K.R. MANGALAM UNIVERSITY

THE COMPLETE WORLD OF EDUCATION

Bachelor of Computer Applications

(BCA)

Programme Code: 06

2018-21

Approved in the 17th Meeting of

Academic Council Held on 29 June 2018

Academic Council
Member Secretary
K.R. Mangalam University

Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

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About K.R Mangalam University

The K.R. Mangalam Group has made a name for itself in the field of education. The K.R. Mangalam story goes back to the chain of schools that offered an alternative option of world-class education, pitching itself against the established elite schools, which had enjoyed a position of monopoly till then. Having blazed a new trail in school education, the focus of the group was aimed at higher education.

K.R Mangalam University is the fastest-growing higher education institute in Gurugram, India. K. R. Mangalam University was established under the Haryana Private University Act 2006, received the approval of Haryana Legislature vide Amendment Act # 36 of 2013 and consent of the Hon'ble Governor of Haryana on 11th April 2013, which was published in the Gazette notification vide Leg. No.10/2013, dated 3rd May 2013.

Since its inception in 2013, the University has been striving to fulfil its prime objective of transforming young lives through ground-breaking pedagogy, global collaborations, and world-class infrastructure. Resources at K.R Mangalam University have been continuously upgraded to optimize opportunities for the students. Our students are groomed in a truly interdisciplinary environment where they grow up with integrative skills through interaction with students from engineering, social sciences, management and other study streams.

K.R Mangalam University is unique because of its:

1. Enduring legacy of providing education to high achievers who demonstrate leadership in diverse fields.
2. Protective and nurturing environment for teaching, research, creativity, scholarship, social and economic justice.

Objectives

i. To impart undergraduate, post graduate and doctoral education in identified areas of higher education.
ii. To undertake research programmes with industrial interface.
iii. To integrate its growth with the global needs and expectations of the major stake holders through teaching, research, exchange & collaborative programmes with foreign, Indian Universities/Institutions and MNCs.
iv. To act as a nodal center for transfer of technology to the industry.
v. To provide job oriented professional education to the Indian student community with particular focus on Haryana.

About School of Engineering & Technology (SOET)

School of Engineering and Technology (SOET), K.R. Mangalam University is dedicated to fostering innovation, excellence, and advancement in engineering and technology. Empowering the new generation of change-makers by imparting exceptional understanding and intellect to facilitate the creation of highly sophisticated futuristic solutions. Our well-qualified academicians, accomplished researchers and industry insiders are focused on imparting their extensive knowledge and expertise to students through various lectures, workshops, industrial visits, projects, and competitions throughout the year ensuring that students receive a comprehensive education that blends theory with practical application.

These programs offered at SOET have the distinct objective of equipping the students with knowledge, skills and attitudes in engineering and technology, to make them capable of successfully meeting the present requirements and future challenges in the engineering profession. SOET brings together outstanding academics, industry professionals, and experienced researchers to deliver a unique hands-on and multi-disciplinary learning experience. The curriculum of programmes has been designed to cater to the ever changing needs and demands of the industry. The curriculum is regularly updated. The school has best infrastructure including domain-specific labs. SOET aims to provide exposure to the principles and practices of Design / Developments and Projects in the area of engineering. SOET is offering Ph.D. programs also.

School Vision

To create, disseminate, and apply knowledge in science and technology to meet the higher education needs of India and the global society, To serve as an institutional model of excellence in scientific and technical education characterized by integration of teaching, research and innovation.

School Mission

M1: To create an environment where teaching and learning are prioritized, with all support activities being held accountable for their success.

M2: To strengthen the institution's position as the school of choice for students across the State & Nation.

M3: To promote creative, immersive, and lifelong learning skills while addressing societal concerns.

M4: To promote co- and extra-curricular activities for overall personality development of the students.

M5: To promote and undertake all-inclusive research and development activities.

M6: To instill in learners an entrepreneurial mindset and principles.

M7: Enhance industrial, institutional, national, and international partnerships for symbiotic relationships.

M8: To help students acquire and develop knowledge, skills and leadership qualities of the 21st Century and beyond.

Programs offered by the School

Bachelor of Computer Applications (BCA)

This Program is aimed at developing a sound knowledge and understanding of concepts in key areas of Computer Science, Industrial Computing, Analysis and Synthesis involved in Computer Systems, Information Systems and Computer Applications, etc.

Program Duration: - 3 Years (6 Semesters)

Eligibility Criteria: - The student should have passed the 10+2 examination conducted by the Central Board of Secondary Education or equivalent examination from a recognized Board with Mathematics/Computer Science/Informatics Practice/ on as one of the subjects and with an overall minimum aggregate of 50% or more.

Career Options

For BCA: -IT Sector requiring Application Developments, Software Testing and Maintenance, PSUs, Academics, Defense & Civil Services.

Class Timings

The classes will be held from Monday to Friday from 9.10 am to 4.10 pm.

Scheme of Studies and Syllabi

For BCA program scheme of studies is attached in Annexure A1.The syllabi is given in the following pages. These are arranged as: (a) common course (b) degree specific course, in numeric order of the last three digits of the course code. For each course, the first line contains; Course Code, Tittle and Credits (C) of the course. This is followed by detailed syllabi.

Bachelor of Computer Application (B.C.A.) Programme At A Glance

Semester	**1**	**2**	**3**	**4**	**5**	**6**	**Total**
Courses	8	8	9	9	9	8	**51**
Credits	25	28	28	28	24	23	**155**

Scheme of Studies

SEMESTER I							
SNo		**Course Code**	**Course Title**	**L**	**T**	**P**	**C**
1	SE	ETMC121	Principles of Management	3	-	-	3
2	CC	ETCA131	Introduction to Computers & IT, Office Automation	3	1	-	4
3	SE	ETCH125	Environmental Studies	3	-	-	3
4	SE	ETCA 133	Digital Logic	3	1	-	4
5	CC	ETCA135	Introduction to Programming	3	1	-	4
6	SE	ETMA163	Basic of Mathematics	3	1	-	4
7	SE	ETCA161	Introduction to Computers & IT, Office Automation Lab	-	-	2	1
8	SE	ETCA165	Introduction to Programming Lab	-	-	2	1
9	SE	ETCA 167	Digital Logic Lab	-	-	2	1
TOTAL				**18**	**4**	**6**	**25**

SEMESTER II							
SNo		**Course Code**	**Course Title**	**L**	**T**	**P**	**C**
1	SE	ETEL101	Communication Skills	4	-	-	4
2	SE	ETCA231	Database System Concepts	3	1	-	4
3	SE	ETCA126	Computer Organization &Architecture	3	1	-	4
4	CC	ETCS112	Object Oriented Programming	3	1	-	4
5	CC	ETCA136	Web Technologies	3	1	-	4
6	SE	ETMA144	Differential Equations & Optimization Techniques	3	1	-	4
7	SE	ETCA269	Database System Concepts Lab	-	-	2	1

8	CC	ETCA164	Web Technologies Lab	-	-	2	1
9	CC	ETCS166	Object Oriented Programming Lab	-	-	2	1
10	SE	ETEL171	Communication Skills Lab	-	-	2	1
TOTAL				**19**	**5**	**8**	**28**

SEMESTER III							
SNo		**Course Code**	**Course Title**	**L**	**T**	**P**	**C**
1	CC	ETCS 217	Data Structures	3	1	-	4
2	CC	ETCS 206	Computer Graphics	3	1	-	4
3	CC	ETCS202	Software Engineering	3	1	-	4
4	CC	ETCS323	Java Programming	3	1	-	4
5	SE	ETCS322	E- Commerce and ERP	3	1	-	4
6	SE	ETMA233	Numerical Methods	3	1	-	4
7	CC	ETCS 257	Data Structures Lab	-	-	2	1
8	SE	ETCS258	Computer Graphics Lab	-	-	2	1
9	CC	ETCS252	Software Engineering Lab	-	-	2	1
10	CC	ETCS361	Java Programming Lab	-	-	2	1
TOTAL				**18**	**6**	**8**	**28**

SEMESTER IV							
SNo		**Course Code**	**Course Title**	**L**	**T**	**P**	**C**
1	CC	ETCA232	Foundation of Computer Science	3	1	-	4
2	CC	ETCS211	Operating Systems	3	1	-	4

3	CC	ETCS304	Computer Networks	3	1	-	4
4	SE	ETMC123	Micro Economics	3	-	-	3
5	SE	ETCA228	Mobile Application Development	3	1	-	4
6	SE	ETCA230	System Analysis and Design	3	1	-	4
7	SE	ETCS255	Operating Systems Lab	-	-	2	1
8	SE	ETCA264	Mobile Application Development Lab	-	-	2	1
9	CC	ETCS365	Computer Networks Lab	-	-	2	1
10	SE	ETCA380	Seminar	-	-	2	1
TOTAL				**18**	**6**	**8**	**28**

SEMESTER V							
SNo		**Course Code**	**Course Title**	**L**	**T**	**P**	**C**
1	CC	ETCS306	Data Warehousing and Data Mining	3	1	-	4
2	CC	ETCA227	Web Based Programming using PHP	3	1	-	4
3	CC	ETCA325	Linux Environment	3	1	-	4
4	CC	ETCS314	Mobile Computing	3	1	-	4
5	CC	ETCS214	Theory of Computation	3	1	-	4
6	SE	ETCA267	Web Based Programming Using PHP Lab	-	-	2	1
7	SE	ETCS362	Data Warehousing and Data Mining Lab	-	-	2	1
8	SE	ETCA365	Linux Environment Lab	-	-	2	1
9	SE	ETCA367	Practical Training	-	-	2	1
TOTAL				**15**	**5**	**8**	**24**

SEMESTER VI							
SNo		**Course Code**	**Course Title**	**L**	**T**	**P**	**C**
1	CC	ETCS422	Cloud Computing	3	1	-	4
2	CC	ETCA324	Net Framework	3	1	-	4
3	CC	ETCA326	Enterprise Computing in JAVA	3	1	-	4
4	SE	ETCA362	Cloud Computing Lab	-	-	2	1
5	SE	ETCA364	Net Framework Lab	-	-	2	1
6	SE	ETCA366	Enterprise Computing in JAVA Lab	-	-	2	1
7	SE	ETCA368	Major Project	-	-	6	3
8		**Elective (with Lab)**					
(i)	CC	ETCA328	Multimedia Technologies	3	1	-	4
	SE	ETCA370	Multimedia Technologies Lab	-	-	2	1
(ii)	CC	ETCA 330	Network Security & Cryptography	3	1	-	4
	SE	ETCA372	Network Security & Cryptography Lab	-	-	2	1
(iii)	CC	ETCA 332	Software Testing	3	1	-	4
	SE	ETCA374	Software Testing Lab	-	-	2	1
TOTAL				**12**	**4**	**14**	**23**

Semester - I Syllabus

ETMA163	Basic of Mathematics	L	T	P	C
		3	1	-	4

Course Objective: The objective of the course is to provide a brief knowledge of Mathematics to the BCA students. The students will learn about the Matrices, Sequence and Series, Differentiation and Integration.

UNIT I:

Determinants: Definition, Minors, Co-factors, Properties of Determinants, Applications of determinants in finding area of triangle.

Matrices: Definition, Types of Matrices, Addition, Subtraction, Scalar Multiplication and Multiplication of Matrices, Adjoint, Inverse, Solution of system of linear equation by Cramer's Rule.

UNIT II:

Sequence and Series: Introduction, Sequences, Series, Arithmetic Progression(A.P), Geometric Progression(G.P), Relationship Between A. M. and G.M., Sum to N terms of Special Series, Principle of Mathematical Induction.

UNIT III:

Differentiation: Derivative of a function, Derivatives of sum, differences, product, and quotient of functions, Derivative of polynomial, trigonometric, exponential, logarithmic, inverse trigonometric and implicit functions, Logarithmic Differentiation, Derivatives of functions in parametric forms, Differentiation by substitution.

UNIT IV:

Integration: Indefinite integrals, Methods of integration: by substitution, by parts, by partial fractions, Integration of algebraic and transcendental functions.

Text Books:

1. A Textbook of Mathematics for XI-XII Students, NCERT Publication Vol. I-II.
2. Shanti Narayan, Integral calculus, Sultan Chand & Co.
3. Shanti Narayan, Differential calculus, Sultan Chand & Company.
4. Babu Ram, Engineering Mathematics, Pearson Education.

ETCA131	Introduction to Computers & IT, Office Automation	L	T	P	C
		3	1	-	4

Course Objective: This course on fundamental of computers and data handling would ensure that the students get first-hand exposure to the fundamentals of computers and get acquainted with handling of the same. Also, it would make them at ease with data-related abilities.

UNIT – I

Introduction to Computers:

The evolution of computers: Computer Generation from First Generation to Fifth Generation. Classifications of Computers: Micro, Mini, Mainframe and super computers, Distributed Computer System, Parallel Computers.

Computer Hardware: Major Components of a digital computer, Block Diagram of a computer Input devices, Output Device. Computer Memory: Memory Cell, Overview of Memory Organization, Primary Memory: RAM & ROM, Secondary memory: Magnetic tapes, Magnetic disk, CD-ROM, DVD.

UNIT – II

Introduction to System Software and Operating System:

Computer Software: Machine language, assembly language, high-level languages, fourth generation language, assemblers, compilers, interpreters, linkers, loaders.

Operating System concepts: different types of operating systems, functions of operating system, concept of multiprogramming, multitasking, multithreading, multiprocessing, time-sharing, real time, single-user & multi-user operating system.

UNIT – III

Programming Concepts & Techniques:

Algorithms, flow chart, decision tables, pseudo code, characteristics of a good programming language, Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.

Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming, Advantages and disadvantages of Structured programming.

UNIT – IV

Computer Networks & The Internet:

Basic elements of a communication system, Data transmission modes, Data transmission media, Network topologies, Network Types (LAN, WAN and MAN), Client and Servers, Intranet, Extranet.

Internet: Terminology related to Internet: Protocols, TCP/IP, HTTP, Internet addressing, Domain Names, DNS, URL, World Wide Web. Overview of various services on Internet: Webservers, E-mail, FTP, Telnet.

TEXT BOOKS

1. P. K. Sinha & Priti Sinha , "Computer Fundamentals", BPB Publications.
2. Anita Goel "Computer Fundamentals", Pearson.

