SCHEME & SYLLABUS
B.Sc. IT Course-3yrs

Department of Computer Science and Applications
UICAIS
Sant Baba Bhag Singh University
Batch: 2022-2025

SCHEME & SYLLABUS
(3YEARS B.Sc. (IT) PROGRAMME)

Session: 2022-25

ABOUT THE B.Sc. (IT)

B.Sc. (IT) (Information Technology) is a 3-year undergraduate degree that imparts learners with intricate knowledge of storing, securing, processing and managing data and information. Pursuing B.Sc. (IT), students get to know about databases, software and networking. Further, you will be exploring the intricacies of software testing, software development, software engineering, web design, programming databases, computer networking and computer systems. Some of the major B.Sc. (IT) subjects are Foundation of Information Technology, Advanced-Data Structure, DBMS using FoxPro, Foundation of Mathematics and Statistics, amongst others.

SALIENT FEATURES OF THE DEPARTMENT

- Research oriented curriculum designed to enable students to acquire all the skills needed to collect and analyze the data.
- The Institute drawing upon its strength of highly qualified well-trained faculty, state of art infrastructure and innovative teaching methodology.
- Elective courses that brides the gap between industry requirements and academia.
- Hands on experience in most of the courses of computer applications so as to impart practical knowledge in the relevant field.
- To keep the students at par with the emerging technologies prevailing in the market, the institute is furnished with various specialized research labs and software labs.

B.Sc. (IT) (BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY)

- The Program outcomes in B.Sc.(IT) are aimed at allowing flexibility and innovation in design and development of course content, in method of imparting training, in teaching learning process and in assessment procedures of the learning outcomes. The emphasis in B.Sc.(IT) courses, in outcome-based curriculum framework, help students learn solving problems, accomplishing IT tasks, and expressing creativity, both individually and collaboratively. The proposed framework will help Students learn programming techniques and the syntax of one or more programming languages.

VISION

- To prepare technically proficient and skillful computer professionals thereby contributing towards building a strong and developed nation.

MISSION

- To provides innovative and quality knowledge to students for global competence and excellence. Also, to prepare high quality Professionals for catering the needs of industry.

ELIGIBILITY CRITERIA

- 10+2 or its equivalent examination in any stream conducted by a recognized Board/ University/Council

DURATION

- 3 Years

The present Curriculum Framework for B.Sc.(IT) degrees is intended to facilitate the students to achieve the following:

Some of the subjects taught in the B.Sc.IT course include computer architecture and organization, database system, operating system, electronics, computer networking, foundations of a computer system, java programming, website design, etc. B.Sc.IT course has excellent job scope career prospects. Aspirants looking for a professional career, then there are various job openings available for them. Some important career profiles are IT Support Analyst, Network Engineer, IT Consultant and Technical Sales.

PROGRAMME EDUCATIONAL OBJECTIVE (PEO)

PEO1: To provide opportunity for the study of modern methods of information processing and its applications.

PEO2: By using technical methods, students are able to solve the real time computerized problems by analyzing, designing, implementing and evaluating the problems.

PEO3: To develop among students the programming techniques and the problem solving skills through programming.

PEO4: To prepare students who wish to go on to further studies in computer science and related subjects.

PROGRAMME OUTCOMES (PO)

PO1: Research and development: Developing with the idea of new research and technology.

PO2: Designing Product: Information Technology design products based on AI motion, and it includes the act of development in the range of Software development, Information technology, Computer Forensic Analyst, Information Technology Business Analyst, and Computer Network Architect.

PO3: Systems Management: Involves basic skills for analyzing and solving problems related to the technical system.

PO4: Marketing: The market of Information Technology is growing day by day and can grow during the working time and date. The work has been easy and dependable upon the Information Technology that doing without is unthinkable.

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO1 Apply standard Software Engineering practices and strategies in real -time software project development

PSO2. Design and develop computer programs/computer -based systems in the areas related to AI, algorithms, networking, web design, cloud computing, IoT and data analytics

PSO3. Acquaint with the contemporary trends in industrial/research settings and thereby innovate novel solutions to existing problems

PSO4. The ability to apply the knowledge and understanding noted above to the analysis of a given information handling problem.

PSO5. The ability to work independently on a substantial software project and as an effective team member.

CHOICE BASED CREDIT SYSTEM (CBCS)

The choice-based credit system provides flexibility in designing curriculum and assigning credits based on the course content and hour of teaching. The choice-based credit system provides an opportunity for the students to choose courses from the prescribed courses comprising core, elective and open elective courses. The CBCS provides a cafeteria type approach in which the students can take courses of their choice, learn at their own pace, undergo additional courses and acquired more than the required credits, and adopt an interdisciplinary approach to learning. The courses shall be evaluated on the grading system, which is considered to be better than the conventional marks system. It is necessary to introduce the grading system to make the uniformity among all technical institutions of India. This will benefit the students to move across institutions within India to begin with and across countries. The uniform grading system will also enable potential employers in assessing the performance of the candidates. In order to bring uniformity in evaluation system and computation of the Cumulative Grade Point Average (CGPA) based on student's performance in examinations, the AICTE has formulated the guidelines to be followed.

Curriculum Structure: IT graduates assume the responsibility of the development and selection of the appropriate computer hardware and software products and systems for an organization; and the installation, customization, implementation, management, and maintenance of such products and systems for the organization's computer users. IT will have a curriculum with Syllabi consisting of following type of courses:

A. **Core Courses**: A course, which should be studied compulsorily by a candidate as a necessary requirement is termed as a core course.

