Baba Ghulam Shah Badshah University
Rajouri (J&K)-185131

Syllabus First to Eighth Semester
B. Tech. Degree Course

(2012-2016)

Department of Computer Science & Engineering
College of Engineering and Technology
School of Mathematical Sciences & Engineering
Baba Ghulam Shah Badshah University
Rajouri (J&K)-185131

Curriculum Structure

Semester–I

Theory Courses

Course Code	Title	Scheme of Examination				Hrs./Week		
		Duration (hrs)	IA	UE	Total Marks	L	T	P
CSE-121	Communication Skills	3	40	60	100	3	1	0
CSE-122	Mathematics-I	3	40	60	100	3	1	0
CSE-123	Computer Fundamentals	3	40	60	100	3	1	0
CSE-124	Basic Electronics	3	40	60	100	3	1	0
CSE-125	Engineering Mechanics	3	40	60	100	3	1	0
CSE-126	Engineering Drawing	3	40	60	100	3	1	0
Total			**240**	**360**	**600**			

Laboratory Course

CSE-131	Computer Fundamentals	2	25	25	50	0	0	2
CSE-132	Basic Electronics	2	25	25	50	0	0	2
CSE-133	Engineering Mechanics	2	25	25	50	0	0	2
CSE-134	Workshop Practice	2	50	-	50	0	0	2
Total			**125**	**75**	**200**			
Total (Theory + Lab)			**365**	**435**	**800**			

Semester – II

Theory Courses

Course Code	Title	Scheme of Examination				Hrs./Week		
		Duration (hrs)	IA	UE	Total Marks	L	T	P
CSE-221	Fundamentals of Mech. Engineering	3	40	60	100	3	1	0
CSE-222	Mathematics-II	3	40	60	100	3	1	0
CSE-223	C Programming	3	40	60	100	3	1	0
CSE-224	Basic Electrical Engineering	3	40	60	100	3	1	0
CSE-225	Engineering Physics	3	40	60	100	3	1	0
CSE-226	Engineering Chemistry &Env. Sciences	3	40	60	100	3	1	0
Total			**240**	**360**	**600**			

Laboratory Courses

CSE-231	C Programming	2	25	25	50	0	0	2
CSE-232	Basic Electrical Engineering	2	25	25	50	0	0	2
CSE-233	Engineering Physics	2	25	25	50	0	0	2
CSE-234	Engineering Chemistry &Env. Sciences	2	25	25	50	0	0	2
	Total		**100**	**100**	**200**			
Total (Theory + Lab)			**340**	**460**	**800**			

Semester-III

Theory Courses

Course Code	Title	Scheme of Examination				Hrs./Week		
		Duration (hrs)	IA	UE	Total Marks	L	T	P
CSE-321	Mathematics-III	3	40	60	100	3	1	0
CSE-322	Data Structures with C	3	40	60	100	3	1	0
CSE-323	Object Oriented Programming	3	40	60	100	3	1	0
CSE-324	Signals & Systems	3	40	60	100	3	1	0
CSE-325	Digital Electronics	3	40	60	100	3	1	0
CSE-326	Database Management System	3	40	60	100	3	1	0
Total			**240**	**360**	**600**			

Laboratory Courses

CSE-331	Data Structures with C	2	25	25	50	0	0	2
CSE-332	Digital Electronics	2	25	25	50	0	0	2
CSE-333	Database Management System	2	25	25	50	0	0	2
Total			**75**	**75**	**150**			
Total (Theory + Lab)			**315**	**435**	**750**			

Semester-IV

Theory Courses

Course Code	Title	Scheme of Examination				Hrs./Week		
		Duration (hrs)	IA	UE	Total Marks	L	T	P
CSE-421	Mathematics-IV	3	40	60	100	3	1	0
CSE-422	Microprocessor & Interfacing	3	40	60	100	3	1	0
CSE-423	Software Engineering	3	40	60	100	3	1	0
CSE-424	Operating Systems	3	40	60	100	3	1	0
CSE-425	Data Comm. & Computer Networks	3	40	60	100	3	1	0
CSE-426	Computer Graphics	3	40	60	100	3	1	0
Total			**240**	**360**	**600**			

Laboratory Courses

CSE-431	Microprocessor & Interfacing	2	25	25	50	0	0	2
CSE-432	Computer Graphics	2	25	25	50	0	0	2
CSE-433	Object Oriented Programming	2	25	25	50	0	0	2
Total			**75**	**75**	**150**			
Total (Theory + Lab)			**315**	**435**	**750**			

Semester-V

Theory Courses

Course Code	Title	Scheme of Examination				Hrs./Week		
		Duration (hrs)	IA	UE	Total Marks	L	T	P
CSE-521	Discrete Mathematics	3	40	60	100	4	0	0
CSE-522	Visual Programming	3	40	60	100	3	1	0
CSE-523	Principles of Programming Languages	3	40	60	100	3	1	0
CSE-524	Communication Systems	3	40	60	100	3	1	0
CSE-525	UNIX/LINUX & Shell Programming	3	40	60	100	3	1	0
CSE-526	Computer Organization & Architecture	3	40	60	100	3	1	0
Total			**240**	**360**	**600**			

Laboratory Courses

CSE-531	Visual Programming	2	25	25	50	0	0	2
CSE-532	Communication Systems	2	25	25	50	0	0	2
CSE-533	UNIX/LINUX & Shell Programming	2	25	25	50	0	0	2
Total			**75**	**75**	**150**			
Total (Theory + Lab)			**315**	**435**	**750**			

- A Minor Project will be allotted to each student/group of students at the end of semester V which has to be completed and shall be evaluated during semester VI.

Semester-VI

Theory Courses

Course Code	Title	Scheme of Examination				Hrs./Week		
		Duration (hrs)	IA	UE	Total Marks	L	T	P
CSE-621	Theory of Automata	3	40	60	100	4	0	0
CSE-622	Cryptography & Network Security	3	40	60	100	3	1	0
CSE-623	Java Programming	3	40	60	100	3	1	0
CSE-624	Design & Analysis of Algorithms	3	40	60	100	3	1	0
CSE-625	Management Information System	3	40	60	100	3	1	0
CSE-626	Internet & Web Technology	3	40	60	100	3	1	0
Total			**240**	**360**	**600**			

Laboratory Courses

CSE-631	Java Programming	2	25	25	50	0	0	2
CSE-632	Internet & Web Technology	2	25	25	50	0	0	2
CSE-633	Minor Project	2	25	25	50	0	0	2
Total			**75**	**75**	**150**			
Total (Theory + Lab)			**315**	**435**	**750**			

- At the end of semester VI students are required to attend an Industrial Training for6 weeks duration, during summer vacations in an Organization/Industry/Company. After the completion of training they have to prepare a detailed report of the training work which they have attended. Industrial Training shall be an essential component of curriculum to fulfill the eligibility criteria for appearing in semester VII university examination. The evaluation of Industrial Training shall be done during semester VII.

Semester-VII

Theory Courses

Course Code	Title	Scheme of Examination				Hrs./Week		
		Duration (hrs)	IA	UE	Total Marks	L	T	P
CSE-721	Fundamentals of Digital Image Processing	3	40	60	100	3	1	0
CSE-722	Entrepreneurship Development Management	3	40	60	100	3	1	0
CSE-723	Computer Based Numerical Techniques	3	40	60	100	3	1	0
CSE-724	Major Project-Phase I	-	100	-	100	-	-	-
	Elective-I	3	40	60	100	3	1	0
	Elective-II	3	40	60	100	3	1	0
Total			**240**	**360**	**600**			

Laboratory Courses

CSE-731	Fundamentals of Digital Image Processing	2	25	25	50	0	0	2
CSE-732	Computer Based Numerical Technique	2	25	25	50	0	0	2
CSE-733	Industrial Training	-	50	-	50	0	0	2
Total			**100**	**50**	**150**			
Total (Theory + Lab)			**340**	**410**	**750**			

- During semester VII every student shall be allotted a Major Project-Phase I under the supervision of an allotted mentor. Students are required to do preliminary exercise of survey of literature and preparation of a road map of the selected Project under the supervision of their allotted mentor. Major Project- Phase I is to be completed during semester VII and shall be evaluated internally as per university statutes by a committee consisting of:

  i) Head of the Department
  ii) One member nominated by Principal
  iii) Coordinator(s)/Supervisor(s)/Mentor(s) of project

Elective Papers in VII semester:

- Students will be required to opt for two elective papers from CSE-741 to CSE-752.
- The choice of electives will rest with the students. However, in no case will the department run more than two subjects for one elective paper.

Electives-I & II

CODE	SUBJECT	CODE	SUBJECT
CSE-741	Distributed Computing	CSE-746	Expert Systems
CSE-742	Grid Computing	CSE-747	Distributed Database System
CSE-743	Advanced Computer Architecture	CSE-748	Neural Networks
CSE-744	Compiler Design	CSE-749	Display System Engineering
CSE-745	Pattern Recognition	CSE-750	Optical Communication
CSE-751	Advanced Java	CSE-752	.Net Technologies

Semester-VIII

Theory Courses

Course Code	Title	Scheme of Examination				Hrs./Week		
		Duration (hrs)	IA	UE	Total Marks	L	T	P
CSE-821	Major Project-Phase II	-	250	200	450	-	-	-
	Elective-III	3	40	60	100	3	1	0
	Elective-IV	3	40	60	100	3	1	0

Elective Papers in VIII semester:

- Students will be required to opt for two elective papers from CSE-831 to CSE-842.
- The choice of electives will rest with the students. However, in no case will the department run more than two subjects for one elective paper.

Electives-III & IV

CODE	SUBJECT	CODE	SUBJECT
CSE-831	Embedded Systems	CSE-836	Multimedia
CSE-832	Artificial Intelligence	CSE-837	Wireless Networks
CSE-833	Advanced Microprocessors & Microcontrollers	CSE-838	Disaster Management
CSE-834	Bio-Informatics	CSE-839	Real Time Operating Systems
CSE-835	Data Mining and Data Warehousing	CSE-840	Principles of Marketing & Management
CSE-841	Cloud Computing	CSE-842	System Software

- After completing the Major Project-Phase I in semester VII the students are required to complete the Major Project- Phase II during semester VIII. Depending upon the infrastructure, computing and other laboratory facilities the students shall be offered in house project on campus or they can complete their project work in any organization/industry outside the campus. Major Project- Phase II shall be evaluated as per university statues.

- For each theory course the assessment pattern will be as shown in table 1.

Table 1: Distribution of Weightage for theory courses of 100 marks.

Continuous Assessment		University Examination	
Component	**Weightage**	**Component**	**Weightage**
Cyclic Test 1	10	Written Examination	60
Cyclic Test 2	10		
Assignment 1	05		
Assignment 2	05		
Attendance	10		
Total	**40**		**60**

- For laboratory courses the assessment pattern will be as shown in table 2.

Table 2 Distribution of Weightage for laboratory courses of 50 marks.

Continuous Assessment		University Examination	
Component	**Weightage**	**Component**	**Weightage**
Continuous assessment of practical work, timely submission of lab records.	15	Lab experiment/procedure/ writing /tabulation/innovation as applicable	15
Test	10	Viva Voce	10
Total	**25**		**25**

Semester I

Course Title: Communication Skills **Max Marks: 100**
Course Code: CSE-121 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: In this world of globalization English language is the first and foremost criteria to acquire job in reputed companies .This course is designed to hone the soft skills of students to make them proficient in English Language(writing & speaking).

Unit–I
Communication: Scope & importance of communication, types of communication, barriers of communication and techniques to improve communication, presentations, group discussions, seminars.

Unit-II
Phonetics: Speech mechanism, organs of speech**,** phonetic transcription, effective speaking.

Unit-III
Applied Grammar: Articles, prepositions, modal auxiliaries, verbs, antonyms, and synonyms, précis writing, paragraph writing.

Unit-IV
Recruitment and employment Correspondence: Applications, curriculum Vitae, letter of acceptance, letter of rejection, resignation, reference, interview.

Unit-V
Business Correspondence: Memorandum, Notices, Agendas, Meetings and Minutes, sales letters, enquiries, claims, adjustment letters.

Course Outcomes: Upon the completion of the course, the students will be able:

1. To acquire basic proficiency in English including reading, listening comprehension, writing and speaking skills.
2. To make the students authoritative in self-expression in their day to day life in this fast-changing world.
3. To identify the common errors involved in writing.
4. To understand the nature and style of sensible writing.
5. To write effective and coherent paragraphs.

Text Books:

1. **Lesikar R.V**. and **Pettit Jr.** Business Communication Theory and Applications,Irwin, 2002 Ed.
2. **Bansal R. K. & Harrison J. B.,** Spoken English, Orient Longman Hyderabad

References:

1. **Gimson A. C.,** An Introduction to the Pronunciation of English, ELBS (YP).
2. **Pal Rajendra** and **Korlhalli, J. S.** Essentials of Business Communication , Sultan C hand &Sons 2007
3. **Rayudu, C. S**. Media and Communication Management, Himalaya Publishing House.

Note for paper setter: The question paper comprises 10 questions. Two questions shall be set from each unit. The students have to attempt five questions, selecting one from each unit.

Semester I

Course Title: Mathematics-I **Max Marks: 100**
Course Code: CSE-122 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The course is designed to provide basic knowledge of Complex Trigonometry,Calculus and Algebra to the engineering students.

Unit-I

Complex Trigonometry : Review of algebra of complex numbers, De"Moiver"sTheoremand its application, Exponential and Circular functions of a complex variable, Hyperbolic and Inverse hyperbolic functions, Logarithmic function of a complex variable, Summation of series- C+iS method.

Unit-II

Differential Calculus: Successive differentiation and Leibnitz"s theorem, Functions of more than one variable and partial differentiation, Geometrical and physical significance of partial derivatives, Homogenous functions and Euler"s theorem, Taylor"s and Maclaurin"s series of function of one and two variables, Expansion of functions, Maxima and Minima of two variables and Lagrange"s multipliers.

Unit-III

Integral Calculus: Definite Integral and their properties, Differentiation under integral sign, Gamma, Beta and Error functions. Transformation of Cartesian co-ordinates into polar, spherical and cylindrical co-ordinates, Multiple integrals, Change of order of integration and applications to simple problems.

Unit-IV

Ordinary Differential Equations: Differential equations of first order and first degree and their solution of the types: equations where variables are separable, Homogenous equations, Linear equations, Exact equations and equations reducible to the above forms, Higher order linear differential equation with constant co-efficient, Solutions of equations reducible to linear equations with constant co-efficient, Cauchy"s homogenous linear equation and Legendre"s linear equation, Applications of ODEs to simple problems of physical sciences and Engineering.

Unit-V

Sequence and Series: Convergence and Divergence of sequences and series, Comparison test, D"Alembert"s ratio test and Cauchy"s root test, Alternating series, Leibnitz"s rule, Conditionally and absolute convergence.

COURSE OUTCOMES: Upon the successful completion of the course, the student will be able to:

1. Understand the basic complex trigonometry concept and apply the correct procedure to solve the problems
2. Comprehend the consequences Euler's theorem, Taylor's and Maclaurin's series of function of one and two variables. They also identify the extrema of a function on an interval and apply the maxima and minima optimization techniques to basic engineering problems
3. Apply the concept and principles of integral calculus to solve geometric and physical problems.
4. Solve the different kinds of ordinary differential equations (ODEs) and apply these ODEs to formulate basic mathematical models in engineering.
5. Comprehend some techniques for testing the convergence of sequences and series and applying them to various engineering problems.

Text Books:

1. **Grewal B.S.,** Higher Engineering Mathematics.
2. **Narayan Santi**, Differential Calculus.

Reference Books:

3. **Narayan Santi**, Integral Calculus.
4. **Ross S. L**., Differential Equations.
5. **Piaggio H.T. H**., Differential Equations and its Applications.

Note for Paper Setter: -The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit. Use of calculator is allowed in the examination

Semester I

Course Title: Computer Fundamentals **Max Marks: 100**
Course Code: CSE-123 **University Examination:60**
Duration of Exam: 3 hours **Internal Assessment:40**

Objective: The course is designed to provide basic knowledge of Computing concepts, operating system concepts and to train students in using common computer software applications.

Unit-I

Introduction: History of Computers, Generations of Computers, Classification of Computers, Application of Computers, Computer Hardware, Input, and Output devices. Memory Hierarchy, RAM, ROM, PROM and types, Secondary memory, working of a Hard Disk and its types.

Unit-II

Software and Languages: Computer Software, System and Application Software, BIOS, POST, Booting Process, Virus, WORM, and Trojans.

Programming Languages, Generations of Languages, Compilers, Assemblers, Machine Language and Assembly Language. Introduction to algorithm and Flow chart: Representation of an algorithm, flowchart symbols and levels of flow chart, rules, advantage and limitations of flowchart and pseudo code.

Unit-III

Data Representation, Number System: Binary, Decimal, Octal and Hexadecimal number systems, Inter conversion of number system, 1"s compliment, 2"s compliment, 9"s compliment, n"s compliment. Logic Gates, Boolean algebra, alphanumeric representation, fixed point representation.

Unit-IV

Booting process details of Dos and Windows: DOS system files, Internal and External Commands, Difference between External and Internal Commands. Internal Commands: MD, CD, RD, COPY CON, TYPE, DATE & TIME, VOLUME VERSION, REN, PROMPT, CLS, DIR/P/W, COPY , DEL External commands: FORMAT, DISKCOPY, DISKCOMP, XCOPY, CHKDISK, SCANDISK, HELP, DEBUG, PRINT. Creation of Batch Files.

Unit-V

Introduction to Computer networks: Applications, types of computer networks, Peer-to-Peer Networks, Client Server Networks, Centralized and Distributed Systems, Internet, Intranet, Extranet, email, ISPs.

Course Outcomes:

1. Know the basic components of the computer and working of each device.
2. Understand the functions of Operating System and softwares.
3. Understand the representation of data in computer.
4. Understand the booting process and several DoS Commands.
5. Know the fundamentals of Computer Networking

Text Books:

1. **Peter Norton**, Introduction to Computers, TMH.
2. **Sanjay Toledo Mata**, A First Course in Computers, TMH.

Reference Books:

1. **Rajaraman,** Introduction to Digital Computer Design, Prentice Hall India.
2. **Bartee, Thomas,** Digital Computer Fundamentals, TMH.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Semester I

Course Title: Basic Electronics **Max Marks: 100**
Course Code: CSE-124 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: This course aims to provide students with solid background of semiconductors and some basic solid state electronic devices used in circuits.

Unit-I

Semiconductors: Classification, semiconductor bonds, Energy band description, Semiconductor types, Energy band diagram for Semi conductors, Drift and Diffusion Current, Mobility of Charged particles, Current density and Conductivity, Conductivity of Semi conductors, Hall Effect.

Unit-II

Introduction to p-n Junction: Current components in p-n junction, Diodes and Characteristics, temperature dependence, equivalent circuits. Rectifiers, half wave, full wave rectifiers, bridged rectifiers (efficiency, ripple factor). Clipping and clamping circuits. Basic operations of Zener, Avalanche and Photo Diodes.

Unit-III

Transistors: Types of transistors, operation & characteristics, CE, CB and CC configurations, Input output characteristics and graphical analysis of basic amplifier circuits, biasing and bias stability, use of transistor as a switch.

Unit-IV

Field Effect Transistors: Operation and characteristics. JFET, MOSFET, types of MOSFET, operation and characteristics of JFET and MOSFET, biasing of JFET and MOSFET. Introduction to feedback, Types of feedbacks, Sinusoidal Oscillators, Hartley, Collpitts and Phase Shift oscillators (transistor version only and no derivation).

Unit-V

Biasing Techniques and biasing stability (BJT/FET):- Need for biasing, operating point, load line analysis, fixed bias configuration, emitter bias configuration, voltage divide bias configuration analysis of these biasing techniques , and bias stability.

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

- Describe the energy bands and the scientific principles behind controlled conductivity in semiconductors.
- Analyze the working of PN junction diode and apply diode in various applications such as rectifiers and other wave shaping circuits.
- Analyze the working of the traditional transistor BJT and as well as the concept of biasing.
- Understand the operation of MOSFET and various issues of scaling in MOSFET.
- Design basic analog circuits

Text Books:

1. **Millman & Halkias**, Electronic Devices & Circuits, TMH
2. **Boylestad** and **Nashelky,** Electronic Devices & Circuits, PHI.

Reference Books:

1. **Floyd T. L.,** Electronic Devices, Pearson Education.
2. **Theodore Bogart Jr**., Electronic Devices & Circuits, Pearson Education.
3. **Mehta V. K.**, Electronic Devices, S. Ch and and Sons, New Delhi

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit

Semester I

Course Title: Engineering Mechanics **Max Marks: 100**
Course Code: CSE-125 **University Examination:60**
Duration of Exam: 3 hours **Internal Assessment:40**

Objective: The course introduces students to the analysis of dynamic and static systemsencountered in engineering design practice.

Unit-I

Two Dimensional force System: Basic Concepts, principal of transmissibility, resultant of a force System, free body Diagrams, Equilibrium and equation of equilibrium Applications. Moment of a force about a point, varrigon theorem friction, law of friction, equilibrium of body lying on horizontal and inclined plane. Ladder friction applications.

Unit-II

Members forces in trusses: planer truss structure, trust joint identification, strategy for planer truss analysis. Statical determinacy and stability of planer trusses. Numerical truss analysis (Method of joints and method of selection)

Unit-III

Kinematics of particles: Velocity and acceleration in rectilinear motion along a plane and curved path. Tangential and normal components of velocity and acceleration motion curves. Kinematics of rigid bodies rotation, absolute motion, relative motion.

Unit-IV

Introduction to centroid and centre of gravity: Centroid and moment of inertia; centroid of plane area and solid bodies. Moment of inertia of plane area. Theorem of parallel axis, Theorem of perpendicular axis, radius of gyration, composite ideas.

Unit-V

Analysis of stress and strains: Forces and stress normal stress and strain under axialloading, ultimate and allowable stresses, mechanical properties, Hooke"s law, modulus of elasticity. Factor of safety, deformation of members under axial loading, thermal stresses, Poisson"s ratio multi axial loading, bulk modulus, shearing Strain, Relation among shear modulus, Young"s Modulus and Bulk Modulus.