REFERENCE BOOKS

1. B.Ram Computer fundamentals Architecture and Organization,New Age Intl.
2. Alex Leon & Mathews Leon, "Introduction to Computers", Vikas Publishing .
3. Norton Peter, "Introduction to computers", TMH.
4. Vikas Gupta, "Comdex Computer Kit", Wiley Dreamtech, Delhi.

ETCA135	Introduction to Programming	L	T	P	C
		3	1	-	4

Course Objective: The objective of the course module is to introduce basics of 'C' Programming language.

UNIT-I

Overview of C: History of C, Importance of C, Structure of a C Program. Elements of C: C character set, identifiers and keywords, Data types, Constants and Variables, Assignment statement, Symbolic constant.

Input/output: Unformatted & formatted I/O function in C, Input functions viz. scanf(), getch(), getche(), getchar(), gets(), output functions viz. printf(), putch(), putchar(), puts().

UNIT-II

Operators & Expression: Arithmetic, relational, logical, bitwise, unary, assignment, conditional operators and special operators. Arithmetic expressions, evaluation of arithmetic expression, type casting and conversion, operator hierarchy & associativity.

Decision making & branching: Decision making with IF statement, IF-ELSE statement, Nested IF statement, ELSE-IF ladder, switch statement, goto statement.

UNIT III

Decision making & looping: For, while, and do-while loop, jumps in loops, break, continue statement.

Functions: Definition, prototype, passing parameters, call by value and call by reference, recursion.

UNIT IV

Arrays: Definition, types, initialization, processing an array, passing arrays to functions, Strings & arrays.

Pointers, Strings and Structures: Pointers, relationship between arrays and pointers Argument passing using pointers Array of pointers. Passing arrays as arguments. Strings and C string library. Structure and Unions. Defining C structures, passing strings as arguments Programming examples.

Text Books

1. Gottfried, Byron S., Programming with C, Tata McGraw Hill
2. Balagurusamy, E., Programming in ANSI C, Tata McGraw-Hill

Reference Books

1. Jeri R. Hanly & Elliot P. Koffman, Problem Solving and Program Design in C, Addison Wesley.
2. Yashwant Kanetker, Let us C, BPB.
3. Rajaraman, V., Computer Programming in C, PHI.
4. Yashwant Kanetker, Working with C, BPB.

	Principles Of Management	**L**	**T**	**P**	**C**
ETMC121		**3**	**-**	**-**	**3**

Course Objective: The course aims at providing fundamental knowledge and exposure to the concepts, theories and practices in the field of management.

UNIT - I

Introduction: Concept, Nature, Process and Significance of Management; Managerial Levels, Skills, Functions and Roles; Management v/s Administration; Coordination as Essence of Management; Development of Management Thought: Classical, Neo-Classical, Behavioral, Systems and Contingency Approaches.

UNIT - II

Planning: Nature, Scope and Objectives of Planning; Types of Plans; Planning Process; Business Forecasting; MBO; Concept, Types, Process and Techniques of Decision-Making; Bounded Rationality.

Organizing: Concept, Nature, Process and Significance; Principles of an Organization; Span of Control; Departmentation; Types of an Organization; Authority-Responsibility; Delegation and Decentralization; Formal and Informal Organization.

UNIT - III

Staffing: Concept, Nature and Importance of Staffing; Motivating and Leading: Nature and Importance of Motivation; Types of Motivation; Theories of Motivation-Maslow, Herzberg, X, Y and Z; Leadership - Meaning and Importance; Traits of a Leader; Leadership Styles - Likert's Systems of Management; Tannenbaum & Schmidt Model and Managerial Grid.

UNIT - IV

Controlling: Nature and Scope of Control; Types of Control; Control Process; Control Techniques - Traditional and Modern; Effective Control System.

TEXT BOOK:

1. Stoner, Freeman and Gilbert Jr. (2013). Management (6th Edition). New Delhi: Pearson Prentice Hall of India.

REFERENCE BOOKS:

1. Koontz, Cannice, and Weihrich (2014). Management- A Global, Innovative and Entrepreneurial Perspective (14th Edition). New Delhi: Tata McGraw Hill Publishing Company.
2. Chopra R. K., Mohan Puneet, & Sharma Vandana (2010). Principles & Practices of Management. New Delhi: Sun India Publication.
3. Tripathi P. C. & Reddy P. N. (2015). Principles & Practices of Management (5th Edition). New Delhi: Tata McGraw Hill Publishing House.

ETCA133	Digital Logic	L	T	P	C
		3	1	-	4

Course Objective: The objective of the course is to acquaint students with fundamental of digital electronics. The course module includes number systems, logical gates and circuits.

UNIT I

Information Representation: Number Systems, Binary Arithmetic, Fixed-point and Floating-point representation of numbers, BCD Codes, Error detecting and correcting codes, Character Representation – ASCII, EBCDIC, Unicode

UNIT II

Binary Logic: Boolean Algebra, Boolean Theorems, Boolean Functions and Truth Tables, Canonical and Standard forms of Boolean functions, Simplification of Boolean Functions – Venn Diagram, Karnaugh Maps.

UNIT III

Digital Logic: Basic Gates – AND, OR, NOT, Universal Gates – NAND, NOR, Other Gates – XOR, XNOR etc. NAND, NOR, AND-OR-INVERT and OR-AND-INVERT implementations of digital circuits, Combinational Logic – Characteristics, Design Procedures, analysis procedures, Multilevel NAND and NOR circuits.

Sequential Logic: Characteristics, Flip-Flops, Clocked RS, D type, JK, T type and Master-Slave flip-flops. State tables, State diagrams and State equations. Flip-Flop excitation tables

UNIT IV

Combinational Circuits: Half-Adder, Full-Adder, Half-Subtractor, Full-Subtractor, Encoders, Decoders, Multiplexers, Demultiplexers, Comparators, Code Converters, BCD to Seven-Segment Decoder, Counters.

Text Books

1. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd.
2. V. Rajaraman, T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hall of India Pvt. Ltd.

Reference Books

1. Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt.

Ltd.
2. Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill

ETCH125	Environmental Studies	L	T	P	C
		3	-	-	3

Course Objective: The objective of the course is to acquaint students with environmental conservation, various types of Pollution, Chemical Toxicology etc.

UNIT I

Multidisciplinary Nature of Environmental studies: Definition, Scope, Importance, need for public awareness, introduction to concept of green technology.

Environmental Conservation and Management: Forest Resources - Use & over-exploitation, deforestation, timber extraction, mining, dams & their effects on forest & tribal people Water Resources, Mineral Resources, Food Resources, Energy, Land Resources – Land as a resource, land degradation, man induced landslides, soil erosion and desertification, Resource Management – Sustainable development

UNIT II

Environmental Pollution and Control

Air pollution: Types of pollutants, source, effects, sink and control of primary pollutants – CO, NO_X, HC, SO_X and particulate, effects of pollutants on man and environment, photo chemical smog, acid rain and global warming, CO_2 sequestration.

Water Pollution: Classification of pollutants, their source, waste water treatment (domestic and industrial),

Soil Pollution: Composition of soil, classification and effects of soil pollutants and their control.

Solid waste pollution: Classification, waste treatment and disposal methods, compositing, sanitary land filling, thermal process, re-cycling and re-use methods.

Hazardous waste: Classification – Radio active, bio-medical and chemical, treatment and disposal – Physical chemical and bio-logical processes, Marine pollution.

UNIT III

Chemical Toxicology: Toxic chemicals in environment, there impact on enzymes, biochemical effect of arsenic, cadmium, lead, chromium, mercury and pesticides.

Eco-friendly Polymer: Polymer synthesis, environmental de-gradation of polymers, photo de-gradable of polymers, hydrolysis, hydro-bio degradable polymers, bio- polymers, bio-plastics, thermal de-gradation of plastics during re-cycling.

UNIT IV

Environmental Bio-Technology: Bio-accumulation, biodegradation, bioremediation, bioleaching, biomenthanation.

Green Technology: Introduction, Basic principles of green technology, concept of Atom economy and Carbon Foot Print Tools of Green technology, zero waster technology.

Environmental Management Systems: Objectives, Components, Environmental Impact Assessment, some important environmental laws, Green bench, Carbon Credits, Environmental Management System standards – ISO 14000 series.

REFERENCE BOOKS:

1. Dr. Rajni Johar Chhatwal, Environmental Sciences.
2. S.K. Kataria Publication, S. K. Dhamija, Environmental Studies.

ETCA161	Introduction to Computers & IT, Office Automation Lab	L	T	P	C
		-	-	2	1

1. MS-Windows: Operating system-Definition & functions, basics of Windows. Basic components of windows, icons, types of icons, taskbar, activating windows, using desktop, title bar, running applications, exploring computer, managing files and folders, copying and moving files and folders. Control panel – display properties, adding and removing software and hardware, setting date and time, screensaver and appearance. Using windows accessories.

2. Documentation Using MS-Word - Introduction to Office Automation, Creating & Editing Document, Formatting Document, Auto-text, Autocorrect, Spelling and Grammar Tool, Document Dictionary, Page Formatting, Bookmark, Advance Features of MS-Word-Mail Merge, Macros, Tables, File Management, Printing, Styles, linking and embedding object, Template.

3. Electronic Spread Sheet using MS-Excel - Introduction to MS-Excel, Creating & Editing Worksheet, Formatting and Essential Operations, Formulas and Functions, Charts, Advance features of MS-Excel-Pivot table & Pivot Chart, Linking and Consolidation, Database Management using Excel-Sorting, Filtering, Table, Validation, Goal Seek, Scenario.

4. Presentation using MS-PowerPoint: Presentations, Creating, Manipulating & Enhancing Slides, Organizational Charts, Excel Charts, Word Art, Layering art Objects, Animations and Sounds, Inserting Animated Pictures or Accessing through Object, Inserting Recorded Sound Effect or In-Built Sound Effect.

References for Manual:

1. Microsoft Office – Complete Reference – BPB Publication
2. Learn Microsoft Office – Russell A. Stultz – BPB Publication

ETCA165	Introduction to Programming Lab	L	T	P	C
		-	-	2	1

List of Experiments

1. Write a C program to reverse a given number, find the sum of digits of the number.
2. Write a C program to find the largest of five numbers.
3. Write a program to find the largest number out of five numbers (ternary operator)
4. Write a program to find roots of quadratic equation using functions.
5. Write a C program to check whether a given year is leap year or not.
6. Write a C program to check whether a given number is prime or not, also check whether it is divisible by a number k or not.
7. Write a C program to take marks of a student as input and print the his/her grade bases on following criteria using if – else statements
    a. Marks <40 FAIL
    b. 40<= Marks <59 GOOD
    c. 59 <= Marks < 80 Excellent
    d. 80 <= Marks Outstanding
8. Perform experiment 7 using switch case statement.
9. Write a C program to concatenate two strings.
10. Write a program using arrays to find the largest and second largest number out of given 10 numbers using bubble sort.
11. Write a program to multiply two matrices
12. Write a program to reverse a string.
13. Write a program to concatenate two strings
14. Write a program to calculate the length of the string.
15. Write a program to find factorial of a number using function.
16. Write a program to check that the input string is a palindrome or not.
17. Write a program using structure to enter a list of books, their prices and number of pages.
18. Write a program to add, subtract, multiply and divide two numbers using menu driven program.
19. Write a C program to compute the length of a string using while loop.
20. Write a C program to convert all the lowercase letter to uppercase letter and all uppercase letters to lower case letter given a string as input.
21. Write a C program to take two matrixes as input and print the sum of two matrixes.
22. Write a C program to display the address of a variable using pointer.
23. Write a C program to compute the length of a string using pointer.
24. Create a structure called STUDENT having name, registration number, class, session as its field. Compute the size of structure STUDENT.

ETCA167	Digital Logic Lab	L	T	P	C
		-	-	2	1

LIST OF EXPERIMENTS

1. Introduction to digital electronics lab- nomenclature of digital ICs, specifications, study of the data sheet, concept of V_{cc} and ground, verification of the truth tables of logic gates using TTL ICs.
2. Implementation of the given Boolean function using logic gates in both SOP and POS forms.
3. Verification of state tables of RS, JK, T and D flip-flops using NAND & NOR gates.
4. Implementation and verification of Decoder/De-multiplexer and Encoder using logic gates.
5. Implementation of 4x1 multiplexer using logic gates.
6. Implementation of 4-bit parallel adder using 7483 IC.
7. Design, and verify the 4-bit synchronous counter.
8. Design, and verify the 4-bit asynchronous counter.
9. Static and Dynamic Characteristic of NAND and Schmitt-NAND gate(both TTL and MOS)
10. Study of Arithmetic Logic Unit.

Semester II Syllabus

ETCA231	Database System Concepts	L	T	P	C
		3	1	-	4

Course Objective: To introduce the concept of Back end, data storage in computers, design of a DBMS,
Queries to construct database, store and retrieve data from the database

UNIT-I

Introduction: An overview of database management system, database system Vs file system, Characteristics of database approach, DBMS architecture, data models, schema and instances, data independence.

Data Modeling using Entity Relationship Model: Entity, Entity types, entity set, notation for ER diagram, attributes and keys, Concepts of composite, derived and multivalued attributes, Super Key, candidate key, primary key, relationships, relation types, weak entities, enhanced E-R and object modeling, Sub Classes:, Super classes, inheritance, specialization and generalization

UNIT – II

Introduction to SQL: Overview, Characteristics of SQL, Advantage of SQL, SQL data types and literals.

Types of SQL commands: DDL, DML, DCL. Basic SQL Queries.

Logical operators: BETWEEN, IN, AND, OR and NOT

Null Values: Disallowing Null Values, Comparisons Using Null Values

Integrity constraints: Primary Key, Not NULL, Unique, Check, Referential key

Introduction to Nested Queries, Correlated Nested Queries, Set-Comparison Operators, Aggregate Operators: The GROUP BY and HAVING Clauses,

Joins: Inner joins, Outer Joins, Left outer, Right outer, full outer joins.Overview of views and indexes.

UNIT – III

Relational Data Model: Relational model terminology domains, Attributes, Tuples, Relations, characteristics of relations, relational constraints domain constraints, key constraints and constraints on null, relational DB schema. Codd's Rules

Relational algebra: Basic operations selection and projection, Set Theoretic operations Union, Intersection, set difference and division,

Join operations: Inner, Outer, Left outer, Right outer and full outer join.