- **Major: Compulsory Course**
- **Minor: Use their minor course to focus or specialized certain area**
- **Skill/ Vocational: Skill Enhancement**
- **Interdisciplinary Course : Introduce for other course**

B. **Elective Course:** Generally a course which can be chosen from a pool of courses and which may be very specific or specialized or advanced or supportive to the discipline/ subject of study or which provides an extended scope or which enables an exposure to some other discipline/subject/domain or nurtures the candidate's proficiency/skill is called an Elective Course.

- **Discipline Specific Elective (DSE) Course:** Elective courses may be offered by the main discipline/subject of study is referred to as Discipline Specific Elective. The University/Institute may also offer discipline related Elective courses of interdisciplinary nature (to be offered by main discipline/subject of study).
- **Project:** An elective course designed to acquire special/advanced knowledge, such as supplement study/support study to a project work, and a candidate studies such a course on his own with an advisory support by a teacher/ faculty member is called project.
- **Generic Elective (GE) Course**: An elective course chosen generally from an unrelated discipline/subject, with an intention to seek exposure is called a Generic Elective. P.S. A core course offered in a discipline/subject may be treated as an elective by other discipline/subject and vice versa and such electives may also be referred to as Generic Elective.

C. **Major Specific Elective courses (MSE)**: Elective courses offered under the major: Management/ Economics/History/Sociology/Political science/Philosophy/Public administration shall be referred to as major specific electives.

D. **Open Elective Courses (OE)**: Open electives courses offered under the related stream/disciplines (Languages/Performing and visual arts) and those under the unrelated streams/disciplines (Physical and chemical sciences/Mathematical, Management and computational sciences) to seek exposure beyond main discipline of choice shall be referred to as open elective courses.

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24	OE	CSA243	Compiler Design	3	44, 45
25	OE	CSA245	Digital Marketing	3	46, 47
26	OE	CSA247	System Analysis and Design	3	48, 49
27	Major	CSA232	Data Communication and Networks	4	51, 52
28	Major	CSA234	Database Management System	4	53, 54
29	Major	CSA236	Probability and Statistics	4	55, 56
30	Major	CSA238	Java Programming	4	57, 58
31	Minor (ID)	EVS001	Environmental Science	4	59, 60
32	Major	CSA240	Java Programming (Lab)	4	61
33	Major	CSA242	Database Management System Lab	4	62, 63
34	ID	CSA244	Six Week Industrial/ Institutional Training	4	64
35	OE	CSA246	Management of Banking operations	4	65, 66
36	OE	CSA248	Cyber laws	4	67, 68
37	OE	CSA250	Internet of Things (IoT)	4	69, 70
38	OE	CSA252	Wireless Sensor and Communication Networks	4	71, 72
39	Major	CSA331	PL/SQL	5	74, 75
40	Major	CSA333	Android Programming	5	76, 77
41	Major	CSA335	Systems and Network Administration	5	78
42	Major	CSA337	Computer Graphics	55	79, 80
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45	OE	CSA343	Ruby on Rail	5	83, 84
46	OE	CSA345	Software Testing	5	85
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50	Major	CSA334	Python Programming	6	93, 94
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52	Major	CSA338	Python Programming (Lab)	6	97, 98
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55	OE	CSA344	Linux Administration	6	101, 102
56	OE	CSA346	Distributed DBMS	6	103
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58	OE	CSA350	MATLAB Language	6	106

Course Scheme (B.Sc. (IT) Program)
Semester 1

I. Theory Subjects

S. No.	Course Type	Course Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	Major	CSA131	C Programming with IT Tools	3:1:0	3:1:0	4	4
2	Major	CSA133	Calculus and Analytical Geometry	3:1:0	3:1:0	4	4
3	Major	CSA135	Fundamentals of Electronics	3:0:0	3:0:0	3	3
4	Minor	COM003	Basics of Accounting	3:0:0	3:0:0	3	3
5	Minor	ENG121	Communication Skills I	2:0:0	2:0:0	2	2
6	Minor	SSC105	Punjab and its Culture: An Historical Overview	3:0:0	3:0:0	3	3
7	PT	PT101/PT103/PT105	Physical Training (NSO/NCC/NSS)	0:0:2	NC	2	NC

II. Practical Subjects

S. No.	Course Type	Course Code	Course Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	Major	CSA137	C Programming with IT Tools (Lab)	0:0:4	0:0:2	4	2
2	Minor	ENG123	Communication Skills-1 (Practical)	0:0:2	0:0:1	2	1

Total Credits: 22
Total Contact Hours: 27

Semester 2

I. Theory Subjects

S. No.	Course Type	Course Code	Subject Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	Major	CSA132	Programming in C++	4:0:0	4:0:0	4	4
2	Major	CSA134	Operating System	3:0:0	3:0:0	3	3
3	Major	CSA136	Computer System Architecture	3:0:0	3:0:0	3	3
4	Major	CSA138	Software Engineering	3:0:0	3:0:0	3	3
5	Minor	COM004	Principles and Practices of Management	3:0:0	3:0:0	3	3
6	PT	PT102/PT104/PT106	Physical Training (NSO/NCC/NSS)	0:0:2	NC	2	NC