Course Outcome: Upon successful completion of the course, student should be able to:

- Use scalar and vector analytical techniques for analyzing forces in statically determinate structures
- Understand basic kinematics concepts – displacement, velocity and acceleration (and their angular counterparts);
- Understand basic dynamics concepts – force, momentum, work and energy;
- Understand and be able to apply Newton's laws of motion;
- Learn to solve dynamics problems. Appraise given information and determine which concepts apply, and choose an appropriate solution strategy;

Text Books:

1. **S. Ramamrutham,** Strength of Materials, Dhanpal Rai & Co,.

Reference Books:

1. **R. K. Bansal,** Engineering Mechanics and Strength of Materials, Laxmi Publication.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Semester I

Course Title: Engineering Drawing **Max Marks: 100**
Course Code: CSE-126 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The course is designed to develop the ability to visualize and communicate three-dimensional shapes and train the students to create drawings following the engineering graphics conventions.

Unit-I

Introduction to Engineering Graphics: Engineering drawing as language of Engineers .Drawing instruments and their uses. **Projections**: The planes of projections, first and third angle projections, projection of points lying in any quadrant. Scale: needs and importance, to find representative factor of a scale, drawing of simple and diagonal scales.

Unit-II

Projection of straight line and their traces: projection of planes. Planes parallel to reference plane; plane perpendicular to both reference planes; planes perpendicular to one and inclined to other reference plane. Projection of solids with their axes perpendicular or inclined to one reference plane but parallel to other.

Unit-III

Section of Solids & Development of surfaces: Definition of sectioning and its purpose, Procedure of sectioning, Illustration through examples, types of sectional planes. Purpose of development, Parallel line, radial line and triangulation method, Development of prism, cylinder, cone and pyramid surface for both right angled and oblique solids.

Unit-IV

Orthographic Projections: Theory of orthographic projections (Elaborate theoretical instructions) Drawing 3 views of given objects (Non symmetrical objects and blocks may be selected for this exercise) Exercises on both first angle are third angle.

Unit-V

Isometric Projection: Classification of pictorial views, Basic Principle of Isometric projection, Difference between isometric projection and drawing, Isometric projection of solids such as cube, prism, pyramid and cylinder.

Course Outcomes: On completion of course, the students will be able:

1. To understand Engineering Drawing, so that the execution of construction work can be made easy and efficient.
2. To represent three dimensional objects by two dimensional views.
3. Students must be in a position to show hidden details of objects or under ground Constructions work by drawing sectional views.
4. Exposure to creating working drawings
5. Exposure to isometric projections in order to visualize aspects of engineering design.

Text Books:

1. **Bhat, N. D. and Panchal, V. M.**, Engineering Drawing, Charotar Publishers, Anand.
2. **Narayana, K. L. &Kannaiah, P.**, Engineering Graphics, TMH, New Delhi.

Reference Books:

1. **Gill P. S.,** Engineering Graphics and Drafting, Katria and Sons, Delhi.
2. **Luzzadde Warren J**., Fundamentals of Engineering Drawing, PHI.

Note for paper setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one from each unit. Question will be set accordingly so that student can be able to answer 5 questions within 3 hours.

Semester I

Course Title: Computer Fundamentals Lab **Max Marks: 50**
Course Code: CSE-131 **University Examination: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

Note: A student is required to undergo training in the following areas:

1. Introduction to Windows.
2. MS-Office software.
3. Create, save, retrieve text file.
4. Spreadsheet program- Create, manage, and manipulate numeric data
5. Presentation software – Create presentations
6. DOS: Internal, external commands.
7. Introduction to the components of a PC.
8. Assembling of a PC.
9. Basic trouble shooting of a PC.
10. Software Installation (both system and application software"s).

Lab Outcomes: Upon the completion of course, the students will be able to:
1. Working on various Operating Systems and their usage
2. Understand and use MS-Office to create documents
3. Understand the basic DoS Commands
4. Recognize Hard Ware components and their assembly
5. Install Operating system on Hardware

Note: These are only the suggested list of experiments. Instructor may add or change some practical relevant to the course contents

Semester I

Course Title: Basic Electronics **Max Marks:50**
Course Code: CSE-132 **University Exam:25**
Duration of Exam: 2 hours **Internal Assessment:25**

List of Experiments:

1. To determine and plot operating characteristics of a PN junction diode
2. To study the input / output waveforms of Half wave and bridge wave rectifiers
3. To suppress the ripple in rectifiers using RC filters.
4. To study the clipper and clamper circuits.
5. To study the Zener characteristics and its application as voltage regulator
6. To plot characteristics of transistor in CE/CB configuration
7. To plot characteristics of a BJT.
8. To plot MOSFET characteristics.
9. To study frequency response of RC Coupled Oscillators.

Lab Outcomes:

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

1. Determine the characteristics of PN Junction and Zener diode.
2. Design various rectifiers configuration and evaluate its various performance parameters.
3. Design and analyze various wave shaping circuits.
4. Determine the characteristics of a BJT and MOSFET
5. Design and analyze the frequency response of RC Coupled Oscillators

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester I

Course Title: Engineering Mechanics **Max Marks: 50**
Course Code: CSE-133 **University Examination: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of Experiments:

1. To conduct tensile test and determine the ultimate tensile strength, percentage elongation and reduction.
2. To conduct the compression test and determine the ultimate compressive strength for a specimen.
3. To determine centroid of Lamina.
4. To determine the hardness of a given specimen using vicker/brinel/Rockwell hardness testing machine.
5. To very Lami"s theorem.
6. To verify polygon law of forces.
7. Friction experiment on inclined plane.
8. Experiment on screw Jack.
9. To verify reactions at the supports of a simply supported beam.
10. To determine moment of inertia of various shapes.

Lab Course Outcomes: After the completion of lab course students will be-

1. Able to understand different engineering mechanics apparatus.
2. Able to understand the mechanical properties of materials.
3. Able to understand the moment of inertia of various shapes.
4. Get the practical idea of frictional forces.
5. Get working principle of screw jack.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester I

Course Title: Workshop Practice **Max Marks:50**
Course Code: CSE-134 **University Examination: 0**
Duration of Exam: 2 hours **Internal Assessment:50**

Carpentry Shop:

- Study of tools & operations and carpentry joints
- Simple exercise using jack plane
- To prepare half-lap corner joint, mortise & tennon joints
- Simple exercise on woodworking lathe.

Fitting Shop:

- Study of tools & operations
- Simple exercises involving fitting work
- Make perfect male-female joint
- Simple exercises involving drilling/tapping/dyeing

Smithy Shop:

- Study of tools & operations
- Simple exercises base on black smithy operations such as upsetting, drawing down, punching, bending, fullering & swaging

Welding Shop:

- Study of tools & operations of Gas welding & Arc welding
- Simple butt and Lap welded joints
- Oxy-acetylene flame cutting

Sheet-Metal Shop:

- Study of tools & operations
- Making Funnel complete with „soldering“
- Fabrication of tool-box, tray, electric panel box etc

Machine Shop:

- Study of machine tools and operations
- Plane turning
- Step turning
- Taper turning
- Threading
- Single point cutting tool grinding

Foundry Shop:

- Study of tools & operations
- Pattern making
- Mould making with the use of a core.
- Casting

Course Outcomes:

Upon completion of this laboratory course,

1. Students will get knowledge of basic tools used in carpentry and will be able to make basic wooden joints.
2. Students will be able to fabricate components with their own hands.

3. They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
4. Students will be able to make different typed of geometrical shapes by using sheet metal using different types of joints in sheet metal shop.
5. Students shall be given full exposure the permanent fastening using different types of welding.

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents

Reference Books:

1. **Kapoor V**. Work Shop Practice.
2. **Raghuwanshi B. S.,** Workshop technology.
3. **Bawa H. S.,** Workshop practice.
4. **Gupta, B. R.,** Production Technology.

Semester II

Course Title: Fundamentals of Mechanical Engg. **Max. Marks: 100**
Course Code: CSE-221 **University Exam: 60**
Duration of Exams: 3 hours **Sessional Assessment: 40**

Unit-I

Basic concept of thermodynamics: Introduction, States, Work, Heat, Temperature, Zeroth, first, second and third law of thermodynamics, Concept of internal energy, enthalpy and entropy. Numerical problems.

Unit-II

Properties of Steam & Steam Generator Formation of steam at constant pressure, Thermodynamic properties of Steam, Use of steam tables, Measurement of dryness fraction by throttling calorimeter.

Unit-III

Refrigeration & Air conditioning: Introduction to refrigeration and air -conditioning, Rating of refrigeration machines, Coefficient of performance, Simple refrigeration vapour compression cycle, Psychometric charts and its use, Human comforts.

Unit-IV

Hydraulic Turbines & Pumps: Introduction, Classification, Construction details and working of Pelton, Francis and Kaplan turbines, Specific speed and selection of turbines, Classification of water pumps and their working.

Unit-V

Motion, Power Transmission Methods and Devices: Rotational motion, angular velocity and rotational work & power. Introduction to Power transmission, Types of gears, power in gear set, Belt, Rope, Chain and Gear drive. Types and functioning of clutches.

Course Outcomes:
After completion students will be able:

1. To acquire knowledge about the fundamentals of thermodynamic laws, concepts and principles.
2. To understand the principles of refrigeration and conditioning.
3. To acquire knowledge about the principles of Hydro turbines and pumps, their construction, way of functioning and the flow process that take place In these machines.
4. To learn about the mechanics of power transfer through belt,rope,chain,clutch end gear drive.
5. To learn how to use steam table to solve the numerical problems in a shortcut method.

Recommended Books:

1. Rajput R. K., Elements of Mechanical Engineering, Lakshmi Pub., Delhi
2. Kumar D.S., Elements of Mechanical Engineering, S.K. Kataria and Sons
3. Nag P.K. Engineering Thermodynamics, TMH, New Delhi
4. Arora &Domkundwar, Refrigeration & Air-conditioning, Dhanpat Rai& Co. Pvt Ltd
5. Ryder G.H., Strength of Materials, ELBS Publication

6. Modi and Seth, Hydraulic and Fluid Mechanics, Standard Book House, Publication, New Delhi
7. Arora C.P., Engineering Thermodynamics, TMH, New Delhi
8. Arora C.P., Refrigeration & Airconditioning, TMH, New Delhi
9. Ostwald, Munoz, Manufacturing Process and Systems, John Wiley, India

Note for paper setter: The question paper shall comprise of 10 questions. Two questions shall be set from each Unit. The students have to attempt five questions, selecting one from each Unit.

Semester II

Course Title: Mathematics-II **Max. Marks: 100**
Course Code: CSE-222 **University Exam: 60**
Duration of Exams: 3 hours **Sessional Assessment: 40**

Objective: The course is designed to provide basic knowledge of Partial Differential,Fourier and Vector Analysis to engineering students.

Unit-I

Partial Differential Equations: Partial differential equations and its formation, Linear and non-linear partial differential equations of first order and their solutions, Charpit"s method, Homogenous and non-homogenous linear partial differential equations with constant coefficients and their solutions.

Unit-II

Applications of Partial Differential Equations: Applications of Partial Differential Equations with initial and boundary conditions, Solution by the method of separation of variables, Partial differential equations of physical sciences and Engineering and their solution viz: vibration of a stretched string, wave equation, heat flow and electric transmission lines in one dimension, Two dimensional heat flow and Laplace"s Equation.

Unit-III

Fourier series and Practical Harmonic Analysis: Periodic functions, Fourier series and Euler"s formulae, Expansion of periodic functions in Fourier series, conditions for a Fourier expansion, Functions having points of discontinuity, Change of Interval, Expansion of even and odd functions, Half range series, Parseval"s formula, Complex form of Fourier series and practical harmonic analysis.

Unit-IV

Vector Space and Matrices: Introduction to vector spaces, linear independence and dependence of vectors, subspaces, basis and dimensions. Rank of a matrix, Elementary transformation of a matrix, Inverse of a matrix, Normal form of a matrix, Characteristic equation, Eigen value and Eigen vectors, properties of Eigen values, Caley-Hamilton theorem, Diagonalization of matrices, Orthogonal, Symmetry, Unitary, Hermitian and Skew-Hermitian matrices.

Unit-V

Vector Analysis: Scalar and vector products of three and four vectors. Scalar and vector fields, Gradient of scalar field, Divergence and Curl of vector field. Line, Surface and Volume Integrals. Theorems of Green, Stoke, Gauss of Vector analysis.

Course Outcomes:
Upon completion of this course, the students will be able to:

1. Acquire the knowledge of partial differential equations (PDEs) and solve both linear and non-linear PDEs.
2. Apply differential equation equations in solving the problems in heat flow, wave equations and electric transmission line in three dimensions.
3. Understand the Fourier series representation of a function of one variable and find solution of the wave, diffusion and Laplace equations using the Fourier series.
4. Learn the essential tools of matrices and linear algebra in a comprehensive manner.

5. Explain physical meaning of curl and divergence in terms of fluid flow and recognize the statements of Green's, Stokes' and Divergence theorem and understand the applications of these theorems in physics and engineering problems.

Text Books:

1. **B. S. Grewal,** Higher Engineering Mathematics, Khanna Publication, 40thEd.
2. **Piaggio H.T. H.,** An Elementary Treatise on Differential Equations, Barman Press.

Reference Books:

1. **Weatherburn C. E.,** Vector Calculus, Ellis Horwood Publication.

Note for paper setter: The Question paper shall comprise of 10 questions. Two each questions will be set from unit. The student has to attempt five questions at least one from each unit.

Semester II

Course Title: C Programming **Max Marks: 100**
Course Code: CSE-223 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To enhance the logical skills of students with the basic programming concepts and implementation in C.

Unit-I

Introduction to C Programming: History of C, Structure of a C Program, Compiling &Executing a C program. Flow Charts, Constants, Variables and Data Types, Operators and Expressions, Data Input and Output.

Unit-II

Control Statements: Decision making and branching, IF statement, IF-ELSE statement, nested IF-ELSE statement, Switch statement, break statement, continue statement. Decision making and Looping, while statement, do-while statement, for statement.

Unit-III

Functions: Types of functions, function declaration, calling a function, passing arguments to functions, return values and their types, nesting of functions, recursion.

Unit -IV

Introduction to arrays: One dimensional arrays, Two dimensional arrays and Multidimensional arrays, basic operations on arrays, arrays and strings, basic string operations. Introduction to Unions, Structures and enumerated data types.

Unit-V

Introduction to Files & Pointers: Operations on pointers, pointers & multi dimensional arrays, pointers & character strings. Dynamic Memory Allocation in C: malloc, calloc, realloc and free functions. Operations on files like open, close, read and write.

Course Outcomes:

The student will be able:

1. To understand the basic constructs of C programming.
2. To solve the problems using control statements.
3. To decompose a problem into functions and synthesize a complete program.
4. To use various types of arrays and user defined data types
5. To use pointers and files to perform several operations.

Text Books:

1. **Balaguruswamy**, Programming in ANSI C, TMH.
2. **YashwantKanitkar**, Let us C, TMH.

Reference Books:

1. **Gottfried, Programming** with C, TMH.
2. **Venugopal,** C Programming, TMH.
3. **Yashwant Kanitkar,** Pointers in C, TMH.

Note for paper setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Semester II

Course Title: Basic Electrical Engineering **Max Marks: 100**
Course Code: CSE-224 **University Examination: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of the course is to impart the knowledge of basic principles of Electrical Engineering and its applied aspects.

Unit-I

Review of Electric Circuit Laws and Energy Sources: Basic Electrical circuit terminology, concept of charge and energy, circuit parameters (resistance, inductance & capacitance), Ohm`s law, Kirchhoff`s current law, Kirchhoff`s voltage law, series and parallel combinations of resistance, inductance & capacitance. Ideal and practical voltage, current sources and their transformations, dependent voltage and current sources.

Unit-II

D.C. Circuit analysis: Power & energy relations, analysis of series parallel DC circuits, Star Delta transformations (Δ'Y), Loop & Nodal methods, Network Theorems: Thevenin"s, Norton"s, maximum power transfer and superposition theorems.

Unit-III

Electromagnetism: Review of Fundamentals of Electromagnetism, Ampere"sLaw, analogies between electric circuits and magnetic circuits, Faraday"s laws of electromagnetic induction, direction of induced emf, Lenz"s law, magnetic saturation and leakage fluxes.

Unit-IV

A.C. Circuit analysis: Basic terminology and definitions, phasor and complex number representations, power energy relations in AC circuits, application of Network Theorems to AC circuits ,Resonance in series and parallel circuits, Concepts of active & reactive powers, Introduction to 3 phase circuits.

Unit-V

Transformers: Concept of Inductance, Self & Mutual Inductance, Conventions for magnetically coupled circuits, Transformers: introduction, classification & construction of single phase transformer, emf equation and phasor diagrams.

Course Outcomes:

At the end of this course, students will demonstrate the ability

1. To understand the concepts and applications of different laws used in the Networks and circuits.
2. To study and analyze the D.C. Circuit with different theorem.
3. To study the concepts related to electromagnetism.
4. To study and analyze the A.C. Circuits.
5. To understand the principle and working of transformers.

Text Books:

1. **David Bell**, Electrical Engineering Principles. PHI.
2. **Vincent Del Toro**, Electrical Engineering Principles, PHI.

Reference Books:

1. **Cotton H.,** Electrical Technology.
2. **Gupta B.R.,** Principles of Electrical Engineering.

Note for Paper Setter: The Question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit

Semester II

Course Title: Engineering Physics **Max Marks: 100**
Course Code: CSE-225 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The course is designed to acquaint the students with ultrasonic, acoustics, atomic physics, their applications and electromagnetic waves.

Unit-I

Wave Motion & Introduction to Acoustics: Longitudinal and transverse waves, transfer of energy, momentum and Intensity. Impedance offered by a string. Introduction to ultrasonic waves, magnetostriction and piezoelectric effect, productions of ultrasonic waves and their applications. A brief introduction to acoustics, Reverberation and Time of Reverberation, Sabine`s Formula for Reverberation Time (qualitative treatment only). Simple related numerical problems.

Unit-II

Atomic & Molecular Physics-I: Uncertainty principle, matter waves and their characteristics properties, de-Broglie wave hypothesis and its experimental verification, photo-electric effect and Compton Effect. Bohr`s quantization condition. emission& absorption spectra. Introduction to Zeeman, Paschenback and Raman`s effects.

Unit-III

Atomic & Molecular Physics-II: Wave Function, Its physical significance, limitations imposed on wave function. Schrodinger`s time dependent and time independent wave equations and its application to one dimensional problems. Potential steps, Potential barrier, infinite potential well and simple harmonic oscillator.

Unit-IV

Lasers: Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation,Meta-stable State, Population Inversion, Lasing Action, Einstein`s Coefficients and
Relation between them, Helium-Neon Laser, Ruby Laser, Applications of Lasers.

Unit-V

Electromagnetic Waves: Concept of Electric Field and Potential, Polarization of di-electrics, Guass`s law and its applications to uniformly charged hollow sphere, uniformly charged plane sheet and cylinder, Electro Static Energy, Lorentz Force, Integral and differential Amperes law, Brief introduction to Maxwell`s Equations.

COURSE OUTCOMES:

After the completion of the course:

1. The students will be able to explain the importance of Applied Physics in describing the technology, we are using today in different engineering fields.
2. The acquired knowledge of Waves, Vibration and acoustics will help the students to design or develop acoustically good infrastructure
3. Students will be able to use the acquired knowledge of basic Quantum Mechanics for further research applications as it can be applied to any quantum mechanical problem.
4. Students now can explain different modes of excitation involved in the working of various lasers, can answer which laser would best meet the need for an industrial or research task and have awareness regarding the safety responsibilities involved during the working with lasers.

Text Books:

1. **Pathania K. S.** &**Khera S. K.**, Waves and Vibration.
2. **Beiser**, **Arthur**, Concepts of Modern physics, TMH.

Reference Books:

1. **Ghatak A. K., Dass P.,** Laser theory & application of ultrasonic waves.
2. **David J. & Cheek**, Fundamentals and application of ultrasonic waves.
3. **Avadhanulu M. N. &Khsirsagar P. G.,** Engineering Physics (S. Chand & Co.)
4. **Vijaya K. K., Chandralingam S.**, Modern Physics, S. Chand & Co. Ltd, New Delhi

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Semester II

Course Title: Engineering Chemistry & Env. Sc. **Max Marks: 100**
Course Code: CSE-226 **University Exam:60**
Duration of Exam: 3 hours **Internal Assessment:40**

Objective: The course is designed to acquaint the students with environmental science,water treatment and application of chemical properties of materials and alloys.

Unit-I

Environmental Chemistry: Concept of Environmental chemistry, segments of environment (a brief idea about atmosphere, hydrosphere & lithosphere), Air pollution- Introduction, Air pollutants and control of air pollution, water pollution- Introduction, water pollutants, methods of controlling water pollution.

Unit-II

Effects of Environmental Pollution: Acid rain, ozone chemistry, Green House effect &Global warming. Chemicals & metal Toxicology, Biochemical effects of Pb, Hg, As, Zn, Cd, Ni, Se, Cn & pesticides in brief on man.

Unit-III

Inorganic Chemistry materials cement & lime: Optical isomerism, racemerization, asymmetric synthesis. Water treatment; Introduction, types of water, softening of water by different processes, disadvantages of hard water, numericals on hardness of water. Introduction & classification of lime, manufacture & properties of lime, setting & hardening of lime. Cement, types of cement, manufacture of Portland cement, setting & hardening of cement.

Unit-IV

Alloys and Lubricants: Introduction, purpose of making alloys, preparation of alloys,classification of alloys, (ferrous & non-ferrous alloys), alloy steels & copper alloys. Definition, functions of lubricants, mechanism of lubrication, classification of lubricants (lubricating oils, semi-solid lubricants, solid lubricants) synthetic lubricant, flash & fire points, oiliness, cloud & pour points.

Unit-V

Rubber and Dyes: Introduction, types of rubber, vulcanization of rubber, preparation,properties& uses of following synthetic rubber: Buna–S, Buna-N & Butyl rubber. Dyes, classification & applications of dyes.

COURSE OUTCOME: Upon completion of this course, the students will be able to:

1. Understand different types of pollution. Air, Noise, Water, Soil, Thermal and Radiation pollution.
2. Analyze the factors responsible for causing pollutions and effects of different kinds of pollutions.
3. Apply the methods to produce soft water for industrial use and potable water at cheaper cost.
4. Understand fundamental knowledge of the Mechanical properties of various alloy steels & copper alloys. Also comprehend mechanism of lubrication, classification and its properties.
5. Acquire the theoretical knowledge about the preparation of rubber and also gain basis of dye and basic technology of their production and application in routine practice.

