SHRI RAMDEOBABA COLLEGE OF ENGINEERING AND MANAGEMENT, NAGPUR - 440013

An Autonomous College affiliated to
Rashtrasant Tukadoji Maharaj Nagpur University,
Nagpur, Maharashtra (INDIA)

PROGRAMME SCHEME & SYLLABI
2017-21

B. E. (INFORMATION TECHNOLOGY)

Published by
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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 14 years. The curriculum is designed so as to cater to Core IT subjects as well as those related to current trends in IT Industries. The department has MOU's signed with leading software industries which gives inputs in curriculum development, conduction of guest lectures, summer / winter training for students. Option of full six months internship is provided, in reputed IT industries, for VIII semester students. Laboratories of the department are well equipped with computers of latest configuration and internet facility. Latest software, wireless access point, LCD projectors and separate router are used in the laboratories and for teaching purpose. Department takes pride in excellent placements of the final year students and has the distinction of consistently getting good results in all semesters. The department also coordinates Semicolon Tech Club of RCOEM, under which various 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 and ability to excel in professional career.

Program Educational Objectives

1. To produce Quality Manpower catering to the requirements of IT Industry with sound fundamentals and core Engineering knowledge along with adequate exposure to Emerging Technologies.
2. To develop graduates possessing abilities to Interpret, Analyse and Design effective solutions while working in a team and capable of adapting to current trends by engaging in Lifelong learning.
3. To imbibe in graduate an understanding of issue related to Environment, Society, Profession and Ethics along with importance of Effective Communication Skills.

Program Outcomes

Engineering Graduates will be able to :

1. **Engineering knowledge :** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis :** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design / development of solutions :** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems :** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage :** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society :** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability :** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of and need for sustainable development.

8. **Ethics :** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work :** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication :** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance :** Demonstrate knowledge and understanding of the engineering and managemnt principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning :** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes

ITPSO1 : Foundation of Logic development and Mathematical concepts : Demonstrate logic development ability along with mathematical concepts to solve real world problems.

ITPSO2 : Foundations of Computer Systems and Software development : Ability to understand the principles and working of computer systems, Software Engineering principles, Familiarity and practical competence with a broad range of programming language and open source platforms relevant to IT Industry.

ITPSO3 : Application of Computing knowledge and Research ability : Ability to work professionally in IT Industry, prepare for higher studies and to develop systems based on cutting edge technologies to solve the real world problems in IT Industry.

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		
ITT307-4	Software Testing		

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
		ITT409-4	Industry Elective - I	ITT410-4	Industry Elective-II

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 Objective

Course objective of this course is to provide understanding the concepts of Mathematics and its application to Engineering. This course introduces the student to Differential Calculus for one and several variable, Differential Equations and Infinite Series.

Course Outcomes

On successful completion of the course, student shall be able to

1. Solve Engineering problems using the concept of Differential Calculus.
2. Get analytical solution of Ordinary Differential Equations in Engineering.
3. Test convergence of Infinite series.

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 :

At the end of the course the students

1. will be able to recognize and analyze phenomena of interference, diffraction and polarization of light waves ;
2. will understand principles of laser action and basic working of many types of laser devices ;
3. will understand geometrical theory of optical fibre communication and the phenomena of attenuation and dispersion of electrical signals in the fibre ;
4. will understand fundamental notions in quantum mechanics such as wave particle duality, de Broglie matter waves, Heisenberg uncertainty relations, wave function of system, quantum confinement, quantization of energy and quantum tunneling of potential barriers;
5. will understand concepts like Fermi energy and density of states, understand calculation of carrier density and electrical conductivity in intrinsic and semiconductors and understand the behaviour of pn-junction;
6. will understand broad principles of electromagnetic electron lenses, cyclotron, mass spectrograph and working of the CRO;
7. will understand the reasons for novel properties at nano-scale, be familiar with elements of some of the methods of synthesis and characterization and some of the properties of such materials ;
8. will be able to understand and perform numerical calculations in areas of optics, lasers, optical fibres, quantum physics, semiconductors, charged particle devices and nano physics at the level defined above for these.

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, Different types of polarization of light, Malus' law, production of plane polarized light, birefringence, wave plates.

Unit-II:

Quantum Physics:

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

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:

Mass Spectrograph and Particle Accelerators :

Principles of electron optics, cathode ray tube, 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, diode rectifier equation.