II. Practical Subjects

S. No.	Course Type	Course Code	Course Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	Major	CSA140	Programming in C++ (Lab)	0:0:4	0:0:2	4	2
2	Major	CSA142	Operating System (Lab)	0:0:4	0:0:2	4	2

Total Credits: 20
Total Contact Hours: 26

Semester 3

I. Theory Subjects

S. No.	Course Type	Course Code	Course Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	Major	CSA231	Data Structure and Algorithms	3:0:0	3:0:0	3	3
2	Major	CSA233	System Programming	3:0:0	3:0:0	3	3
3	Major	CSA235	Web System and Technologies	4:0:0	4:0:0	4	4
4	Minor (ID)	MGT003	Essentials of Management	3:0:0	3:0:0	3	3
5	OE	Open Elective		4:0:0	4:0:0	4	4
6	Minor (ID)	SSC005	Human Values and Professional Skills	3:0:0	3:0:0	3	3
7	PT	PT201/PT203/PT205	Physical Training (NSO/NCC/NSS)	0:0:2	NC	2	NC

II. Practical Subjects

S. No.	Course Type	Course Code	Course Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	Major	CSA237	Data Structure and Algorithms Lab	0:0:4	0:0:2	4	2
2	Major	CSA239	Web systems and technologies Lab	0:0:4	0:0:2	4	2

Open Elective Course (4 Credits)

S. No.	Course Type	Course Code	Course Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1.	OE	CSA241	Cyber Security and Laws	4:0:0	4:0:0	4	4
2.	OE	CSA243	Compiler Design	4:0:0	4:0:0	4	4
3.	OE	CSA245	Digital Marketing	4:0:0	4:0:0	4	4
4.	OE	CSA247	System Analysis and Design	4:0:0	4:0:0	4	4

Total Credits: 24
Total Contact Hours: 30

Semester 4

I. Theory Subjects

S. No.	Course Type	Course Code	Course Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	Major	CSA232	Data Communication and Networks	3:1:0	3:1:0	4	4
2	Major	CSA234	Database Management System	3:0:0	3:0:0	3	3
3	Major	CSA236	Probability and Statistics	3:0:0	3:0:0	3	3
4	Major	CSA238	Java Programming	3:0:0	3:0:0	3	3
5	OE	Open Elective		3:0:0	3:0:0	3	3
6	Minor (ID)	EVS001	Environmental Science	3:0:0	3:0:0	3	3

II. Practical Subjects

S. No.	Course Type	Course Code	Course Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	Major	CSA240	Java Programming (Lab)	0:0:4	0:0:2	4	2
2	Major	CSA242	Database Management System Lab	0:0:4	0:0:2	4	2
4	ID	CSA244	Six Week Industrial/ Institutional Training	NA	NA	NA	2

Open Elective Course (3 Credits)

S. No.	Course Type	Course Code	Course Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1.	OE	CSA246	Management of Banking operations	3:0:0	3:0:0	3	3
2.	OE	CSA248	Cyber Laws	3:0:0	3:0:0	3	3
3.	OE	CSA250	IoT	3:0:0	3:0:0	3	3
4.	OE	CSA252	Wireless Sensor and Communication Networks	3:0:0	3:0:0	3	3

Total Credits: 25
Total Contact Hours: 27

Semester 5

I. Theory Subjects

S. No.	Course Type	Course Code	Course Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	Major	CSA331	PL/SQL	3:0:0	3:0:0	3	3
2	Major	CSA333	Android Programming	4:0:0	4:0:0	4	4
3	Major	CSA335	Systems and Network Administration	3:1:0	3:1:0	4	4
4	Major	CSA337	Computer Graphics	4:0:0	4:0:0	4	4
5	OE	Open Elective		3:0:0	3:0:0	3	3

II. Practical Subjects

S. No.	Course Type	Course Code	Course Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	Major	CSA339	Computer Graphics (Lab)	0:0:4	0:0:2	4	2
2	Major	CSA341	Android Programming Lab	0:0:4	0:0:2	4	2

Open Elective Course (3 Credits)

S. No.	Course Type	Course Code	Course Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1.	OE	CSA343	Ruby on Rail	3:0:0	3:0:0	3	3
2.	OE	CSA345	Software Testing	3:0:0	3:0:0	3	3
3.	OE	CSA347	Mobile Architecture &Security	3:0:0	3:0:0	3	3
4.	OE	CSA349	Parallel Computing	3:0:0	3:0:0	3	3

Total Credits: 22

Total Contact Hours: 26

Semester 6

I. Theory Subjects

S. No.	Course Type	Course Code	Course Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	Major	CSA332	Network Security & Cryptography	3:1:0	3:1:0	4	4
2	Major	CSA334	Python Programming	4:0:0	4:0:0	4	4
3	Major	CSA336	Object Oriented Analysis and Design	4:0:0	4:0:0	4	4
4	OE	Open Elective		3:0:0	3:0:0	3	3

II. Practical Subjects

S. No.	Course Type	Course Code	Course Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1	Major	CSA338	Python Programming (Lab)	0:0:4	0:0:2	4	2
2	Major	CSA340	Object Oriented Analysis and Design (Lab)	0:0:4	0:0:2	4	2
2	Major	CSA342	Minor Project	0:0:4	0:0:2	4	2

Open Elective Course (3 Credits)