ER to relational Mapping: Data base design using ER to relational language.

Data Normalization: Functional dependencies, Armstrong's inference rule, Normal form up to 3rd normal form.

UNIT – IV

Transaction processing and Concurrency Control: Definition of Transaction, DesirableACID properties, overview of serializability, serializable and non serializable transactions

Concurrency Control: Definition of concurrency, lost update, dirty read and incorrectsummary problems due to concurrency

Concurrency Control Techniques: Overview of Locking, 2PL, Timestamp ordering,multiversioning, validation

Elementary concepts of Database security: system failure, Backup and Recovery Techniques, authorization and authentication

TEXT BOOKS:

1. R. Elmarsi and S.B.Navathe, "Fundamentals of Database Systems", Pearson Education.
2. Singh S.K., "Database System Concepts, design and application", Pearson Education

REFERENCES BOOKS:

1. Schaum's outline series, "Data Structure", TMH.
2. Y. Langsamet. al., "Data Structures using C and C++", PHI.
3. Yashwant Kanetkar, "Data Structure through C", BPB.

ETCA126	Computer Organization & Architecture	L	T	P	C
		3	1	-	4

Course Objective: The objective of the course is to acquaint students with the basic architecture of the computer system. The course module includes Sequential Logic, Sequential Circuits, Memory & I/O Devices, Instruction Design & I/O Organization

UNIT I

Sequential Logic: Characteristics, Flip-Flops, Clocked RS, D type, JK, T type and Master-Slave flip-flops.

Register Transfer and Microoperation: Register transfer language, register transfer, bus and memory transfer, arithmetic microoperations, logic microoperations, shift microoperations.

Basic Computer Organization and Design: Instruction codes, computer registers, computer instructions, timing & control, instruction cycle (typically 3 to 5 stages), memory reference instructions, input-output and interrupts, design of basic computer

UNIT II

Instruction Design & I/O Organization: Machine instruction, Instruction set selection, Instruction cycle, Instruction Format and Addressing Modes. I/O Interface, Interrupt structure, Program-controlled, Interrupt-controlled & DMA transfer, I/O Channels, IOP.

UNIT III

Central Processing Unit: Introduction, general registers organization, stack organization, instruction formats, and addressing modes.

Pipeline and vector processing: Parallel Processing, pipelining, arithmetic pipeline, RISC Pipeline, Vector Processing, Array Processors.

UNIT IV

Sequential Circuits: Designing registers – Serial Input Serial Output (SISO), Serial Input Parallel Output (SIPO), Parallel Input Serial Output (PISO), Parallel Input Parallel Output (PIPO) and shift registers. Designing counters – Asynchronous and Synchronous Binary Counters, Modulo-N Counters and Up-Down Counters

Memory organization: Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory, memory management hardware.

Text Books

1. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd.

2. V. Rajaraman, T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hall of India Pvt. Ltd.

Reference Books

1. Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd.
2. Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill

ETMA144	Differential Equations & Optimization Techniques	L	T	P	C
		3	1	-	4

Course Objective: The objective of the course is to provide a brief knowledge of Mathematics to the BCA students. The students will learn about the Limits and Continuity, Differential Equations, Statistics, Linear Programming.

UNIT I

Limits and Continuity: Limit at a point, Properties of limit, Computation of limits of various types of functions, Continuity of a function at a point, Continuity over an interval, sum, product and quotient of continuous functions, Intermediate Value Theorem, Types of discontinuities.

UNIT II

Ordinary Differential Equations : Introduction, Basic Concepts, General and particular solutions of a differential equation, Formation of a differential equation, Methods of solving first order, first degree differential equation- Separation of Variable, Homogeneous differential equations, Linear differential equations.

UNIT III

Statistics: Definition, Importance & Limitation of Statistics, Types of data, Data collection technique, Presentation of data- tabulation, bars, histogram, diagrammatic, Measures of central tendency – mean, median and mode.

UNIT IV

Linear Programming: Linear programming problems formulation, solution of linear programming problem using graphical method, simplex method, Big-M method, Duality concept.

Text Books

1. A textbook of Mathematics for XI-XII Students, NCERT Publication Vol. I-II.

2. S.P. Gupta and V.K Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand and Sons.
3. S.P. Gupta, and P.K.Gupta, Quantitative Techniques and Operations Research, Sultan Chand & Sons.
4. R.L.Rardin, Optimization in Operations Research, Prentice Hall.

ETEL101	Communication Skills	L	T	P	C
		4	-	-	4

UNIT-I

Concepts and Fundamentals: Introduction to Technical Communication, meaning of communication, Importance of communication, Process of communication, Essentials of good communication - The seven Cs of communication ,Verbal and Non-Verbal communication, Barriers of, communication.

UNIT-II

Written Communication: Objectives of written communication, Media of written communication, Merits and demerits of written communication Writing Letters: Business letters, Office memorandum, Report Writing**:** Meaning & Definition, Types of reports; Format of report, Drafting the report, Layout of the report, Requirements of good report writing.

Job Application**:** Types of application, Form & Content of an application, drafting the application, Preparation of resume.

UNIT-III

Oral Communication: Principles of effective oral communication, Media of oral communication, Advantages of oral communication, Disadvantages of oral communication, Styles of oral communication.

Interviews**:** Meaning & Purpose, Art of interviewing, Types of interview, Interview styles, Essential Features, Structure, Guidelines for Interviewer, Guidelines for interviewee.

Project Presentations: Advantages & Disadvantages, Executive Summary, Charts, Distribution of time (presentation, questions & answers, summing up), Visual presentation, Guidelines for using visual aids, Electronic media (power-point presentation).

Listening Skills: Good listening for improved communications, Art of listening, Meaning, nature, process, types and importance of listening, Principles of good listening, Barriers in listening

Negotiation Skills **:** Definition of negotiation, Factors that can influence negotiation, what skills do we need to negotiate, Negotiation process (preparation, proposals, discussions, bargaining, agreement, implementation).

UNIT-IV

Language Skills: Improving command in English, improving vocabulary, choice of words, Common problems with verbs, adjectives, adverbs, pronouns, tenses, conjunctions, punctuations, prefix, suffix, idiomatic use of prepositions. Sentences and paragraph construction.

TEXTBOOKS:

1. Kavita Tyagi and Padma Misra , "Advanced Technical Communication", PHI.
2. P.D.Chaturvedi and Mukesh Chaturvedi, "Business Communication – Concepts, Cases and Applications", Pearson.
3. Rayudu, "C.S- Communication", Himalaya Publishing House.
4. Asha Kaul , "Business Communication", PHI, second edition.

REFERENCES:

1. Raymond Murphy, "Essential English Grammar- A self study reference and practice book for elementary students of English" , Cambridge University Press.
2. Manalo, E. & Fermin. Technical and Report Writing. ECC Graphics. Quezon City.
3. Kavita Tyagi and Padma Misra , "Basic Technical Communication", PHI.
4. Herta A Murphy, Herbert W Hildebrandt and Jane P Thomas, "Effective Business Communication", McGraw Hill.

ETCS136	WEB TECHNOLOGIES	L	T	P	C
		3	1	-	4

Course Objective: The objective of this course is to introduce the basic concept and methodologies for web processing.

UNIT I

Overview of the Internet and World Wide Web and Search Engines, Common terminology: IP Addressing, URLs, Domain names. Website Creation and maintenance, Web Hosting and Publishing Concepts.

Static Webpages: HTML - Introduction to HTML, HTML Document structure tags, HTML comments, Text formatting, inserting special characters, anchor tag, adding images and sound, lists: types of lists, tables, frames and floating frames, Developing Forms, Image maps.

UNIT II

Client-side scripting: JavaScript - Data Types, Control Statements, operators, Built in and User Defined Functions, Objects in JavaScript, Handling Events. HTML Document Object Model.

Page Styling: Separation of content and presentation in HTML, Cascading Style Sheets - Types of Style Sheets – Internal, inline and External style sheets, customizing common HTML elements, types of CSS selectors.

UNIT III

XML: Introduction to XML-Mark up languages, Features of Markup languages, XML Naming rules, Building block of XML, Document, Difference between HTML & XML, Components of XML, XML Parser, DTD's Using XML with HTML and CSS.

UNIT IV

Introduction to Web Services, UDDI, SOAP, WSDL, Web Service Architecture, Developing and deploying web services. AJAX –Introduction AJAX programming, Improving web page performance using AJAX.

Textbooks:

1. Internet and World Wide Web, Deitel H.M., P.J.Deitel , Pearson

Reference Books:

1. Web Technologies, Uttam K. Roy, Oxford University Press
2. HTML Black Book, Stephen Holzner, Wiley Dreamtech.
3. Web Technology, Rajkamal, Tata McGraw-Hill.
4. Web Technologies: A Computer Science Perspective, Jeffrey C. Jackson, Pearson.
5. XML: How to Program, Deitel&Deitel Nieto.

ETCS112	OBJECT ORIENTED PROGRAMMING	L	T	P	C
		3	1	-	4

Course Objective: The objective of the course module is to acquaint students with object-oriented programming using Programming C++.

UNIT I

Introduction: Introducing Object-Oriented Approach related to other paradigms (functional, data decomposition), Characteristics of Object-Oriented Languages.

Basic terms and ideas: Abstraction, Encapsulation, Information hiding, Inheritance, Polymorphism, Review of C, Difference between C and C++, Cin, Cout, new, delete operators.

UNIT II

Classes and Objects: Abstract data types, Object & classes, attributes, methods, C++ class declaration, State identity and behavior of an object, Constructors and destructors, instantiation of objects, Default parameter value, Copy Constructor, Static Class Data, Constant and Classes, C++ garbage collection, dynamic memory allocation.

UNIT III

Inheritance and Polymorphism: Inheritance, Types of Inheritance, Class hierarchy, derivation – public, private & protected, Agrégations, composition vs classification hiérarchies, Polymorphism, Type of Polymorphism – Compile time and runtime, Method polymorphism, Polymorphism by parameter, Operator overloading, Parametric polymorphism, Generic function – template function, function name overloading, Overriding inheritance methods

UNIT IV

Files and Exception Handling: Persistent objects, Streams and files, Namespaces, Exception handling, Generic Classes

Standard Template Library: Standard Template Library, Overview of Standard Template Library, Containers, Algorithms, Iterates, Other STL Elements, The Container Classes, General Theory of Operation, Vectors.

TEXT BOOKS:

1. A.R. Venugopal, Ra jkumar, T. Ravishanker "Mastering C++", TMH
2. R. Lafore, "Object Oriented Programming using C++", BPB Publications
3. Schildt Herbert, "C++ Programming", 2nd Edition, Wiley DreamTech.

REFERENCE BOOKS:

1. D. Parasons, "Object Oriented Programming with C++", BPB Publication
2. Steven C. Lawlor, "The Art of Programming Computer Science with C++", Vikas Publication
3. Yashwant Kanethkar, "Object Oriented Programming using C++", BPB

ETCA269	Database System Concepts Lab	L	T	P	C
		-	-	2	1

Course Objective: At the end of course the student should be

1. Have good understanding of how several fundamental algorithms work particularly those concerned with creation and updation of tables
2. Have good understanding of DBMS

3. To be able to understand various queries and their execution
4. To be able to design new database and modify existing ones for new applications and reason about efficiency of results

LIST OF EXPERIMENTS

1. Data Definition, Table Creation, Constraints,
2. Insert, Select Commands, Update and Delete Commands.
3. Nested Queries and Join Queries
4. Views
5. High level programming language extensions (Control structures, Procedures and Functions).
6. Consider the insurance database given below. The primary keys are made bold and the data types are specified.

PERSON(**driver_id**:string , name:string , address:string)
CAR(**regno**:string , model:string , year:int)
ACCIDENT(**report_number**:int , accd_date:date , location:string)
OWNS(**driver_id**:string , **regno**:string)
PARTICIPATED(**driver_id**:string , **regno**:string , **report_number**:int , damage_amount:int)

a)Create the above tables by properly specifying the primary keys and foreign keys.
b) Enter at least five tuples for each relation.
c)Demonstrate how you
i. Update the damage amount for the car with specific regno in the accident with report number 12 to 25000.
ii. Add a new accident to the database.
iii. Find the total number of people who owned cars that were involved in accidents in the year 2008.
iv. Find the number of accidents in which cars belonging to a specific model were involved.

7. Consider the following relations for a order processing database application in a company.

CUSTOMER(**custno**:int , cname:string , city:string)
ORDER(**orderno**:int , odate:date , custno:int , ord_amt:int)
ORDER_ITEM(**orderno**:int , **itemno**:int , quantity:int)
ITEM(**itemno**:int , unitprice:int)
SHIPMENT(**orderno**:int , **warehouseno**:int , ship_date:date)
WAREHOUSE(**warehouseno**:int , city:string)

a)Create the above tables by properly specifying the primary keys and foreign keys.
b) Enter at least five tuples for each relation.

c) Produce a listing: custname ,No_of_orders , Avg_order_amount , where the middle column is the total number of orders by the customer and the last column is the average order amount for that customer.
d) List the orderno for orders that were shipped from ***all*** the warehouses that the company has

in a specific city.
e) Demonstrate the deletion of an item from the ITEM table and demonstrate a method of handling the rows in the ORDER_ITEM table that contains this particular item.

8. Consider the following database of student enrollment in courses and books adopted for that course.
STUDENT(**regno**:string , name:string , major:string , bdate:date)
COURSE(**courseno**:int , cname:string , dept:string)
ENROLL(**regno**:string , **courseno**:int , **sem**:int , marks:int)
BOOK_ADOPTION(**courseno**:int , **sem**:int , book_isbn:int)
TEXT(**book_isbn**:int , book_title:string , publisher:string , author:string)
a) Create the above tables by properly specifying the primary keys and foreign keys.
b) Enter atleast five tuples for each relation.
c) Demonstrate how you add a new text book to the database and make this book to be adopted by some department.
d) Produce a list of text books (includescourseno , book_isbn , book_title) in the alphabetical order for courses offered by the 'CS' department that use more than two books.
e) List any department that has ***all*** its books published by a specific publisher.