Unit-VI:

Nanophysics:

What is Nanotechnology? Fullerenes and nanoparticles; Outline of methods of preparation; Elements of electron microscopy; Scanning probe microscopy, Outline of properties – physical, thermal, optical, electrical, magnetic; Quantum size-effects; CNTs; 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) / Applied Physics : S. Jain Sahastrabuddhe and S. M. Pande.
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: H. Malik and A.K. Singh, TMH (2010).
3. Engineering Physics: D.K. Bhattacharya and A.Bhaskaran, Oxford University Press (2010)

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 :

In addition to the demo experiments, the Lab turns will be utilized for performing the experiments based on the following list:

1. Study of diodes
2. Study of transistors
3. Study of thermistors
4. Study of phenomena of interference due to thin films.
5. Diffraction of light by slit(s), an edge, obstacles, etc.
6. Hall effect
7. Study of CRO
8. Graph plotting, curve fitting, visualization using Mathematica

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, slip, torque slip 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 using static capacitors.
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 | **Course : 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. Understand basics of computer, software, number systems, flowchart and algorithms.
2. Design and code well-structured C programs.
3. Write program on the basis of decision control structures and loop control structures.
4. Perform sorting and various other operations on 1-D and 2-D array.
5. Perform operations on structures, functions and pointers.

Syllabus

Unit-I:

Computer Fundamentals: Basic Structure of a computer, Input/output devices and memories, 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 Languages Procedural, Object oriented, High level, Assembly, Machine Language. System Software - Translator, Compiler, Interpreter, Linker, Loader 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 classes, 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 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 Lab**

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, Open Source CDs
3	Group Discussion-Orientation	1. GD types 2. GD techniques/rules - videos 3. General/familiar topics for discussion	Open Source CDs 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	Open Source CDs Activity Based
7	Interview Techniques Practice Sessions	1. Video 2. Non-verbal communication 3. Types of interview questions	Open Source CDs Activity Based
8	Interview Techniques-Mock Interviews Optional Practicals	1. Mock Interviews (One to One) Teacher can decide any other Practical apart from the ones mentioned below	Activity Based
9	Listening Skills	1. Listening Barriers	PPT Based, Activity Based
10	Non Verbal Communication	1. Kinesics in com/interviews 2. Activities/Role play	Open Source CDs 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. Understand fundamental skills and basic rules of games.
2. Gain health related physical fitness.
3. Develop body-mind coordination through games and yogasans.

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.

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 Objective

The objective of this course is to expose student to understand the basic importance of Integral Calculus and Vector calculus. The student will become familiar with fitting of curves and regression analysis.

Course Outcomes

On successful completion of the course, student shall be able to

1. Understand and use the concepts of Integral Calculus for Engineering problems.
2. Apply technique of Vector differentiation and integration to various Engineering problems.
3. Know basic statistical techniques required for Engineering.

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 $y = a + bx + cx2$ 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 of Engineering Chemistry :

Upon successful completion of the course, the student shall be :

1. Able to understand the basic scientific principles underlying the troubles caused by impurities present in water and treatment to remove the same.
2. Understand the applications of different nanomaterials with their synthtic routes.
3. Able to characterize the fuels and analyze their combustion mechanism.
4. Able to understand the effect of constituents on quantity of cement manufactured with their setting and hardening reactions.
5. Able to understand principles of lubrication along with chemical properties of lubricants.
6. Knowledge of proper engineering materials having better corrosion resistance and sustainability and implement the effective measures to minimize the corrosion wherever possible.

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**

Course Outcomes of Engineering Chemistry Lab

After successful completion of the course, the student will be able to

1. Be conversant with various chemical processes involved in qualitative as well as quantitative analysis of different materials, water pertaining to various impurities and to record the information in the scientific way.
2. Understand applicability of different physico-chemical properties of fluids such as viscosity and flash point for various industrial machineries.

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 various parameters related to static and dynamic 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 Publishing House Pvt. Ltd.

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 Lab; 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 : The expected learning outcome is that, the students shall be able to :

1. Draw & interpret technical drawings.
2. Convert 2-D drawing to 3-D drawing & vice-versa.
3. Represent the various positions of planes & solids in different orientations.
4. 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**

Course Outcome : The expected learning outcome is that, the students shall be able to:

1. Draw & interpret technical drawings.
2. Plan the sheet layout for the given drawing.
3. Convert 2-D drawing to 3-D drawing & vice-versa.
4. Represent the various positions of planes & solids in different orientations.
5. Develop the solid surface for sheet metal working.
6. Use & demonstrate drafting package.

List of Sheets: (50% of the sheets to be drawn in Auto CAD)

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. A new look into Social Sciences by Sheikh and Shabbir
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), Astha Publication, Nagpur
4. Tariq Modood, Multiculturalism (Themes for 21st Century Series)(1st Publication 2007), Polity Press, Cambridge, U.K. ISBN-13:97807456-3288-9.
5. Social & Human Skills by Dr. Vinod Asudani and Dr. Monika Seth.

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

Course Objectives :

To impart practical training (hands-on experience) regarding use and operations of various tools, equipment and machine with basic knowledge of manufacturing process and materials.

Course Outcomes :

1. Student will be able to read job drawing, identity and select proper material, tools, equipments and process / machines for manufacturing the required job.
2. Student will be able to use basic marking and measuring instruments to inspect the job for confirming desired dimensions and shape.
3. Student will be able to observe and follow precautions during operation.