S. No.	Course Type	Course Code	Course Name	Contact Hours (L:T:P)	Credits (L:T:P)	Total Contact Hours	Total Credit Hours
1.	OE	CSA344	Linux Administration	3:0:0	3:0:0	3	3
2.	OE	CSA346	Distributed DBMS	3:0:0	3:0:0	3	3
3.	OE	CSA348	Programming for Mobile Device	3:0:0	3:0:0	3	3
4.	OE	CSA350	MATLAB Language	3:0:0	3:0:0	3	3

Total Credits: 21
Total Contact Hours: 27

Summary of Scheme

Sem	L	T	P	Project/ Training /Seminar	Contact hrs per week	Credits
1	17	2	8		27	22
2	16	0	10		26	20
3	20	0	10		30	24
4	18	1	8		27	25
5	17	1	8		26	22
6	14	1	12		27	21
Total	**102**	**05**	**56**		**163**	**134**

First Semester

Course Code	**CSA131**
Course Title	**C Programming with IT Tools**
Type of Course	Major
L T P	3:1:0
Credits	4
Course Prerequisites	Basic Knowledge about Computers
Course Objective(s)	1. To gain experience about structured programming. 2. To help students to understand the implementation of Programming language. 3. To understand various features in Programming Language.
Course Outcome (CO)	The students will be able to: 1. Illustrate the flowchart and to develop C programs. 2. Develop conditional and iterative statements to write C programs and exercise user defined functions to solve real time problems. 3. Inscribe C programs that use Pointers to access arrays, strings and functions. 4. Exercise user defined data types including structures and unions to solve problems.

SYLLABUS

UNIT I:

Fundamentals of Computer: Computer generations, History of languages, high- level, Low level, Assembly languages etc. Definition and properties. Principles of flowcharts. Flowcharting symbols, Algorithms. **Introduction to Programming Language:** character Set, Constants, Types of constants, Variables and Keywords, data types. Instructions: Type Declaration Instruction, Arithmetic Instructions.

UNIT II:

Control structures: Decision making structures: If, If-else, Nested If –else, Switch. Loop Control structures: While, Do-while, for, Nested for loop. Other statements: Break, Continue, goto, Exit. **Arrays and Pointers:** Arrays Initialization, Types of Array. Initializing Two Dimensional & Multidimensional Arrays, Introduction to Pointers. Pointers and Functions.

UNIT III:

Storage Classes and Character Strings: Automatic, Register, Static, External (Local and Global), Strings, Standard library String Functions: strlen (), strcpy (), strcat(),strcmp().

Functions: Definition, Passing values between functions, call by value, call by reference, Recursion.

UNIT IV:

Structures And Unions: Declaring structure and its variables,Arrays of structures. Introduction to Unions. **Input/Output:** Getchar (), putchar (), printf (), scanf (), puts (), gets () Introduction to files and its operations.

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Programming In C	Byron Gottfried,Jitenderchhabra	Schuam Out Line Series
2.	Let us C	Yaswant Kanetkar	BPB Publication
3.	A Structured Programming Approach Using C	Behrouz Forouzan	Thomas Learning

Course Code	**CSA133**
Course Title	**Calculus and Analytical Geometry**
Type of Course	Major
L T P	3:1:0
Credits	4
Course Prerequisites	Elementary calculus of +2 level.
Course objective(s)	1. The applications of differential calculus for tracing curves. 2. The concept of Integration and its definition as limit of sum and area under curve. 3. The relation between derivative and the integration of a function. 4. The concept of improper integrals.
Course Outcome (CO)	The students will be able to: 1. Understand the techniques to sketch a curve using the concepts of differential 2. Visualize all concepts of differential calculus geometrically 3. Understand the concept of Integration 4. Understand the fundamental relation between differential and Integral Calculus.

SYLLABUS

UNIT-I Concavity and Convexity, points of inflexion, derivative of arc, radius of curvature, centre of curvature, chord of curvature, evolutes and involutes.

UNIT-II Asymptotes, working rules of determining Asymptotes, Asymptotes in polar co-ordinates, Cusps, curve tracing (Cartesian and polar), introduction to envelopes.

UNIT-III Anti derivative of function of real variable, Riemann sums, definite integrals and their properties, Indefinite integral and net change, the fundamental theorem of calculus, Improper Integrals: Infinite Integrals, Discontinuous intervals, comparison test for improper integrals (Scope: James Stewart; Chapter-), reduction formulae.

UNIT-IV Approximate Integration: Midpoint rule, Trapezoidal rule, Simpson's rule; applications of integrals to find length of arc and area between curves, finding volumes, area of surface of revolution.

RECOMMENDED BOOKS

Sr. no.	Name	AUTHOR(S)	PUBLISHER
1.	Calculus	James Stewart	Thomson

Course Code	**CSA135**
Course Title	**Fundamentals of Electronics**
Type of Course	Major
L T P	3:0:0
Credits	3
Course Prerequisites	Students should know about the various electronics components and physics concepts
Course objective(s)	Demonstrate the operation of simple digital gates, identify the symbols, truth table for gates; change binary, hexadecimal, octal numbers to their decimal equivalent and vice versa, demonstrate the operation of a flip-flop. Convert digital into analog and vice versa.
Course Outcome (CO)	The students will be able to: 1. Develop a digital logic 2. Apply it to solve real life problems 3. Understand, analyze and design various combinational and sequential circuits. 4. Learn how to convert signals.