Text Books:

1. **Jain & Jain**, Engineering Chemistry, DhanpatRai Publishing Co. 15th Ed.
2. **Sharma, B.K.,** Engineering Chemistry, Krishna Publications.

Reference Books:

1. **Bahl, B. S.**, Organic Chemistry, S. Chand & Co. Ltd, New Delhi.
2. **Soni P. L.,** Organic Chemistry, Sultan Chand and Sons.
3. **De. A. K.,** Environmental chemistry, Willey Eastern Pvt. Ltd, New Delhi.
4. **Tyagi&Mehra,** Text Book of Engineering Chemistry, Vikas Publication House.

Note for Paper Setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions, selecting one from each unit.

Semester II

Course Title: C Programming Lab **Max Marks: 50**
Course Code: CSE-231 **University Exam: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of Experiments:

1. Basic program in Sequential Statement in C
2. Program of multiway control structure (Switch Case)
3. Program of different types of loops nested loops.
4. Program on function (Parameter passing - call by value)
5. Programs on recursion.
6. Programs on string manipulation with or without string function.
7. Program on 1-Dimesional Arrays.
8. Program on 2-Dimensional Arrays.
9. Programs on pointers
10. Programs on file handling.

Course Outcomes:

The student will be able:

1. To understand the basic constructs of C programming.
2. To solve the problems using control statements.
3. To decompose a problem into functions and synthesize a complete program.
4. To use various types of arrays and user defined data types
5. To use pointers and files to perform several operations.

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents

Semester II

Course Title: Basic Electrical Engineering **Max Marks: 50**
Course Code: CSE-232 **University Examination: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of suggested experiments:

1. Introduction to Circuit Elements.
2. Verification of Ohms Law.
3. Verification of Kirchhoff"s Current and Voltage Law (KCL & KVL)
4. Verification of Thevenin"s Theorem &Norton"s Theorem.
5. Transformation of Star & Delta Networks.
6. Measurement of Power using 2-Wattmeter method.
7. Verification of Superposition Theorem.
8. Verification of reciprocity theorem.
9. To plot the Resonance curve for a Series & Parallel Resonance.
10. Determination of resonance frequency using LCR Meter.

Lab Outcomes

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

1. Determine the characteristics of PN Junction and Zener diode.
2. Design various rectifiers configuration and evaluate its various performance parameters.
3. Design and analyze various wave shaping circuits.
4. Determine the characteristics of a BJT and MOSFET
5. Design and analyze the frequency response of RC Coupled Oscillators

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents

Semester II

Course Title: Engineering Physics **Max Marks:50**
Course Code: CSE-233 **University Exam:25**
Duration of Exam: 2 hours **Internal Assessment:25**

List of Experiments:

1. To find out the intensity response of a solar cell/photo diode.
2. To find the angle of given prism using a spectrometer.
3. To analyze the atomic spectra of Neon/Sodium lamp.
4. To determine the laser parameters like diversions, wavelength, etc for a given laser source (2 or 3 experiments)
5. To find the dispersive power of a given prism using a spectrometer.
6. To find the refractive index of a given liquid using hollow prism/glass prism.
7. Determination of wavelength of light by Newton"s rings experiment.
8. To determine the wavelength of monochromatic light (Sodium Lamp) with the help of Fresnel"sbiprism.
9. To determine the focal length of two lenses separated by a distance with the help of nodal slide.
10. Young"s double slit experiment.
11. To find the wavelength of light by diffraction grating.
12. To find the frequency of AC main using an electrical vibrator.
13. To plot a graph between a distance of knife edges from the centre of gravity and the period of a compound pendulum and find acceleration due to gravity from the graph.

Lab. Outcomes: On Completion of this course, students can

1. Answer questions relating to the principle of Physics involved for their respective experiments.
2. Measure Vernier constant/ Least count of respective instruments and can give precise results.
3. Explain where these experiments get failed and why?
4. To plot uncertainty in their results to that of the actual values and can predict how such errors can be reduced.
5. Learn safety rules in the practice of laboratory investigations.

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents

Semester II

Course Title: Engineering Chemistry **Max Marks: 50**
Course Code: CSE-234 **University Exam:25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of the experiments:

1. Determine the percentage of $CaCO_3$ in precipitated chalk (provided I NHCL and 0.1 N NaOH)
2. Determine volumetrically the percentage purity of given sample of ferrous sulphate, x gms of which have been dissolved per litre provided N/10 $KMnO_4$
3. Determine the alkalinity of a given water sample.
4. Organic analysis: Identify the following organic compounds (preparation of at least one derivative)
   - Carboxylic acid
   - Compounds containing alcoholic and phenolic OH group
   - Aldehydes and Ketones
   - Carbohydrates
   - Amides, amines, Anilides and nitro compounds
   - Hydrocarbons
   - Compounds containing sulphur or halogen
5. Determine volumetrically the number of molecules of water of crystallization present in the given sample of Mohr's salt, x gms of which is dissolved per litre provided N/10 $K_2Cr_2O_7$ (using external indicator)
6. Determine volumetrically the percentage of Cu in a sample of $CuSO_4$ crystals z gms of which is dissolved per litre, provided N/10 $Na_2S_2O_3$.
7. Determine the coefficient of viscosity of an unknown liquid using Ostwald viscometer.
8. Determine the surface tension of an unknown liquid using stalagmometer.
9. To prepare pure and dry sample of Glucosazone
10. Determine the aniline point of given lubricating oil.

Lab. Outcomes:

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

1. Estimate the percentage of $CaCO_3$ in precipitated chalk experimentally.
2. Determine the alkalinity of a given water sample.
3. Analyze the identification of carbohydrates and ccompounds containing alcoholic and phenolic OH group
4. Ability to select lubricants for various purposes.
5. Prepare pure and dry sample of Glucosazone

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents

Semester III

Course Title: Mathematics-III **Max Marks: 100**
Course Code: CSE-321 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The course is designed to provide basic knowledge of special functions integral transforms and probability theory to the engineering students for application in solving real life problems.

Unit-I

Series Solution and Special Functions-I: Validity of series solution of the type $P_0(x)\ y'' + P_1(x)\ y' + P_2(x)\ y = 0$,Frobenius method, Legendre"s differential equation, Legendre"s polynomial, Rodrigue"s Formula, generating function for $P_n(x)$, Recurrence formulae, Orthogonality of Legendre"s polynomials, Fourier-Legendre Expansion of $f(x)$.

Unit-II

Integral Transform-I: Introduction, Laplace transform, Existence theorem, Properties and theorem of Laplace transform, Laplace transform of unit-step function, impulse function, periodic function and error functions, Inverse Laplace transform, Convolution theorem. Applications of Laplace transform in solving differential and integro-differential equations.

Unit-III

Integral Transform-II: Fourier integral, Fourier Sine and Cosine integrals, Complex form of Fourier integral, Fourier transform, Inverse Fourier transform, Fourier Sine and Cosine transforms, Properties of Fourier transform, Inverse Fourier transform,

Convolution theorem, Parseval"s identities for Fourier transforms, Fourier transform of the derivatives of a function, Applications of F-transform to Boundary Value Problems.

Unit-IV

Statistics and Probability-I

Measurement of central tendency-Mean, Median, mode, standard Deviation(S.D), Methods for S.D(shortest methods), moment of variable, co-relation, methods for computing coefficients of co-relation(Shortcut method), regression analysis, definition of probability , laws of probability, conditional probability.

Unit-V

Statistics and Probability-II:

Introduction to random variable, discrete and continuous variables, discrete probability distribution, binomial distribution, Mean, standard Deviation and Moment Generating functions (MGF) of binomial distribution, Poisson"s distribution-Mean, S.D and MGF of Poisson"s distribution. Continuous probability distribution- Mean, S. D and MGF of continuous probability distribution.

Course Outcomes:

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

1. Understand the Frobenius method and apply the same to find series solution. They will also be able to analyze the Legendre's function and its properties.
2. Find the Laplace and the inverse Laplace transform of a function. They will be able to solve basic integro-differential equations using the Laplace transform.
3. Explain the concept of Fourier transform & its properties and apply the same to solve boundary value problems
4. Distinguish between different measure of central tendencies i.e. mean, mode, median and techniques for these measures and understand basic probability concepts.

5. Understand the concepts of a random variable and a probability distribution and analyse how to approximate Binomial probabilities by Poisson probabilities.

Text Books:

1. **H. K. Das**, Advanced Engineering Mathematics.
2. **T.Veerarjan, "**Probability, statistics and random Processes"TMH

Reference Books:

1. **Babu Ram**," Engineering Mathematics" Pearson Publication.
2. **Schaum's Series Publication,** Discrete Mathematics.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester III

Course Title: Data Structures Using C **Max Marks: 100**
Course Code: CSE-322 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objectives:
1. To impart the basic concepts of data structures and algorithms.
2. To understand concepts about searching and sorting techniques
3. To understand basic concepts about stacks, queues, lists, trees and graphs.
4. To enable them to write algorithms for solving problems with the help of fundamental data structures

Unit-I
Review of Data Types and Concepts: Review of data types, Scalar types, Primitive types, Structures, Unions, Enumerated types, Records, Sparse Matrices, Recursion and its importance.

Unit-II

Expression and Linear Data Structure: Definition of a Data structure, ADT, Linear Data structures.

Stack**:** Operations, Applications, implementation using linked list as well as arrays, Expressions and their conversions, Infix, Postfix & Prefix.

Queue**:** Types, Operations, Applications, implementation using linked list as well as arrays. Linked List**:** Types, Operations, Applications, Implementation.

Unit-III

Trees: Preliminaries, Trees, Forest, Binary Trees, Binary Search Tree ADT, Binary Search Trees, Conversion of Forest to Binary Tree, Binary Search Tree, AVL Trees, Tree Traversals, Priority Queues (Heaps), Model, Simple implementations, Binary Heap.

Unit-IV

Graphs: Definitions, Representation of Graphs, Adjacency Matrix, Path Matrix, Operations on Graphs, Traversing a graph: BFS and DFS, Shortest Path Algorithms:

Dijkstra's Algorithm and Warshall's Algorithm, Minimum Spanning Tree, Kruskal's Algorithm and Prim`s Algorithm.

Unit-V

Searching and Sorting: Searching: Sequential search, Binary search, Hashing, General Idea, Hash Function, Separate Chaining, Open Addressing, Linear Probing.

Sorting: Bubble sort, Insertion Sort, Selection sort, Heap sort, Merge sort, Quick sort, External Sorting.

Course outcomes:
At the end of this course, the student will able to do the following:

1. For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness.
2. For a given Search problem (Linear Search and Binary Search) student will able to implement it.
3. For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity.
4. Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.

5. Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity.

Text Books:

1. **Tanenbaum A. S.**, Data Structure Using C, Dorling Kindersley Publisher.
2. **Ellis Horowitz and Satraj Sahni**, An Introduction to Data Structures, ComputerScience Press, Rockville MA 1984.
3. **M. A. Weiss**, "Data Structures and Algorithm Analysis in C", 2nd ed, Pearson Education Asia.

Reference Books:

1. **E. Horowitz & S. Shani**Fundamentals of Data Structures in C, Galgotia Pub. 1999.
2. **Richard F. Gilberg, Behrouz A. Forouzan**, Data Structures: A PseudocodeApproach with C, Thomson Cole, 1998.
3. **Hopcroft A. J. E. & Ullman J. D.,** Data Structures and Algorithms, Pearson Education Asia, 1983.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester III

Course Title: Object Oriented Programming **Max Marks: 100**
Course Code: CSE-323 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The course will introduce standard tools and techniques for software development, using object oriented approach, use of a version control system, an automated build process, an appropriate framework for automated unit and integration tests.

Unit-I

Concepts of Object-Oriented Programming: Object Oriented Programming Paradigm, Basic concepts of OOP`s, Benefits of OOPS, Introduction to object oriented analysis and design, Design steps, Design example, Object oriented languages, Comparison of structured and object-oriented programming languages.

Unit-II

Expressions, Control Structures, Arrays, Pointers and Functions: Data Types, Operators, expressions and control structures. Arrays, Storage of arrays in memory, Initializing Arrays, Multi-Dimensional Arrays, Strings, Pointers, accessing array elements through pointers, Arrays of pointers, Pointers to pointers, Void Pointers, Functions, Arguments, Passing Pointers as Function Arguments.

Unit-III

Classes and Objects: Classes and objects, access specifies in C++, constructors, destructors, Inline Functions, Friend Functions.

Polymorphism: Function Overloading, Operator Overloading, Type Conversions in C++. Dynamic memory allocation in C++.

Unit-IV

Inheritance: Inheritance, single Inheritance, Multiple Inheritance, Multi level inheritance, hierarchical inheritance, hybrid inheritance, Virtual base classes, Virtual functions, function overriding .

Generic programming with templates: Class templates, Function Templates.

Unit-V

Exception Handling and Files: Exceptions, Types of Exceptions, throwing and catching exceptions. Streams and Files: Opening and closing a file, File Pointers and their Manipulations, sequential Input and Output Operations, multi-file Programs, Command Line Arguments.

Course Outcomes:

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

1. Specify simple abstract data types and design implementations, using abstraction functions to document them.
2. Recognise features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
3. Name and apply some common object-oriented design patterns and give examples of their use.
4. Design applications with an event-driven graphical user interface.
5. Able to understand exception handling and its use.

Text Books:

1. **Robert Lafore,** Object Oriented Programming in Turbo C++, Galgotia Publications.
2. **Balagurusamy E,** Object Oriented Programming with C++, Tata McGraw Hill.

Reference Books:

1. **BjarneStrustrup,** The C++ programming Language, Addison Wesley.
2. **Booch,** Object Oriented Analysis and Design with Applications, Addison Wesley.
3. **Chair H. Pappas & William H. Murray**, Complete Reference Visual C++, TMH

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt 5 questions selecting at least one question from each unit.

Semester III

Course Title: Signals & Systems **Max Marks: 100**
Course Code: CSE-324 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this course is to study and analyze the characteristics of continuous, discrete signals and systems**.**

Unit-I

Introduction: Definitions of a signal and a system, classification of signals, basic Operations on signals, elementary signals, Systems viewed as Interconnections of operations, properties of systems.

Unit-II

Time-domain representations for LTI systems–1: Convolution, impulse response representation, Convolution Sum and Convolution Integral. Properties of impulse response representation.

Unit-III

Fourier representation for signals–1: Fourier representation for signals–: Discrete and continuous Fourier transforms (derivations of transforms are excluded) and their properties. Frequency response of LTI systems, Fourier transform representation of periodic signals, Fourier transform representation of discrete time signals

Unit-IV

Laplace Transforms–1: Introduction, Laplace transform, properties of ROC, properties of Laplace transforms, inversion of Laplace transforms. Transform analysis of LTI Systems, unilateral Laplace Transform and its application to solve differential equations. Block diagram representation in S-Domain.

Unit-V

The Z Transform: Z-Transform, Region of convergence; Properties of the Z-transform; inversion of Laplace transforms. Transform analysis of LTI Systems, Unilateral Z-transform and its application to difference equations with zero and non-zero initial condition. Block diagram representation in Z-Domain.

Course Outcomes:

After completion of the course student will be able to:

CO1. Represent different Signals in mathematical form and apply basic operations on Signals. Also, Student's must know physical significance of various elementary signals.

CO2. Classify systems based on their properties and determine the response of LTI system using convolution.

CO3. Represent Signals in frequency domain i.e. analyze the spectral characteristics of continuous-time periodic and aperiodic signals using Fourier analysis.

CO4. Apply the Laplace transform and Z- transform for analysis of continuous-time and discrete-time signals and systems.

Text Books:

1. **Simon Haykin and Barry Van Veen**"Signals and Systems",John Wiley & Sons,2001.Reprint 2002.
2. **B. P. Lathi,** "Linear Systems and Signals", Oxford University Press, 2005.

Reference Books:

4. **V. Oppenheim Alan, S. Alan, Willsky&Nawab Hamid A.,** Signals and Systems,

PHI, 2nd Ed., 1997
5. **H. P Hsu, R. Ranjan,** "Signals and Systems", Scham"s outlines, TMH, 2006.
6. **Ganesh Rao and Satish Tunga,** Signals and Systems, Sanguine TechnicalPublishers, 2004.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester III

Course Title: Digital Electronics **Max Marks: 100**
Course Code: CSE-325 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this subject is to enable the students to know basic concepts of digital electronics design and build digital hardware.

Unit-I

Review of number systems, BCD, Excess-3, Gray and Alphanumeric codes. Review of Boolean algebra, De-Morgan's Theorems, Standard Forms of Boolean Expressions, Minimization-Techniques: K-MAPS, VEM Technique, Q-M (Tabulation) method.

Unit-II

Logic Gates & families: TTL, MOS, CMOS, Bi-CMOS; Performance parameters of IC families: input and output loading, fan-in, fan-out, tri-state, current drive, voltage levels, noise margins, power-speed tradeoff; Unused inputs; Interfacing between logic families.

Unit-III

Combinational Logic Circuits: Problem formulation and design of Basic Combinational Logic Circuits, Combinational Logic Using Universal Gates. Basic Adders, ALU, Parity-Checkers and Generators, Comparators, Decoders, Encoders, Code Converters, Multiplexer (Data Selector), De-multiplexers

Unit-IV

Sequential Circuits: Latches, Flip-flops (SR, JK, T, D, Master/Slave FF,) Edge-Triggered Flip-Flops, Flip-Flop Operating Characteristics, Basic Flip-Flop Applications, Asynchronous Counter Operation, Synchronous Counter Operation, Up/Down Synchronous Counters.

Unit-V

Shift registers & Memories, Shift Register Functions, Serial In - Serial Out Shift Registers, Serial In - Parallel Out Shift Registers, Parallel In - Serial Out Shift Registers, Parallel In - Parallel Out Shift Registers, Bidirectional Shift Registers, Basics of Semiconductor Memories, Random-Access Memories (ROM), Read Only Memories (ROMs), Programmable ROM's (PROMs and EPROM's), PAL, PLA.

Course Outcomes:

After studying this course the students would gain enough knowledge

1. Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.
2. To understand and examine the structure of various number systems and its application in digital design.
3. Ability to identify basic requirements for a design application and propose a cost effective solution.
4. The ability to identify and prevent various hazards and timing problems in a digital design.
5. To develop skill to build, and troubleshoot digital circuits.

Text Books:

1. **Morris Mano**, Digital Logic Design, TMH.
2. **Kumar Anand**, Digital Logic Design, PHI.

References Books:

3. **Thomas L. F.**, Digital Fundamentals, Prentice Hall, Inc, 4thEdition 1997.

4. **Tocci R. J.** &**Widner**, Digital Systems: Principles and Applications, PHI.
5. **Gothman**, Fundamentals of Digital Electronics, PHI.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Semester III

Course Title: Database Management System **Max Marks: 100**
Course Code: CSE-326 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objectives:

1. To learn the importance of databases in comparison to file systems.
2. To impart knowledge regarding the design of database and information storage.
3. To teach students how to make use of various queries for data insertion, deletion and retrieval.
4. To impart knowledge of how transactions are handled in databases.

Unit-I

Introduction: Drawbacks of Files Management System, Database System Concepts and Architecture, Data Abstraction, Schemas and Instances, Data Independence, Data Models, Database Language and Interface, DDL, DML, Overall Data Base Structure.

Data Modeling Using Entity Relationship Model: E.R. Model Concept, Notation for ER Diagrams, Mapping Constraints, Weak and Strong Entity Types, Keys, Concept of Super Key, Candidate Key, Primary Key, Extended ER Model, Specialization, Generalizations, Aggregation.

Unit-II

Relational Data Model and Language: Relational Data Model Concepts, Keys Constraints, Integrity Constraints, Domain Constraints, Referential Integrity, Assertions, Triggers, Relational Algebra, Relational Calculus, Domain and Tuple Calculus.

Unit-III

Introduction to SQL: SQL Data Type and Literals, Types of SQL Commands, SQL Operations (DDL, DML, and DCL), Tables, Views and Indexes, Queries and Nested Sub-queries, Aggregate and Scalar Functions, Joins, Unions, Intersection, Minus, Triggers, Cursors, Procedures and Functions in SQL.

Unit-IV

Data Base Design and Normalization: Functional Dependencies, Armstrong"s Axioms,

Normalization: First, Second and Third Normal forms, BCNF, Multi-Valued Dependencies, Fourth Normal form, Join Dependencies and Fifth Normal form, DKNF, Decomposition, Dependency Preservation and Lossless Join.

Unit-V

Transaction & Concurrency Control: Transaction Concept, Transaction State, Schedules, Serializability of Schedules, Conflict & View Serializability, Testing of Serializability, Recoverability, Recovery From Transaction Failures, Log Based Recovery, Checkpoints, Shadow Paging, Recovery with Concurrent Transactions.

Concurrency Control Techniques**:** Concurrency Control, Lock Based Protocols, Timestamp-Based Protocols, Validation-Based Protocols, Multiple Granularity, Multi-Version Schemes, Deadlock Handling.

Course Outcomes:

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

1. To evaluate the role of database management systems in information technology.
2. Make use of logical design methods and tools for databases and Derive a physical design for a database from its logical design;
3. To remove the various anomalies present in the existing database with the help of various normalization forms.
4. Understand the SQL data definition and SQL query languages;
5. To implement various techniques to handle transactions and Deadlocks in a system.

Text Books:

1. **Korth, Silbertz, Sudarshan**, Database Concepts, Tata McGraw Hill.
2. **Desai**,**Bipin C.** An Introduction to Database Systems, Galgotia Publications.

Reference Books:

1. **Elmasri&Navathe**, Fudamentals of Database Systems, Addision Wesley.
2. **Ramakrishna &Gehkre**, Database Management System, McGraw Hill.
3. **Date C. J.**, An Introduction to Database Systems, Addision Wesley.
4. **Madhulika Jain**, Introduction to Database Systems, BPB Publications.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit .The student has to attempt five questions at least one from each unit.

Semester-III

Course Title: Data Structures with C Lab **Max Marks: 50**
Course Code: CSE-331 **University Exam: 25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of Programs

1. Program to demonstrate concept of structures.
2. Program to implement single Linked List.
3. Program to implement Doubly Linked List.
4. Program to implement Stack using Linked List.
5. Program to implement Queue using Linked List.
6. Program to implement Stack using arrays.
7. Program to implement Queue using arrays.
8. Program to Create and Copy a Tree.
9. Program to implement Tree Traversal.
10. Program to implement Insert and Delete Operation on Trees.
11. Program to implement AVL Trees.
12. Program to implement Warshal`s algorithm to find path matrix.
13. Program to implement Djikstra`s algorithm.
14. Program to implement Binary Search.
15. Program to implement Bubble, Selection, Insertion, Heap, Merge and Quick Sort.