List of Experiments :

SHOP	No. of Experiments /Jobs
Fitting Shop	1. Introduction of fitting tools, equipments, machines, material & processes.
	2. Manufacturing & fitting practice for various joints & assembly.
	3. Drilling, tapping & pipe threading operations.
Carpentry Shop	1. Introduction of carpentry tools, equipments, machines, material & processes.
	2. Manufacturing of carpentry joints.
	3. Turning practice on wood working lathe.
	4. Demonstration & practice on universal wood working machine.
Welding Shop	1. Introduction of welding tools, equipments, machines, material & processes.
	2. Fabrication of joints like lap, butt, corner, T etc.
	3. Fabrication of lap joint by spot welding process.
Smithy Shop	1. Introduction of smithy tools, equipments, machines, material & processes.
	2. Forging of combine circular/square/hexagonal cross section.

Text Books :

1. Elements of workshop technology vol -1 by Hajra Choudhari
2. Elements of workshop technology vol -1 by Raghuwanshi

Reference Book:

1. Manufacturing technology by P.C. Sharma
2. Workshop manual by Kannaiah Narayan

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**

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, 43rdEdition*
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, 2nd edition.*
3. Fundamentals of Mathematical statistics : *S. C. Gupta, V. K. Kapoor.*

Course Outcomes :

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

1. Understand Matrices and Numerical Methods to solve system of equations and differential equations.
2. Use Z-transform to solve difference equations.
3. Understand probability theory and use for analysis of data.

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**

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 & 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.*

Reference Books:

1. Human Resource Management: *K. Aswathappa; Tata-McGraw-Hill Publishing Co. Ltd, New Delhi.*
2. 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:

1. Students will understand the founding principles of Management.
2. Students will be able to understand the functions of management.
3. Students will be familiar with principles of Marketing Management.
4. Students will be able to apply HR principles in industrial sector.
5. Students will be able to understand and apply financial principles in their working.
6. Students will be able to apply the principles of Organizational Behaviour in their career.

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**

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 Book :

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 1st Edition, Pearson Pub.

Reference Books:

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

Course Outcomes:

At the end of the course student will be able to

1. Demonstrate the concepts of algorithm design and complexity theory.
2. Apply the basic concepts of linear data structures like Arrays and Link List, to solve real life problems.
3. Analyze and apply the standard searching / sorting algorithms to real life problems.
4. Design algorithms using non-linear data Structures to solve real life problems.
5. Demonstrate application of data structures appropriate to a given contextual problem.

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 Outcomes:

Upon completion of the course, students will be able to

1. Identify the data structure to develop algorithm for real life applications.
2. Defend the time and space complexities of given algorithm.
3. Design optimal algorithms for solving real world problems.
4. Describe 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**

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 μp 8085.

Text Books :

1. Digital Logic Design: M. Mano, 2nd edition Pearson Pub.
2. Modern Digital Electronic: R.P. Jain, 4th edition MGH.
3. Microprocessor Architecture, Programming and Applications with 8085: Ramesh Gaonkar,5th Edition, Prentice Hall

Reference Books :

1. Fundamental of Digital Electronics: *A. Anand Kumar PHI.*
2. 8 bit Microprocessor & Controller: *V.J.Vibhute, 5th Edition Techmedia.*

Course Outcomes :

Upon completion of the course students will be able to

1. Design simple logic circuits.
2. Design combinational circuits.
3. Design sequential circuits.
4. Analyze sequential circuits using storage elements.
5. Describe 8085 architecture and use its instruction set for writing Assembly Language programs.

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 Outcomes:

Upon completion of the course students will be able to

1. Design combinational circuits.
2. Design sequential circuits.
3. Design basic memory elements using flip-flops.
4. Write 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**

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, 4th Edition, Pearson Education.*
2. Business Information Systems: *Analysis, Design and Practice: Mr. Graham Curtis, Dr. David Cobham., 6th Edition Pearson Education.*

Reference Books :

1. Business Information System: *Elizabeth Hardcastle, 2nd Edition, BookBoon.com.*
2. Principles of Business Information Systems: *Ralph Stair, George Reynolds, Thomas Chesney, 11th Edition Cengage Learning.*

Course Outcomes :

At the end of the course student will be able to

1. Recognize fundamentals of Information system and its characteristics.
2. Describe network basics and its essentials for various Information Systems.
3. Apply the process models for a software project through evaluation of risk factors and feasibility.
4. Apply controlling techniques to protect computer based Information System.

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**

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**

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 & 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:

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

1. Analyze discrete data structure such as sets, relations and mathematical logic.
2. Understands Algebraic structures.
3. Derive formulas using recurrence relations and generating functions applied to sets of objects.

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**

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, 4th Edition, PHI.*

Reference Books:

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

Course Outcomes:

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

1. Describe the role, organization and interaction of different hardware units of a computer system.
2. Design memory unit, adder, subtractor, multiplication and division circuits.
3. Design and compare the performance of hardwired and micro-programmed control units.
4. Analyze different techniques for handling I/O.
5. Recognize 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**

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. Recognize the features of Object Oriented Programming.
2. Apply the concept of a class for solving real life problems.
3. Apply concepts of interfaces, Streams and exception handling for solving real life problems.
4. Design and implement data structures in Object Oriented Programming.
5. Construct UML diagrams for a given problem.