9. The following are maintained by abook dealer.
AUTHOR(**author_id**:int , name:string , city:string , country:string)
PUBLISHER(**publisher_id**:int , name:string , city:string , country:string)
CATALOG(**book_id**:int , title:string , author_id:int , publisher_id:int , category_id:int , year:int , price:int)
CATEGORY(**category_id**:int , description:string)
ORDER_DETAILS(**order_no**:int , **book_id**:int , quantity:int)
a) Create the above tables by properly specifying the primary keys and foreign keys.
b) Enter at least five tuples for each relation.
c) Give the details of the authors who have 2 or more books in the catalog and the price of the books is greater than the average price of the books in the catalog and the year of publication is after 2000.
d) Find the author of the book that has maximum sales.
e) Demonstrate how you increase the price of books published by a specific publisher by 10%.

10. Consider the following database for a banking enterprise.
BRANCH(**branch_name**:string , branch_city:string , assets:real)
ACCOUNT(**accno**:int , branch_name:string , balance:real)
DEPOSITOR(**customer_name**:string , **accno**:int)
CUSTOMER(**customer_name**:string , customer_street:string , customer_city:string)
LOAN(**loan_number**:int , branch_name:string , amount:real)
BORROWER(**customer_name**:string , **loan_number**:int)
a) Create the above tables by properly specifying the primary keys and foreign keys.
b) Enter at least five tuples for each relation.

c) Find ***all*** the customers who have at least two accounts at the ***main*** branch.
d) Find all the customers who have an account at ***all*** the branches located in a specific city.
e) Demonstrate how you delete all account tuples at every branch located in a specific city.

ETCS164	WEB TECHNOLOGIES LAB	L	T	P	C
		-	-	2	1

LIST OF EXPERIMENTS:

1. Write HTML/Java scripts to display your CV in Web Browser.
2. Creation and annotation of static web pages using any HTML editor.
3. Write a program to use XML and JavaScript for creation of your homepage.
4. Write a program in XML for creation of DTD which specifies a particular set of rules.
5. Create a Stylesheet in CSS/XSL and display the document in Web Browser.
6. Create a Registration Form with Table.
7. CSS : Inline Style , Internal Style ,and External Style Sheets
8. DHTML
   I. Use user defined function to get array of values and sort them in ascending order
   II. Demonstrate String and Math Object's predefined methods
   III. Demonstrate Array Objects and Date Object's predefined methods
   IV. Exception Handling
   V. Calendar Creation : Display all month

   Event Handling

   i. Validation of registration form
   ii. Open a Window from the current window
   iii. Change color of background at each click of button or refresh of a page
   iv. Display calendar for the month and year selected from combo box
   v. OnMouseover event

9. XML

I. Create any catalog
II. Display the catalog created using CSS or XSL

ETCS166	OBJECT ORIENTED PROGRAMMING LAB	L	T	P	C
		-	-	2	1

LIST OF EXPERIENTS

Q1. Raising a number n to a power p is the same as multiplying n by itself p times. Write a function called power ( ) that takes a double value for n and an int value for p, and returns the result as double value. Use a default argument of 2 for p, so that if this argument is omitted, the number will be squared. Write a main ( ) function that gets values from the user to test this function.

Q2. A point on the two dimensional plane can be represented by two numbers: an X coordinate and a Y coordinate. For example, (4,5) represents a point 4 units to the right of the origin along the X axis and 5 units up the Y axis. The sum of two points can be defined as a new point whose X coordinate is the sum of the X coordinates of the points and whose Y coordinate is the sum of their Y coordinates.

Write a program that uses a structure called point to model a point. Define three points, and have

the user input values to two of them. Than set the third point equal to the sum of the other two,

and display the value of the new point. Interaction with the program might look like this:

Enter coordinates for P1: 3 4

Enter coordinates for P2: 5 7

Coordinates of P1 + P2 are : 8, 11

Q 3. Create the equivalent of a four function calculator. The program should request the user to enter a number, an operator, and another number. It should then carry out the specified arithmetical operation: adding, subtracting, multiplying, or dividing the two numbers. (It should use a switch statement to select the operation). Finally it should display the result. When it finishes the calculation, the program should ask if the user wants to do another calculation. The response can be 'Y' or 'N'. Some sample interaction with the program might look like this.

Enter first number, operator, second number: 10/ 3

Answer = 3.333333

Do another (Y/ N)? Y

Enter first number, operator, second number 12 + 100

Answer = 112

Do another (Y/ N) ? N

Q4. A phone number, such as (212) 767-8900, can be thought of as having three parts: the area code (212), the exchange (767) and the number (8900). Write a program that uses a structure to store these three parts of a phone number separately. Call the structure phone. Create two structure variables of type phone. Initialize one, and have the user input a number for the other one. Then display both numbers. The interchange might look like this:

Enter your area code, exchange, and number: 415 555 1212

My number is (212) 767-8900

Your number is (415) 555-1212

Q 5. Create two classes DM and DB which store the value of distances. DM stores distances in metres and centimeters and DB in feet and inches. Write a program that can read values for the class objects and add one object of DM with another object of DB.

Use a friend function to carry out the addition operation. The object that stores the results maybe
a DM object or DB object, depending on the units in which the results are required.
The display should be in the format of feet and inches or metres and cenitmetres depending on
the object on display.
Q 6. Create a class rational which represents a numerical value by two double values- NUMERATOR & DENOMINATOR. Include the following public member Functions:
• constructor with no arguments (default).
• constructor with two arguments.
• void reduce( ) that reduces the rational number by eliminating the highest common factor between the numerator and denominator.
• Overload + operator to add two rational number.
• Overload >> operator to enable input through cin.
• Overload << operator to enable output through cout.
Write a main ( ) to test all the functions in the class.
Q 7. Consider the following class definition
class father {
protected : int age;
public;
father (int x) {age = x;}
virtual void iam ( )
{ cout < < "I AM THE FATHER, my age is : "<< age<< end1:}
};
Derive the two classes son and daughter from the above class and for each, define iam ( ) to write
our similar but appropriate messages. You should also define suitable constructors for these classes.
Now, write a main ( ) that creates objects of the three classes and then calls iam ( ) for them. Declare pointer to father. Successively, assign addresses of objects of the two derived classes to this pointer and in each case, call iam ( ) through the pointer to demonstrate polymorphism in action.
Q 8. Write a program that creates a binary file by reading the data for the students from the terminal. The data of each student consist of roll no., name (a string of 30 or lesser no. of characters) and marks.
Q9. A hospital wants to create a database regarding its indoor patients. The information to store include
a) Name of the patient
b) Date of admission
c) Disease
d) Date of discharge
Create a structure to store the date (year, month and date as its members). Create a base class to

store the above information. The member function should include functions to enter information
and display a list of all the patients in the database. Create a derived class to store the age of the
patients. List the information about all the to store the age of the patients. List the information about all the pediatric patients (less than twelve years in age).

Q 10. Make a class **Employee** with a name and salary. Make a class **Manager** inherit from **Employee**. Add an instance variable, named department, of type string. Supply a method to **toString** that prints the manager's name, department and salary. Make a class **Executive** inherit from **Manager**. Supply a method **to String** that prints the string **"Executive"** followed by the information stored in the **Manager** superclass object. Supply a test program that tests these classes and methods.

Q11. Imagine a tollbooth with a class called toll Booth. The two data items are a type unsigned int to hold the total number of cars, and a type double to hold the total amount of money collected. A constructor initializes both these to 0. A member function called payingCar ( ) increments the car total and adds 0.50 to the cash total. Another function, called nopayCar ( ), increments the car total but adds nothing to the cash total. Finally, a member function called displays the two totals. Include a program to test this class. This program should allow the user to push one key to count a paying car, and another to count a nonpaying car. Pushing the ESC kay should cause the program to print out the total cars and total cash and then exit.

Q12. Write a function called reversit ( ) that reverses a string (an array of char). Use for loop that swaps the first and last characters, then the second and next to last characters and so on. The string should be passed to reversit ( ) as an argument. Write a program to exercise reversit ( ). The program should get a string from the user, call reversit ( ), and print out the result. Use an input method that allows embedded blanks. Test the program with Napoleon's famous phrase, "Able was I ere I saw Elba)".

Q13. Create some objects of the string class, and put them in a Deque-some at the head of the Deque and some at the tail. Display the contents of the Deque using the forEach ( ) function and a user written display function. Then search the Deque for a particular string, using the first That ( ) function and display any strings that match. Finally remove all the items from the Deque using the getLeft ( ) function and display each item. Notice the order in which the items are displayed: Using getLeft ( ), those inserted on the left (head) of the Deque are removed in "last in first out" order while those put on the right side are removed in "first in first out" order. The opposite would be true if getRight ( ) were used.

Q 14. Create a base class called shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base class, a member function get_data ( ) to initialize base class data Members and another member function display_area ( ) to compute and display the area of figures. Make display_area ( ) as a virtual function and redefine this function in the derived classes to suit their requirements.

Using these three classes, design a program that will accept dimensions of a triangle or a rectangle interactively and display the area.

Remember the two values given as input will be treated as lengths of two sides in the case of rectangles and as base and height in the case of triangles and used as follows:

Area of rectangle = x * y

Area of triangle = ½ * x * y

ETEL171	COMMUNICATION SKILLS LAB	L	T	P	C
		-	-	2	1

Course Objective: The purpose of this course is to

- Understand the basics of Grammar to improve communication and speak correct form of English
- Improve students' personality and enhance their self-confidence

UNIT I

Introduction to Communication: Meaning, Forms & Types of Communication; Process of Communication; Principles of Effective Communication/7Cs, Barriers in Communication

UNIT II

Essentials of Grammar: Parts of Speech: Noun, Pronoun, Adjective, Verb, Adverb, Preposition, Conjunction, Interjection; Using tenses; Articles; Reported Speech; Punctuation

UNIT III

Building Vocabulary: Word Formation (by adding suffixes and prefixes); Common Errors; Words Often Confused; Homonyms and Homophones; Antonyms/Synonyms, Phrasal Verbs

UNIT IV

Personality Development: Public Speaking; Body Language: Posture, Gesture, Eye Contact, Facial Expressions; Presentation Skills/ Techniques

TEXT BOOK:

Sanjay Kumar and Pushp Lata, Communication Skills, Oxford University Press.

REFERENCES:

1. M.L.Tickoo, A. E. Subramanian and P.R. Subramaniam, Intermediate Grammar, Usage and Composition, Orient Blackswan.
2. Barun K Mitra, Personality Development and Soft Skills, Oxford University Press.

Semester - III Syllabus

ETCS217	DATA STRUCTURES	L	T	P	C
		3	1	-	4

Course Objective: The main objective of this course is to provide an introduction to basic data structures, and algorithms.

UNIT I

Introduction to Data Structures: Definition of data structures and abstract data types, Static and Dynamic implementations, Examples and real life applications; Arrays**:** ordered lists, representation of arrays, sparse matrices, polynomial arithmetic

Running time: Time Complexity, Big – Oh - notation, Running Times, Best Case, Worst Case, Average Case, Factors depends on running time, Introduction to Recursion, Divide and Conquer Algorithm, Evaluating time Complexity.

UNIT II

The Stacks : Definition, Array based implementation of stacks, Linked List based implementation of stacks, Examples : Infix, postfix, prefix representation, Conversions, Applications.

Queues and Lists: Definition, Array based implementation of linear Queues, Circular implementation of Queues, Linked Lists: Singly linked lists: Representation of linked lists in memory, Traversing, Searching, Insertion into, Deletion from linked list Linked List implementation of Queues and Stacks Lists, Straight / circular implementation of doubly linked Queues / Lists, Priority Queues, Applications.

UNIT III

Trees: Basic Terminology, Binary Trees and their representation, expression evaluation, Complete Binary trees, Extended binary trees, Traversing binary trees, Searching, Insertion and Deletion in binary search trees(with and without recursion), AVL trees, Threaded trees

Graphs: Terminology and Representations, Graphs & Multigraphs, Directed Graphs, Sequential representation of graphs, Adjacency matrices, Transversal Connected Component and Spanning trees, Shortest path

UNIT IV

Sorting Algorithms : Introduction, Sorting by exchange, selection, insertions : Bubble sort, Straight selection sort, Efficiency of above algorithms,; Shell sort, Performance of shell sort, Merge sort, Merging of sorted arrays& Algorithms; Quick sort Algorithm analysis,

Heap sort: Heap Construction, Heap sort, bottom – up, Top – down Heap sort approach;

Searching Algorithms: Straight Sequential Search, Binary Search (recursive & non–recursive Algorithms)

TEXT BOOKS:

1.E. Horowitz and S. Sahani, "Fundamentals of Data Structures", GalgotiaBooksource Pvt. Ltd.
2. R. L. Kruse, B. P. Leung, C. L. Tondo, "Data Structures and program design in C", PHI.

REFERENCES BOOKS:

1. Schaum's outline series, "Data Structure", TMH.
2. Y. Langsamet. al., "Data Structures using C and C++", PHI.

ETCS 206	COMPUTER GRAPHICS	L	T	P	C
		3	1	-	4

Course Objective: This course aims at familiarizing the student with basic transformation techniques, Curves, Projections etc. The course contains various Clipping Algorithms.. A focus will be put on knowledge of computer based graphics creation so that at the student at end of the course is well equipped to pursue either an industrial or academic career in the area.

UNIT I

Transformation, Projections, and Clipping Algorithms: Introduction to computer graphics, applications, hardware and software, 2D graphics, Bresenham's Line Drawing Algorithm, Homogeneous Coordinate System for 2D and 3D, Various 2D, 3D Transformation matrices (Translation, Scaling, Rotation, Shear), Rotation about an arbitrary point (2D), Rotation about an arbitrary axis (3D), Computing location of V.P, Clipping Algorithms, Sutherland-Cohen Clipping Algorithm.

UNIT II

Curves and Surfaces: Bresenham's Circle Drawing Algorithm, Bezier Curves, 4 point and 5 point Bezier curves using Bernstein Polynomials, Conditions for smoothly joining curve segments, Bezier bi-cubic surface patch, B-Spline Curves, Cubic B-Spline curves using uniform knot vectors, Testing for first and second order continuities

UNIT III

Projection and Solid Modelling: Parallel Projection, Oblique Projection on xy plane, Isometric Projection, Perspective Projection, One Vanishing Point (V.P.) projection from a

point on z axis, Generation of 2 V.P. Projection, Isometric Projection, Perspective, Projection, one vanishing Pint (VP), projection from 0 point on z axis, Generation of 2 VP Projector & Projections, Solid Modelling.