Course Outcomes:

1. Understand the concept of Dynamic memory management, data types, algorithms, Big O notation.
2. Understand basic data structures such as arrays, linked lists, stacks and queues. Describe the hash function and concepts of collision and its resolution methods
3. Solve problem involving graphs, trees and heaps
4. Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data

Note: This is only the suggested list of practical exercises. Instructor may add or change some practicals relevant to the course contents.

Semester III

Course Title: Digital Electronics Lab **Max Marks: 50**
Course Code: CSE-332 **University Exam:25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of Experiments:

1. Study of pin diagram of various ICs and to test the logic gates and verify their truth tables.
2. Implementation of following with Logic Gates.
    a. Half Adder.
    b. Full Adder.
    c. Half Subtractor.
    d. Full Subtractor.
3. Implementation of Boolean functions using 74153 4:1 MUX
4. Implementation of De-multiplexer, Decoder and Encoder.
5. To add two 4 bit binary numbers using IC 7483.
6. To verify the operation of different modes of shift register using IC 7495.
7. Design of BCD to 7 segment display using logical gates.
8. Simulations
    8.1. Introduction to circuit maker and electronic work bench.
    8.2. Implementation of experiments from Serial No. 1 to 8 through simulations.

Course Outcomes: At the end of this course, the students will able to do the following:

1. Design and implementation of combinational circuits like adder, subtractor, encoder and decoder, multiplexer and De-multiplexer etc.
2. Able to simulate various circuit design through circuit maker and electronics workbench or any other tools.

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester III

Course Title: Database Management System Lab **Max Marks: 50**
Course Code: CSE-333 **University Exam:25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of Experiments

1. Login and logout of the SQL.
2. Creation of users and roles.
3. Database schema creation.
4. Database schema modification.
5. Dropping of Database schema.
6. Use of Insert command, Update, Delete, Select commands.
7. Use of various aggregate functions.
8. Making reports with SQL report writer.
9. Creation of PL/SQL stored procedures.
10. Creation of Database triggers.
11. Creation of Cursors.
12. One case study on Database Application Development.

Course Outcomes:

At the end of this course, the students will able to do following:

1. Understand the basis of SQL and PL/SQL.
2. Design and implementation of database for an application

Note: These are only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents

Semester IV

Course Title: Mathematics-IV **Max Marks: 100**
Course Code: CSE-421 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The course is designed to provide basic knowledge of theory of complex variables, Numerical analysis and Z-transform to engineering students.

Unit-I

Complex Analysis-I:Function of complex variable, Limit, Continuity and differentiability of functions of complex variable, Analytic function, Cauchy-Riemann equations, harmonic function, Construction of analytic functions by Milne-Thomson method, conformal mapping and bilinear transformations.

Unit-II

Complex Analysis-II: Complex integration, Line integral, Cauchy"s integral formula, Derivatives of integral, Cauchy"s inequality, Lowville"s theorem, Taylor"s and Laurent"s series, Zeros and Singularities of complex functions, Residue and Cauchy"s Residue theorem, Evaluation of real integrals by using Residue theorem.

Unit-III

Numerical Analysis-I: Finite-differences and operators, Finite and divided difference stable, Differences of a polynomial, Factorial notation, Relation between operators,
Newton"s and Lagrange"s interpolation formulae, Numerical differentiation and integration, Trapezoidal rule, Simpson"s one-third rule, Simpson"s third-eight rule.

Unit-IV

Numerical Analysis-II: Difference equations and their solutions. Solutions of algebraic and transcendental equations by iterative, Bisection, Regula-Falsi and Newton-Raphson methods, Numerical solution of ordinary differential equations by Picard"s method, Euler"s method, Modified Euler"s method and Runge-Kutta method.

Unit-V

Z-Transform: Introduction and definition of z-transform, Some standard forms, Linearity property, Damping rule Some standard results , shifting un to the right and to the left, Multiplication by n. Two basic theorems, Inverse Z-Transform, Convolution theorem, Application to difference equations.

Course Outcomes:

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

1. Comprehend the significance of differentiability for complex functions and be familiar with the Cauchy-Riemann equations and conformal mapping.
2. Apply the Cauchy Residue theorem to evaluate definite integrals, compute the Taylor and Laurent expansions of simple functions and determine the nature of the singularities and calculating residues.
3. Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration and the solution of linear and nonlinear equations.

4. Apply numerical methods like Picard's, Euler's and Runge-Kutta's methods to obtain approximate solutions to ordinary differential equations.
5. Understand the Z-transform , its properties and apply the same to solve the difference equations

Text Books:

1. **Grewal B.S.,** Higher Engineering Mathematics

Reference Books:

1. **Santi Narayan,** Theory of Functions of Complex Variables
2. **Saxena H.C.,** Difference Calculus

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester IV

Course Title: Microprocessor & Interfacing **Max Marks: 100**
Course Code: CSE-422 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this course is to introduce to the students the fundamental of8085 microprocessor and its interfacing.

Unit-I

Introduction To Microprocessor: History and Evolution, types of microprocessors,8085 Microprocessor, Architecture, Bus Organization, Registers, ALU, Control section, Instruction set of 8085, Instruction format, Addressing modes, Types of Instructions.

Unit-II

Assembly Language Programming and Timing Diagram: Assembly language programming in 8085, Macros, Labels and Directives, Microprocessor timings, Instruction cycle, Machine cycles, T states, State transition diagrams, Timing diagram for different machine cycles.

Unit-III

Serial I/O, Interrupts and Comparison of Contemporary Microprocessors: Serial I/O using SID, SOD. Interrupts in 8085, RST instructions, Issues in implementing interrupts, Multiple interrupts and priorities, Interrupt handling in 8085 with RIM and SIM, Enabling, disabling and masking of interrupts. Brief comparison of contemporary 8-bit microprocessors like Z-80, M68000 with 8085.

Unit-IV

Data Transfer techniques: Data transfer techniques, Programmed data transfer, Parallel data transfer using 8155. Programmable parallel ports and handshake input/output, Asynchronous and Synchronous data transfer using 8251A. Programmable interrupt controller 8259A. DMA transfer, cycle stealing and burst mode of DMA, 8257 DMA controller.

Unit-V

Microprocessor Interfacing Techniques: Interfacing and refreshing dynamic RAMs, Interfacing a keyboard, Interfacing LED and seven segment displays, Interfacing A/D converters, D/A converters.

Course Outcomes:
At the end of this course, the students have ability to:

1. Understand the architecture of 8085
2. Impart the knowledge about the instruction set of 8085
3. Understand and apply the fundamentals of assembly language
4. Understand the basic idea about the data transfer schemes and its applications
5. Understanding different peripheral devices and memory units

Text Books:

1. **R. S. Gaonkar**, µprocessor Architecture, Programming & applications with the8085/8086A, Wiley Eastern Ltd.
2. **Douglas V Hall**, Microprocessors & Interfacing.

Reference Books:

1. **A. P. Mathur**, Introduction to Microprocessor, Tata McGraw Hill.
2. **Yu-Cheng Liu** & **G A Gibson**, µprocessor System, Arch Programming & Design.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester IV

Course Title: Software Engineering **Max Marks: 100**
Course Code: CSE-423 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The program's goal is to provide a professionally guided education in software engineering that prepares graduates to transition into a broad range of career options: industry, government, computing graduate program, and professional education.

Unit-I

Introduction: Introduction to software engineering, Importance of software, The Software evolution, Software characteristics, Software components, Software applications, Crisis-Problem and causes.

Software development life-cycle: Requirement analysis, software design, coding, testing and maintenance.

Unit-II

Software requirement Specification: Waterfall model, Prototyping model, Iterativedevelopment model, Spiral model, role of management in software development, role of metrics and measurement, Problem analysis, requirement specification, validation, metrics.

Unit-III

System Design: Problem partitioning, Abstraction, Top down and Bottom up–design,Structured approach, Functional versus Object Oriented Approach, Design Specification, Verification, Metrics, Cohesiveness, coupling.

Unit-IV

Coding: TOP-DOWN and BOTTOM-UP structure programming, information hiding, programming style, and internal documentation, verification, and metrics.

Testing; levels of testing, functional testing, structural testing, test plane, test case specification, reliability assessment, Software testing strategies, Verification and validation, Unit, Integration Testing, Top down and bottom up integration testing, Alpha and Beta testing, System testing and debugging.

Unit-V

Software project Management: Cost Estimation, Project Scheduling, Staffing, Software Configuration Management, Maintenance, Quality Assurance, Project Monitoring, Risk Management.

Course Outcomes:

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

1. How to apply the software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment.
2. An ability to work in one or more significant application domains.
3. Work as an individual and as part of a multidisciplinary team to develop and deliver quality software.
4. Demonstrate an understanding of and apply current theories, models, and techniques that provide a basis for the software lifecycle.
5. Demonstrate an ability to use the techniques and tools necessary for software engineering practice.

Text Books

1. **Peters**, Software Engineering, Wiley India.
2. **Pankaj Jalote**, An integrated Approach to Software Engineering, Narosa Publishing.

Reference Books:

1. **Thompson**, Software Engineering Project management, Wiley India.
2. **Richard Fairley**, Software Engineering, TMH.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester IV

Course Title: Operating System **Max Marks: 100**
Course Code: CSE-424 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment:40**

Course Objectives:

- To learn the fundamentals of Operating Systems.
- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporary OS
- To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
- To know the components and management aspects of concurrency management

Unit-I

Introduction: Operating System and Function, Evolution of Operating System, Batch Systems, Time Sharing and Real Time System, System Protection and Methods.
Operating System Structure**:** System Components, System Structure.

Unit-II

Concurrent Processes: Process concept, Principle of Concurrency, Semaphores and its types. Classical problems in Concurrency, Producer Consumer, Critical Section and readers" writers" problem, Inter Process Communication, Process Generation, Resident Monitors.

Unit-III

CPU Scheduling: Scheduling Concept, levels of Scheduling, Scheduling Algorithm, Multiprocessor Scheduling.
Deadlock**:** System Model, Deadlock Characterization, Prevention, Detection and Recovery.

Unit-IV

Memory Management: Multiprogramming with Fixed Partition and Variable Partition, Multiple Base Register, Paging, Demand Paging, Segmentation, Virtual Memory Concept, Allocation of Frames, Paged Replaced Algorithm, Thrashing, Cache Memory Concept.

Unit-V

I/O Management: I/O Devices and Organization of I/O Function, I/O Buffering, DISKI/O, and Operating System Design Issues.
File System: File Concept, File Organization and Access Mechanism, File Directories, File Sharing,

Course Outcomes:

At the end of this course, the students will able to do the following:

1. Create processes and threads.
2. Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time.
3. For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for

improving the access time.
4. Design and implement file management system.
5. For a given I/O devices and OS (specify) develop the I/O management functions in OS as part of a uniform device abstraction by performing operations for synchronization between CPU and I/O controllers.

Text Books:

1. **Milenekovic**, Operating System Concepts, McGraw Hill
2. **Silverschwatz**, Operating System Concepts, Willey & Willey.

Reference Books:

1. **Dietel**, An introduction to operating system, Addision Wesley.
2. **Tannenbaum A. S.**, Operating system design and implementation, PHI

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester IV

Course Title: Data Comm& Computer Networks **Max Marks: 100**
Course Code: CSE-425 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objectives:

- To provide insight about fundamental concepts and reference models (OSI and TCP/IP) and its functionalists.
- To gain comprehensive knowledge about the principles, protocols, and significance of Layers in OSI and TCP/IP
- To know the implementation of various protocols.

Unit-I

Communication concepts: Bandwidth and Channel Capacity, Nyquist Law, Shannon"s Law, Key Components in Data Communication Systems. Data Transmission Concepts: Simplex, Half Duplex, Full Duplex. Characteristics of Signals.

Unit-II

Transmission Media: Guided and Unguided Transmission Media. Reliable Transmission of Data: Asynchronous and Synchronous Transmission. Error Detection: Parity Based, CRC Based, FCS Computation. Error Control and Recovery Techniques.

Unit-III

Goals and applications of networks: Classification**:** LAN, MAN, WAN. Network Topology. Network Architecture, ISO-OSI Reference Model, TCP/IP Model. IP Addresses, Subnetting, Internet Protocol (IP). Internet Control Protocols: ICMP, ARP and RARP.

Unit-IV

Routing: Types of Routing. Routing Algorithms: Interior (RIP, OSPF), Exterior (BGP).Transport Layer: UDP and TCP Concepts.

Unit-V

Data Link Layer Protocols: SLIP, PPP. MAC Sub Layer. Channel Allocation Issues. Multiple Access Protocols: ALOHA (Pure and Slotted) Protocol, CSMA/CD. High Speed LANS (Fast, Ethernet and FDDI).

Course Outcomes:

At the end of this course, the students will able to do the following:

1. Explain the functions of the different layer of the OSI Protocol.
2. Draw the functional block diagram of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) describe the function of each block.
3. For a given requirement (small scale) of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) design it based on the market available component
4. For a given problem related TCP/IP protocol developed the network programming.
5. Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools.

Text Books:

1. **James F. Kurose and Keith W. Ross,** Computer Networking, a Top-Down Approach Featuring the Internet.
2. **Behrouz A. Forouzan,** Data Communications and Networking, Fourth Edition.
3. **W. Stallings**, Data and communications, 6th Edn., Prentice Hall, 2000.

Reference Book:

1. **Gallo**, Computer Communications & Networking Technologies, Cengage India.
2. **Peterson and Davie**, Computer networks: A systems approach, 2nd Edn. Morgan Kaufman.
3. **Tanenbaum A. S.**, Computer Networks, 4th Edn. Prentice Hall.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt 5 questions selecting at least one question from each unit

Semester IV

Course Title: Computer Graphics **Max Marks: 100**
Course Code: CSE-426 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objectives:

1. To understand the basics of various inputs and output computer graphics hardware devices.
2. Exploration of fundamental concepts in 2D and 3D computer graphics.
3. To know the working of multimedia tools.

Unit-I

Line Generation: Points, pixels and frame buffers, Line and Circle generation algorithms, Graphics Primitive**:** display device, interactive devices, display file structure, Polygon**:** polygon representation, entering polygon & filling polygons.

Unit-II

Transformations & Segments: Matrices transformation, transformation routines, Windowing and Clipping**:** viewing transformation and clipping, generalized clipping, multiple windowing. Segments**:** segment table, creating deleting and renaming segments, visibility, image transformations.

Unit-III

Three Dimension: 3D geometry and primitives, 3D transformations: translation, scaling, rotation, 3D viewing, Projections (perspective and parallel).

Unit-IV

Curves and surfaces: Shape description requirements, parametric functions, Bezier methods, Bezier curves, Bezier surfaces, B-Spline methods

Unit-V

Hidden surface removal: Need for hidden surface removal, The Depth – Buffer Algorithm, Properties that help in reducing efforts, Scan Line coherence algorithm, Span– Coherence algorithm, Area-Coherence Algorithms, Warnock"s Algorithm, Priority Algorithms

Course Outcomes:

1. Students will get the concepts of Graphics display devices, techniques, and different types of graphics drawing algorithms.
2. Students will get the concepts of 2D and 3D Geometrical Transformations
3. Students will get the concepts of Viewing, Curves and surfaces.
4. Students will get the concepts of Hidden Line/surface elimination techniques.
5. Students will get the concepts of some Scan Conversion algorithms.

Text Books:

1. **Steven Harrington**, Computer Graphics, A programming approach second Edn.
2. **John F. Koegel Buford**, Multimedia Systems, Pearson Education.
3. **Fred Halsall**, Multimedia Communications, Pearson Education.

Reference Books:

1. **Rogers**, Procedurals elements of Computer Graphics, McGraw hill.
2. **Newman and Sproul**, Principle of interactive Computer Graphics, McGraw Hill.
3. **A. P Godse**, Computer Graphics, Technical Publications Pune.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester IV

Course Title: Microprocessor & Interfacing Lab **Max Marks: 50**
Course Code: CSE-431 **University Exam:25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of Experiments:

1. Introduction to Microprocessor Kits and overview of Programming
2. Programs using basic programming construct
3. Program which used various control statements
4. Programs for interfacing
5. Programs on Timing and Delays
6. Interfacing of A/D Module
7. Interfacing of a stepper motor module

Course Outcomes:
At the end of this course, the students will able to do the following:

1. Understand the basic programming of microprocessor
2. Implement various operations on microprocessor kits
3. Design and implementation of interfacing
4. Design and implementation A/D Module
5. Design and implementation a stepper motor module

Note: This is only the suggested list of practical. Instructor may add or change some practical relevant to the course contents

Semester IV

Course Title: Computer Graphics Lab **Max Marks: 50**
Course Code: CSE-432 **University Exam:25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of Experiments:

1. To draw a line using DDA Algorithm.
2. To draw a line using Bresenham"s Algorithm.
3. To draw a circle using trigonometric Algorithm.
4. To draw a circle using Bresenham"s Algorithm.
5. To implement polygon boundary fill algorithm.
6. To implement polygon flood fill algorithm.
7. To translate an object with translation parameters in X and Y directions.
8. To scale an object with scaling factors along X and Y directions.
9. To rotate an object with a certain angle.
10. To perform composite transformations of an object.
11. Implementation of simple graphics animation.

Course Outcomes:

At the end of this course, the students will able to do following:

1. Design and implementation of various algorithms to draw a number of shapes
2. Design and implementation of various algorithms for designing animation graphics and composite objects
3. Design and simulation of various algorithms using multimedia tools

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester IV

Course Title: Object Oriented Programming Lab **Max Marks: 50**
Course Code: CSE-433 **University Exam:25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of Experiments:

1. Program to break a number into it's factors
2. Program to find the prime numbers from the list
3. Program to overload <= and + operator
4. Program to get tomorrow"s date
5. Program to add two complex numbers using add as member function of class complex
6. Program to add 2 complex numbers using friend function
7. Program to overload unary operator
8. Program to demonstrate multiple inheritance
9. Program to demonstrate multilevel inheritance
10. Program to demonstrate containership
11. Program to demonstrate hybrid inheritance
12. Program to overloading member functions
13. Program to illustrate virtual base class
14. Program to find sum of array passing pointers to functions
15. Program to convert polar to rectangular coordinates using constructor in destination class
16. Program to concatenate 2 strings using inheritance
17. Program to perform operation on strings

Course Outcomes:

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

1. Understanding and implementation of various object oriented programming concepts like inheritance, polymorphism, object and classes etc.
2. Designing the application using the object oriented concepts

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester V

Course Title: Discrete Mathematics **Max Marks: 100**
Course Code: CSE-521 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The course is designed to provide basic knowledge of Graph theory and itsApplications to engineering students.

Unit-I

Graphs: Definition and examples of graphs Incidence and degree, Handshaking lemma, Isomorphism Subgraphs, Weighted Graphs, Eulerian Graphs, Hamilitonian Graphs Walks, Paths and Circuits Connectedness algorithm, Shortest Path Algorithm, Fleury's Algorithm Chinese Postman problem, Traveling Salesman problem.

Unit-II

Trees: Definition and properties of trees Pendent vertices, centre of a tree Rooted and binary tree, spanning trees, minimum spanning tree algorithms. Fundamental circuits, cutsets and cut vertices, fundamental cutsets, connectivity and separativity, maxflow mincut theorem.

Unit-III

Planar Graphs: Definition of planar graph, combinatorial and geometric duals,Kuratowski's graphs, detection of planarity, thickness and crossings.

Unit-IV

Matrix Representation of Graphs: Incidence, Adjacency Matrices and their properties.

Unit-V

Directed Graphs: Types of digraphs, directed paths and connectedness, Eular digraphs, Directed trees, Arborescence, Tournaments, Acyclic digraphs and decyclication.

Course Outcomes: Upon completion of this course, the students will be able to:

1. Comprehend the basic terminology and some of the theory associated with graphs.
2. Learn to model problems using graphs and to solve these problems algorithmically.
3. Analyse applications of graph theory in modern society
4. Understand relation between matrix theory and graph theory.
5. Compare graphs and digraphs.

Text Books:

1. **Bondy, J. A. &Murty U. S. R.,** Graph Theory with Applications, MacMillan
2. **Deo, Narsing,** Graph Theory with Applications to Engineering and Computer Science, Prentice Hall

Reference Books:

1. **Graham, R. M., D. E., Knuth & O. Patashnik**[1989], Concrete Mathematics, A

Foundation for Computer Science, Addison Wesley
2. **Tarjan G. R. E. & Woods D. R.** [1983], Notes on Introductory Combinatorics,Polya Birk Hauser
3. **Swamy, M. N. S. &Tulsiram K.** [1981], Graph, Networks and Algorithms, JohnWilley.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester V

Course Title: Visual Programming **Max Marks: 100**
Course Code: CSE-522 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objectives: The student should be made to:

- Understand the foundations of CLR execution
- Learn the technologies of the .NET framework
- Know the object oriented aspects of C#
- Learn web based applications on .NET(ASP.NET)

Unit-I

Introduction: Introduction to the Visual programming, Features of visual programming, Integrated Development Environment (IDE), IDE components. Variables, Constants, Data types, Operators, Conditional Statements and loops. Procedures, Subroutines, Calling functions and subroutines, writing argument procedures, Type of procedures, Calling procedures ,Argument passing Mechanism, Built in function, Overloading functions.

Unit-II

Windows Forms and Basic Controls: Windows Forms and Events, Message Box, Creating MDI, Using basic controls like command buttons, Text Box, List Box, Radio Buttons, Labels, Link Labels, Combo Box, Building Small Applications.

Unit-III

Error handling and OOP Implementation: Types of Errors, Introduction to Exception Handling, Unstructured and Structured Exception Handling, Raising an Exception Intentionally, System Exception, Throwing an Exception, Try, Catch and Finally statements. Object oriented programming, Concept of OOP (Abstraction, encapsulation, inheritance and polymorphism), Classes and Objects, Creating Class Libraries, Constructors and Destructors, Overloading, Overriding and Shadowing.

Unit-IV

Advanced controls: Rich Text Box, Scroll Bars and Progress Bars, Date Time Picker,Picture Box, Tree View and List View Controls. Designing Menus, Working with Files and Folders, Accessing Folders and Files.