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

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

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

Course Outcomes :

Upon completion of the course students will be able to

1. Write object-oriented program in C++/Java Language.
2. Apply object-oriented concepts to solve real world problems.
3. Write extensible and reusable programs.
4. Describe 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**

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 be able to

1. Identify, compare and install Linux distributions as per requirement.
2. Configure GRUB loader services and perform network troubleshooting.
3. Apply the concept of Package management, Storage management and do failure recovery.
4. Configure important services like FTP, DNS, MAIL and WEB.
5. Perform Backup and recovery 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 Outcomes:

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

1. Install, configure and use different commands to operate Linux system.
2. Demonstrate package and storage management under Linux environment.
3. Installation, configuration and running 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**

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, MG, 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**

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**

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, 3rd Edition, TMH Publication.
2. The 8051 micro controller and embedded systems : using assemblers and c: Mazidi & Mc. Kinley. 2nd Edition, Pearson Education.
3. Advanced microprocessor and peripherals: A.K. Ray and K. M. Bhurchandi, 3rd Edition, TMH

Reference Books :

1. Microcomputer Systems: The 8086/8088 Family Architecture, Programming and Design: Yu-Cheng Liu and Glenn A. Gibson, 2nd Edition, PHI
2. The 8051 Microcontroller, Architecture, programming & applications: K.J.Ayala, 2nd Edition, Penram International

Course Outcomes :

Upon completion of the course, students will be able to

1. Describe basic architecture and functions of each block of 8086 Microprocessor.
2. Write Assembly Language Programs for 8086 based system.
3. Analyze and write programs for interfacing peripheral IC's with microprocessor.
4. Describe characteristics of advance processors.
5. Explain basic concepts of 8051 microcontroller.

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

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

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

Course Outcomes:

Upon completion of the course, students would be able to

1. Demonstrate working of microprocessor and microcontroller on simulator.
2. Write assembly language programs.
3. Demonstrate working of Interrupts on simulator.
4. Apply programming skills 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**

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 source coding and channel coding in digital communication.
3. Basic techniques involved in digital modulation.
4. Fundamentals of error detecting and correcting codes in communication.
5. Basic concepts of spread spectrum modulation.

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**

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. Systems Programming & Operating Systems : *D.M.Dhamdhare, 2nd Edition, TMH.*

Course Outcomes :

At the end of the course student will be able to

1. Describe various System softwares' and their functionality in detail.
2. Explain the architecture of SIC and SIC/XE machines.
3. Design Assemblers, Macro processors, linkers and loaders for SIC and SIC/XE machines.
4. Design and install the device drivers for various devices.
5. Describe COFF, SCCS, Symbolic Debugger and GCC.

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**

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. Design Finite automata for real life problems.
2. Demonstrate concepts of grammars and formal languages.
3. Analyze the problem and apply appropriate computational model to solve it.
4. Describe the concepts of undecidable problems.
5. Demonstrate the concepts of recursive function theory.

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**

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 & 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, Principles and Practices, *Rajesh Narang, 1st Edition, MGH*
2. Software Engineering : *Schach, Special Indian Edition, TMH.*

Course Outcomes :

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

1. Use different software development process models for projects.
2. Evaluate the cost, time and effort of the project and also identify different risk associated with project.
3. Use different graphical tools like DFD, Flowchart for presenting project.
4. Demonstrate different testing techniques and 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 Outcomes:

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

1. Use different software development processes for project.
2. Apply different estimation methods for project and select best solution with respect to quality assurance.
3. Demonstrate use of Rational Rose Software to create different UML Diagrams.
4. Apply skills to construct software of high quality

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**

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, 2nd Edition, Prentice Hall India.*
2. Fundamentals of Computer Algorithms : *Horowitz, Sahani, Rajsekharam, 2nd Edition, Computer Science Press .*
3. Foundations of Algorithms : *Dr. S. R. Sathe , 1st Edition Penram Publications.*

Reference Books :

1. Fundamentals of Algorithms : *Brassard, Bratley, 1st Edition. Prentice Hall India.*
2. The Design and Analysis of Algorithms : *Dexter C. Kozen, Springer*

Course Outcomes :

At the end of the course students will be able to

1. Apply mathematical concepts to analyze the complexity of algorithms.
2. Explain the concepts of different programming paradigms.
3. Design algorithms by applying the concepts of different programming paradigms to solve real life problems.
4. Demonstrate the concepts 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**

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,8th Edition, Pearson Education*
2. An Introduction to Database System : *Bipin C. Desai, 1st Edition Galgotia Pub.*

Course Outcomes :

At the end of the course students will be able to

1. Identify various data models, their advantages and disadvantages.
2. Explain characteristics of DBMS along with its architecture.
3. Describe various file organizations and indexing techniques.
4. Defend optimal query processing.
5. Design good database.
6. Demonstrate knowledge of 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 Outcomes:

Upon completion of the course, students will be able to

1. Install, configure, and interact with a relational database management system.
2. Demonstrate concept of DML and DDL commands.
3. Construct and execute querries of varying complexities.
4. Apply the concept of index and transaction 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**

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, 6th Edition, Cengage E-Learning.*
2. Software Project Management : *Bob Huges & Mike Cotterell, 3rd Edition, TMH.*

Reference Books :

1. Software Project Management in practice : *Pankaj Jalote, 3rd Edition, Pearson Education 2002.*
2. Software Project Management : A concise study : *S.A. Kelkar, 3rd Edition, 2003, PHI.*

Course Outcomes :

Upon completion of the course, students will be able to

1. State Development process of software project.
2. Apply different project management tools.
3. Apply concept of project cost management and communication management.
4. Design a real life project by applying various quality standards.
5. Identify risks 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**

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, 2nd Edition, TMH.
2. Principles of Interactive Computer Graphics : Newman & Sproull, 1st Edition, MGH.
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, 2nd Edition, MGH*
2. Schaum's outline of Theory and Problems of Computer Graphics : *Zhigang Xiang, Roy A. Plastock, 2nd Edition, TMH.*

Course Outcomes :

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

1. Describe the working of various display devices.
2. Apply the basic line, circle and ellipse generation algorithms to real life situations.
3. Analyze and apply basic transformations and various polygon filling algorithms as per the problem statement.
4. Apply standard polygon clipping and hidden surface removal algorithms as per the problem statement.
5. Recognize different types of curves along with their properties.
6. Design Graphics system using 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**

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 be able to

1. Describe e-commerce concepts.
2. Discuss working of e-Banking and e-Business environments.
3. Analyze the impact of electronic commerce on key sectors of the economy.
4. Assess the strategic implications and analysis of e-commerce.

ELECTIVE-I

Course Code: ITT307-4 **Course: Software Testing**

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

Syllabus

Unit I:

Introduction to Testing : Why and What ? : is Why is testing necessary ? What is testing ? Role of Tester, Testing and Quality, Overview of STLC.

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:

Software testing Life Cycle - V model : SDLC vs STLC, different stages in STLC, document templates generated in different phases of STLC, different level testing, different types of testing.

Unit IV:

Test Design : Various test categories, test design techniques for different categories of tests.

Unit V:

Test Management : Documenting test plan and test case, effort estimation, configuration management, Introduction to TestLink.

Defect Managent : Logging defects, defect lifecycle, fixing / closing defects.

Intorduction to Bugzilla

Unit VI :

Automation Testing : Introduction to automation testing, why automation, what to automate, tools available for automation testing.

Automation testing using Selenium : Introduction to Selenium, using Selenium IDE for Automation testing and Selenium Web driver for automation testing.

Test Books :

1. Software Testing: Ron Palton, 2nd Edition, Pearson Education
2. Managing the Testing Process: Rex Black (2001), 2nd Edition, John Wiley & Sons
3. Foundations of Software Testing: Dorothy Graham, Erik van Veenendaal, Isabel Evans, Rex Black, 2nd Revised Edition, Cengage Learning

Reference Books :

1. Effective Methods for Software Testing : *Willam Perry, 3rd Edition, Wiley*
2. Implementing Automated Software Testing : *How to Save Time and Lower Costs While Raising Quality - Elfriede Dustin, 1st Edition, Addison-Wesley Pub.*

Course Outcomes :

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

1. Demonstrate software testing knowledge
2. Apply techniques of software testing and review.
3. Design test cases, manage defects and generate test reports.
4. Demonstrate the concepts of automation and web based testing.

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**

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, 2nd Edition, MGH.*
2. Operating System : *Madnick & Donovan, 1st Edition, MGH.*
3. Modern Operating Systems : *Tanenbaum, 2nd Edition, PHI.*

Course Outcomes :

At the end of course, Students will be able to

1. Describe the role of Operating Systems and their types.
2. Use the concept of a process, thread and scheduling algorithms.
3. Demonstrate the concept of process synchronization in real life problems.
4. Analyze the occurrence of Deadlock and handle it.
5. Differentiate and apply various memory management techniques in real life problems.
6. Recognize 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 Outcomes:

Upon completion of the course the students will be able to

1. Defend the appropriate algorithm for designing CPU scheduler for the given operating system.
2. Demonstrate programs consisting of cooperating processes.
3. Execute program for deadlock avoidance.
4. Execute the programs for memory management.
5. Demonstrate virus programs and their countermeasures.