UNIT IV

Shading and Hidden Surface Removal: Shading, Illumination Model for diffused Reflection, Effect of ambient lighting, distances, Specular Reflection Model, Computing Reflection Vector, Curved Surfaces, Polygonal Approximations, Gourard Shading, Phong Model, Hidden Surface Removal, Back Face Detection, Depth Buffer (Z-Buffer, A-Buffer) Method, Scan Line Method, Depth Sorting Method, Area Subdivision Method.

TEXT BOOKS:

1.Foley et. al., "Computer Graphics Principles & practice", Addison Wesley.

REFERENCES BOOKS:

1. D. Rogers and J. Adams, "Mathematical Elements for Computer Graphics", MacGraw-Hill International Edition.
2. D. Hearn and P. Baker, "Computer Graphics", Prentice Hall.
3. R. Plastock and G. Kalley, "Theory and Problems of Computer Graphics", Schaum's Series, McGraw Hill.

ETCS 202	SOFTWARE ENGINEERING	L	T	P	C
		3	1	-	4

Course Objective: The objective of the course is to provide a brief knowledge of Software Engineering to the under graduate Engineering students. The students will learn about the Requirement Analysis, Various SDLC Models, Software Design etc.

UNIT I

Introduction: Software Crisis, Software Processes & Characteristics, Software life cycle models, Waterfall, Prototype, Evolutionary and Spiral Models

Software Requirements analysis & specifications: Requirement engineering, requirement elicitation techniques, requirements analysis using DFD, Data dictionaries & ER Diagrams, Requirements documentation, Nature of SRS, Characteristics & organization of SRS.

UNIT II

Software Metrics: Software measurements: What & Why, Token Count, Size Estimation like lines of Code & Function Count, Halstead Software Science Measures, Design Metrics, Data Structure Metrics, Information Flow Metrics, Cost Estimation Models: COCOMO, COCOMO-II.

System Design: Design Concepts, design models for architecture, component, data and user interfaces; Problem Partitioning, Abstraction, Cohesiveness, Coupling, Top Down and Bottom Up design approaches; Functional Versus Object Oriented Approach, Design Specification.

Coding: TOP-DOWN and BOTTOM-UP structure programming, Information Hiding, Programming Style, and Internal Documentation, Verification.

UNIT III

Unified Approach and Unified Modeling Language: The Unified Approach: Layered Approach to OO Software Development, UML: UML Diagrams for Structure Modeling, UML Diagrams for Behavior Modeling, UML Diagram for Implementation and deployment modeling.

Software Reliability: Importance, Hardware Reliability & Software Reliability, Failure and Faults, Reliability Models, Basic Model, Logarithmic Poisson Model, Software Quality Models, CMM & ISO 9001.

UNIT IV

Software Testing: Testing process, Design of test cases, functional testing: Boundary value analysis, Equivalence class testing, Decision table testing, Cause effect graphing, Structural testing, Path Testing, Data flow and mutation testing, Unit Testing, Integration and System Testing, Debugging, Alpha & Beta Testing, Testing Tools & Standards.

Software Maintenance: Management of Maintenance, Maintenance Process, Maintenance Models, Regression Testing, Reverse Engineering, Software Re-engineering, Configuration Management, Documentation.

TEXT BOOKS:

1. K. K. Aggarwal & Yogesh Singh, “Software Engineering”, New Age International.
2. R. S. Pressman, “Software Engineering – A practitioner’s approach”, McGraw Hill Int. Ed.
3. W.S. Jawadekar, “Software Engineering – Principles and Practices”, McGraw Hill

REFERENCE BOOKS:

1. Stephen R. Schach, “Classical & Object Oriented Software Engineering”, IRWIN, TMH.
2. James Peter, W. Pedrycz, “Software Engineering: An Engineering Approach”, John Wiley & Sons.
3. I. Sommerville, “Software Engineering”, Addison Wesley.
4. K. Chandrasehakhar, “Software Engineering & Quality Assurance”, BPB.

ETCS323	JAVA PROGRAMMING	L	T	P	C
		3	1	-	4

Course Objective: The objective of the course is to provide a brief knowledge of Java Programming to students. The students will learn how to develop software system using Java programming language. Students will also learn about designing of Website.

UNIT I

Introduction to Java: Importance and features of Java, Keywords, constants, variables and Data Types, Operators and Expressions, Decision Making, Branching and Looping: if..else, switch,?: operator, while, do, for statements, labeled loops, jump statements: break, continue return. Introducing classes, objects and methods: defining a class, adding variables and methods, creating objects, constructors, class inheritance.

Arrays and String: Creating an array, one and two dimensional arrays, string array and methods, Classes: String and String Buffer classes, Wrapper classes: Basics types, using super, Multilevel hierarchy abstract and final classes, Object class, Packages and interfaces, Access protection, Extending Interfaces, packages.

UNIT II

Exception Handling: Fundamentals exception types, uncaught exceptions, throw, throw, final, built in exception, creating your own exceptions, Multithreaded Programming: Fundamentals, Java thread model: priorities, synchronization, messaging, thread classes, Run able interface, inter thread Communication, suspending, resuming and stopping threads.

Input/output Programming: Basics Streams, Byte and Character Stream, predefined streams, Reading and writing from console and files. Using Standard Java Packages (lang, util, io, net).

UNIT III

Event Handling: Different Mechanism, the Delegation Event Model, Event Classes, Event Listener Interfaces, Adapter and Inner Classes.

Swing: Working with windows, Graphics and Text, Java Swing - Lists, Trees, Tables, Styled Text Components, Progress Indicators and Component Organizers.

UNIT IV

Networking: Basics of network programming in Java, networking classes and interfaces, using java.net package, TCP/IP and Data-gram Programming, Connecting to a Server, Implementing Servers, Sending E-Mail, Making URL Connections, Advanced Socket Programming.

TEXT BOOKS:

1. Horstmann, “Computing Concepts with Java 2 Essentials”, John Wiley.

REFERENCES BOOKS:

1. E. Balaguruswamy, “Programming with Java: A Primer”, TMH.
2. Horstmann, “Computing Concepts with Java 2 Essentials”, John Wiley.
3. Decker &Hirshfield, “Programming Java: A introduction to programming using JAVA”, Vikas Publication.
4. TmyGaddies, “Starting out with Java”, Wiley Dreamtech.
5. Holzner, “HTML Blackbook”, Wiley Dreamtech.
6. Rick Dranell, “HTML 4 unleashed”, Techmedia Publication.

ETCS322	E-COMMERCE AND ERP	L	T	P	C
		3	1	-	4

Course Objective: The objective of this course is to make students aware of the potential and limitations of ERP systems. This objective will be reached through hands-on experience, case studies, lectures, guest speakers and a group project. The course would equip students with the basics of E-Commerce, technologies involved with it and various issues associated with.

UNIT- I

Introduction and Concepts: Networks and Commercial transactions - Internet and other novelties, networks and electronic transactions today, Model for commercial transactions; Internet environment - Internet advantage, worlds wide web and other Internet sales venues; online commerce solutions.

Electronic Payment Methods: Updating traditional transactions; secure online offline secure processing; private data networks, Security protocols.

UNIT- II

Electronic Commerce Providers: On - line Commerce options, Company profiles, Electronic Payment Systems, Digital payment systems, First virtual Internet payment system, cyber cash model, On-line Commerce environments, Servers and commercial environments, E-commerce Servers

Digital Currencies: Operational process of Digicash, E-cash Trail, Using E-cash, Smart cards, Electronic Data Interchange: Basics, EDI versus Internet and EDI over Internet, Strategies, Techniques and Tools, Shopping techniques and online selling techniques.

UNIT- III

ERP - An Enterprise Perspective: Production finance, Personnel disciplines and their relationships, Transiting environment, MIS Integration for disciplines, Information/ workflow, Network Structure, client Server Integrator System, Virtual Enterprise.
ERP - Resource Management Perspective: Functional and Process of Resource, Management, Introduction to basicModules of ERP System: HRD, Personnel Management, Training and Development, Skill Inventory, Material Planning and Control, inventory, forecasting, Manufacturing, Production Planning, Production Scheduling, Production Control, Sales and Distribution, Finance, Resource Management in global scenario.

UNIT- IV

ERP - Information System Perspective: Functional to OLAP (Online Analysis and Processing), TP, OAS, KBS, MRP, BPR, SCM, REP, CRM, and Information Communication Technology.
ERP - Key Managerial Issues: Concept Selling, IT Infrastructure, Implication, of ERP System on business Organization, Critical success factors in ERP System, ERP Culture Implementation Issues, resistance to change, ERP Selection issues, return on Investment, pre and Post Implementation Issues.

TEXT BOOK

1. Ravi lalakota, Andrew Whinston, "Frontiers of Electronics Commerce", Addison Wesley.

REFERENCE BOOKS

1. V.K. Garg and N.K. Venkita Krishna, "Enterprise Resource Planning - Concepts and practice", PHI.
2. Greenstein and Feinman, "E-Commerce", TMH.
3. Bajan and Nag: "E-Commerce: The cutting Edge of Business", TMH.
   Greenstein, Feinman, "Electronic Commerce - Security, Risk Management and Control", TMH.

ETMA233	Numerical Methods	L	T	P	C
		3	1	-	4

Course Objectives:: To understand the basics concepts of probability and numerical analysis.

Unit I

Numerical errors: Round-off error, Truncation error, Absolute & relative errors, error propagation.
Nonlinear Equations: Bisection method, fixed point iteration, Newton's method, Newton's method for non-linear system of equations.

Unit II
Finite differences and Interpolation: Forward, backward & central differences, Factorial notation, averaging operator, shift operator and relationship between various type of operators, Newton's forward & backward interpolation, central difference interpolation formulas, Interpolation with unequal interval, Lagrange interpolation formula.

Unit III
Numerical Differentiation & Integration: Numerical Differentiation using forward, backward & central difference formulas, Newton's Cotes formula, Trapezoidal and Simpson's rules. Romberg integration

Unit IV
Probability distributions: Conditional probability, Bayes theorem and its applications, expected value of a random variable. Properties and application of Binomial, Poisson and Normal distributions.

TEXT BOOKS:
1. F Kreyszig, "Advanced Engg. Mathematics"
2. B.S. Grewal, "Higher Engg. Mathematics".
3. E. Balagurusamy, "Numerical Methods", TMH

ETCS257	DATA STRUCTURES LAB	L	T	P	C
		-	-	2	1

LIST OF EXPERIMENTS

1. Write a program for multiplication and transpose of array.
2. Write a program to compute the transpose of a sparse matrix
3. Write a program to implement push and pop operation in Stack.
4. Write a program to convert a Infix notation to post fix notation using stacks
5. Write a program to evaluate postfix notation using stacks
6. Write a program to implement a linear queue
7. Write a program for swapping two numbers using call by value and call by reference strategies.
8. Write a program to insert and delete a node in linked list. The number of nodes to inserted and deleted should be governed by user.
9. Write a program to implement a linear search arrays and linked list.

10. Using iteration and recursion concepts write programs for finding the element in the array using the Binary search method.
11. Write the programs to implement bubble sort.
12. Write a program using iteration and recursion concepts for quick sort.
13. Write a program to implement merge sort.
14. Write a program to simulate various tree traversal techniques.
15. Write a program to simulate various BFS and DFS.

ETCS258	COMPUTER GRAPHICS LAB	L	T	P	C
		-	-	2	1

LIST OF EXPERIMENTS

1. Write a program to draw a point on screen. Study of various built in commands to draw basic objects on screen.
2. Write a program to implement Bresenham's Line Drawing Algorithm.
3. Write a program to implement various 2D, 3D Transformation matrices such as Translation, Scaling, Rotation, and Shear.
4. Write a program to implement Sutherland-Cohen line Clipping Algorithm.
5. Write a program to implement Bresenham's Circle Drawing Algorithm.
6. Write a program to implement Bezier Curves.
7. Write a program to implement B-Spline Curves.
8. Write a program to implement various Projections of 2D objects.
9. Write a program to implement various Projections of 3D objects.
10. Write a program to implement Isometric Projection.

ETCS252	SOFTWARE ENGINEERING LAB	L	T	P	C
		-	-	2	1

LIST OF EXPERIMENTS

1. To identify the role of the software in today's world across a few significant domains related to day to day life Create SRS document of admission management for your university
2. To identify the problem related to software crisis for a given scenario
3. To identify the suitable software development model for the given scenario.
4. To identify the various requirement development activities viz. elicitation, analysis, specification and verification for the given scenario

5. To identify the various elicitation techniques and their usage for the Banking case study.
6. Identify the elements in Software Requirements Specification for a given document.
7. Draw E-R Diagram for Hockey League.
8. Draw a context diagram and a level-1 diagram that represent the selling system at the store**.**
9. Find out all software metrics for a Quadratic Equation program written in 'C'.
10. Identify the design principle that is being violated in relation to the given scenario.
11. To identify the usage of stubs or drivers in the context of an integration testing scenario.
12. Identify the different types of performance testing.
13. Identify the usage of regression testing.
14. Write various white box test cases to test the internal behavior of above program.
15. Write various Black box test cases to test the functionalities of above program.

ETCS361	JAVA PROGRAMMING LAB	L	T	P	C
		-	-	2	1

LIST OF EXPERIMENTS

1. Create a java program to implement stack and queue concept.
2. Write a java package to show dynamic polymorphism and interfaces.
3. Write a java program to show multithreaded producer and consumer application.
4. Create a customized exception and make use of all the 5 exception keywords.
5. Convert the content of a given file into the uppercase content of the same file.
6. Develop an analog clock using applet.
7. Develop a scientific calculator using swings.
8. Create an editor like MS-word using swings.
9. Create a servlet that uses Cookies to store the number of times a user has visited your servlet.
10. Create a simple java bean having bound and constrained properties.