SYLLABUS

UNIT I:

Fundamental concepts: Introduction, Digital Signals, Basic Gates and derived Gates: AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR, Boolean Algebra

Number System and codes: Introduction to number systems, Decimal, Binary, Octal, Hexadecimal, And Conversation from one number system to another number system. Binary Arithmetic: Addition, Subtraction, Multiplication, Division, Half adder, full adder.1's and 2's compliment of Binary Number. Codes : BCD Code, Excess-3 Code, Gray Code Error detecting and correcting codes

UNIT II:

Combinational Logic Design: Standard Representation of logical functions, SOP, POS Forms, K-map Representation of logical functions, and Simplification of logical functions using K-map. Multiplexer, De-multiplexer. Encoder, Decoder

UNIT III:

Flip Flops: 1-Bit Memory Cell, Clocked S-R Flip Flop, J-K Flip Flop, Master Slave Flip Flop, D-type Flip Flop, T-type Flip Flop

Sequential Logic Design: Registers, Shift Register, Counter, Synchronous and asynchronous Counter, examples of each

UNIT IV:

Timing Circuits and Converters: 555 Timer, Digital To Analog Converter, Analog To Digital Converter

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Modern Digital Electronics	R.P. Jain	McGraw-Hill Science/Engineering/Math
2.	Microprocessor	B.RAM	DhanpatRai

Course Code	**COM003**
Course Title	**Basics of Accounting**
Type of Course	Minor (ID)
L T P	3:0:0
Credits	3
Course Prerequisites	N.A
Course objective(s)	To familiarize the students with the basic fundamentals of the accounting and understand the Accounting mechanism.
Course Outcome (CO)	At the end of the completion of course students, the students will be able to: 1. To understand the basic fundamentals of the accounting and Accounting mechanism. 2. To Develop the ability to use a basic accounting system to create, record, classify, and summarize the data in order to solve a variety of business problems. 3. To use accounting information to solve a variety of business problems.

SYLLABUS

UNIT-I

Basics of Accounting: Accounting, Accountancy and Book-Keeping, Nature of accounting, Branches, Objectives, features and limitation of accounting Users of accounting information, Accounting Concepts and conventions.

UNIT-II

Accounting Terminology, Process and Bases of Accounting, Accounting standards, Accounting Equations. Journal, Ledger and Trial Balance, Subsidiary books.

UNIT-III

Depreciation and its Methods, Final accounts with adjustments

UNIT –IV

Ratio analysis- Meaning, features and its types, Marginal costing and its application, Cost volume profit analysis, contribution, Break even point, Margin of safety.

RECOMMENDED BOOKS

S.No.	Author(s)	Title	Publisher
1	D.K Goel, Rajesh Goel, Shelly Goel	Accountancy	Arya Publications
2	P C Tulsian	Cost accounting	Tata MC Graw Hill

Course Code	**ENG121**
Course Title	**Communication skills-I**
Type of course	Minor
L T P	2:0:0
Credits	2
Course prerequisite	+2 in any stream
Course Objective (CO)	Objectives of the course is to: 1. Equip the learner with proficiency in reading comprehension.. 2. Enable the learner with improved writing skills and command over official/ corporate communication. 3. Enhance the learners' range of vocabulary and knowledge of the essentials of grammar.
Course Outcomes	At the conclusion of the course the learner will be able to: 1. Have fairly good proficiency in reading comprehension. 2. Have enhanced writing skills and command in official/ corporate communication. 3. Develop confidence in making presentation: oral or documentary. 4. Learn speaking skills.

SYLLABUS

UNIT I:

Basics of Communication Skills: Communication, Process of Communication, Types of Communication-Verbal and Non verbal communication, Channels of Communication- Upward, Downward, Horizontal, Barriers to Communication, Role of Communication in society.

UNIT II:

Listening Skills: Listening Process, Hearing and Listening, Types of Listening, Effective Listening, Barriers of Effective Listening, Note Taking **Reading Skills:** Purpose of reading, Process of reading, reading skills Models and strategies, scanning, skimming, SQ3R, Approaches of Reading, Comprehension passages for practice.

UNIT III:

Writing Skills: Purpose of writing, Effective writing, Types of writing, Business Correspondence, Precise writing, Memo writing, minutes of meeting.

UNIT IV:

Speaking Skills: Speech process, Skills of effective speaking, Role of audience, Feedback Skill, Oral Presentation.

RECOMMENDED BOOKS			
Sr No	**Author(s)**	**Title**	**Publisher**
1	Bhupender Kour	Effectual Communication Skills	S.K. Kataria and Sons
2	R. Datta Roy and K.K. Dheer	Communications Skills	Vishal Publishing Company
3	The Essence of Effective Communication	Ludlow and Panton	Prentice Hall of India
4	Essentials of Business Communication	Pal and Korlahalli	S. Chand and Sons. New Delhi

Course code	**SSC105**
Course title	**Punjab and its Culture: An Historical Overview**
Type of course	Theory
L T P	3:0:0
Credits	3
Course prerequisite	+2
Course objectives (CO)	1. The student will acquire the knowledge about Punjab and its historical resources. 2. The student will understand the Harppan Culture and different Vedic periods. 3. The students will get to know about foreign invaders.
Course Outcomes	1. The students are able to acquire the knowledge about ancient Punjab and its historical resources. 2. The students shall be able to understand the Harppan culture and different Vedic Periods. 3. The students are able to analyse Alexander's invasions. 4. The students will understand the teachings of Mahatma Buddha and Mahavira.

Unit I

Ancient Punjab: Physical features, Political, Social, Economic, Geographical, Religious impact on History, Historical Sources: Literacy, Archaeological, Harappan Culture: Extent and Town Planning.