Unit-V

Data Access with ADO .Net: Data Access with ADO .Net, Using Databases, Server Explorer, Data Adapter and Datasets, Working with ADO .Net, Architecture of ADO .Net, Using Data controls: Data Grid, Data Binding, Creating New Data Connection in Code. Introduction to Structured Query Language, Executing SQL Statements, Selection Queries, SQL joins, Introduction to query builder.

Course Outcomes:

1. List the major elements of the .NET frame work
2. Explain how C# fits into the .NET platform.
3. Analyze the basic structure of a C# application
4. Debug, compile, and run a simple application.
5. Develop programs using C# on .NET

Text Books

1. **Evangelous Petroutsos**, Mastering Visual basic.Net, BPB Publication.
2. **Steven Holzner**,Visual Basic .net Programming, Black book, Dreamtech Press.

References Books:

1. **David S. Platt**, "Introducing Microsoft .Net", Microsoft Press, PHI.
2. **Petroutsos Bilgin**, "Visual Basic .Net, Database Programming", BPB.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester V

Course Title: Principles of Programming Languages **Max Marks: 100**
Course Code: CSE-523 **University Exam:60**
Duration of Exam: 3 hours **Internal Assessment:40**

Objective: The objective of this course is to provide students with a working knowledge of the basic principles underlying the design of all computer programming languages.

Unit-I

Introduction: Concept of Programming Languages, History, Reference and Suggestions. Structure and operation of a computer translators, Syntax, semantics and Virtual Computers, Hierarchies.

Data types: Elementary data types: specifications and implementation, declaration. Type checking and type conversion. Assignment and initialization structures. Data types; specifications and implementation. Declaration type checking, vectors, arrays, character strings, pointers and files.

Unit-II

Subprograms and programmer defined data types: Object oriented programming: data encapsulation, Local modules, Classes in C++, Derived classes and Information hiding. Inheritance and polymorphism in C++.

Unit-III

Sequence Control: Implicit, Explicit sequence control, subprogram sequence control. Recursive subprograms. Exceptions and exceptions handlers. Co-routines. Task and concurrent execution. Data structures and sequence control.

Data control: Static and dynamic scope. Local data, shared data. Parameters. Parameter transmission, task shared data.

Unit-IV

Storage management: Programmer and system control, storage management phases, static SM, stack based SM, heap. Structured programming techniques.

Unit-V

Syntax and translation: General syntactic control. Syntactic elements of a language. Stages in translation. Formal definition of syntax.

Course Outcomes: Students will be able to-

1. Understand the basic concepts of programming languages
2. Understand the features of object oriented programming
3. Understand the concepts of exception handling and data controls
4. Know and understand the several storage management techniques
5. Understand the various steps involved during translation process.

Text Books:

1. **B. Horowitz,** Programming languages, BPB
2. **MacLennan J.** Principles of Programming Languages, Oxford University Press,1999

Reference Books:

1. **Pratt W.,** Programming Languages, Prentice Hall, 2001
2. **Tennet D.,** Principles of programming languages, Prentice Hall, 1990

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester V

Course Title: Communication Systems **Max Marks: 100**
Course Code: CSE-524 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this course is to provide students with a working knowledge of the basic principles underlying the Communication Systems.

Unit-I

Modulation Techniques: Introduction to Amplitude modulation, Frequency spectrum of AM Waves, Representations of AM waves, Power relation in AM waves, Need and description of SSB, suppression of carrier, suppression of unwanted side bands, vestigial side band system, frequency modulation (FM), Mathematical representation of FM, frequency spectrum & Band width of FM waves, Carson's rule.

Unit-II

AM Transmitters And Receivers: AM Transmitters: Generation of AM, low level and high level modulation, comparison of levels, AM transmitter block diagram, collector class C modulator, Base modulator.

AM RECEIVERS: Tuned radio frequency (TRF) receiver. Super heterodyne receiver, RF section and characteristics, mixers, frequency changing and tracking, IF rejection and IF amplifiers, AM receiver characteristics.

Unit-III

FM Transmitters and Receivers: Basic requirements and generation of Frequency Modulation (FM), & methods, direct methods, variable capacitor modulator, varactor diode modulator, reactance modulators, disadvantages of direct method, Indirect modulators, RC phase shift modulator, Armstrong FM systems.

FM RECEIVERS: Limiters, balanced slope detector, foster seely or phase discriminator, block diagram of FM receiver,FM receiver characteristics.

Unit-IV

Pulse Digital Modulation: Elements of digital communication systems, advantages of digital communication systems, Elements of PCM: Sampling, Quantization &Coding ,proof of sampling theorem, Quantization error, Companding in PCM systems. Differential PCM systems (DPCM). Bandwidth of PCM.

Unit-V

Digital Modulation Techniques: Introduction, Generation & Demands of ASK, FSK, PSK, DPSK, QPSK, M-ary, ASK similarity of BFSK and BPSK.

Course Outcomes:

At the end of this course students will demonstrate the ability to,

1. Analyze and compare different analog modulation schemes for their efficiency and bandwidth
2. Analyze the behavior of a communication system in presence of noise
3. Investigate pulsed modulation system and analyze their system performance
4. Analyze different digital modulation schemes and can compute the bit error performance

Text books:

1. **Taub**& **Schilling,** Principles of Communication, Tata McGraw Hill Publication, 1990.
2. **Simon Haykins**, Principles of Communication, PHI, 1990.

Reference books:

1. **B. P. Lathi**, Analog and Digital Communication Systems, PHI, 1992.
2. **Proakis,** Digital Communication, McGraw Hill, 1992.
3. **B. Carlson**, Communication Systems, McGraw Hill, 1992.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester V

Course Title: UNIX/LINUX & Shell Programming **Max Marks: 100**
Course Code: CSE-525 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: This subject aims to provide students with fundamental principles and comprehensive knowledge of Unix/Linux & Shell Programming.

Unit-I

Introduction to the kernel: Architecture of the UNIX, the buffer cache. Internal representation of files**,** node, accessing blocks, releasing blocks, structure of regular files, conversion of a path name to an inode, inode assignment to a new file, and allocation of disk-block.

Unit-II

System Calls: System calls for the file systems**;** open, read, write, close. The pipe system call, opening a named pipe, reading and writing pipes, closing pipes, dup, mounting and un-mounting file system, link, unlink. System calls for time and clock.

Unit-III

Processes: The structure of processes, process states and transitions, layout of system memory, the context of a process, saving the context of the process, manipulation of the process address space. Process Control, process creation, signals, process termination, awaiting process termination, the user id of a process, changing the size of the process, the system boot and init process.

Unit-IV

Shell Programming: Study of different types of shells like Bourne shell, C & K shell. Shell variable, shell script, shell command. Looping and making choices, for loop, while and until, passing arguments to scripts. Programming with different shells.

Unit-V

Inter Process Communication: Inter process communication, process tracing, network communication sockets. Multiprocessor system, problem of multiprocessor systems, solution with master and slave processor, solution with semaphores. Study of distributed UNIX system.

Course Outcomes:
At the end of this course, the students will able to do the following:

1. Understanding system calls and its role
2. Understanding the concept of shell programming
3. Able to understand process attributes and its structure.
4. Understanding the working of kernel and implementing them.
5. Implementing the system calls, process management, and inter process communication

Text Books:

1. **Maurice J Bach.,** The design of the UNIX operating system, Prentice-Hall, 1986.
2. **Raymond S. Eric**,The Art of UNIX Programming.

Reference Books:

1. **Stephen Prata,** Advanced UNIX: A Programmer Guide, Howard W. Sams, 1987
2. **Rochkind,** Advanced Unix Programming.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester V

Course Title: Computer Organization & Architecture **Max Marks: 100**
Course Code: CSE-526 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objectives: To expose the students to the following:

- How Computer Systems work & the basic principles
- Instruction Level Architecture and Instruction Execution
- The current state of art in memory system design
- How I/O devices are accessed and its principles.
- To provide the knowledge on Instruction Level Parallelism
- To impart the knowledge on micro programming
- Concepts of advanced pipelining techniques.

Unit-I

Basic structure of computer: Basics of Computer Architecture and Organization, Stored Program Organization (Von Neumann Architecture), Instruction Formats, Addressing Modes, Stack and Queue Organization.

Unit-II

Arithmetic: Integer and Floating-Point Representation, Fixed Point Arithmetic: Addition, Subtraction, Multiplication and Division With Flowcharts and Hardware Implementations, Floating Point Arithmetic: Addition and Subtraction.

Unit-III

Basic Processing Unit: Fundamental Concepts: Single Bus Organization, Execution of a Complete Instruction, Multiple Bus Organization, Hard-Wired & Micro-Programmed Control Units, Hard-Wired Design Methods, State Table Method, Multiplier Control, Control Memory, Address Sequencing.

Unit-IV

Memory systems: Memory Hierarchy, Main Memory: RAM, ROM, PROM, EPROM,EEPROM, Virtual Memory Concepts, Virtual Memory Address Translation, Interleaved Memories, Cache Memory: Mapping Functions, Replacement Algorithm, Secondary Storage: Magnetic Hard Disks.

Unit-V

Input/output Organization: Accessing I/O Devices, Input/output Mechanism: Memory-Mapped I/O, Programmed I/O, Interrupts, Direct Memory Access, Standard I/O Interfaces: PCI Bus, SCSI Bus and USB.

Course Outcomes:

1. Draw the functional block diagram of a single bus architecture of a computer and describe the function of the instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set.

2. Write assembly language program for specified microprocessor for computing 16 bit multiplication, division and I/O device interface (ADC, Control circuit, serial port communication).
3. Write a flowchart for Concurrent access to memory and cache coherency in Parallel Processors and describe the process.
4. Given a CPU organization and instruction, design a memory module and analyze its operation by interfacing with the CPU.
5. Given a CPU organization, assess its performance, and apply design techniques to enhance performance using pipelining, parallelism and RISC methodology

Text Books:

1. **Hamacher**, Computer Organization, McGraw Hill.
2. **Moris Mano**, Computer system Architecture, PHI.

Reference Books:

1. **Parthasarthy**, Advanced Computer Architecture, Cengage India.
2. **Tennenbaum A. S.**, Structured Computer Organization, PHI.
3. **Gear C. W**., Computer Organization and Programming, McGraw Hill

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester V

Course Title: Visual Programming Lab **Max Marks: 50**
Course Code: CSE-531 **University Exam:25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of Experiments:

1. Creating user interface in Visual Basic.Net
2. Simple Programs with control structures
3. Adding menus and Dialog Boxes to form
4. Creating MDI
5. Creating and using Basic Controls
6. Working with advance controls
7. Data Access with ADO
8. Working with Data Grid Control

Lab Outcomes:

At the end of this course, the students will able to do following:

1. Design and **develop** Graphical User Interfaces;
2. Understand and code **Event**-Driven procedures;
3. Program Visual Basic controls proficiently;
4. Access database from VB.NET programs; and.
5. Design, **develop** and test Visual Basic programs.

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester V

Course Title: Communication Systems Lab **Max Marks: 50**
Course Code: CSE-532 **University Exam:25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of Experiments:

1. Design, build & test a simple communication system.
2. Study of Amplitude Modulation.
3. Study of frequency Modulation.
4. Study of ASK Modulation.
5. Study of FSK Modulation.
6. Study of Spread Spectrum Techniques.
7. Study of PCM Transmitter & Receiver.
8. Study of Cryptography & Scrambling.

Course Outcomes:

At the end of this course, the students will able to do following:

1. Understand the basis of Communication System and its components
2. Design and implementation of a Communication System

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents

Semester V

Course Title: UNIX/LINUX & Shell Programming Lab **Max Marks: 50**
Course Code: CSE-533 **University Exam:25**
Duration of Exam: 2 hours **Internal Assessment: 25**

The lab course will address the demand for Information technology professionals with UNIX training and experience.

1. Using the visual editor (vi) and the Pico editor.
2. Setting file and directory permissions.
3. Controlling user processes.
4. Managing, printing, and archiving large files.
5. Accessing and touring graphical desktops.
6. Administering a Linux PC system.
7. General administration issues, root account, creating user in Linux, changing password, deleting user, disabling user account, Linux Password & Shadow File Formats System Shutdown and Restart creating groups, Custom Configuration and administration issues.
8. Practicing various Commands, Using various editors, Shell programming, Networking and TCP/IP on Linux.
9. Common Network Troubleshooting on Linux.
10. FTP and Telnet settings, Web server configuration.

Lab Outcomes:
Upon completion of this course, the student will be able to:
1. You will be able to run various UNIX commands on a standard UNIX/LINUX Operating system (We will be using Ubuntu flavor of the Linux operating system).
2. You will be able to run C / C++ programs on UNIX.
3. You will be able to do shell programming on UNIX OS.
4. You will be able to understand and handle UNIX system calls.

Note: This is only the suggested list of experiments. Instructor may frame additional experiments relevant to the course contents

Semester VI

Course Title: Theory of Automata **Max Marks: 100**
Course Code: CSE–621 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objectives: The main objectives of the course are:

- Studying several formal mathematical models of computing and their relationship with the formal language.
- Understanding the regular languages and context free languages that help to understand the working of compilers as well as programming languages.
- Develop the understanding about the certain problems that are not solvable by a computer system, and others are also not admitted an efficient algorithm.
- Developing the mathematical skills to solve various problems.
- Understand the Decidability and Undecidability of various problems

Unit-I

Introduction: Alphabets, Strings and Languages; Automata and Grammars.

Machines: Basic Machine, FSM, Transition Graph, Transition Matrix, Deterministic and Non-Deterministic FSM"S, Equivalence of DFA and NDFA, Mealy & Moore Machines, Minimization of Finite Automata, Two-Way Finite Automata.

Unit-II

Regular Sets and Regular Grammars: Regular Sets, Finite Automata and Regular Expression, Pumping Lemma and Regular Sets, Application of Pumping Lemma, Closure Properties of Regular Sets.

Formal Grammars & Languages: Basic Definitions and Examples of Languages, Chomsky Hierarchy, Regular Grammars, Context Free & Context Sensitive Grammars, Normal Forms -CNF and GNF, Binary Operations on Languages.

Unit-III

Pushdown Automata: Formal Definition, Behavior and Graphical Notation, Instantaneous Descriptions and Language of PDA. Equivalence of PDAS and CFGS.
Linear Bounded Automata: Context Sensitive Language and Linear Bounded Automata

Unit-IV

Turing Machines: TM Model, Representation and Languages Acceptability of TM. Design of TM, Universal TM & Other Modification, Composite & Iterated TM. Properties of Recursive & Recursively Enumerable Languages, Universal Turing Machine and an Undecidable Problem

Unit-V

Decidability: Post's Correspondence Problem, Rice"s Theorem, Decidability of Membership, Emptiness and Equivalence Problems of Languages. Time and Tape Complexity Measures of Turing Machines, Random Access Machines, the Classes P and NP, NP-Completeness, Satisfiability and Cook's Theorem.

Course Outcomes:
At the end of this course, the students have ability to:

1. Apply the basic knowledge of computing and mathematics appropriate to the discipline.
2. Apply mathematical foundation, algorithm design, and theory of computer science to the modeling and designing of computer based system.
3. Apply the knowledge of theoretical computer science to design and development of compilers and system software.
4. Understand the solvable and unsolvable problems

5. Understand Decidable and Undecidable problems

Text Books:

1. **John E. Hopcroft, Jeffery Ullman**, Introduction to Automata theory, Langauges & Computation, Narosa Publishers.
2. **Xavier S. P. E**., Theory of Automata and Formal Languages, New Age Intl.2005Ed.

References:

1. **E. V. Krishnamurthy**, Introductory Theory of computer science.
2. **K. L. P. Mishra**, Theory of computer Science, Prentice Hall of India Pvt. Ltd.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VI

Course Title: Cryptography & Network Security **Max Marks: 100**
Course Code: CSE- 622 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To understand the principles of encryption algorithms: conventional andcryptography. To have a detailed knowledge about authentication, hash functions and application level security mechanisms.

Unit-I

Introduction: To Security Attacks, Services and Mechanisms, Introduction to Cryptology. Conventional Encryption Model, Classical Encryption Techniques-Substitution Ciphers & Transposition Ciphers, Cryptanalysis, Stagnography, Stream & Block Ciphers.

Unit-II

Modern Block Ciphers: Block Ciphers Principles, Standards (DES), Strength of DES, Differential & Linear Cryptanalysis of DES, Block Cipher Modes of Operation, Triple DES, AES Encryption & Decryption, Key Distribution, Random Number Generation.

Unit-III

Public Key Cryptography: Principle of Public Key Cryptography, Prime and Relative Prime Numbers, Modular Arithmetic, Key Management. Diffie-Hellman Key Exchange. Elliptic Curve Architecture and Cryptography. Introduction to Number Theory, RSA.

Unit-IV

Authentication and Hash Function: Authentication Recruitments, AuthenticationFunctions and Message Authentication Codes. Digital Signatures, Digital Signature Standard (DSS), Proof of Digital Signatures Algorithm, MD5 Message Digest Algorithm. Secure Hash Algorithm-I (SHA-1), RIPEMD.

Unit-V

Network Security & System Level Security:
Electronics Mail Security: Pretty Good Privacy (PGP), S/MIME IP Security: IP SecurityOverview, Architecture, Authentication Header.
Web Security: Security Socket Layer & Transport Layer Security.
System Security: Intruders, Viruses and Related Threads, Firewall Design Principles.

Course Outcomes:
At the end of this course, the students will able to do the following:

1. Understand cryptography and network security concepts and applications.
2. Apply security principles to system design.
3. Identify and investigate network security threat.
4. Analyze and design network security protocols.
5. Conduct research in network security.
6. Understand different types of attacks and how to prevent them.

Text Book:

1. **William Stallings**,Cryptography and Network Security, Principles and Practices,Prentice Hall of India, Third Edition, 2003.
2. **Johannes A. Buchmann**, Introduction to cryptography, Springer Verlag.

Reference Books:

1. **Kaufman C., Perlman R. & Spenser M.**, Network Security, PHI.
2. **Bellovin S. &Chesvick W.**, Internet Security and Firewalls, Second Edition,Addison-Wesley.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VI

Course Title: Java Programming **Max Marks: 100**
Course Code: CSE-623 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objectives:

1. To understand Object oriented concepts like data abstraction, encapsulation, etc.
2. To solve the real world scenarios using top down approach.
3. To understand various Java programming constructs.

Unit-I

Overview of Java: Introduction to Java, Features of Java, Object Oriented Concepts, Lexical Issues, Data Types, Variables, Arrays, Operators, Java Virtual Machine, Bytecode, Control Statements: Selection, Iteration and Jump Statements, Java Bean Standards.

Unit-II

Classes and Inheritance: Classes, Objects, Constructors, Overloading Method, Access Control, Static and Final Keywords, Nested and Inner Classes, Abstract Class, Object Class, Inheritance, Overriding Methods, Using Super, Dynamic method Dispatch. Packages, Access Protection, Importing Packages, Interfaces.

Unit-III

Exception Handling and Multithreading: Exception Handling, Multiple Catch Clauses, Nested Try and Throw. Multithreading: Thread, Creating a Thread, Creating Multiple Threads, Synchronization, Inter Thread Communication, Deadlock, Suspending, Resuming and Stopping Threads, Multithreading.

Unit-IV

I/O, Applets and String Handing files: Files, Stream Classes, Serialization, Reading Console Input, Writing Console Output, Print Writer Class, Reading And Writing Files, Transient And Volatile Modifiers, Instance of, Strictfp, Native Methods.
Applets: Introduction: Applet Fundamentals, Applet Architecture.
Strings: String Constructors, String Operations, String Buffer, String Builder, StingTokenizer.

Unit-V

Collections Framework: Collections Overview, Collection Interfaces, Collection Classes, Accessing a Collection via Iterator, Map Classes and Map Interfaces, Comparators, Arrays, Legacy Classes and Interfaces, Wrapper Classes.

Course Outcomes:

At the end of semester, the students will able to do the following:

1. Understand and explain the fundamental concepts and features of Java Programming language.
2. Implement the basic principles of Object Oriented Programming which includes inheritance, polymorphism, encapsulation and abstraction.
3. Understand the concepts of Exception Handling and Creating multiple threads along with the communication between the threads.
4. Implementing Applets and understanding various Stream classes in java.
5. Implementing Collections and its different Interfaces and Classes.

Text Books:

1. **P. Naughton& H. Schildt**, Java2 (The Complete Reference), 3rd Edn, TMH 1999.
2. **K. Arnold & J. Gosling**, The Java Programming Language, 2nd Edn, AddisonWesley, 1996.

Reference Books:

1. **Cay S. Horstmann, Gary Cornell**, Core Java 2 Volume I Fundamentals, 5th Edn.PHI, 4000.

Note for paper setter: The question paper shall comprise of 10 questions. Twoquestions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VI

Course Title: Design & Analysis of Algorithms **Max Marks: 100**
Course Code: CSE-624 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objectives:

- Analyze the asymptotic performance of algorithms.
- Write rigorous correctness proofs for algorithms.
- Demonstrate a familiarity with major algorithms and data structures.
- Apply important algorithmic design paradigms and methods of analysis.
- Synthesize efficient algorithms in common engineering design situations.

Unit-I

Introduction to Algorithm: Areas of Study of Algorithms, Algorithm Design Paradigms, Concept of Algorithmic Efficiency, Run Time Analysis of Algorithms, Asymptotic Notations (O, Ω, Θ).

Divide and Conquer: Structure of Divide and Conquer Algorithms: Examples; Binary Search, Finding the Maximum and Minimum, Merge Sort, Quick Sort, Strassen"s Matrix Multiplication; Analysis of Divide and Conquer Run Time Recurrence Relations.

Unit-II

Greedy Method: Overview of the Greedy Paradigm, Examples of Exact Optimization Solution (Minimum Cost Spanning Tree Using Prim`s and Kruskal`s Algorithms), Approximate Solution (Knapsack Problem), Single Source Shortest Paths.

Unit-III

Dynamic Programming: Overview, Difference between Dynamic Programming andDivide and Conquer, Applications: Shortest Path In Graph (Multistage Graph, All-Pairs Shortest Paths, Single-Source Shortest Paths: General Weights), Matrix Chain Multiplication, Traveling Salesman Problem, Longest Common Subsequence Problem.

Unit-IV

Graph Searching and Traversal: Overview, Binary Tree Traversal, Graph Traversal Methods (Depth First and Breadth First Search).
Back Tracking: Overview, 8-Queens Problem, 0/1 Knapsack Problem.