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**

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, 5th Edition, PHI .*
2. Internet : A User's Guide : *K.L. James, 2nd edition, PHI learning.*
3. Business Information System : *Paul Bocij, Andrew Greasley, Simon Hickie, 4th Edition, Pearson Education*
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 :
Upon completion of the course, the student will be able to
1. Demonstrate the basic Internetworking concept and technologies.
2. Describe the issues related to ethics and privacy related to Internet.
3. Design web pages using HTML.
4. 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**

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, 2nd Edition, BookBoon.com.*
2. An Introduction to Database Systems : *C.J. Date, 8th Edition, Pearson Education*
3. Computer Networks : *Andrew Tanenbaum, 4th Edition, PHI*

Course Outcomes :

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

1. Demonstrate understanding of Information System concepts.
2. Apply the concept of data organization and management.
3. Define the role of telecommunication and Internet in the context of Information System.
4. Apply the 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**

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. Demonstrate the relevant knowledge and skills acquired, to solve a given problem.
2. Develop, document and present the work with requirements on structure, format and language usage.
3. Enhance knowledge and continuously develop one's own competencies.
4. Work in a team.

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**

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, 4th Edition, PHI.*
2. Data Communication and Networking : *Behrouz Forouzan, 4th Edition, TMH.*
3. Computer Networks and Internet : *Douglas Comer, 5th Edition, PHI.*

Reference Books :

1. Introduction to Data Communications and Networking : *Wayne Tomasi, 1st Edition, Pearson Education.*
2. Computer Networks : A systems approach : *Larry. L. Peterson, Bruce. S. Davie, 3rd Edition, Morgan Kaufmann publishers.*

Course Outcomes :

At the end of the course students will be able to

1. Explain the hardware and software aspects of networking.
2. Demonstrate the layered functionality for solving networking related issues.
3. Identify and apply different algorithms in each layer of network architecture.
4. Design TCP/IP based networking systems for solving real world problems.

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

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

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

Course Outcomes:

At the end of the course students will be able to

1. Demonstrate the functionality of various software and hardware components of networking.
2. Differentiate and demonstrate various algorithms at different layers.
3. Configure different devices like routers, host machines for setting up a network.
4. Use different networking tools like Wireshark and Network Visualizer.

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**

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, 1st Edition, Narosa Pub.*
2. Principles and Practice of Compiler Writing : *Aho, Sethi & Ullman, 2nd Edition, Addison Wesley.*

Reference Books :

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

Course Outcomes :

At the end of the course students will be able to

1. Describe the functionality and implementation issues of different phases of compiler.
2. Demonstrate the concept of parsers, syntax directed translation and semantic analysis to design solution for practical problems.
3. Defend the concept of storage management, symbol table management and error handling to solve real world problems.
4. Apply code optimization and code generation 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 Outcomes:

Upon completion of the course, students will be able to

1. Execute program for lexical analysis (Tokenization).
2. Demonstrate programs for parsers.
3. Demonstrate understanding of LEX and YACC tools.
4. Describe the lab work in the form of lab report.

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**

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, 1st Edition Elsevier*
2. Cloud Computing Bible : *Barrie sosinsky, Wiley- India Edition*
3. Cloud Computing : *A Practical approach for learning and Implementation, A. Srinivasan, J. Suresh, 1st Edition, Pearson Publication*

Reference Books :

1. The Complete Cornerstone Guide to Virtualization Best Practices : *Ivanka Menken, Paperback, 2nd Edition, Emereo Pty Ltd.*
2. Cloud Computing Explained : *Implementation Handbook for Enterprise, 2013 Edition, Recursive Press Publication.*
3. Enterprise Cloud Computing : *Technology, Architecture, Applications, Gautam Shroff, 1st Edition, Cambridge University Press*
4. Cloud Computing : *Dr. Kumar Saurabh, 2nd Edition, Wiley- India Edition*

Course Outcome :

At the end of the course students will be able to

1. Apply the concepts and benefits of virtualization technology to solve real world problems.
2. Analyze and apply the existing virtualization technologies for design and implementation of real world systems.
3. Understand and analyze architecture, services and challenges in cloud computing.
4. Classify the services offered by different cloud vendors.
5. Design and deploy services using virtualization tools and cloud platform.

Elective II

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

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

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 Mining : Concepts and Techniques : *Jiawei Han and Micheline Kamber, 2nd edition Morgan Kaufmann Publishers, 2006.*

Reference Books :

1. Data Warehousing System : *Mallach, TMH.*
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 be able to

1. Describe Architecture of a data warehouse and methods for data gathering and data pre-processing using OLAP tools.
2. Demonstrate knowledge of different data mining models and techniques.
3. Apply data visualization techniques.
4. Design data mining and data warehousing applications for real world scenarios.

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**

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.*

Reference Books :

1. Wireless Communication : *Theodore S. Rappaport, 2nd Edition, Pearson Education.*
2. Mobile Computing : *Asoke Talukder, Roopa Yavagal, 1st Edition, TMH.*

Course Outcomes :

At the end of the course students will be able to

1. Recognize the basic concepts and principles of wireless communication.
2. Differentiate and compare Mobile technologies like GSM, GPRS and Wireless LAN standards.
3. Differentiate and compare various protocols like VOIP, WAP, Mobile IP, Mobile TCP.
4. Explain the implementation issues in Emerging mobile technologies.