Unit II

Harppan Culture: Social, Economic and Religious life; Causes and Disappearance, Rig Vedic Age: Early Vedic Age: Political, Economic, Social, and religious life of Early Vedic Aryans., Later Vedic Age: Political, Economic, Social, and religious life of Later Vedic Aryans.

Unit III

The Epics: Tale of Ramayan and Mahabharat, Early life and Teachings of Mahatma Budha, Legacy of Budhism,Early life and Teachings of Mahavira, Legacy of Jainism.

Unit IV

Occupation of Punjab by Chandragupta, Ashoka's Conquest of the Punjab, Social, Religious and Economic condition of the Punjab under the Mauryas.

Important Historical places if Punjab: Mohenjodaro, Harappa, Kotla Nihang Khan, Sanghol, Banawali, Taxila, Hastinapur, Indraprastha, Srinagar, Sakala, Purusapura

Text and Reference Books:

S.NO.	Author's	Title	Publisher
1	Sukhdev Sharma	History And Culture of Punjab	New Academic Publisher
2	Romila Thapar	A History of India, Vol. I	Penguin Books

Course Code	**CSA137**
Course Title	**C Programming with IT Tools Lab**
Type of Course	Major
L T P	0:0:4
Credits	2
Course Prerequisites	Basic Knowledge about Computers
Course Objective(s)	To help students to understand the implementation of language. This Programming language helps in solving a problem.
Course Outcome (CO)	The students will be able to: 1. Illustrate the flowchart and to develop C programs. 2. Develop conditional and iterative statements to write C programs and exercise user defined functions to solve real time problems. 3. Inscribe C programs that use Pointers to access arrays, strings and functions. 4. Exercise user defined data types including structures and unions to solve problems.

SYLLABUS

1 Introduction of Office & Internet usage

2 Introduction to MS Word.

3 Prepare time-table in Word.

4 Introduction of PowerPoint.

5 Prepare Presentation in PowerPoint by applying Formatting Tools.

6 Introduction of Excel

7 Prepare Mark sheet in Excel

8 Write and execute program to show the working of input/output statements.

9 Write and execute programs to show the use of different types of operators (arithmetic, relational, logical, and conditional).

10 Write and execute programs based on conditional control statements (if, if-else)

11 Write and execute programs based on switch-case statements.

12 Write and execute programs based on for loops

13 Write and execute programs based on while loops.

14 Write and execute programs based on jumping control statements.

15 Write and execute programs to implement one dimensional arrays.

16 Write and execute programs to implement two dimensional arrays.

17 Write and execute programs to show the use of pointers.

18 Write and execute programs to perform various functions on strings.

19 Write and execute programs based on use of functions (call by value)

20 Write and execute programs based on use of functions (call by reference)

21 Write and execute programs using recursive functions.

Course Code	**ENG123**
Course Title	**Communication skills-I Practical**
Type of course	Minor
L T P	0:0:2
Credits	1
Course prerequisite	+2 in any stream
Course Objective (CO)	To help students to develop their communicative competence and facilitate them to hone their soft skills. Also equip students with employ-ability skills to enhance their prospect of placements.
Course Outcomes	At the conclusion of the course the learner will be able to: 1. Have fairly good proficiency in reading comprehension. 2. Have enhanced writing skills and command in official/ corporate communication. 3. Develop confidence in making presentation: oral or documentary. 4. Learn speaking skills.

SYLLABUS

1. **Activities on Fundamentals of Inter-personal Communication and Building Vocabulary –** Starting a conversation – responding appropriately and relevantly – using the right body language – Role Play in different situations & Discourse Skills-using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

2. **Activities on Reading Comprehension –** General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading& effective googling.

3. **Activities on Writing Skills –** Structure and presentation of different types of writing – letter writing/Resume writing/ e-correspondence/Technical report writing/ – planning for writing – improving one's writing.

4. **Activities on Presentation Skills –** Oral presentations (individual and group) through JAM sessions/seminars/PPTs and written presentations through posters/projects/reports/ emails/ assignments etc.

5. **Activities on Group Discussion and Interview Skills –** Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and

process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

MINIMUM REQUIREMENT: The Advanced English Communication Skills (AECS) LABoratory shall have the following infrastructural facilities to accommodate at least 35 students in the LAB:

- Spacious room with appropriate acoustics.
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ
- T. V, a digital stereo & Camcorder
- Headphones of High quality

SUGGESTED SOFTWARE: The software consisting of the prescribed topics eLABorated above should be procured and used.

- Oxford Advanced Learner's Compass, 7th Edition
- DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dream tech
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)

TEXT BOOKS:

1. Effective Technical Communication by M Asharaf Rizvi. McGraw Hill Education (India) Pvt. Ltd. 2nd Edition
2. Academic Writing: A Handbook for International Students by Stephen Bailey, Routledge, 5th Edition.

REFERENCES:

1. Learn Correct English – A Book of Grammar, Usage and Composition by Shiv K. Kumar and Hemalatha Nagarajan. Pearson 2007
2. Professional Communication by Aruna Koneru, McGraw Hill Education (India) Pvt. Ltd, 2016
3. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.