Unit-V

Brach And Bound: LC Searching, Bounding, FIFO Branch and Bound, LC Branch and Bound Application: 0/1 Knapsack Problem, Traveling Salesman Problem.

Basic Concepts of Complexity Classes. P, NP, Polynomial vs. Non-Polynomial Time Complexity, Reducibility, NP-Hard and NP-Complete Classes.

Course Outcomes:

At the end of this course, the students will able to do the following:

1. Analyze running times of algorithms based on asymptotic analysis and describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Synthesize divide-and-conquer algorithms. Derive and solve recurrence relation.
2. Describe the greedy paradigm and explain when an algorithmic design situation calls for it. For a given problem develop the greedy algorithms.
3. Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. For a given problems of dynamic-programming

develop the dynamic programming algorithms, and analyze it to determine its computational complexity

4. Describe the backtracking paradigm and explain when an algorithmic design situation calls for it. For a given problem develop the backtracking algorithms. Perform graph traversals using different methods.
5. Describe the branch-and-bound paradigm and explain when an algorithmic design situation calls for it. For a given problem develop the branch-and-bound algorithms and also have an idea to solve the globally recognize unsolvable problems.

Text Books:

1. **Horowitz E., Sahni S., &Rajasekaran S.**, Fundamental of Computer Algorithms,Galgotia Publication
2. **Basse Sara, Gelder A. V.**, Computer Algorithms, Addison Wesley.

Reference Books:

1. **Cormen T. H., Leiserson, Rivest and stein**, Introduction of Computer algorithm,PHI.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VI

Course Title: Management Information Systems **Max Marks: 100**
Course Code: CSE- 625 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this subject is to understand the concept of MIS in terms of its various components and as an integrated system.

Unit-I

Introduction: Definition and Importance of MIS, Evolution of MIS, Concept of MIS, Function of MIS, Characteristics of MIS, Managerial Functions, Management Hierarchy, System: Elements of a system, Cybernetic System.

Unit-II

Structure of MIS: MIS structure based on Operating Elements, MIS structure based on Decision Support, MIS structure based on Management Activities, MIS structure based on Organizational Function, Synthesis of MIS Structure: Conceptual and Physical Structure.

Unit-III

Classification of MIS & Information Concept: MIS Classification: Operation Support System, Management Support System and Other Support System. Data and Information, Characteristics of Information, Quality of Information, Classification of Information: John Dearden Classification, Classification in terms of Application and Classification on the basis of usage. Methods of Data and Information Collection, Methods to Avoid misuse of Information.

Unit-IV

Decision-Making and DSS: Types of Decisions: Purpose of Decision Making, Level of programmability, Knowledge of outcomes. Decision Making Models: Simon"s Model of Decision Making and Implicit Favorite Model. Decision Support System: Elements of DSS, Objective of DSS, Characteristics of DSS, Classification of DSS.

Unit-V

Enterprise Resource Planning: Introduction, Main Features of ERP, Evolution of ERP, General Model of ERP, Benefits of ERP, Role of Consultants ,Vendors and Users in ERP,ERP Implementation Methodology.

Course Outcomes:

At the end of this course, the students will able to do the following:

1. Understand the concept and function of MIS.
2. Understand the structure of MIS.
3. Understand the methods of data and information collections, Characteristics of Information and its qualities
4. Understand the decision making models and DSS
5. Understand the ERP model and its implementation steps

Text Books:

1. **D. P. Goyal**, MIS**,** Macmillan Publishers.
2. **Davis and Olson**, MIS, TMH.
3. **Vinod Kumar Garg**, ERP, PHI Learning Pvt. Ltd.

Reference Books:

1. **Sangeeth Gupta**, MIS.
2. **CSV Murthy**, MIS, Himalaya Publishing House.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VI

Course Title: Internet & Web Technology **Max Marks: 100**
Course Code: CSE-626 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To impart basic understanding of the methods and techniques of developing websites.

Unit-I

Internet & Web: History and growth of Internet and Web, Introduction to WWW, Web Servers, Web Browsers and Search Engines, TCP/IP Suite, Cyber laws, Web engineering, Symantec Web Technology.

Unit-II

HTML: Introduction to HTML, Elements of HTML syntax, Head and Body sections, Building HTML documents, Lists, types and implementation of lists, Hyperlinks. Presentation and control: Images, Image as buttons, Image maps, Text, Colors and Backgrounds, CSS, Tables: Use of table tags.

Unit-III

Frames: Developing Web pages using frames. Interactivity: Forms, DHTML, JavaScript, Use of Java Applets.

Unit-IV

Security: Principles of security, Web Security: Cryptography, Digital certificates, Digital Signatures, Secure Socket Layer, Network Security: Firewalls, IP Security, Virtual Private Networks.

Unit-V

Wireless Internet: Mobile IP, Mobile TCP, GPRS, Wireless Application Protocol (WAP).Introduction to server side programming: CGI, ASP, JSP, Servlets.

Course Outcomes:
At the end of this course, the students will able to do the following:

1. Understand the basic principles of web designing
2. Build an attractive websites for various applications as per the requirements
3. Understand the various issues of internet security and their implementation
4. Build dynamic web pages using JavaScript
5. Understand the concepts of server side programming

Text Books:

1. **Thomas Powell,** Complete Reference HTML/XHTML.
2. **S. AchyutGodbole and AtulKahate**, Web Technologies, Tata McGraw Hill.
3. **Raj Kamal**, Internet & Web Design, Tata McGraw Hill.

Reference Books:

1. **Xavier C.**, Web Technology & Design, New Age International Publishers.
2. **Ann Navarro**, Effective Web Design, BPB publications.
3. **Stephen E**, Will Train, HTML 4.0, BPB publication.
4. **Xavier C.**, World Wide Web Design with HTML, Tata McGraw Hill.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VI

Course Title: Java Programming Lab **Max Marks: 50**
Course Code: CSE-631 **University Exam:25**
Duration of Exam: 2 hours **Internal Assessment: 25**

Course Objective:: This main Objective of this course is introduced to understand the basic concepts of Java,Class syntax, data types, flow of control, classes, methods, objects, arrays, exception handling, multithreading. Writing and testing applets for inclusion in web pages.

List of Experiments:

1. The Fibonacci sequence is defined by the following rule. The fist two values in the sequence are 1 and 1. Every subsequent value is the run of the two values preceding it. Write a Java program that uses both recursive and non recursive functions to print the nth value in the Fibonacci sequence.
2. Write a Java program that reads on file name from the user then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
3. Write a Java program that reads a file and displays a file and displays the file on the screen, with a line number before each line.
4. Write a program to demonstrate the concept of command line arguments
5. Write a program to demonstrate various string operations like concatenation, string copy etc
6. Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.
7. Write a program to demonstrate exception handling
8. Write a program to demonstrate Applet
9. Write a program to demonstrate the concept of single thread creation and multithread creation, inter thread communication
10. Write a program to create package, use that package in some other program. Use different access modifiers to demonstrate
11. Write a program to demonstrate the concept of ArrayList and LinkList

Course Outcomes

1. Implement Object Oriented Programming Concepts(class, constructor, overloading, inheritance, overriding) in java.
2. Use and create packages and interfaces in a Java program
3. Implement exception handling in Java.
4. Implement Multithreading in java.
5.Use of Input/output Streams in java

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester VI

Course Title: Internet & Web Technology Lab **Max Marks: 50**
Course Code: CSE-632 **University Exam:25**
Duration of Exam: 2 hours **Internal Assessment: 25**

1. **Overview of HTML**
   Overview of HTML, Introduction to HTML, Creating an HTML Document

2. **Formatting text with HTML**
   Paragraph Formatting with HTML, Character Formatting with HTML, Comparing Procedural and Descriptive Formatting

3. **Adding local and remote links**
   Adding Local and Remote Links, Adding Internal Links with the Named Anchor Tag

4. **Adding graphics**
   Linking and Embedding Graphics, **Creating lists in HTML,** Creating Lists and Nested Lists
5. **Creating tables in HTML**
   Creating and Modifying Tables, Creating Advanced Table Elements

6. **Setting Body and Background Attributes**
   Setting Background and Text Colors, **Web Page Design Guidelines,** Web Page Design Guidelines
7. **Adding Links to other Internet Services**
   Links to Non-Web Internet Services

8. **An introduction to Java applets and graphical programming**
   Graphical User Interfaces; Drawing; Components
   Java basics: types, variables, statements, syntax
   Testing and debugging programs
   Setting up applets on the Internet

Learning Outcomes:

At the end of the course, students should be able to:

1. Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's.
2. Have a Good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services.
3. Get introduced in the area of Online Game programming.

Note: This is only the suggested list of experiments. Instructor may add or change some experiments relevant to the course contents.

Semester VII

Course Title: Fund. of Digital Image Processing **Max Marks: 100**
Course Code: CSE–721 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: Study the image fundamentals, mathematical transforms necessary for image processing, image enhancement techniques, image compression procedures.

Unit-I

Introduction: Digital Image Representation, Fundamental Steps in Image Processing. Elements of Digital Image Process Systems, Application of Digital Image Processing: Medical Science, Industries & Security. Relationship between Pixels. Brief Introduction to Image Data Types and File Formats; 1-Bit Images, 8-Bit Gray Level Images, 8-Bit Color Images, 24-Bit Color Images, Color Lookup Tables, Formats; GIF, JPEG, PNG, TIFF.

Unit-II

Image Enhancement in the Spatial Domain: Background, Some Basic Grey Level Transformations, Histogram Processing, Basics of Spatial Filtering: Smoothing Using Linear/Non-Linear Spatial Filters, Sharpening Spatial Filters; Second Derivative (Laplacian), First Order Derivative (Gradient).

Unit-III

Image Enhancement in the Frequency Domain: Background, Introduction to the 2D-Discrete Fourier Transform and its Inverse, Basics of Frequency Domain Filtering, Image Smoothing Frequency Domain Filters, Image Sharpening Frequency Domain Filters.

Unit-IV

Image Compression: Coding Redundancy, Inter-Pixel Redundancy, Fidelity Criteria,Image Compression Models, Error-Free Compression, Variable Length Coding, Bit-Plane Coding, Wavelet Coding, Digital Image Watermarking, Image Compression Using Discrete Cosine Transform (JPEG).

Unit-V

Image Segmentation: Point, Line and Edge Detection, Edge Linking and Boundary Detection, Thresholding: Global Thresholding, Local Thresholding, Region Based Segmentation: Region Growing, Region Splitting & Merging.

Course Outcomes:

At the end of this course, the students will able to:

- Mathematically represent the various types of images and analyze them.
- Process images for the enhancement of certain properties or for optimized use of the resources in spatial domain using various filters.
- Process images for the enhancement of certain properties or for optimized use of the resources by using various frequency domain filters .
- Develop and use various algorithms for image compression.
- Develop and use various algorithms for image segmentation.

Text Books:

1. **Gonzalez R. & Wood E.R.**, Digital Image Processing, Prentice Hall India.
2. **JAIN R. K.**, Fundamentals of Image Processing.

Reference Books:

1. **Low Andrian**, Introductory Computer Vision and Image Procession, TMH
2. **Robert Scholkoff& John Willey & Sons**, Pattern Recognition-Statistical,Structural and neural approach.
3. **Pratt W.K.**, Digital Image Processing, McGraw Hill.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VII

Course Title: Entrepreneurship Dev & Management **Max Marks: 100**
Course Code: CSE-722 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To give an overview of who the entrepreneurs are and what competences are needed to become an entrepreneur and to create an awareness of the need for systematic management of projects.

Unit-I

Entrepreneurship Development: Meaning, Objectives, Type of Entrepreneurs, Importance of Entrepreneurship Training, Factors affecting Entrepreneurship, Linkage between Entrepreneurship and Economic Development, Problem of Increasing Unemployment, Balanced Regional Growth, Harnessing Locally Available Resources, New Industrial Policy and Innovation in Enterprises.

Unit-II

Entrepreneurship Support System: Small Industries Development Bank of India, Small Industries Service Institute, State Small Industries and Export Corporation, District Industrial Centres and other Supporting Agencies.

Unit-III

Project Report Preparation: Identifying Business Opportunities, Project Report and its Importance, Various Contents of Project Report: Managerial and Entrepreneurial Capabilities, Socio-Economic Benefits, Demand Analysis, Technical Feasibility and Financial Viability.

Unit-IV

Introduction to Marketing Management: Brief Introduction to various types of Product Strategies, Pricing Strategies, Channel Strategies and Promotional Strategies.
Introduction to Production Management: Types of Production Systems, Production Planning and Control, Functions of Production Manager and Materials Management.

Unit-V

Introduction to Human Resource Management: Manpower Planning, Recruitment, Selection, Placement and Induction, Training and Development, Compensation.
Introduction to Financial Management: Source of Finance and Working Capital Management.

Course Outcomes:
At the end of this course, the students will able to do following:

- Have the ability to discern distinct entrepreneurial traits
- Understand the systematic process to select and screen a business idea
- Understanding the market strategy and constraints for new business ideas
- Design strategies for successful implementation of ideas
- Write a successful business plan

Text Books:

1. **Holt David H**, Entrepreneurship: New Venture Creation, PHI (4000).
2. **Saini Jasmer Singh**, Entrepreneurship Development Programmes and Practices,Deep and Deep Publications, New Delhi (1997).

Reference Books:

1. **Dollinger**, Entrepreneurship Strategies and Resources, Pearson Education (4003).

2. **Jose Paul & Kumar Ajith N**, Entrepreneurship Development and Management,Himalaya Publishers, New Delhi (4000).
3. **Hisrich Robert D and Micheal Peters P**, Entrepreneurship, TMH, (4002).

Note for paper setter: The question paper shall comprise of 10 questions. Twoquestions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VII

Course Title: Computer Based Numerical Techniques **Max Marks: 100**
Course Code: CSE–723 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective:*The objective of this course is to introduce students to the various numerical techniques which find their applications in almost every sphere of Science and Engineering.*

Unit-I

Introduction: Errors and Significant Digits. Algebraic Equations: Bisection Method, Secant Method, Newton Raphson Method, Graeffe"s Root Squaring Method, Regula-Falsi Method

Unit-II
Solution for Systems of Equations: Gauss Elimination, Gauss Jordan and Partition Method for Linear System of Equations.

Unit-III
Interpolation: Introduction. Forward, Backward, Central and Divided Differences, Newton`s Formula for Equal and Unequal Intervals. Lagrange`s Interpolation Formula. Sterling`s and Bessel`s Formula.

Unit-IV

Numerical Integration and Differentiation: Introduction. Trapezoidal Rule, Simpson`s 1/3 Rule, Simpson`s 3/8 Rule. Gaussian Integration.

Unit-V

Difference Equations and their Solutions: Numerical Methods, Taylor Series Methods, Euler`s Method, Range Kutta Method, Predictor Corrector Method, Adams Bashforth Method.

Course Outcomes:
At the end of this course, the students will able to do the following:
1. Understand Various Numerical Techniques and their applications.
2. Implement various numerical solution algorithms using c programming.
3. Be familiar with calculations and interpretation of errors in numerical method.
4. To learn various integration and differentiation formulas in the field of computer science and engineering.
5. Understanding the implications of approximations.

Text Books:

1. **Balagurusamy**, Numerical Methods, TMH.
2. **V. Rajaraman**, Introduction to Numerical Methods, TMH.

Reference Books:

1. **Schilling**, Applied Numerical Methods for Engineers using MATLAB and C, CengageIndia.
2. **Cheney**, Numerical Mathematics & Computing, Cengage India.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Semester VII

Course Title: Fund of Digital Image Processing Lab **Max Marks: 50**
Course Code: CSE–731 **University Exam:25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of Experiments:

1 Working with Image Processing Toolbox

2 Importing and Exporting Images

3 Pre- and Post-Processing Images

4 Enhancing Images

5 Image Transforms

6 Image Conversions

7 Analyzing Images

8 Displaying and Exploring Images

9 Spatial Transformations and Image Registration

10 Implementation of image compression Techniques.

11 Implementation of image Segmentation Techniques.

Course Outcomes:

At the end of this course, the students able to do the following:

1 Understanding of various techniques for working on images
2 Simulation on images using Image Processing Toolbox
3 Design and Implementation of image compression Techniques.
4 Design and Implementation of image Segmentation Techniques.

Required Products
MATLAB.

Related Products
Image Acquisition Toolbox. Acquire ,Mapping Toolbox, Signal Processing Toolbox.

Note: This is only the suggested list of practical. Instructor may frame additional practical relevant to the course contents.

Semester VII

Course Title: Computer Based Numerical Tech Lab **Max Marks: 50**
Course Code: CSE–732 **University Exam:25**
Duration of Exam: 2 hours **Internal Assessment: 25**

List of Experiments:

1. Bisection method.
2. Secant method.
3. Newton Raphson Method.
4. Root Squaring Method.
5. Guass Elimination.
6. Guass Jordan method.
7. Forward, backward, central and divided differences.
8. Newton"s formula for equal and unequal intervals.
9. Lagrange"s Interpolation formula.
10. Sterling"s and Bessel"s formula.
11. Trapezoidal rule.
12. Simpson"s 1/3 rule.
13. Simpson"s 3/8 rule.
14. Gaussian Integration.
15. Taylor series methods.
16. Euler"s method.
17. Range Kutta method.
18. Predictor Corrector method.
19. Adams Bashforth method.

Lab Outcomes:
After the completion of the course, students will be able to:

1. Demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions to otherwise intractable mathematical problems.
2. Apply numerical methods to obtain approximate solutions to mathematical problems.
3. Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of differential equations.

Note: This is only the suggested list of practical. Instructor may frame additional practical relevant to the course contents.

Semester VII

Elective-I & II

Course Title: Distributed Computing **Max Marks: 100**
Course Code: CSE–741 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this course is to introduce students to the fundamentals and techniques of distributed computing. Students are expected to develop distributed applications using latest technologies.

Unit-I

Introduction: Introduction to Distributed System; Goals, Hardware Concepts, SoftwareConcepts and Client-Server Model. Examples of Distributed Systems.

Unit-II

Process and Interprocess Communication: Communication: Layered Protocols, Remote Procedures Call, Remote Object Invocation, Message-Oriented Communication. Processes: Threads, Code Migration, Software Agent.

Unit-III

Naming & Synchronization: Naming: Naming Entities, Locating Mobile Entities, Removing Un-Referenced Entities.
Synchronization: Election Algorithms, Mutual Exclusion, Distributed Transactions.

Unit-IV

Consistency and Replication: Consistency and Replication: Introduction, Data Centric Consistency Models, Client Centric Consistency Models, Distribution Protocols.
Fault Tolerance; Introduction, Process Resilience, Reliable Group Communication. Distributed Commit.

Unit-V

Security Policies: Security: Introduction, Secure Channels, Access Control, Security Management.

Course Outcomes:
At the end of this course, the student will able to do following:

- Understanding distributed Database Architecture & Distributed Database Design.
- Understanding the concepts of distributed operating systems & the algorithms related to them.
- Understanding Distributed Transaction & Concurrency Control Mechanism.
- Understanding the concepts of Distributed File Systems & Distributed Objects & Remote Invocation
- Understanding the basic concepts of Grid Computing & Cloud Computing

Text Book:

1. **Tannenbaum A. S.**, "Distributed Systems: Principles and Paradigms", PHI.
2. **M. Singhal& N. Shivaratri**, Advanced Concepts in Operating Systems, TMH.

Reference Book:

1. **G. Coulouris, J. Dollimore, and T. Kindberg**, Distributed Systems: Conceptsand Design, Pearson Education.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Grid Computing **Max Marks: 100**
Course Code: CSE-742 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The aim of the subject is to acquaint the students with the grid computing technology and its impact on engineering sciences.

Unit-I

Introduction: Why Computational Grids? A Discussion of the Need, Potential Users and Techniques for Use of Grids. Grid Requirements of End Users, Application Developers, Tool Developers, Grid Developers and System Managers.

Unit-II

Grid Architecture: Networking Infrastructure, Protocols and Quality of Service. Computing Platforms. Operating Systems and Network Interfaces. Compilers, Languages and Libraries for the Grid.

Unit-III

Grid Scheduling: Grid Scheduling, Resource Management, Resource Brokers, Resource Reservations. Instrumentation and Measurement, Performance Analysis and Visualization.

Unit-IV

Security, Accounting and Assurance: The Globus Toolkit: Core Systems and Related Tools such as the Message Passing Interface Communication Library, The Remote I/O (RIO) Library and the Nimrod Parameter Study Library.

Unit-V

Grid Portal Development: Application Types: Geographically Distributed, High-Throughput, On Demand, Collaborative and Data Intensive Supercomputing. Computational Steering. Real-Time Access to Distributed Instrumentation Systems.

Course Outcomes:
At the end of this course, the students will able to do the following:

- Understand the need for and evolution of Grids in the context of processor- and data-intensive applications
- Be familiar with the fundamental components of Grid environments, such as authentication, authorization, resource access, and resource discovery
- To understand the technology and tool kits for facilitating grid computing
- Design and implement Grid computing applications using Globus or similar toolkits
- Justify the applicability or non-applicability of Grid technologies for a specific application

Text Books:

1. **Craig Fellenstein**, Grid Computing, TMH
2. **Janakiram**, Grid Computing Models, TMH.

Reference Books:

1. **Jaya Krishna**, Grid Computing – an introduction, John Wiley.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Advanced Computer Architecture **Max Marks: 100**
Course Code: CSE-743 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this course is to learn the advanced aspects of computer architecture design and analysis.

Unit-I

Introduction: Introduction to Parallel Processing and Pipelining, Array Computers, Multiprocessor Systems, Dataflow Diagrams and Applications of Parallel Processors.

Unit-II

Pipeline Processors: Various Types of Pipeline Processors like Arithmetic Pipelines, Instruction Pipelines etc. Reservation Table, Design of various types of Pipelines, Instruction Pre-Fetching and Branch Handling in Pipelines, Data Buffering and Busing Structures in Pipelines.

Unit-III

Streams: Meaning of Instruction Streams and Data Streams, Classification of Computers Based on these as SISD, SIMD, MISD and MIMD, SIMD Computer Organization, Various types of SIMD Interconnected Networks like Static and Dynamic Networks, Mesh-Connected, Networks, Cube Connected Networks etc. SIMD Matrix Multiplication and Parallel Sorting Algorithms.