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**

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, 2nd Edition Prentice Hall Series in AI.*
2. Expert Systems : *Design & Development John Durkin, 1st Edition, PHI.*
3. Natural Language Processing and Information Retrieval : *U.S. Tiwary, Tanveer Siddique, 1st Edition, Oxford University Press.*

Reference Books :

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

Course Outcomes :

At the end of the course students will be able to

1. Solve AI problems using standard searching algorithms.
2. Solve constraint satisfaction problems and design games.
3. Demonstrate knowledge representation and reasoning techniques.
4. Design an Expert System for real world applications.

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

Course Code ITP 405 **Course: Project Phase-I and Seminar-I**

L: 0 Hrs., T: 0Hr., P: 2 Hrs. Per week **Total Credits: 04**

Course Outcomes :

1. Demonstrate skills to work in a team.
2. Identify the area of project work and perform requirement analysis.
3. Select appropriate hardware and software tools for implementation.
4. Defend the project work through seminars and viva voce.
5. Develop project report.

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)**

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, 1st Edition , Pearson Education.*

Reference Books :

1. Complete Reference : *HTML & CSS- Thomas Powell, 5th edition TMH.*

Course Outcomes :

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

1. Recognize Web servers, BI, Virtualization and Cloud Computing tools.
2. Demonstrate the use of IDE tools.
3. Design API's for software development.
4. Demonstrate the use of 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**

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, 1st Edition TMH.*
2. Distributed Systems : *Colouris, 3rd Edition, AWL Press. Pearson Education.*

Reference Books :

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

Course Outcomes :

At the end of the course students will be able to

1. State the distinguishing features of distributed operating systems.
2. Demonstrate the concepts of distributed deadlock handling and distributed mutual exclusion.
3. Analyze and apply various distributed scheduling algorithms and they will be able to understand distributed file system.
4. Analyze and apply 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**

Syllabus

Unit I:

Security goals, cryptographic attacks, services and mechanisms, Steganography.

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

Classical Encryption Techniques: Substitution ciphers, Transposition ciphers.

Unit II:

Components of modern Block ciphers, two classes of product ciphers.

Symmetric key ciphers: DES, Triple DES, IDEA, Blowfish, AES, Differential & linear cryptanalysis, Block cipher mode of operation.

Concept and Services provided by asymmetric -key cryptography.

Asymmetric key ciphers : 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, 3rd Edition MGH.*
2. Cryptography & Networks Security Principles & Practice : *William Stallings, 5th Edition, Pearson Education.*

Reference Books :

1. Network Security and Cryptography : *Bernard Menezes, 1st Edition, Cengage Learning*

Course Outcomes :

At the end of the course students will be able to

1. Demonstrate knowledge of Mathematics required for cryptography.
2. Design, Analyze and implement conventional and modern ways of providing computer security, to solve real world problems.
3. Examine and implement various standard security protocols.
4. Differentiate and examine different types of 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 Outcomes:

At the end of the course students will be able to

1. Design and implement conventional ciphers.
2. Implement Symmetric key ciphers.
3. Implement Asymmetric key ciphers.
4. Describe the design issues of various standard security protocols.

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**

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. Mobile Apps Development : *Anubhav Pradhan, Anil V. Deshpande, 1st Edition, Wiley India*
2. Android Application Development all in one for Dummies - *Barry Burd, 1st Edition, John Wiley & Sons*.

Reference Books :

1. Teach Yourself Android Application Development 24 Hours- *Lauren Darcy, 1st Edition, Pearson*.

Course Outcomes :

At the end of the course students will be able to

1. Describe the Mobility landscape and the issues there in.
2. Analyze the different aspects of Mobile apps development.
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. Apply the concepts of native hardware, location awareness, graphics and multimedia in building real world applications.
5. Test 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**

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. Fundamentals of Business Analytics : *R N Prasad, Seema Acharya, 1st Edition Wiley India, Edition*
2. Data Mining: Concepts and Techniques : *J.Han and M. Kamber, 3rd Edition, Morgan Kaufman publishers, Harcourt India pvt. Ltd.*

Reference Books :

1. Business Intelligence : *David Loshin, 2nd Edition, Morgan Kaufman publishers, Harcourt India pvt. Ltd.*
2. Business intelligence for the enterprise : *Mike Biere.*
3. Business intelligence roadmap : *Larissa Terpeluk Moss, Shaku Atre, Addison Wesley.*

Course Outcomes :

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

1. Classify 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, analyze and apply the 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**

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, 1st Edition, PHI .*
3. Fuzzy Sets Uncertainty and Information : *George Klir Tina Folger, 1st Edition, PHI .*

Reference Books :

1. Neural Networks and Fuzzy System : *B.Kosko, 1st Edition, PHI.*
2. Introduction to Soft Computing: *Samir Roy, Udit Chakraborty, 1st Edition, Pearson*

Course Outcomes :

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

1. Describe the basic concepts of Neurons, Neural Networks, types of learning.
2. Design and analyze intelligent machines through various kinds of training methodologies.
3. Apply basics of fuzzy logic, fuzzy rules, and problem solving techniques for real world scenarios.
4. Design a solution to real life problems by applying fuzzy logic and reasoning to handle uncertainty.
5. Design a solution to problem through fuzzy and Neural Networks.