Second Semester

Course Code	**CSA132**
Course Title	**Programming in C++**
Type of Course	Major
L T P	4:0:0
Credits	4
Course Prerequisites	Basic Knowledge about Computers
Course objective(s)	To gain experience about structured programming. To help students to understand the implementation of Programming language. To understand various features in Programming Language.
Course Outcome (CO)	The students will be able to: 1. Understand how **C++** improves C with object-oriented features. 2. Learn how to write inline functions for efficiency and performance. 3. Learn the syntax and semantics of the **C++** programming language. 4. Learn how to design C++ classes for code reuse.

SYLLABUS

UNIT-I: Basics: Introduction to C++, Tokens, Identifiers, data types, control statements, functions, array, structure, union, pointers.

Classes and Objects: Classes, Structures and Classes, Unions and Classes are Related, Friend Functions, Friend Classes, Inline Functions, Constructors and its types, Static Class Members, When Constructors and Destructors are Executed, Scope Resolution Operator, Nested Classes, Local Classes, Passing and Returning Objects, Object Assignment

Arrays, Pointers, References and the Dynamic Allocation: Arrays of Objects, Pointers, References, Dynamic Allocation Operators, The Placement Forms of new and delete.

UNIT-II :Function Overloading and Default Arguments: Function Overloading, Overloading Constructor Functions, Finding the Address of an Overloaded Function, Overload Anachronism, Default Arguments, Function Overloading and Ambiguity.

Operator Overloading: Creating Member Operator Function, Overloading Using a Friend Function, Overloading new delete, Overloading Special Operators & Comma Operator

UNIT-III: Inheritance: Base-Class Access Control, Inheritance and protected members, Inheriting Multiple Base Classes, Constructors, Destructors and Inheritance, Granting Access, Virtual Base Classes.

Virtual Functions & Polymorphism: Virtual Functions, The Virtual Attribute is inherited, Virtual Functions are Hierarchical, Pure Virtual Functions, Using Virtual Functions, Early Vs Late Binding. **Templates:** Generic Functions, Applying Generic Functions, Generic Classes, Typename and export Keywords, Power of Templates.

UNIT–IV: Exception Handling: Fundamentals, Derived-Class Exceptions, Options, Terminate() and unexpected(), uncaught_exception(), exception and bad_exception Classes, Applying Exception Handling. **The C++ I/O System Basics:** Old Vs. Modern C++ I/O, Streams, Stream Classes, Formatted I/O, Overloading << and >>, Creating Manipulators.

RECOMMENDED BOOKS			
Sr No	**Name**	**Author(s)**	**Publisher**
1	Object Oriented Programming with C++	E. Balaguruswamy	Tata Mc. Graw Hill
2	Object Oriented Programming using C++	R.Lafore	Galgotia Publications
3	Mastering C++	A.R.Venugopal, Rajkumar, T. Ravishanker	TMH

Course Code	**CSA134**
Course Title	**Operating System**
Type of Course	Major
L T P	3:0:0
Credits	3
Course Prerequisites	Basic computer knowledge and OS DOS Windows
Course objective(s)	The objective of this course is to help students become familiar with the fundamental concepts of operating systems and provide students with sufficient understanding of operating system design.
Course Outcome (CO)	The students will be able to: 1. Describe the importance of computer system resources and the role of operating system in their management policies and algorithms 2. Understand the process management policies and scheduling of processes by CPU 3. Evaluate the requirement for process synchronization and coordination handled by operating system 4. Describe and analyze the memory management and its allocation policies

SYLLABUS

UNIT I: Introduction: Importance of Operating system. Basic concepts and terminology, An Operating system Resource manager, Operating Systems functions, Services provided by operating system, Types of operating systems, An Operating system- Process and system calls, Operating system architecture, Processor and user modes, Virtual Machine.

UNIT II: Memory management: Physical and virtual address space, Single Contiguous Allocation, Partitioned Allocation, Fragmentation, Paging, Segmentation, Virtual memory and Demand paging, Page replacement algorithms. **Processor Management**: Process, Process control block, State Model, Non-pre-emptive and pre-emptive scheduling, Process Scheduling Algorithms, Deadlocks- detection and prevention.

UNIT III: Information Management: Directory structure, File operations, A Simple File System, General Model of a File System, File allocation methods.

UNIT IV: OS and Security: Security breaches, types of attacks, attack prevention methods, security policy and access control, OS design considerations for security, access, policy and access control, OS design considerations for security, access control lists and OS support,

internet and network security, Policy mechanism, Program, network and system threats, Authentication.

RECOMMENDED BOOKS			
Sr No	**Name**	**Author(s)**	**Publisher**
1	Operating System	William Stallings	Prentice Hall
2	Operating System Concepts	A. Silberschatz, P.B. Galvin, G. Gagne	John Wiley Publication

Course Code	**CSA136**
Course Title	**Computer System Architecture**
Type of Course	Major
L T P	3:0:0
Credits	3
Course Prerequisites	Knowledge of Computer hardware
Course Objective(s)	The main objective of computer organization course is to introduce the main concepts and components of computer organization and architecture.
Course Outcome (CO)	The students will be able to: 1. Understand the theory and architecture of central processing unit. 2. Analyze some of the design issues in terms of speed, technology, cost, performance. 3. Learn the concepts of parallel processing, pipelining and inter-processor communication 4. Understand the basics of hardwired and micro-programmed control of the CPU

SYLLABUS

UNIT I: Basic computer organization and design, Instructions and instruction codes, Timing and control/ instruction cycle, Register/ Types of register/ general purpose & special purpose registers/ index registers, Register transfer and micro-operations/ register transfer instructions, Memory and memory function, Bus/ Data transfer instructions, Arithmetic logic micro-operations/ shift micro-operations, Input/ Output and interrupts, Memory reference instructions, Memory interfacing memory/ Cache memory.