Unit-IV

Arrays and Associative Processors: Various types of Array and Associative Processors,Loosely and Tightly Coupled Microprocessors, Various types of Interconnection Networks like Time Shared or Common Bus, Crossbar Switch, Multi-Port Memories etc.

Unit-V

Control Flow and Data Flow Computers: Control Flow and Data Flow Computers, DataFlow Computers, Data Flow Graphs and Languages, Static and Dynamic Data Flow Computers, Systolic Array Architecture.

Course Outcomes:
On successful completion of this course you will be able to:

- Understand the principles of computer system design
- Distinguish the various instruction set architectures
- Understand the operation of performance enhancements such as pipelines, dynamic scheduling, branch prediction, caches, and vector processors
- Describe modern architectures such as RISC, Super Scalar, VLIW (very large instruction word), multi-core and multi-cpu systems
- Compare the performance of the existing architectures
- Improve application performance for different CPU architectures
- Develop applications for high performance computing

Text Books:

1. **V. Carl Hamacher**, Computer Organization, TMH.
2. **John P. Hayes**, Computer Architecture and Organization, TMH.

Reference Books:

1. **Kai Hwang,** Advanced Computer Architecture, TMH.
2. **David A. Patterson and John l. Hennessy**, Computer Organization and Design,Elsware India.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Compiler Design **Max Marks: 100**
Course Code: CSE-744 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The aim of the subject is to help the learners to understand the fundamentals of Compiler Design.

Unit-I

Introduction: Compiler Structure: Analysis-Synthesis Model of Compilation, Various Phases of a Compiler, Tool Based Approach to Compiler Construction. Lexical Analysis: Interface with Input, Parser and Symbol Table, Token, Lexeme and Patterns. Difficulties in Lexical Analysis. Error Reporting. Implementation. Regular Definition, Transition Diagrams, LEX.

Unit-II

Syntax Analysis: CFGS, Ambiguity, Associativity, Precedence, Top Down Parsing, Recursive Descent Parsing, Transformation on the Grammars, Predictive Parsing, Bottom Up Parsing, Operator Precedence Grammars, LR Parsers (SLR, LALR, LR), YACC. Syntax Directed Definitions: Inherited and Synthesized Attributes, Dependency Graph, Evaluation Order, Bottom Up and Top Down Evaluation Of Attributes, L- and S-Attributed Definitions.

Unit-III

Type Checking: Type System, Type Expressions, Structural and Name Equivalence ofTypes, Type Conversion, Overloaded Functions and Operators, Polymorphic Functions. Run Time System: Storage Organization, Activation Tree, Activation Record, Parameter Passing, Symbol Table, Dynamic Storage Allocation.

Unit-IV

Intermediate Code Generation: Intermediate code, postfix notation, three addresscode- quadruples triples, translation of Assignment statement, Boolean Expression, Statements that alter the flow of control.

Unit-V

Code optimization And Generation: Loop optimization, DAG Representation of basicblocks, Global data flow Analysis, Issues in the design of code generator, Peephole optimization, a simple code generator Register Allocation & Assignment.

Course Outcomes:
At the end of the course, the students would be able to

- Learn the fundamentals of the Design of Compilers by applying mathematics and engineering principles
- Design a system for parsing the sentences in a compiler grammar
- Design a system to translate into various intermediate codes
- Analyze the methods of implementing a Code Generator for compilers
- Analyze and Design the methods of developing a Code Optimizer

Text Book:

1. **Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman**, Compilers Principles, Techniquesand Tools, Pearson Education, 2008.
2. **Steven S. Muchnick**, Advanced Compiler Design & Implementation, MorganKaufmann Publishers, 2000.

Reference Book:

1. **David Galles**, Modern Compiler Design, Pearson Education Asia, 2007.
2. **C. N. Fisher and R. J. LeBlanc**, Crafting a Compiler with C, Pearson Education,2000.

Note for paper setter: The Question paper will comprise of ten questions. Two questions shall be set from each unit. The student has to attempt five questions, at least one from each unit.

Course Title: Pattern Recognition **Max Marks: 100**
Course Code: CSE–745 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The aim of the subject is to help the learners to understand the fundamentals of Pattern Recognition.

Unit-I

Introduction to Pattern Recognition, Types of Images, Regular Pattern, Irregular Pattern, Fuzzy Methods. Statistical Pattern Recognition, Feature Selection, Syntactic Pattern Recognition, Clustering and Non-Supervised Learning Methods.

Unit-II

Combined Detection Method, Edge Detection, Edge Linking, Gradient. Laplacian, Line Detection, Method Based, Point Detection, Snake Methods.

Unit-III

Boundary Description Detection, Matching, Merging Segmentation, Smoothing, Splitting of Boundaries Syntactic, Analysis of Region Boundaries and Study of Shape by Region Analysis.

Unit-IV

Explanation of how Fuzzy Approach can be applied to Pattern Recognition, Classificatory Analysis Preprocessing, Feature Detection and Primitive Extraction, Adaptive Classification of Fuzzy Grammar.

Unit-V

Algorithms for Pattern Recognition, Neural Network Fundamentals, Approaches for Pattern Recognition. Simulation Exercises.

Course Outcomes:

At the end of this course, the students will able to do the following:

- Understand the concept of a pattern and the basic approach to the development of pattern recognition and machine intelligence algorithms
- Understand and apply both supervised and unsupervised classification methods to detect and characterize patterns in real-world data
- Describe the strength and limitations of some techniques used in computational Machine Learning for classification, regression and density estimation problems
- Describe fuzzy logic, and its application of pattern recognition
- Implement learning algorithms for supervised tasks
- Conduct, document and present a literature review on a topic related to Machine Learning and Pattern Recognition

Text Books:

1. **RajjanShingal,** Pattern Recognition Techniques & Applications, John Wiley &Sons.
2. **Earl Gose,** Pattern Recognition and Image Analysis, PHI.

Reference Books:

1. **Robert Scholkofe,** Pattern Recognition–Statistical, Structural & Neural approach**,** John Wiley & Sons.
2. **Duda& Harts,** Pattern Classification and Scene Analysis, John Wiley & Sons.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Expert Systems **Max Marks: 100**
Course Code: CSE-746 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The aim of the subject is to provide basic and necessary information about the Expert Systems.

Unit-I

Expert Systems: Definitions Types, Components of an Expert System, Expert System Shells, Architecture for Knowledge Based Systems, Operational Expert Systems, Development Process.

Unit-II

Knowledge Representation Techniques: Logic Frames, Semantic & Nets, etc.

Unit-III

Natural Language Processing: Basic Parsing Techniques, Types of Learning, Inductive Bearing, Explanation Based Learning, Neural Based Learning, Game Playing Examples.

Unit-IV

Planning and Explanation in Expert System: Neural Expert System, Fuzzy Expert System and Real Time Expert Systems.

Unit-V

Implementation Tools: Prolog & Expert System Shell Expert Sys, Etc., Study of Existing Expert Systems-TIERES, AsMycin& AM.

Course Outcomes:
After completing this course, the student should be able to:

- Apply the methodology to transfer human knowledge into an expert system
- Apply knowledge representation and Design a knowledge base
- Understand Natural language processing tools and techniques
- Understand planning and explanation in expert system
- Evaluate Expert System tools

Text Book:

1. **Patterson**, Introduction to AI Expert System, PHI, 2001.
2. **Jackson**, Building Expert System, John Wiley, 2000.

Reference Book:

1. **Joseph C Giarratano**, Introduction to Expert System: Principles and Programming,Vikas Publications, 3rd Edition, 1998.
2. **Peter Jackson**, Introduction to Expert System, Addison Wesley, 1998.
3. **James P Ignigio**, Introduction to Expert System, McGraw Hill, 1990.

Note for paper setter: The Question paper will comprise of ten questions. Two questions shall be set from each unit. The student has to attempt five questions, at least one from each unit.

Course Title: Distributed Database System **Max Marks: 100**
Course Code: CSE-747 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective:

1. The aim is to impart knowledge to students regarding how distributed database functions and how it is different from traditional file system and centralized database.
2. To provide students knowledge about queries and how queries are handled in distributed database.
3. To provide students knowledge regarding deadlocks in distributed database.

Unit-I

Distributed Databases- An Overview: Introduction to Distributed Databases, Comparison of Distributed and Centralized Systems, DDBMS, Global Relations, Fragment and Physical Image, Types of Schemas, Methods of Fragmentation of a Relation, Levels of Transparency in a Distributed System, Integrity Constraints.

Unit-II

Query Processing*:* Representation of Database Operation in form of a Query, Operation in form of a Query, Operations on a Query, Unary and Binary Tree in a Query, Converting a Global Query into Fragment Query, Join and Union Operations Involving a Query, Aggregate Functions, Parametric Queries.

Unit-III

Optimization of Access Strategies: Introduction to Query Optimization, Estimation of Profiles of Algebraic Operations, Optimization Graphs, Reduction of Relation Using Semi-Join and Join Operation.

Unit-IV

Distributed Transaction Management: Properties and Goals of Transaction Management, Distributed Transactions, Recovery Mechanism in case of Transaction Failures, Log Based Recovery, Check Pointing, Communication and Site Failures In Case Of a Transaction and Methods to handle them, Serializability and Timestamp in Distributed Databases.

Unit-V

Concurrency Control & Reliability: Introduction to Distributed Deadlocks, Local and Global Wait for Graphs, Deadlock Detection using Centralized and Hierarchical Controllers, Prevention of Deadlocks, 2 and 3 Phase Locking and Commitment Protocols, Reliability in Commitment and Locking Protocols, Reliability and Concurrency Control, Reliability and Removal of Inconsistency.

Course outcome:

At the end of this course, the students will be able to do the following:

- Differentiate the centralized and distributed database, its architecture. and other differences
- Get knowledge of Query optimization, query trees and graphs.
- How relational schema is fragmented for different locations and various methods to retrieve data from distributed location over a network.

- Understand the various techniques of deadlocks recovery in a distributed database.
- Understand the various techniques to handle transactions in a distributed database.

Text Books:

1. **Ceri Stefano and Pelagatti Guiseppe**, Distributed Databases Principles andSystems, McGraw-Hill International Editions.

Reference Books:

1. **T. Connolly, Begg&Strachan,** Distributed Database Systems, Addition Wesley.
2. **Trindbery Tim**, Distributed Database System**,** John Wiley.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Neural Networks **Max Marks: 100**
Course Code: CSE-748 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The principal objective of this subject is to introduce students to neuralnetworks and fuzzy theory from an engineering perspective

Unit-I

Introduction: Historical Perspective, Basic Neurobiology, Why Artificial Networks? Network Architectures, the Tasks Neural Networks Can Perform, Characteristics of Neural Networks

Unit-II

Basic Neuron Models: Mcculloch-Pitts Model, Radial Basis Function Model, etc, Learning Algorithms. Matlab Simulation Exercises.

Unit-III

Basic Neural Network Models: The Hebbian Hypothesis. Single-Layered Neural Networks, Multilayer Perceptron, Nearest Neighbor Based Multilayer Perceptron, Training of Artificial Neural Networks

Unit-IV

Basic Learning Algorithms: Supervised Learning, Constructive Algorithms, Single-Hidden Layer Algorithms. The Upstart Algorithm. The Cascade Correlation Algorithm. Neural Networks and Temporal Sequences. Sequence Recognition. Sequence Generation. Unsupervised Learning. Competitive Learning. The Back Propagation Algorithm, Self-Organization Learning, Winner-Take-All Competitive Learning, Evolutionary Learning.

Unit-V

Applications: Character Recognition, Signal Restoration, Pattern Recognition. Matlab Simulation Exercises.

Course Outcomes:
At the end of the course, students should be able to understand and appreciate:

- The role of neural networks in engineering, artificial intelligence, and other areas.
- Understanding of basic neural network
- Understanding of the concepts and techniques of neural networks through the study of the most important neural network models.
- Able to evaluate whether neural networks are appropriate to a particular application.
- Able to apply neural networks to particular applications, and to know what steps to take to improve performance.

Text Books:

1. **Jacek M. Zurada**, Introduction to Artificial Neural Systems, PWS Publishing Company, (2001)
2. **S. S Haykin**, Neural Networks: A Comprehensive Foundation, Pearson Education.

Reference Books:

1. **Valluru Rao**, C++ Neural Networks and Fuzzy Logic, Honary Holt & Co*(1998)*
2. **Freeman**, Neural Networks, Pearson Publication (2003).
3. **Rajasekaran&Pai**, Genetic Algorithms ;Synthesis and applications, Prentice Hallof India (2004).

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Display Systems Engineering **Max Marks: 100**
Course Code: CSE-749 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The principal objective of this subject is to introduce students to Display System Engineering.

Unit-I

Introduction to Display Systems: Character of the Display Field, Processing System ,Component System, Data Organization and Display Technology, Structure of the Information Display Technology. Display System Development: High Definition Displays, Aural Component of Visual Realism, Display Systems.

Unit-II

Principle of Vision and Application of Visual Properties: Sources of Illumination, Luminance and Colour, Response of Eye, Photometry Quantities, Colour Representation, Function of Camera, Television System, Video Colorimetry, Video System Characteristics, Working Principle and Display Application of LED, Liquid Crystal and Plasma Devices.

Unit-III

Measuring Display Parameters: Visual Acuity, Contrast, Flicker, Visual Spectrum. Measurement of Colour Displays and Application of Zone Pattern Signal.

Unit-IV

Broadcast Sound Display: Basic Sound, Behavior of Sound Waves, Hearing Concept, Loud Speakers, Basic Stereo, Processing of Audio, Digital Audio, Dolby System, Surround Sound System.

Unit-V

Recording: Video Cassette Recorders, Video Tape Characteristics, Tape Recording andPlayback. Digital Video Disc (DVD): DVD Technology, Disc and Data Details DVD Audio-DVD Video, DVD.

Course Outcomes:
Upon the completion of the course,the students will be able to:

- Recognize and classify the structures of Optical fiber and types.
- Discuss the channel impairments like losses and dispersion.
- Analyze various coupling losses.
- Classify the Optical sources and detectors and to discuss their principle.
- Familiar with Design considerations of fiber optic systems.

Text Books:

1. **Jerry Whitaker**, Electronic Displays Technology, Design, and Applications,McGraw-Hill International Editions. 1994.
2. **H. R. Luxenberg, L. Kuehn**, Display Systems Engineering, TMH.

Reference Books:

1. **Jim Taylor**, DVD Demystified Second Edition, TMH, Edition, 2001.

2. **Michael Talbot Smith**, Broadcast Sound Technology, Second Edition, Butterworth-Heinemann Ltd. 1990.
3. **Ponkove J. I.**, Display Devices Topics in Applied Physics, Vol-40, Springer Verlag,Berlin Heidelberg New York, 1980.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Optical Communication **Max Marks: 100**
Course Code: CSE-750 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To introduce to the students the basic concepts of optical fiber communication system.

Unit-I

Introduction: Overview of Optical Fiber Communication: Basic Concepts, Light wave Components, Principle of Light Transmission, Channel Capacity etc. Nature of Light, Polarization, Basic Laws and Definition, Mode Theory Analysis for Optical Communication, Optical Fiber Modes and Configuration, Wave Propagation in Optical Fiber, Operating Wavelength, Single Mode and Multimode Fibers, V–Numbers, Mode Field Diameter, Numerical Aperture, Refractive Index Profiles.

Unit-II

Signal Degradation in Optical Fibers: Attenuation, Absorption, Scattering Losses, Bending Losses in Optical Fibers. Dispersion in Optical Waveguides, Group Delay, Material Dispersion, Waveguide Dispersion, Intermodal Dispersion and Chromatic Dispersion in Single Mode Fibers.

Unit-III

Optical Sources: Basic Concepts from Semiconductor Electronics, Energy Bands. Light Emitting Diodes: Structure, Principle, Material, Modulation Response, Transient Response. Laser Diodes: Principle of Action, Structure, Efficiency and Characteristics of Laser Diodes. Modulation He–Ne Lasers, DFB Lasers.

Unit-IV

Optical Detectors: Basic Concepts, Photodiodes, PIN Photodiode, Avalanche Photodiode, Detector Response Time, Avalanche Gain, Receiver Noise, Receiver Sensitivity, BER.

Unit-V

Transmission Systems: Overview of Analog and Digital Optical Link, Power Launching and Coupling. Point to Point Link System Consideration: Link Power Budget and Risk Time Analysis.

Course Outcomes:
Upon the completion of the course,the students will be able to:

- Recognize and classify the structures of Optical fiber and types.
- Discuss the channel impairments like losses and dispersion.
- Analyze various coupling losses.
- Classify the Optical sources and detectors and to discuss their principle.
- Familiar with Design considerations of fiber optic systems.

Text Books:

1. **G. Keiser,** Optical Fiber Communication, 3rd Edition, TMH.
2. **D.F. Mynbacv and L. Scheiner,** Fiber Optic Communication Technique, PersonEducation.

Reference Books:

1. **Ghatak& K Thyangarajan,** Introduction to fiber optics, Cambridge university press, 1998.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Advanced Java **Max Marks: 100**
Course Code: CSE-751 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: To emphasize on the basic concepts of advanced Java and web based development.

Unit-I

Introduction: Concepts of Classes and Objects, Constructors, Inheritance, Function Overloading, Polymorphism, Packages and Interfaces, exception handling, file streams and their manipulation.

Unit-II

Design of User Interfaces: Swing, Japplet, Icons and Labels, Text Fields, Buttons,Jbutton Class, Check Box, Radio Buttons, The Container, Panel, Windows, and Frame Classes, Combo Box, Tabbed Panes, Scroll Panes, Trees, Tables, Custom Rendering of Jlist Cells.

Unit-III

JDBC: JDBC Fundamentals, Establishing Connectivity and working with connection interface, working with statements, Creating and Executing SQL statements, working with Result Set Object & Result Set Meta Data.

Unit-IV

Servlets: Introduction to Servlets, Life cycle of Servlets, Creating, Compiling and running servlet, Reading the servlet Parameters, Reading Initialization parameter, Packages-javax. servlet Package, Handling HTTP Request and Response (GET / POST Request), Cookies and Session Tracking.

Unit-V

Java Beans: Java Bean, Installing, Starting Bean Development Kit, Use of JAR files andthe use of Java Beans API.

JSP: JSP Architecture, JSP Access Mode, JSP Syntax Basic (Directions, Declarations, Expression, Scriplets and Comments), JSP Implicit Object, Object Scope, Synchronization Issue, Session Management.

Course Outcomes:
At the end of this course, the students will be able to do the following:

- Understanding and designing of GUI
- Understanding the Java Database connectivity
- Understanding and designing the distributed and web-based applications
- Understanding the Server-side and client-side programming

Text Books:

1. **Gary Cornell and Horstmann Cay S.,** Core Java, Vol I and Vol II, SunMicrosystems Press.
2. **Herbert Schildt**, Java: The Complete Reference, McGraw-Hill.

References:

1. **Philip Hanna,** JSP: The Complete Reference, McGraw-Hill.
2. **Deital and Deital,** Java How to Program, Prentice Hall (2007).

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Course Title: .Net Technologies **Max Marks: 100**
Course Code: CSE-752 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of the course is to enable a student to acquire the knowledge pertaining to fundamentals of .NET Technology.

Unit-I

Introduction: Microsoft .net Platform, Design Goals and Overview.

Common Language Runtime: CLR Environment and Executables, Meta data ,Assemblies, Intermediate Language, CLR Execution.

Programming in .net Framework: Common Programming Model, Features and Languages, Language Integration.

Unit-II

.net Framework Components: Deployment options, Distributed components, COM+services, Message queuing.

Unit-III

Data and XML: ADO.NET Architecture and Benefits, Content components, Managed providers, Datasets and XML.

Unit-IV

Web services: Web services in practice, Web services Framework, Provider, Customerand Security.

Web forms: ASP, ASP.NET, Web Form syntax, Data binding, Use of templates, Statemanagement and scalability, Application development, ASP.NET and Web services.

Unit-V

Windows forms: Introduction, System. Windows. Forms Namespace, Windows Forms development, Windows Forms and Web services.

Course Outcomes:

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

1. Understand the basic frame work of dot net.
2. Ability to design and implement applications and distributed systems on the .NET platform.
3. Understand the database connectivity with application.
4. Design web pages using ASP.NET
5. Understand the window programming using .NET.

Text Books:

1. **Hoang Lam, Thuan L. Thai**, .NET Framework Essentials, O"Reilly Publications.
2. **Joe Duffy,** Professional .Net Framework 2.0, Wrox Library Books.

References:

1. **Jeffrey Richter**, Applied Microsoft .NET Framework Programming, Microsoft Press.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions at least one question from each unit.

Semester VIII

Course Title: Major Project-Phase II **Max Marks: 450**
Course Code: CSE–821 **University Exam: 200**
Internal Assessment: 250

The students are required to complete the Major Project-Phase II during semester VIII. Depending upon the infrastructure, computing and other laboratory facilities the students shall be offered in house project on campus or they can complete their project work in any organization/industry outside the campus. Major Project- Phase II shall be evaluated as per university statues.

Elective-III & IV

Course Title: Embedded Systems **Max Marks: 100**
Course Code: CSE–831 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The aim of the subject is to help the learners to understand the fundamentals of Embedded Systems.

Unit-I

Introduction to Embedded Systems: Hardware and Software Components: Types, Examples, Characteristics and Challenges in Embedded Computing System Design, Embedded System Design Processes.

Unit-II

Architecture of Embedded System: Hardware Components: SOC, Processors, CPU,Types of Memory, Memory Management, I/O Devices and Interfacing. Software Components: Interpreter, Compiler, Assembler, Cross Assembler, RTOS, Languages for Embedded Applications, Hardware and Software Architecture. Examples: Cell Phone, Smartcard, Digital Thermometer.

Unit-III

OS for Embedded Systems: Introduction to Real Time Theory. Operating System Services. Real Time Operating System Concepts. Basic Design using an RTOS. Underground Tank Monitoring System.

Unit-IV

Performance Issues of an Embedded System: CPU Performance. CPU Power Consumption. Analysis and Optimization of CPU Power Consumption Program Execution Time. Analysis and Optimization of Energy and Power. Analysis of Program Size. Hardware Accelerators.

Unit -V

Design Examples: Personal Digital Assistants. Set Top Boxes. Ink Jet Printers. Telephone PBX. Introduction to Micro C/OS-II Operating System and Its Uses.

Course Outcomes:

After completion of the course student will be able to:

- Understand and design embedded systems.
- Learn basic of OS and RTOS.
- Understand types of memory.
- Understand embedded firmware design approaches.
- Design RTOS embedded systems.