Semester - IV Syllabus

ETCA232	FOUNDATION OF COMPUTER SCIENCE	L	T	P	C
		3	1	-	4

Course Objective: The computer science goals of this course are to introduce the fundamental organization and structure of computer systems. A broader set of objectives for

this course is to teach critical thinking, how to learn, and how to communicate technical concepts.

UNIT-I

Formal Logic: Statement, Symbolic Representation and Tautologies, Quantifiers, Predicator and validity, Normal form. Propositional Logic, Predicate Logic, Logic Programming and Proof of correctness.State space representation of Problems.

Proof, Relation and Analysis of Algorithm: Techniques for theorem proving: Direct Proof, Proof by Contra position, Proof by exhausting cares and proof by contradiction, principle of mathematical induction, principle of complete induction. Recursive definitions, solution methods for linear, first-order recurrence relations with constant coefficients,

UNIT-II

Sets and Combinations: Sets, Subtracts, powersets, binary and unary operations on a set, set operations/set identities, fundamental counting principles, principle of inclusion, exclusion and pigeonhole principle, permutation and combination, Pascal's triangles, binominal theorem, representation of discrete structures

Relation/function and matrices: Relation, properties of binary relation, operation on binary relation, closures, partial order relation, equivalence relation, Function, properties of function, composition of function, inverse, binary and n-ary operations, characteristics for, Permutation function, composition of cycles.

UNIT-III

Automata: Introduction to Automata, Deterministic Finite Automata, Non Deterministic Finite Automata, Transformation of NFA to DFA,NFA with and without $\in$ transition,minimization of DFA's,

Grammer: context free grammer, Derivation: left most & right most derivation, Ambiguity, ambiguous grammer & unambiguous grammer, **Parsing** Top down parsing, Bottom up Parsing

UNIT-IV

Graph Theory: Terminology, isomorphic graphs, and Euler's formula (proof) four color problem (without proof) and the chromatic number of a graph, five color theorem. Trees terminology, directed graphs, Computer representation of graphs, Warshall's algorithms, Decision Trees, Euler path &Hamiltonian circuits, Shortest path & minimal spanning trees, Depth-first and breadth first searches, trees associated with DFS & BFS). Connected components, in order, preorder & post order trees traversal algorithms.

TEXT BOOKS:

1. Keneth H. Rosen, "Discrete Mathematics and Its Applications", TMH.
2. C.L. Liu, "Elements of Discrete Mathematics", TMH.

REFERENCES BOOKS:

1. Kolman, Busby & Ross, "Discrete Mathematical Structures", PHI.

2. NarsinghDeo, “Graph Theory with Application to Engineering and Computer Science”, PHI.
3. J. P. Trembly& P. Manohar, “Discrete Mathematical Structures with Applications to Computer Science”, McGraw Hill.
4. Vinay Kumar, “Discrete Mathematics”, BPB Publications.

ETCS211	OPERATING SYSTEMS	L	T	P	C
		3	1	-	4

Course Objectives: To introduce an operation System and describe the functionalities of Operating System

UNIT – I

Introduction: What is an Operating System, Simple Batch Systems, Multiprogramming, Batches systems, Time-Sharing Systems, Personal-computer systems, Parallel systems, Distributed Systems, Real-Time Systems.

Memory Management: Background, Logical versus Physical Address space, swapping, Contiguous allocation, Paging, Segmentation

Virtual Memory: Demand Paging, Page Replacement, Page-replacement Algorithms, Performance of Demand Paging, Allocation of Frames, Thrashing, Other Considerations

UNIT – II

Processes: Process Concept, Process Scheduling, Operation on Processes

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling,

Process Synchronization: Background, the Critical-Section Problem, Synchronization, Hardware, Semaphores, Classical Problems of Synchronization

UNIT – III

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock

Device Management: Techniques for Device Management, Dedicated Devices, Shared Devices, Virtual Devices; Input or Output Devices, Storage Devices, Buffering, Secondary-Storage Structure: Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, Disk Reliability

UNIT – IV

Information Management: Introduction, A Simple File System, General Model of a File System, Types of File System File-System Interface: File Concept, Access Methods,

Directory Structure. Protection: Goals of protection, Domain of protection, Access rights, Consistency
Semantics Security: Authentication, Program threats, System threats, Encryption.

TEXT BOOKS:

1. Silbersachatz and Galvin, "Operating System Concepts", John Wiley & Sons.
2. Haldar/Aravind, "Operating System", Pearson Education

ETCS304	COMPUTER NETWORKS	L	T	P	C
		3	1	-	4

Course Objectives: The aim of this course is to allow students to develop background knowledge as well as core expertise in networking technologies, which one of the fastest growing industries is in today's world

Unit-I:
OSI Reference Model and Network Architecture: Introduction to Computer Networks, Example networks ARPANET, Internet, Private Networks, Network Topologies: Bus, Star, Ring, Hybrid, Tree,
Complete, Irregular –Topology; Types of Networks: Local Area Networks, Metropolitan Area Networks, Wide Area Networks; Layering architecture of networks, OSI model, Functions of each layer, Services and Protocols of each layer.

Unit–II:
Local Area Networks: Introduction to LANs, Features of LANs, Components of LANs, Usage of
LANs, LAN Standards, IEEE 802 standards, Channel Access Methods, Aloha, CSMA, CSMA/ CD, Token Passing, Ethernet, Layer 2 & 3 switching, Fast Ethernet and Gigabit Ethernet, Token Ring, LAN interconnecting devices: Hubs, Switches, Bridges, Routers, Gateways.

Unit-III:
TCP/IP: Introduction, History of TCP/ IP, Layers of TCP/ IP, Protocols, Internet Protocol, Transmission Control Protocol , User Datagram Protocol, IP Addressing, IP address classes, Subnet Addressing, Internet Control Protocols, ARP, RARP, ICMP, Application Layer, Domain Name System, Email – SMTP, POP,IMAP; FTP, NNTP, HTTP, Overview of IP version 6.

Unit–IV:

Wide Area Networks: Introduction of WANs, Routing, Congestion Control, WAN Technologies, Distributed Queue Dual Bus (DQDB), Synchronous Digital Hierarchy (SDH)/ Synchronous Optical Network (SONET), Asynchronous Transfer Mode (ATM), Frame Relay, Wireless Links.

Introduction to Network Management: Remote Monitoring Techniques: Polling, Traps, Performance Management, Class of Service, Quality of Service, Security management, Digital signatures, SSL, Firewalls, VLANs, Proxy Servers.

Text Book:

1. Tanenbaum Andrew S, "Computer Network", PHI.
2. Behrouz A. *Forouzan, "Data communication and Networking", McGraw Hill*

Reference Books:

1. Halsall Fred, "Data Communications, Computer Networks and Open Systems",Addison Wesley

ETMC123	MICRO ECONOMICS	L	T	P	C
		3	-	-	3

Course Objective: The objective of this subject is to give understanding of the basic concepts and issues in business economics and their application in business decisions.

UNIT - I

Introduction to Business Economics and Fundamental concepts: Nature, Scope, Definitions of Business Economics, Difference between Business Economic and Economics, Contribution and Application of Business Economics to Business. Micro vs. Macro Economics. Opportunity Costs, Time Value of Money, Marginalize, Instrumentalism, Market forces and Equilibrium, Risk, Return and Profits.

UNIT - II

Consumer Behavior and Demand Analysis: Cardinal Utility Approach: Diminishing Marginal Utility, Law of Equi-Marginal Utility. Ordinal Utility Approach: Indifference Curves, Marginal Rate of Substitution, Budget Line and Consumer Equilibrium. Theory of Demand, Law of Demand, Movement along Vs. Shift in Demand Curve, Concept of Measurement of Elasticity of Demand, Factors Affecting Elasticity of Demand, Income Elasticity of Demand, Cross Elasticity of Demand, Advertising Elasticity of Demand and Expectation Elasticity of Demand. Demand Forecasting: Need, Objectives and Methods (Brief)

UNIT - III

Theory of Production: Meaning and Concept of Production, Factors of Production and production function. Fixed and Variable Factors. Law of Variable Proportion (Short Run

Production Analysis), Law of Returns to a Scale (Long Run Production Analysis) through the use of ISOQUANTS.

UNIT - IV

Cost Analysis & Price Output Decisions: Concept of Cost, Cost Function, Short Run Cost, Long Run Cost, Economies and Diseconomies of Scale. Explicit Cost and Implicit Cost, Private and Social Cost. Pricing Under Perfect Competition, Pricing Under Monopoly, Control of Monopoly, Price Discrimination, Pricing Under Monopolistic Competition, Pricing Under Oligopoly.

TEXT BOOK:

1. Dwivedi, D.N.; Managerial Economics, Vikas Publishing House.

REFERENCE BOOKS:

1. Chaturvedi, D.D. and S. L. Gupta; Business Economics, Brijwasi Publishers.

2. Mehta, P. L.; Managerial Economics, Sultan Chand & Sons.

3. Koutsoyiannis, A.; Modern Micro Economics, Macmillan Press Ltd.

4. Salvator,Dominick,Managerial Economics,McGraw-Hill Book Company.

ETCA228	MOBILE APPLICATION DEVELOPMENT	L	T	P	C
		3	1	-	4

Unit -I

Introduction to Mobile Application Development: Definition of mobile computing, various types of mobile computing devices (mobile computers, smart phones and dedicated devices). Web based applications, Native applications and Compare and contrast web-based mobile applications against native applications, history of mobile platforms (PDA's, Notebooks, smart phones, Internet protocols for mobile applications .i.e. WAP), evolution of browsers and Internet languages such as HTML and JavaScript.

Unit-II

Infrastructure: Describe mobile and cell phone technologies (CDMA, GSM, 3G, 4G), Compare and contrast 3G and 4G, Internet terms: IP address, subnet mask, gateway, DNS, static vs Dynamic IP, transport including HTTP , routing, secure connections, proxies and reverse proxies. Need for storage, local Storage, storage on Web

Unit-III

HTML/CSS/ DOM and Scripting; Basic HTML: validation, rendering and web browser, Cascading Style Sheets (CSS) and how to use them, document object model (DOM) : document, objects, model, DOM tree and DOM's utilization in web design, basic Java Script code and constructs of the JavaScript language.

Unit IV

Designing mobile user interfaces and Mobile Platforms: Design mobile interfaces, usability, ways to test user interfaces, various types of user interfaces for mobile apps
Interactive voice response (IVR), SMS/ MMS, Mobile web, Native applications, Hybrids, mobile application development design considerations: Text entry, screen size, user interface and user context.
Mobile Platforms: URIs for mobile apps, Compare and contrast native mobile platforms such as tightly controlled (IPhone), open (Android), and licensed (Windows Mobile), web as a mobile application platform.

Text Book:

1. Lauren Darcey and Shane Conder, "Android Wireless Application Development", Pearson Education

Reference Books:

1. Reto Meier, "Professional Android 2 Application Development", Wiley India Pvt Ltd.
2. Mark L Murphy, "Beginning Android", Wiley India PvtLtd.
3. Sayed Y Hashimi and SatyaKomatineni, "Pro Android", Wiley India PvtLtd.
4. Brian Fling, "Mobile Design and Development: Practical concepts and techniques for creating mobile sites and web

ETCA 230	SYSTEM ANALYSIS AND DESIGN	L	T	P	C
		3	1	-	4

Course Objectives: To gain knowledge of various software design activities, software testing, maintenance and debugging

UNIT-I

Introduction to System: Definition and characteristics of a system, Elements of system, Types of system, System development life cycle, Role of system analyst, Analyst/user interface, System planning and initial investigation: Introduction, Bases for planning in system analysis, Sources of project requests, Initial investigation, Fact finding, Information gathering, information gathering tools, Fact analysis, Determination of feasibility.

UNIT-II

Structured Analysis: Tools of structured analysis: DFD, Data dictionary, Flow charts, Gantt charts, decision tree, decision table, structured English, Pros and cons of each tool, Feasibility study: Introduction, Objective, Types, Steps in feasibility analysis, Feasibility report, Oral presentation, Cost and benefit analysis: Identification of costs and benefits, classification of costs and benefits, Methods of determining costs and benefits, Interpret results of analysis and take final action.

UNIT-III

System Design: System design objective, Logical and physical design, Design Methodologies, structured design, Form-Driven methodology(IPO charts), structured walkthrough, Input/Output and form design: Input design, Objectives of input design, Output design, Objectives of output design, Form design, Classification of forms, requirements of form design, Types of forms, Layout considerations, Form control.

UNIT-IV

System Testing: Introduction, Objectives of testing, Test plan, testing techniques/Types of system tests, Quality assurance goals in system life cycle, System implementation, Process of implementation, System evaluation, System maintenance and its types, System documentation, Forms of documentation.

TEXT BOOKS:

1. E.M. Awad, "Systems Analysis and Design", Galgotia Pub.(P) Ltd.
2. Loomis, "Data Management and Data Structures", PHI
3. V.Rajaraman, "Analysis and Design of Information System", PHI

ETCS255	OPERATING SYSTEMS LAB	L	T	P	C
		-	-	2	1

LIST OF EXPERIMENTS

1. Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir.

2. Write programs using the I/O System calls of UNIX operating system. (open, read, write, etc)

3.Write C programs to simulate UNIX commands like ls, grep, etc.

4. Given the list of processes, their CPU burst times and arrival times. Display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time.

5. Given the list of processes, their CPU burst times and arrival times. Display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time.

6.Develop Application using Inter-Process-Communication (Using shared memory, pipes or message queues).

