use for www documents on Internet: HTTP, MIME, SGML, DTD, URL.

HTML Programming: Tags, Special Characters, Heading, Paragraph, List, Images, Tables, Forms, Hyperlinks, Cascading style sheet (CSS).

Unit II:

Sockets: Connections, domains, Types and protocols (sockets), Different routines for socket programming. Creating and closing sockets, Socket communication.

CGI: Understanding CGI, CGI Environmental variables, CGI Applications.

XML : XML Basics , DTD , XML processor, XML namespaces.

Unit III:

Introducing PHP and MySQL: History, Features, and architecture. Learning PHP: Using variables, Statements, and Operators. Using conditional statements and loops.

Unit IV:

Using Arrays and Custom functions: Using Arrays to Group Related Values. User defined function: Defining and Invoking Functions, Using arguments and return values, Defining global and local variables, Importing function definitions.

Unit V:

String and regular expression: Determining length, Comparing strings Manipulating string case, Padding and striping a string. Counting characters and words.

Using Files, Sessions, cookies: Reading and Writing Files, Managing sessions and Using session variables, Storing data in Cookies.

Unit VI:

Learning MySQL: Understanding RDBMS, Using MySQL command line client. Using PHP with MySQL: Managing database connection, performing queries, Processing result sets. Validating user input: Setting constraints at the database layer, Validating input at the application layer.

Text Books:

1. The Complete Reference HTML & XHTML :Thomas Powell, 3rd Edition, TMH.
2. PHP and MySQL :Vikram Vaswani, McGraw-Hill
3. XML in action web technology William J. Pardi, PHI.
4. MySQL : The complete Reference - Vikram Vaswani,TMH
5. CGI Programming on the World Wide Web - Shishir Gundavaram, O' Reilly Associates

Reference Books:

1. PHP 5 / MySQL Programming for the Absolute Beginner – Andy Harris – THOMSON Publication
2. Beginning PHP and MySQL – W. Jason Gilmore, Third edition ,Apress
3. www.php.net

Course Outcomes:

At the end of the course students will be able to

1. Develop and organize the web pages into website for different domain.
2. Write client – server socket program using different socket method.
3. Develop static and dynamic web pages using HTML and scripting language.
4. Develop XML document for internet and use it in HTML pages.
5. Create dynamic web site using PHP and MySQL language.

Syllabus for Semester VIII, B.E. (Information Technology)

Course Code: ITT410-3 **Course: Information Retrieval**

L: 4 Hrs., T: 0 Hr., P: 0Hrs.Per week **Total Credits: 08**

Course Objectives:

1. To understand concepts and challenges in Information retrieval.
2. To know difference between Database Management System and Information retrieval.
3. To learn various data structures used in Information retrieval.
4. To understand web search basics.

Syllabus

Unit I:

Introduction to Information Retrieval, Various stages of an Information Retrieval System, the various open challenges and area in Information retrieval, Difference between data mining and information retrieval, relationship of Information retrieval to Database management systems, Introduction to terms like precision, precision@k, f-measure, throughput, latency, recall, corpus etc, Introduction to open source IR systems-Lucene etc

Unit II:

Boolean retrieval, The term vocabulary and postings lists, Data structures used in Information retrieval, inverted index, n-gram retrieval, Dictionaries and tolerant retrieval, Introduction to index-construction and index-compression

Unit III:

Scoring, term weighting and the vector space model, Cosine similarity measures, tf-idf model, Computing scores in a complete search system, Evaluation in information retrieval, Relevance feedback and query expansion.

Unit IV:

Probabilistic information retrieval, review of basic probability theory, the probability ranking principle, the binary independence model, Robertson Spark Jones Ranking formula, BM25 ranking function

Unit V:

Introduction to Web search basics, Web crawling and indexes, Link analysis, Page rank computation, Clustering in Information Retrieval, Flat clustering, Hierarchical clustering.

Unit VI:

Matrix decomposition and latent semantic indexing technique, Concept of Hub and Authority, Distributed/Parallel Information retrieval, term partitioning, document partitioning.

Text Books:

1. An Introduction to Information Retrieval: Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze, Cambridge University Press, Cambridge, England, 2009

Reference Book:

1. Information Retrieval: Implementing and evaluating search engines: Stefan Büttcher, Charles L. A. Clarke, Gordon V. Cormack, MIT Press, 201

Course Outcomes:

At the end of the course students will possess knowledge of

1. Challenges in Information retrieval.
2. Difference between Database Management System and Information retrieval.
3. Data structures used in Information retrieval.
4. Web search basics.