Text Books:

1. **Wayne Wolf**, Computer as Components, Principles of Embedded Computing System Design, Harcourt India Pvt. Ltd.,
2. **David E Simon**, An Embedded Software Primer, Pearson Education,

Reference Books:

1. **Raj Kamal**, Embedded Systems, Architecture, Programming and Design, TMH.
2. **Sriram V Iyer, Pankaj Gupta**, Embedded Real time Systems Programming, TMH.
3. **K.V.K.K. Prasad**, Embedded/Real time Systems: Concepts, Design andProgramming, Dreamtech Press.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Artificial Intelligence **Max Marks: 100**
Course Code: CSE-832 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this subject is to complement and broaden what students learn in the subject Artificial Intelligence and Natural Language Processing.

Unit- I

Introduction to Artificial Intelligence. Problem Solving Concepts. Definition of Pattern Recognition. Production System. Problem and Production. System Characteristics. Two Path Problem. Analysis of Artificial Intelligence Techniques. Criteria and Success.

Unit- II

Knowledge Representation. Formal And Non-Formal Logic. Representation Evaluation Criteria. Level Of Representation. Formal Logic Schemes. Resolutions. Predicate And Proportional Logic. Conversion To Clause Form. Semantic Networks. Frames. Scripts. Production Systems.

Unit- III

Problem Solving Algorithms and Fuzzy Logic: Problem Solving Strategies. Dealingwith Uncertainty. Defining the Problem. Control Strategies. Exhaustive Search. Generate and Test. Matching. Weak Methods. Hill Climbing. Breadth and Depth First Searches. Search Algorithms Based on Probability. Fuzzy Reasoning.

Unit- IV

Neural Networks: Principles and Promises. Pattern and Pattern Recognition Tasks. Conventional Methods Scope.

Unit- V

Expert System: Introduction to Expert System Development. Matlab Simulation.

Course Outcomes:
At the end of this course, the student will be able to do following:

- To learn different forms of logic
- Deal with inconsistencies and uncertainties of logic
- Be familiar with informed and uniformed searching techniques
- To study different matching techniques
- To learn pattern recognition and expert systems

Text Books:

1. **Flante Rich,** Artificial Intelligence.
2. **Nilson and Springer**, Principles of Artificial Intelligence.

Reference Books:

1. **David W. Rolston**, Principles of Expert System Development

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Adv Microprocessors & Microcontrollers **Max Marks: 100**
Course Code: CSE-833

University Exam: 60
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The aim of the subject is to provide basic and necessary information about the Advanced Microprocessors and Microcontrollers.

Unit-I

Introduction: Architecture of 8086 Microprocessor. Special Functions of General Purpose Registers. 8086 Flag Register and Function of 8086 Flags. Addressing Modes of 8086. Instruction Set of 8086. Assembler Directives, Simple Programs, Procedures and Macros.

Unit-II

Pin Diagram of 8086: Pin Diagram of 8086, Interrupts of 8086, Minimum Mode and Maximum Mode of Operation. Timing Diagram. Memory Interfacing.

Unit-III

Assembly Language Programs of 8086: Assembly Language Programs of 8086Involving Logical, Branch & Call Instructions, Sorting, Evaluation of Arithmetic, Expressions, String Manipulation.

Unit-IV

Micro-Controllers: Historical Background Of Micro-Controllers, Introduction To 8051Micro-Controllers, Architectural Details, Bus Timing, Memory Organization, Memory Map Expansion, Fetch/Execute Sequences, External Memory Access, Addressing Modes of 8051.

Unit-V

8051: Hardware description of 8051, Instruction Formats, Instruction Sets, Interrupt Structure& Interrupt Priorities, Port Structures & Operation, Linear Counter Functions, Different Modes of Operation and Programming Examples, Interfacing, Adding External Devices to the Bus, Some Practical Examples of Interfacing.

Course Outcomes:
At the end of this course, the students have ability to:

- Understand the architecture of 8086
- Impart the knowledge about the instruction set and pin diagram of 8086
- Understand and apply the fundamentals of assembly language
- Understand the basic idea about the data transfer schemes and its applications
- Understanding different peripheral devices and their architecture

Text Books:

1. **A.K.Ray and K.M.Bhurchandi**, Advanced microprocessor and Peripherals, TMH.
2. **Deshmukh**, Micro Controllers, Tata McGraw Hill, Edition.

Reference Books:

1. **Douglas U. Hall**, Micro Processors & Interfacing, 2007.
2. **Liu and GA Gibson,** Micro Computer System 8086/8088 Family Architecture, Programming and Design, PHI, 2nd Ed.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Bio-Informatics **Max Marks: 100**
Course Code: CSE-834 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective: The basic objective is to give students an introduction to the basic practical techniques of bioinformatics. Emphasis will be given to the application of bioinformatics and biological databases to problem solving in real research problems. The students will become familiar with the use of a wide variety of internet applications, biological database and will be able to apply these methods to research problems.

Unit-I

Introduction to Bioinformatics and Computational Genomics, Biological Databases, Kinemages for Biological Structure, Dynamic Programming Sequence Alignment, BLAST, FASTA.

Unit-II

3D Structure Computations, NMR, Xtallography, RNA Secondary Structure, Introduction to Microarrays, Review of Structural Genomics, Microarray Clustering and Classification, Vector Machine Applications in Bioinformatics.

Unit-III

Terminologies and Ontologies, Multiple Sequence Alignment, 1D Motifs, Algorithms and Databases, 3D Structure Alignment, MUSTA Algorithm for Geometric Hashing and Multiple Alignments.

Unit-IV

Hidden Markov Models, Molecular Energetics and Dynamics, Protein Structure Prediction, Genetic Networks, Gene Finding Algorithms.

Unit-V

Comparative Genomics Algorithms, Genome Alignment, Phylogenetic Algorithms, Natural Language Processing, Proteomics, 3D Motifs & Final Thoughts.

Course Outcomes:
At the end of this course, the students will be able to do the following:

- Explain the basic principles that underpin Bioinformatics analyses, and apply these principles when analysing biological data;
- Survey a selected field within Bioinformatics, synthesise information from primary literature, and coherently report your findings in a written document;
- Analyse biological data using a variety of Bioinformatics tools; and
- Interpret correctly the outputs from tools used to analyse biological data and make meaningful predictions from these outputs.

Text Books:

1. **David Mount**, Bio-informatics: Sequence and Genome analysis, 2ed, Cold SpringHarbor Laboratory Press.

Reference Books:

1. **Srinivas**, Bio-metrics: A Modern Approach, PHI.
2. **Bergen**, Bio-informatics Computing, PHI.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Data Mining and Data Warehousing **Max Marks: 100**
Course Code: CSE-835 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Course Objective:

1. To introduce the basic concepts of Data Warehouse and Data Mining techniques.
2. Examine the types of the data to be mined and apply pre-processing methods on raw data.
3. Learning different classification algorithms for data mining.

Unit-I

Introduction: Dimensional Modeling: Goals of a Data Warehouse, Components of a Data Warehouse, Operational Data Store, Fact and Dimension Tables Star, Snowflake and Hybrid Schemas, Confirmed Facts and Dimensions. Slowly Changing Dimensions, Casual Dimensions, Helper Tables and Surrogate Keys.

Unit-II

Data Warehouse: Introduction, Sources, Users and Applications, Software Architecture and Design, Data Sub System, Data Granularity Model, Characteristics of a Data Warehouse, Data Warehouse Bus Architecture.

Unit-III

Meta Data: Introduction, Need, Types and Metadata Versioning, Metadata Process Concept. Data Marts and Characteristics, Decision Support System and Uses, Using Data Warehouse for DSS, Comparison between OLTP and OLAP.

Unit-IV

Populating a Data Warehouse: Survey of Data Warehouse, Populating Issues ,Architecture Solution Models, Techniques and Solutions for constructing a Central Data Warehouse, Extract, Transform and Build Methods, Managing a Data Warehouse Environment.

Unit-V

Introduction to Data Mining and Uses: Introduction to Data Mining and Uses. Introduction to Decision Trees and its Working. Data Mining Techniques: Concept of Neural Networks. Nearest Neighbor & Clustering. Genetic Algorithms and Data Visualization Concepts.

Course Outcomes

Students who complete this course should be able to

1. Describe the fundamental concepts, benefits and problem areas associated with data warehousing.
2. Describe the various architectures and main components of a data warehouse.
3. Design a data warehouse, and be able to address issues that arise when implementing a data warehouse.
4. Ability to apply acquired knowledge for understanding data and select suitable methods for data analysis.
5. Applicability of various classification algorithms in data mining for real-world problems.

Text Books:

1. **Gray & Smith**, Data Warehousing handbook, CRS, PHI.
2. **Berson**, Data Warehousing, Data Mining & OLAP.

Reference Books:

1. **Mallach**, Data Warehousing System, McGraw Hill.
2. **Prabhu**, Data Warehousing–Concepts, Techniques, Products and Applications, 2^{nd}Edn, PHI.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Multimedia **Max Marks: 100**
Course Code: CSE-836 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Unit-I

Introduction to Multimedia, Multimedia Networks, Multimedia Information Representation, Media & Data Streams, Image, documents, Video & Audio File Formats & their representation.

Unit-II

Audio & Video Compression, Text & Image Compression. Multimedia Communications , Networks & Standards relating to Interpersonal Communication.

Unit-III

Interactive Applications over the Internet, Reference Models, Multimedia Operating System & Synchronization, Multimedia Applications & Multimedia Databases.

Unit-IV

Broadband ATM Networks, Protocol Architecture, ATM LANs, ATM MAN"s, High Speed PSTN, Access Technologies.

Unit-V

Architectures and Issues for Distributed Multimedia Systems: Distributed multimedia systems, Synchronization, QoS Architecture, The role of Standards, A frame work for Multimedia systems.

Course Outcomes:
At the end of this course, the student able to do the following:

- Understand the fundamental of multimedia system
- Understanding and application of various data compression techniques
- Design a interactive application using multimedia techniques
- Designing of a multimedia system for the distributed environment

Text Books:

1. **Steinmetz R & K. Nahrstedt,** Mutimedia Computing, Communication & Application
2. **John F. Koegel Buford,** "Multimedia Systems" , Pearson Education.
3. **Fred Halsall**,Multimedia Communication

References:

1. **JeffcoateJ** ,Multimedia in Practice - Technology & Application .
2. **Fred Halsall,**"Multimedia Communications", Pearson Education.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Wireless Networks **Max Marks: 100**
Course Code: CSE-837 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The aim of the subject is to make the students aware of the latest technologies in the field of Wireless Networks.

Unit-I

Cellular wireless Networks:- Introduction: Applications, Replacement of wired Networks, principles of cellular networks, first generation analog, second generation TDMA, second generation CDMA and third generation systems.

Unit-II

Satellite communications:-History, Applications, satellite parameters & configurations-GEO, LEO, MEO, capacity allocation (frequency division, time division), routing, localization, Handover.

Unit-III

Wireless LANS: - Infrared LANS, spread spectrum LANS, narrowband microwave LANS,IEEE 802.11 wireless LAN standard, Bluetooth and IEEE 802.15, wireless local loop.

Unit-IV

Mobile Network Layer:-Mobile IP, Entities and terminology, IP packet delivery, Agent advertisement and discovery, Registration, tunneling and encapsulation, optimizations.

Unit-V

Ad Hoc wireless Networks: - what are Ad Hoc networks? Difference between cellular and Ad Hoc wireless networks, applications, technical & research challenges, Important issues in Ad Hoc wireless networks, the need for MAC, MAC layer protocols for Ad Hoc wireless Networks, introduction to quality of service (QoS) in Ad Hoc wireless networks.

Course Outcome:

On successful completion of this unit students will be able to:

- Identify the basic concept of wireless networks, channel coding, and cellular concepts;
- Compare and contrast LEO, MEO and GEO. Routing and handover in satellite communication
- Understand various wireless LAN technologies
- Understand the terminologies in mobile network layers and the process of packet discovery and registration in network layer.
- Compare and contrast between cellular and Ad Hoc wireless networks, areas of its applications and challenges

Text Books:

1. Stallings William, ***Wireless Communications & Networking***, PHI.
2. PahlavanKaven, ***Principles of Wireless Networks,***, Pearson Education India.

References:

1. Nicopolitidis, H. S. Obaidat***Wireless Networks***, John Wiley.
2. Stoimenovic Ivan, ***Handbook of Wireless Networks & Mobile Computing***, CRS Presss.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Disaster Management **Max Marks: 100**
Course Code: CSE-838 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objectives: The aim of the course is to acquaint the students about the disaster, and its management.

Unit-I

Introduction to Disaster: Concept, and definition (Disaster, Hazards, Vulnerability, Resilience, Risk)

Unit-II
Disaster:
Classification, Causes and Impacts (including social, economic, political, environmental, health etc).
Differential Impact- in term of caste, class, gender, age, location, disability.
Global trends in disasters, urban disaster, pandemics, complex emergencies, Climate change.

Unit-III

Approaches to Disaster Risk reduction: Disaster cycle–its analysis, Phase, Cultureof safety, prevention, mitigation and preparedness, community based DRR, Structural-nonstructural measures, roles and responsibilities of community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/URBs), state, Centre and other stake-holders.

Unit-IV

Inter relationship between Disasters and Development: Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land – use etc. Climate Adaption, Relevance of indigenous knowledge, appropriate technology and local recourses..

Unit-V

Disaster Risk Management in India: Hazard and Vulnerability profile of India
Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management.
Institution arrangements (Mitigation, Response and Preparedness, DM Act and Policy, Other related policies, Plans, programmes and legislation)

Course Outcomes:-After completing subject, Students will be able to

- Affirm the usefulness of integrating management principles in disaster mitigation work
- Distinguish between the different approaches needed to manage pre- during and post- disaster periods
- Explain the relation between disaster and development
- Relate to risk transfer

Text Books:

1. **Krishnamurthy et al** DisasterManagement: Global Challenges 1st Edition, Universities Press (2009).
2. **Bhattacharya T.**DisasterScience and Management Tata McGraw Hill.

References:

1. **MullickN.H** DisasterManagement, Enkay Publishing House (2011).

Note for Paper Setter: The Question paper shall comprise 10 questions, two questions from each unit. The students are required to attempt five questions, one from each unit.

Course Title: Real Time Operating Systems **Max Marks: 100**
Course Code: CSE-839 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The aim of the subject is to provide basic and necessary information about the working of RTOS and Embedded Systems.

Unit 1: Introduction to RTOS and Embedded System

Brief History of Operating system, Introduction to real time operating system, Introduction to Embedded Systems, Definition of RTOS, Characteristics and Features Real Time Kernels, Scheduler, Objects, Services

Unit 2: Tasks & Memory Management

Tasks and memory management:

Introduction, Defining Tasks, Task state and scheduling, Task operation, Task structures, Synchronization, communication and concurrency.

Memory management concepts in RTOS

Unit 3: **IPC Mechanism**

Defining Semaphore, Semaphore operation, use of semaphore.

Defining Message queues, Message queue states, Message queue contents, use Pipes, Signals, Condition variables.

Unit 4: Exceptions & Interrupts

Defining exceptions and interrupts. How they are implemented. Applications of exceptions and interrupts, Types of interrupts, Handling interrupts

Unit 5: Timer & Timer Services

Real Time clocks and system clocks, Programmable interval timers, Timer interrupt, Service routines.

Basic I/O concepts, The I/O Subsystem.

Course Outcomes:

At the end of this course, the students will able to do the following:

- Understand the basic concept of RTOS and its usefulness for embedded systems
- Understand Theoretical background and practical knowledge of real-time operating systems.
- Understand multitasking techniques in real-time systems.
- Understand the impact of real time operating systems on application area.

Text Books:

1. Qing Li, ***RTOS concepts in Embedded Systems***, CMP Publications.
2. V. Penumchu, ***Simple RTOS,*** Trafford Publications.

References:

1. Mall Rajib, ***Real Time Systems: Theory & Practice***.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Principles of Marketing & Management **Max Marks: 100**
Course Code: CSE-840 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective:

Unit- I : Forms of Business Organizations

Sole Proprietorship, Partnership, Company-Public and Private Sector Enterprises. Principles of Management, Evolution of Management Function of a Manager.

Unit- II : Function of Management

Planning- Nature and purpose- Types of Plans- Objectives, Policies, Procedures, Rules, Strategies,
Programmes, Projects.

Unit- III : Staffing

Selection-Recruitment Process, Decision Making Process- Types of Decisions Directing, Leadership, Motivation, Communication. Controlling- Processes, Techniques Budgetary and non- Budgetary.

Unit- IV : Financial Management

Short term and long term sources of Funds- Financing, decision, investment decision, investment decision, introduction to financial, Statements- Production Management- Planning and scheduling, purchasing inventory control.

Unit- V : Marketing Management

Introduction to marketing Mix, Product, Pricing, Promotion and Place. Personnel management, performance appraisal. Conflict- Identification and Resolution Training and development. Introduction to total quality Management, quality circles.

Course Outcomes:

At the end of this course, the students will able to do following:

1. Understand different forms of organizations
2. Understand the functioning of management
3. Understand the process of staffing
4. Understand the several terms associated with financial management
5. Must be able to understand marketing management

References:

1. Koontz, H & Weihrich, H. Management: A Global Perspective 10^{th}ed.
2. Robbins, S. P. Organizational Behavior.
3. Prasad, L. M. Principles of management.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: Cloud Computing **Max Marks: 100**
Course Code: CSE-841 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: This course offers a good understanding of cloud computing concepts and prepares students to be in a position to design cloud based applications.

Unit-I
Cloud Computing Basics:
Cloud Computing Overview, Characteristics, Applications, Internet and Cloud, Benefits, Limitations, Challenges, Cloud Computing Services and Deployment Models: Infrastructure as a Service, Platform as a Service, Software as a Service, Private Cloud, Public Cloud, Community Cloud, Hybrid Cloud.

Unit-II
Cloud Computing vs Other Computing Technologies:
Overview of Grid, Peer-to-Peer, Pervasive and Utility Computing technologies; their characteristics and comparison with Cloud Computing.
Accessing the Cloud: Hardware and Infrastructure requirements, Access Mechanisms: Web Applications, Web APIs, Web Browsers.

Unit-III
Understanding Abstraction and Virtualization
Virtualization Technologies, Load Balancing and Virtualization, Hypervisors, Machine Imaging.

Unit-IV
Scheduling in Cloud
Overview of Scheduling problem, Different types of scheduling, Scheduling for independent and dependent tasks, Static vs. Dynamic scheduling, Optimization techniques for scheduling.

Unit-V
Cloud Storage and Cloud Standards:
Overview, Storage as a Service, Cloud Storage Issues, Challenges, Standards.
Cloud Security:
Securing the Cloud, Securing Data, Establishing identity and presence.

Course Outcomes:
At the end of this course, the students will able to do following:

- Develop and deploy cloud application using popular cloud platforms.
- Design and develop highly scalable cloud-based applications by creating and configuring virtual machines on the cloud and building private cloud.
- Explain and identify the techniques of big data analysis in cloud.
- sApply and design suitable Virtualization concept, Cloud Resource Management and design scheduling algorithms.
- Broadly educate to know the impact of engineering on legal and societal issues involved in addressing the security issues of cloud computing.

Text Books:

Raj Kumar Buyya, James Broberg, AndrezeiM.Goscinski, Cloud Computing: Principles and paradigms, 2011

Anthony T. Velte, Toby J. Velte, and Robert Elsenpeter, Cloud Computing: A Practical Approach, McGraw Hill, 2010.

References:

1. Judith Hurwitz, Robin Bllor, Marcia Kaufman, Fern Halper, Cloud Computing for dummies, 2009.
2. Sosinsky Barrie ,Cloud Computing Bible, Wiley India .2011.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.

Course Title: System Software **Max Marks: 100**
Course Code: CSE–842 **University Exam: 60**
Duration of Exam: 3 hours **Internal Assessment: 40**

Objective: The objective of this course is to introduce students to the various numerical techniques which find their applications in almost every sphere of Science and Engineering.

Unit-I

Introduction: System software and machine architecture: The Simplified Instructional computer (SIC), Machine architecture, Data and instruction formats, addressing modes, instruction sets, I/O and programming

Unit-II

Assemblers: Basic assembler functions, A simple SIC assembler–Assembler algorithm and data structures, Machine dependent assembler features, Instruction formats and addressing modes – Program relocation, Machine independent assembler features, Literals – Symbol, defining statements – Expressions, One pass assemblers and Multi pass assemblers, Implementation example, MASM assembler

Unit-III

Loaders and Linkers: Basic loader functions, Design of an Absolute Loader–A Simple Bootstrap Loader, Machine dependent loader features, Relocation – Program Linking – Algorithm and Data Structures for Linking Loader, Machine independent loader features, Automatic Library Search – Loader Options, Loader Linkage Editors – Dynamic Linking – Bootstrap Loaders, Implementation example, MSDOS linker.

Unit-IV

Macroprocessors: Basic macro processor functions , Macro Definition and Expansion– Macro Processor Algorithm and data structures, Machine independent macro processor features, Concatenation of Macro Parameters – Generation of Unique Labels – Conditional Macro Expansion – Keyword Macro Parameters, Macro within Macro, Implementation example , MASM Macro Processor – ANSI C Macro language.

Unit-V

System Software Tools: Text editors , Overview of the Editing Process , User Interface Editor Structure. , Interactive debugging systems , Debugging functions and capabilities – Relationship with other parts of the system – User Interface Criteria.

Course Objectives:
At the end of the course, the students will able to do following:

- To understand the basics of system programs like editors, compiler, assembler, linker, loader, interpreter and debugger.
- Describe the various concepts of assemblers and macroprocessors.
- To understand the various phases of compiler and compare its working with assembler.
- To understand how linker and loader create an executable program from an object module created by assembler and compiler.
- To know various editors and debugging techniques

Text Books:

1. **Leland L. Beck**, "System Software –An Introduction to Systems Programming", 3rd Edition, Pearson Education Asia, 2000

References:

1. **D. M. Dhamdhere,** "Systems Programming and Operating Systems", Second Revised Edition, Tata McGraw, Hill, 1999.
2. **John J. Donovan,** "Systems Programming", Tata McGraw,Hill Edition, 1972.

Note for paper setter: The question paper shall comprise of 10 questions. Two questions will be set from each unit. The student has to attempt five questions selecting at least one question from each unit.