7.Implement the Producer-Consumer problem using semaphores(Using UNIX system calls)

8. Implement some Memory management schemes like Paging and Segmentation.

16. Implement some Memory management schemes like FIRST FIT, BEST FIT & WORST FIT.

			L	T	P	C
	ETCA264	**MOBILE APPLICATION DEVELOPMENT LAB**	**-**	**-**	**2**	**1**

LIST OF EXPERIMENTS

1: Getting Started with Android Development
2: Activities and Views: Android Manifest.xml, Activity Class, Basic View Components: Layouts and Buttons
3: Navigation with Data: Working with Intent, Sharing Data between Activities, Application Class
4: Android Resources: String Resources, Loading Strings in XML, Loading Strings in Code, The Resource Values Folder
5: Drawables - Image Basics, Drawable Folders and Qualifiers, Dimensions, Image Padding, The ImageButton Widget
6: Lists Implementing an Android List, ListView, ListActivity, Empty Lists , ListAdapter, Sorting the Adapter,Overriding ArrayAdapter, List Interaction
7: Dialogs, New and Old : AlertDialog, Custom Dialog, Support Library, Fragments, DialogFragment
8: Menus: Options Menu, Modifying an Options Menu, Context Menu
9: Saving Data with Shared Preferences: Shared Preferences, Getting Started with Shared Preferences, Preference Activity
10: Saving Data with a Database: Setting Up SQLite, Creating a Helper , using the Helper, Cursor and Cursor Adapater
11: Threading with AsyncTasks: Threading in Android, AsyncTask, Tracking Progress
12: Styles and Themes: Introduction to Styling: Defining Styles, Defining Themes, Style Inheritance, Direct Theme References

13. Develop an Android based Project

ETCS365	COMPUTER NETWORKS LAB	L	T	P	C
		-	-	2	1

LIST OF EXPERIMENTS

1. Write specifications of latest desktops and laptops.
2. Familiarization with Networking Components and devices: LAN Adapters, Hubs, Switches, Routers etc.
3. Familiarization with Transmission media and Tools: Co-axial cable, UTP Cable, Crimping Tool, Connectors etc.
4. Preparing straight and cross cables.
5. Study of various LAN topologies and their creation using network devices, cables and computers.
6. Configuration of TCP/IP Protocols in Windows/Linux.
7. Implementation of file and printer sharing.
8. Designing and implementing Class A, B, C Networks
9. Subnet planning and its implementation
10. Installation of ftp server and client.

ETCA380	SEMINAR	L	T	P	C
		-	-	2	1

Seminar is required to be given by the student on the topic of the dissertation. Progress of the dissertation will be evaluated based on the seminar given by the student during the semester. Evaluation will be done two times during the semester. Marks will be given based on the performance of the student during the seminar.

Semester - V Syllabus

ETCS 306	DATA WAREHOUSING AND DATA MINING	L	T	P	C
		3	1	-	4

Course Objective: The objective of this course is to explain what data warehousing and data mining is.

UNIT I

Introduction: Evolution of Data Warehousing (Historical Context), The Data Warehouse - a Brief Overview, Characteristics, Operational Database Systems and Data Warehouse (OLTP & OLAP), Data Marts, Metadata.

Principles of Data Warehousing (Architecture and Design Techniques): System Processes, Data Warehousing Components, Architecture for a Warehouse, Three-tier Data Warehouse Architecture, Steps for the design and construction of Data Warehouses, Conceptual Data Architecture, Logical Architectures, Design Techniques.

UNIT II

Multidimensional Data Models: Types of Data and Their Uses, From Tables and Spreadsheets to Data Cubes, Identifying Facts and Dimensions, Fact Tables, Designing Fact Tables, Designing Dimension Table, Data Warehouse Schemas- STAR Schema, Snowflake Schema, OLAP, OLAP Operations**,** Hypercube**,** ROLAP, MOLAP, From Data warehousing to Data Mining, Data warehouse Usage

UNIT III

Data Mining: Motivation, Importance, Knowledge Discovery Process (KDD), KDD and Data Mining, Data Mining vs. Query Tools, Kind of Data, Data preprocessing, Functionalities, Interesting Patterns, Classification of data mining systems, Major issues.

UNIT IV

Classification and Prediction: Classification & Prediction, Issues Regarding Classification & Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back Propagation, Classification Parameters.

Cluster Analysis: Types of Data in Cluster Analysis, Partitioning Method, Hierarchical Method, Density Based Method, Grid Based Method, Model Based Clustering Method, Outlier Analysis.

Mining Association Rules: Association Rule Mining, Market Basket Analysis, Types of Association Rules, Methods for Mining Association

TEXT BOOKS:

1. Kamber and Han, “Data Mining Concepts and Techniques”, Hartcourt India P. Ltd.

REFERENCES BOOKS:

1. W. H. Inmon, “Building the operational data store”, 2nd Ed., John Wiley.
2. Paul Raj Poonia, “Fundamentals of Data Warehousing”, John Wiley & Sons.

3. Sam Anahony, “Data Warehousing in the real world: A practical guide for building decision support systems”, John Wiley.

ETCA227	Web Based Programming using PHP	L	T	P	C
		3	1	-	4

Course Objectives: To highlight the features of different technologies involved in Web Development

UNIT – I

Introduction to web applications: HTML, Client-Side Scripting Vs Server-Side Scripting, Web Servers: Local Servers and Remote Servers, Installing Web servers, Internet Information Server (IIS) and Personal Web Server (PWS). Static website vs Dynamic website development.

UNIT – II

Introduction to PHP: Start and End Tags of PHP, Data types in PHP, Variables, Constants, operators and Expressions, printing data on PHP page, Control statements – if, switch case, for, while, do while.

Arrays: Initialization of an array, Iterating through an array, Sorting arrays, Array Functions

Functions: Defining and Calling Functions, Passing by Value and passing by references, Inbuilt Functions.

UNIT – III

Working with Forms: Get and Post Methods, Query strings, HTML form controls and PHP

Maintaining User State: Cookies, Sessions and Application State.

Working with Files: Opening and Closing Files, Reading and Writing to Files, Getting Information on Files, OOP’s – Instantiation, Modifiers, Inheritance, Interfaces, Exceptions, Static Methods and properties,

Auto load, Reflection, Type Hinting and class constant.

UNIT – IV

PHP Database Connectivity: Introduction to MYSQL, creating database and other operations on database, connecting to a database, use a particular database, sending query to database, Parsing of the query results, Checking data errors. MVC overview, security, Ajax basics, PHP with Ajax

TEXT BOOKS:

1. Rasmus Lerdorf and Kevin Tatroe, “Programming PHP”, O'Reilly.

2. Robin Nixon, "PHP, MySQL, and JavaScript: A Step-By-Step Guide to Creating Dynamic Websites", O'Reilly Media

ETCA325	LINUX ENVIRONMENT	L	T	P	C
		3	1	-	4

Course Objective: To understand Linux Operating System and its security.

UNIT – I

UNIX & LINUX:- Overview of UNIX and LINUX Architectures, UNIX Principles, GNU Project/FSF, GPL, Getting help in Linux with –help, whatis, man command, info command, simple commands like date, whoami, who, w, cal, bc ,hostname, uname, concept of aliases etc, Linux filesystem types ext2, ext3, ext4,Basic Linux directory structure and the functions of different directories basic directory navigation commands like cd, mv, copy, rm, cat command, less command, runlevel (importance of /etc/inittab

UNIT – II

Standard Input and Output, redirecting input and Output, Using Pipes to connect processes, tee

command, Linux File Security, permission types, examining permissions, changing permissions (symbolic method numeric method), default permissions and umask, vi editor basics, three modes of vi editor, concept of inodes, inodes and directories, cp and inodes, mv and inode rm and inodes, symbolic links and hard links, mount and umount command, creating archives, tar, gzip, gunzip, bzip2, bunzip2(basic usage of these commands)

UNIT – III

Environment variables (HOME, LANG, SHELL, USER, DISPLAY, VISUAL), Local variables, concept of /etc/passwd, /etc/shadow, /etc/group,and su- command, special permissions(suid for an executable, sgid for an executable, sgid for a directory, sticky bit for a directory)tail, wc, sort, uniq, cut, tr, diff, aspell, basic shell scripts grep, sed, awk(basic usage)

UNIT – IV

Process related commands(ps, top, pstree, nice, renice), Introduction to the Linux Kernel, gettingstarted with the kernel(obtaining the kernel source, installing the kernel source,using patches,the kernel source tree, building the kernel process management(process descriptor and the taskstructure, allocating the process descriptor, storing the process descriptor, process state,manipulating the current process state, process context, the process family tree, the Linuxscheduling algorithm, overview of system calls,Introduction to kernel debuggers(in windowsand Linux

TEXT BOOKS:

1 Sumitabha Das, "Unix Concepts and Application", TMH

2 Robert Love, “Linux Kernel Development”, Pearson Education
3 Sumitabha Das, “Your Unix The Ultimate Guide”, TMH

ETCS314	MOBILE COMPUTING	L	T	P	C
		3	1	-	4

Course Objective: To learn the concepts and principles of mobile computing and also to explore both theoretical and practical issues of mobile computing

UNIT I

Introduction to Personal Communications Services (PCS): PCS Architecture, Mobility management, Networks signaling.

Global System for Mobile Communication (GSM) system overview: GSM Architecture, Mobility management, Network signaling.

General Packet Radio Services (GPRS): GPRS Architecture, GPRS Network Nodes.

UNIT II

Mobile Data Communication: WLANs (Wireless LANs) IEEE 802.11 standard, Mobile IP.

Wireless Application Protocol (WAP): The Mobile Internet standard, WAP Gateway and Protocols, wireless markup Languages (WML).

UNIT III

Third Generation (3G) Mobile Services: Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G.

Wireless Local Loop(WLL): Introduction to WLL Architecture, wireless Local Loop Technologies.

UNIT IV

Global Mobile Satellite Systems: case studies of the IRIDIUM and GLOBALSTAR systems.

Wireless Enterprise Networks: Introduction to Virtual Networks, Blue tooth technology, Blue tooth Protocols.

TEXT BOOKS:

1. Yi-Bing Lin &ImrichChlamtac, "Wireless and Mobile Networks Architectures", John Wiley & Sons.

REFERENCE BOOKS:

1. Mark Ciampa, "Guide to Designing and Implementing wireless LANs", Thomson learning, Vikas Publishing House.
2. Ray Rischpater, "Wireless Web Development", Springer Publishing.
3. P.Stavronlakis, "Third Generation Mobile Telecommunication systems", Springer Publishers.
4. Hansmann, "Principles of Mobile Computing", Wiley Dreamtech.

ETCS214	THEORY OF COMPUTATION	L	T	P	C
		3	1	-	4

Course Objective: The goals of this course are to introduce the fundamental theory of computation to students. A broader set of objectives for this course is to present the basic concepts of formal languages, automata and computability theory to the students with methods to solve problems in these units.

UNIT I

Introduction to formal proof: Additional forms of proof, Inductive proofs, Finite Automata (FA), Deterministic Finite Automata (DFA), Non-deterministic Finite Automata (NFA) , Finite Automata with Epsilon transitions.

UNIT II

Regular Expression: FA and Regular Expressions, Proving languages not to be regular, Closure properties of regular languages, Equivalence and minimization of Automata.

UNIT III

Context-Free Grammar (CFG): Parse Trees, Ambiguity in grammars and languages, Definition of the Pushdown automata, Languages of a Pushdown Automata, Equivalence of Pushdown automata and CFG, Deterministic Pushdown Automata. Normal forms for CFG, Pumping Lemma for CFL, Closure Properties of CFL, Turing Machines, Programming Techniques for TM.

UNIT IV

A language that is not Recursively Enumerable (RE): An undecidable problem that is RE, Undecidable problems about Turing Machine, Post's Correspondence Problem.

TEXT BOOK:

1. J.E. Hopcroft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory, Languages and Computations", second Edition, Pearson Education.

REFERENCE BOOKS:

1. H.R. Lewis and C.H. Papadimitriou, "Elements of the theory of Computation", Second Edition, Pearson Education.
2. Thomas A. Sudkamp," An Introduction to the Theory of Computer Science, Languages and Machines", Third Edition, Pearson Education.
3. Raymond Greenlaw an H.James Hoover, "Fundamentals of Theory of Computation, Principles and Practice", Morgan Kaufmann Publishers.
4. MichealSipser, "Introduction of the Theory and Computation", Thomson Brokecole.
5. J. Martin, "Introduction to Languages and the Theory of computation" Third Edition, Tata Mc Graw Hill.

ETCA 267	Web Based Programming Using PHP Lab	L	T	P	C
		-	-	2	1

LIST OF EXPERIMENTS

1. WAP using Client-side scripting to perform arithmetical tasks and display results.
2. WAP in PHP to accept values from user and check the eligibility to vote, and print result on screen.
3. WAP in PHP to display table of a given no.
4. WAP to transfer data from one page to another using PHP. Working in forms and using get and post method.
5. WAP to manage data and information across the pages like in shopping carts etc.
6. WAP a program to count total numbers of hit (visitor no) on the site and also total no of users online.
7. Make a page to store the data in file and reading the data from file.
8. Make an application to upload image file to website and display on site. Image to be uploaded dynamically using PHP controls etc.
9. Write SQL Commands to create database, create a table in it and store data in this table. Also write commands to search and delete the record.

10. Write PHP code to connect to database (MySQL) , and perform following operations
    a. insert new record
    b. search for record(s)
    c. change any record
    d. delete the record(s)

ETCS362	DATA WAREHOUSING AND DATA MINING LAB	L	T	P	C
		-	-	2	1

LIST OF EXPERIMENTS:

1. Demonstration of data preprocessing on datasets using WEKA and R tools.
2. To list all the categorical (or nominal) attributes and the real valued attributes using WEKA or R mining tool.
3. Create a data classification model using decision tree in WEKA or R.
4. Create a data classification model using naive bayesin WEKA or R.
5. Create a data classification model using rule based classifies in WEKA or R.
6. Create a data classification model using statistical classifiersin WEKA or R.
7. Create a data classification model using neural networksin WEKA or R.
8. Create a data classification model using in WEKA or R.
9. Demonstrate the working of k-means algorithm for clustering the data.
10. Create a clustering model using hierarchical clustering algorithm in WEKA or R

ETCA365	LINUX ENVIRONMENT LAB	L	T	P	C
		-	-	2	1

1. **Installing Linux :**Installing the Operating System
2. **Exploring the System :**Starting Up and changing runlevels, Using the man utility, Using built-in help switches for commands, Using Auto completion
3. **Common System Utilities:** Using cd**,** Using pwd**,** Using mkdir**,** Using rmdir, Using Touch, Using ls**,**Using mv**,**Using cp**,** Using cat, Using Redirection**,**rm**,**Using vi**,**Searching for files: grep, frep and similar commands
4. **The XWindow System:** Preamble, Virtual terminals**,** Setting up a basic display**,**X clients**,** Window Managers**,** Display Manager**,** xinit and startx**,** system-config-display

5. **The Shell and Shell Scripting :** Different kind of shells (c shell, bash shell, korn shell and others), A simple Script, Using variables in scripts, Using Control Structures
6. **User Accounts :** PreambleManually creating a new user,Manually creating a new groups, automatically creating a new user, automatically creating new groups, using sticky bits, share the file between users and groups.
7. **Managing and Installing Software :**Installing, Querying and Uninstalling PackagesThird party tools,Building Software from Source
8. **Understanding Devices:** Determining device type, Creating devices, mounting and umounting devices

ETCA 367	Practical Training	L	T	P	C
		-	-	2	1

Each student has to undergo Professional Training of at least 4 weeks from the industry, institute, research lab, training center etc. during summer vacation and its evaluation shall be carries out in the V semester.