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

Course Code: ITT409-4 **Course: Industry Elective-I**

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

Course Outcomes :

1. Demonstrate knowledge of domain as identified by industry.
2. Identify suitable tool to work in the domain identified.
3. Demonstrate the ability to work on the tool identified to solve real world problems.
4. Defend the knowledge acquired through seminars and viva voce.

ELECTIVE-IV

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

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

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. Enterprise Resource Planning : *Parag Diwan and Sunil Sharma, 1st Edition, PHI.*

Reference Books :

1. E Business and ERP: Transforming the Enterprise: *Grant Noris, James R. Hurley, Prce Waterhouse Coopee Publication.*
2. Class A ERP implementation : *Donald H. Sheldon, J. Ross Publishing.*

Course Outcomes :

At the end of the course students will be able to

1. Describe the structure of a typical ERP system.
2. Analyze and apply the process chains in materials management, production, controlling and sales in an ERP system.
3. Design, implement and customize an ERP system using appropriate modeling methods.
4. Apply customization on 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**

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, 1st Edition ,MGH
3. XML in action web technology: William J. Pardi, 1st Edition, PHI.
4. CGI Programming on the World Wide Web : Shishir Gundavaram , 1st Edition , O' Reilly Associates

Reference Books :

1. PHP 5 / MySQL Programming for the Absolute Beginner: *Andy Harris, 1st Edition, THOMSON Publication*
2. MYSQL : The Complete Reference : *Vikram Vaswani, 1st Edition, TMH*
3. www.php.net

Course Outcomes :

At the end of the course students will be able to

1. Design, develop and organize the web pages into website for different domains.
2. Apply the concepts of Socket and CGI.
3. Design and develop static and dynamic web pages using HTML.
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**

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, 1st Edition ,Cambridge University Press.*

Reference Book:

1. Information Retrieval: Implementing and evaluating search engines : *Stefan Büttcher, Charles L. A. Clarke, Gordon V. Cormack, 1st Edition, MIT Press.*

Course Outcomes :

At the end of the course students will be able to

1. Recognize the basic concepts and challenges in Information retrieval.
2. Demonstrate application of different scoring schemes and Information retrieval models.
3. Formulate data structures used in Information retrieval.
4. Demonstrate the basic principles for Web search.

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

Course Code: ITT410-4 **Course: Industry Elective-II**

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

Course Outcomes:

1. Demonstrate knowledge of domain as identified by industry.
2. Identify suitable tool to work in the domain identified.
3. Demonstrate the ability to work on the tool identified to solve real world problems.
4. Defend the knowledge acquired through seminars and viva voce.

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

Course Code ITP 411 **Course: Project Phase-II and Seminar-II**

L: 0 Hrs., T: 0Hr., P: 6 Hrs. Per week **Total Credits: 12**

Course Outcomes :

1. Demonstrate skills to work in a team.
2. Identify the area of project work and perform requirement analysis.
3. Select appropriate hardware and software tools for implementation.
4. Defend the project work through seminars and viva voce.
5. Develop project report.

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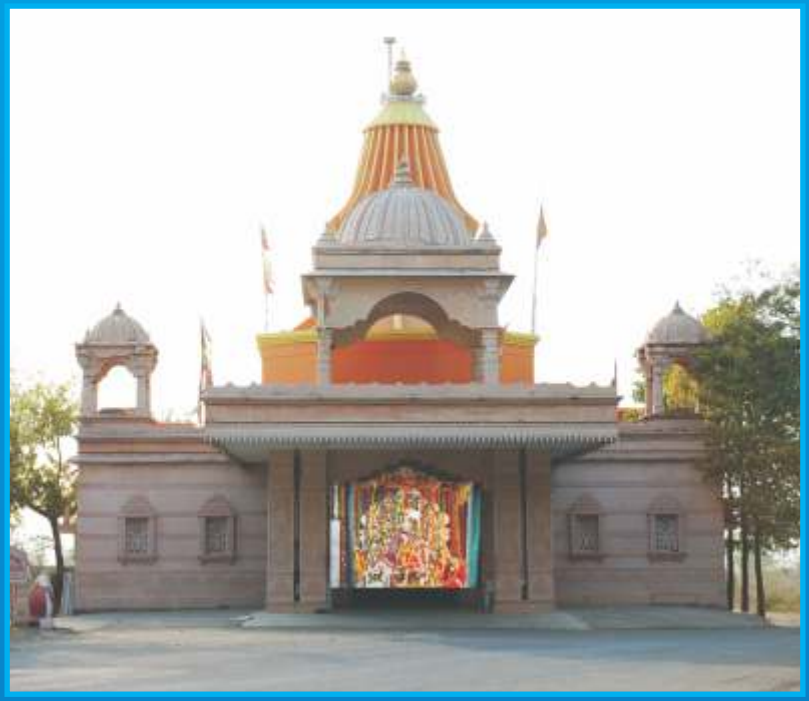

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