Semester - VI Syllabus

ETCS422	CLOUD COMPUTING	L	T	P	C
		3	1	-	4

Objectives

To get the Knowledge about the basics concepts of cloud computing and its applications.
To get the knowledge of its relevance with internet and its future aspects.

UNIT-I

Introduction: Cloud computing history, architecture and essential characteristics, cloud service models, Cloud Deployment models, advantages of cloud computing, cloud v/s grid computing.

Unit-II

Virtualization: Virtualization techniques, Benefits and drawbacks of virtualization, VM migration with its types, hypervisors, types of hypervisors, distributed management of virtual infrastructures, scheduling techniques foradvance reservation of capacity, Service-oriented architectures, SOA implementation, SOAP v/s REST, web 2.0.

Unit-III

PaaS: Introduction, advantages and disadvantages of PaaS, introduction to google app engine, GAE cost structure,

Apache hadoop: MapReduce, HDFS, Hive, Mapreduce programming model,Hadoop as a service.

Unit-IV

Migrating into the cloud: Introduction, challenges in the cloud, legal issues in cloud computing, Cloud Economics and Capacity Management: Restricted Choices, Capacity Planning, Queuing andResponse Time, Evidence Based DecisionMaking, Instrumentation (Measuring Resource Consumption), Bottlenecks, Key Volume Indicators.

Text Books:

1. Rajkumar Buyya, "Cloud Computing Principles and Paradigms" Wiley & Sons publications

Reference Books:

1. Christian Baun, "Cloud Computing Web-Based dynamic IT services", Springer.

ETCA324	.NET FRAMEWORK	L	T	P	C
		3	1	-	4

UNIT I

Introduction to .NET technologies: Features of .NET, .NET Framework, CLR, MSIL, .NET class library, .NET Languages, CTS, assemblies, manifest, and metadata, What is ASP.NET?, Difference between ASP and ASP.NET.

UNIT II

Controls in ASP.NET: Overview of Dynamic Web page, Understanding ASP.NET Controls, Applications, Web servers, Installation of IIS. Web forms, web form controls - server controls, client controls. Adding controls to a web form, Buttons, Text Box, Labels, Checkbox, Radio Buttons, List Box. Adding controls at runtime. Running a web Application, creating a multiform web project. Form Validation: Client side validation, server Side validation, validation Controls: Required Field Comparison Range. Calendar control, Ad rotator Control, Internet Explorer Control.

UNIT III

Overview of ADO.NET and XML: What is ADO.NET, from ADO to ADO.NET. ADO.NET architecture, Accessing Data using Data Adapters and Datasets, using Command & Data Reader, binding data to data bind Controls, displaying data in data grid , XMLbasics, attributes, fundamental XML classes: Document, text writer, text reader. XML validations, XML in
ADO.NET, XML Data Document.

UNIT IV

ASP.NET Applications: Creating, tracking, caching, error handling, Securing ASP.NET applications - form based applications, window based application, State management- View state, Session state, Application state, Building ASP.NET web services, working with ASP.NET applications, creating custom controls.

TEXT BOOKS:

1. Stephen Walther , "ASP.NET Unleashed", SAMS publications

REFERENCE BOOKS:

1.ASP.NET, WroxPublications
2.ASP.NET and VB.NET, Wrox Publication
3.ASP.NET and C#.NET, Wrox Publication.

ETCA326	ENTERPRISE COMPUTING IN JAVA	L	T	P	C
		3	1	-	4

Course Objectives: To build upon the foundation acquired from the programming courses from 5th semester in working with JAVA; to learn, practice and perfect the art and science of developing more advance and commercial software's;

UNIT-I

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.

Socket Programming and Distributed Objects: Connecting to a server, implementing a server, Sending E-mail, Making URL connections, Advance Socket Programming, Remote Method Invocations, Parameter Passing in Remote Methods, Server Object Activation, Java IDL and Common Object Request Broker Architecture, and Overview of SOAP

UNIT-II

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.

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

UNIT-III

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

UNIT-IV

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

Electives:

ETCA328	MULTIMEDIA TECHNOLOGIES	L	T	P	C
		3	1	-	4

Objectives

1. To get the knowledge about the basics concepts of multimedia and its applications.
2. To get the knowledge of its relevance with internet and its future aspects.

UNIT-I

Introductory Concepts: Multimedia - Definitions, Basic properties and medium types. (Temporal and non-temporal). Multimedia applications

Uses of Multimedia, Introduction to making multimedia - The Stages of project, the requirements to make good multimedia, Multimedia skills and training .

Multimedia-Hardware and Software: Multimedia Hardware - Macintosh and Windows production Platforms, Hardware peripherals - Connections, Memory and storage devices, Media software - Basic tools, making instant multimedia, Multimedia software and Authoring tools, Production Standards.

UNIT-II

Multimedia building blocks Creating & Editing Media elements: Text, image, Sound, animation Analog/ digital video Data Compression: Introduction, Need, Difference of lossless/lossy compression techniques. Brief overview to different compression algorithms concern to text, audio, video and images etc.

UNIT-III

Multimedia and the Internet: History, Internet working, Connections, Internet Services, The World Wide Web, Tools for the WWW - Web Servers, Web Browsers, Web page makers and editors, Plug-Ins and Delivery Vehicles, HTML, Designing for the WWW – Working on the Web, Multimedia Applications - Media Communication, Media Consumption,
Media Entertainment, Media games

UNIT-IV

Multimedia-looking towards Future: Digital Communication and New Media, Interactive Television, Digital Broadcasting, Digital Radio, Multimedia Conferencing, Virtual Reality, Digital Camera. Assembling and delivering a Multimedia project-planning and costing, Designing and Producing, content and talent, Delivering, CD-ROM: The CD family, production process, CD-i – Overview – Media Types Technology.

TEXTBOOKS:

1 Tay Vaughan, "Multimedia: Making it work", TMH.
2 Ralf Steinmetz and Klara Naharstedt, "Multimedia: Computing, Communications Applications", Pearson.

ETCA 330	NETWORK SECURITY& CRYPTOGRAPHY	L	T	P	C
		3	1	-	4

Unit-I

Introduction: Plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption,symmetric and asymmetric key cryptography.

Unit-II

Symmetric key algorithms: introduction, algorithms types and modes, DES, AES.
Asymmetric key algorithms: introduction, history of asymmetric key cryptography, RSA symmetric and asymmetrickey cryptography together, Digital signature.
Unit-III

Internet security protocols: basic concepts, Secure Socket Layer (SSL), Transport Layer Security (TLS), Secure HyperText Transfer protocol (SHTTP), Time Stamping Protocol (TSP), Secure Electronic Transaction (SET), SSL versus SET, Electronic Money, Email Security.

Unit-IV

User Authentication and Kerberos: Introduction, Authentication basics, Passwords, authentication tokens, certificate based authentication, biometric based authentication, Kerberos, key distribution center (KDC), Security handshake pitfalls, single sign on(SSO) approach.

Text Books:
1. Atul Kahate, "Cryptography and Network Security", TMH
2. Mani Subramaniam , "Network Management Principles & Practices" AWL

ETCA332	SOFTWARE TESTING	L	T	P	C
		3	1	-	4

Unit-I
Introduction: What is software testing and why it is so hard?, Error, Fault, Failure, Incident, Test Cases, Testing Process, Limitations of Testing, No absolute proof of correctness, Overview of Graph Theory.
Functional Testing: Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause Effect Graphing Technique.

Unit-II
Structural Testing: Path testing, DD-Paths, Cyclomatic Complexity, Graph Metrics, Data Flow Testing, Mutation testing.
Testing Activities: Unit Testing, Levels of Testing, Integration Testing, System Testing, Debugging, Domain Testing.

Unit-III
Reducing the number of test cases: Prioritization guidelines, Priority category, Scheme, Risk Analysis, Regression Testing, and Slice based testing
Object Oriented Testing: Issues in Object Oriented Testing, Class Testing, GUI Testing, Object Oriented Integration and System Testing.

Unit-IV

Testing Tools: Static Testing Tools, Dynamic Testing Tools, and Characteristics of Modern Tools and Implementation with example, Advanced topics in software testing: web based testing, Client server testing, Automated test cases generation, Regular expression and FSM based testing.

Text Books

1. William Perry, "Effective Methods for Software Testing", John Wiley & Sons.
2. CemKaner, Jack Falk, Nguyen Quoc, "Testing Computer Software", Van Nostrand Reinhold, New
York.
3. Boris Beizer, "Software Testing Techniques, Second Volume", VanNostrand Reinhold, New York,.
4. Louise Tamres, "Software Testing", Pearson Education.

Reference Books

1. Roger S. Pressman, "Software Engineering – A Practitioner's Approach", McGraw-Hill International Edition.
2. Boris Beizer, "Black-Box Testing – Techniques for Functional Testing of Software and Systems", John Wiley & Sons.
3. K.K. Aggarwal &Yogesh Singh, "Software Engineering', New Age International Publishers, New Delhi.
4. Marc Roper, "Software Testing", McGraw-Hill Book.
5. Gordon Schulmeyer, "Zero Defect Software", McGraw-Hill.
6. Watts Humphrey, "Managing the Software Process", Addison Wesley Publications.

ETCA362	CLOUD COMPUTING LAB	L	T	P	C
		-	-	2	1

1. Development of applications on Google app engine.
2. Case study of private Cloud setup through OpenStack
3. Case study of private Cloud setup through CloudStack
4. Case study of XEN/VMware/KVM hypervisor
5. Case study of Amazon ec2.

ETCA364	.NET FRAMEWORK LAB	L	T	P	C
		-	-	2	1

1. Write a program using web controls to
   a)Factorial of a number
   b) Money Conversion
   c) Quadratic Equation
   d) Temperature Conversion
   e) Login Control

2. Write a program for Ad rotator Control
3. Write a program for Calendar control
   a) Display a message in calendar
   b) Display vacations in calendar
   c) Select a day in calendar control using style
4. Write a program for Tree view control and use various operation of Treeview control
5. Write a program to design graphical user interface and display records stored in database
6. Write a program to insert and delete the records in database
7. Write a program of Data binding using drop down list control
8. Design a interactive website for admissions in university.

ETCA366	ENTERPRISE COMPUTING IN JAVA LAB	L	T	P	C
		-	-	2	1

1. Write programs to create packages and multiple threads in Java.
2. Write programs in Java for event handling Mouse and Keyboard events.
3. Using Layout Manger create different applications.
4. Write programs in Java to create and manipulate Text Area, Canvas, Scroll Bars, Frames, and menus using swing.
5. Using Java create Applets.
6. Using Java language for Client Server Interaction with stream socket connections.
7. Write a program in Java to read data from disk file.mm
8. Write a program in Java to implement RMI
9. Write a program in Java to store, retrieve and calculate the percentage of marks of the class using database
10. Write program to implement webpage using java servlets
11. Write a program to implement java beans

ETCA368	MAJOR PROJECT	L	T	P	C
		-	-	6	3

The project can be developed in any technology desired by student. However, the same should be duly approved by the department. The same should be completed in VI Semester itself and will be evaluated through a panel of examiners consisting of the following:

Chairperson of Department: Chairperson
Project coordinator: Member
External expert: To be appointed by the University
The student will be required to submit two copies of his/her project report to the department for record (one copy each for the department and participating teacher).

		L	T	P	C
ETCA370	**MULTIMEDIA TECHNOLOGIES LAB**	**-**	**-**	**2**	**1**

List of Experiments

1. Compare different Image Compression Techniques with regards to quality and compression ratios.
2. Study how to create simple animations.
3. Test different audio compression formats using an audio compression tool. Classify your results on the basis of fidelity, size and error tolerance.
4. Learning video compression: Tools, codecs, quality vs. compression and the video quality requirements suitable for different medium.
5. Create a website for a software company which contains all the details of that company and include links to other related web pages.
6. Deploy the webpage to a hosting space. Identify the categories of web hosting services and their characteristics.
7. Understanding principles in designing a simple game.
8. Any other experiments using Flash or other suitable tools.

		L	T	P	C
ETCA372	**NETWORK SECURITY & CRYPTOGRAPHY LAB**	**-**	**-**	**2**	**1**

List of Experiments

1. Understanding types of Network Attacks:
    a. Case study of different types of passive and active attacks (2 each).
2. To study Symmetric key encryption principles.

3. Write a program to implement DES algorithm or use existing library programs to test it.
4. Examine different techniques for authentication. Study examples of each type.
5. Examine how PGP works.
    - Use the tools available at gnupg.org, study the commands and use it.
6. To study MD5 algorithm. Use existing implementations in your own code to generate and verify MD5 hashes for files.
7. To study RSA algorithm.
8. Study of Secure Socket Layer (SSL).
    - To study security requirements for websites
9. To study Wireless Network security.
10. Examine how firewalls work.

ETCA374	SOFTWARE TESTING LAB	L	T	P	C
		-	-	2	1

List of Experiments

1. Learn the procedure for Functional Testing using QTP.
2. Learn to generate and run Test Scripts repeatedly for Regression Testing (Record and Play).
3. Learn to check the behavior of Test Scripts for Multiple data (Parameterization).
4. Learn how to do synchronization of Test Cases (Synchronization).
5. Enables to add check points to Test Cases to know the current state of the object (Checkpoints).
6. Learn to test the recovery mechanism for the specified scenario (Recovery Scenario Manager).
7. Know to test Web application for no. of links, no. of images, load time, web buttons etc (Testing web application).
8. Learn to do Manual Testing by writing own Test Cases (Identify Business Scenario's for Employee Login Form).
9. Learn to write own Test cases and do Manual Testing(Independent Test cases for Students University Result System).