UNIT II: Central Processing Unit: General Register Organization/ stacks organizations instruction formats, addressing modes, Data transfer and manipulation. Program control reduced computer, pipeline/ RISC/ CISC pipeline vector processing/ array processing. Arithmetic Algorithms: Integer multiplication using shift and add, Booth's algorithm, Integer division,

Floating-point representations.

Computer Arithmetic: Addition, subtraction and multiplication algorithms, divisor algorithms. Floating point, arithmetic operations, decimal arithmetic operations, and decimal arithmetic operations.

UNIT III: Input – Output Organization: Peripheral devices, Input/output interface, ALU, Asynchronous mode of data transfer, priority interrupts, Direct memory Address (DMA), Input/ Output processor, serial communication.

UNIT IV: Evaluation of Microprocessor: Overview of Intel 8085 to Intel Pentium processors Basic microprocessors, architecture and interface, internal architecture, external architecture memory and input/ output interface.

Assembly language, Assembler, Assembly level instructions, macro, use of macros in I/C instructions, program loops, programming arithmetic and logic subroutines, Input-Output programming.

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Computer System architecture	Morris Mano	Pearson Education
2.	Computer Organization & Architecture	William Stallings	PHI

Course Code	**CSA138**
Course Title	**Software Engineering**
Type of Course	Major
L T P	3:0:0
Credits	3
Course Prerequisites	Basic knowledge of computer system.
Course objective(s)	This course will provide knowledge about testing and maintenance of software.
Course Outcome (CO)	The students will be able to: 1. Describe key techniques and standards in software testing. 2. Explain and evaluate strategies for software testing for both complete program life cycles and individual phases, 3. Develop correct, stable, maintainable and efficient software that extends or improves existing code. Specify and design test cases and test, debug and optimize programs and produce appropriate documentation for test management, including test plans, test schedules and test progress monitoring. 4. Learn **about** various technical Metrics for Software.

SYLLABUS

UNIT I: Software Engineering introduction, software development models. Testing and its concepts: significance and potentials Testability and features of test cases.

UNIT II: Software Testing Techniques: Definition of Software Testing, Need for software Testing, various approaches to Software Testing, defect distribution, Software Testing Fundamentals. General characteristics of testing, seven principles of testing. **Software testing strategies:** Testing strategies in software testing, basic concept of verification and validation, criteria for completion of testing and debugging process.

UNIT III: Comparative Evaluation of Techniques: Testing tools, dynamic analysis tools, test data generators, debugger and test drivers. Water fall model, V-model, Spiral model, agile model, Life cycle testing concepts, testing methods, testing levels. Static Testing, static analysis tools, dynamic testing, White box testing, block box testing, Regression testing, dynamic testing tools. Functional testing concepts, Equivalence class partitioning, Boundary value analysis, Decision tables, Random testing, Error guessing. Test planning, cost-benefit analysis of testing, Test organization, Test strategies, Test progress monitoring and control- test reporting, test control, Specialized testing.

UNIT IV: Technical Metrics for Software: Quality factors, framework, metrics for analysis, design, testing source code, Software maintenance and Reengineering. **Access Project Management** Development Estimate and status, Requirement Phase Testing, Design Phase

Testing program Phase Testing, Execute Test and record results, Acceptance Test Report Test results, Testing Software Installation, Test Software Change, Evaluate Test Effectiveness. Testing calculating model (TCM).

Client/Server Systems, RAD, System Documentation, Web based systems, Off-the self software, Multi platform environment, Security, Data Warehouse.

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Learning Software Testing with Test Studio	RawaneMadi	Shroff and Pactt
2.	Exploratory Software Testing: Tips, Tricks, Tours and Techniques to guide Test Design	James A. Whittaker	Addison Wesley
3.	Mobile Software Testing	Narayanan Palani	Wiley

Course Code	**COM004**
Course Title	**Principles and Practices of Management**
Type of Course	Minor
L T P	3:0:0
Credits	3
Course Prerequisites	NA
Course objective(s)	To make students able to know the concept of management & to understand its application to the various sphere of corporate world.
Course Outcome (CO)	The students will be able: **1.** To make students able to know the concept of management & to understand the its application to the various sphere of corporate world. **2.** To apply management concepts and approaches including planning, organizing, and controlling organizational resources, preparing for and managing organizational change and managing people. **3.** To make the students able to describe the different ways in which organizations may be structured

SYLLABUS

UNIT-I

Introduction: Concept, nature, process, and significance of management; An overview of functional areas of management; Development of management thought; Classical and neoclassical systems. Communication: nature, process, networks and barriers, Effective communication.

UNIT-II

Planning: Concept, process, and types**, Decision making:** concept and process. Management by objectives; corporate planning; Environment analysis and diagnosis; strategy formulation.

UNIT-III

Organizing: Concept, nature, process, and significance; Authority and responsibility relationship; Centralization and decentralization.

UNIT-IV

Management Informatiom system(MIS), Time management and stress management: meaning, causes and techniques.

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Principles and Practices of Management	L.M. Prasad	S. Chand Publishers

2.	Essentials of Management	Koontz H. & Weihrich H.	Tata McGraw Hill Publishers
3.	Management	VSP Rao & V.H. Krishna	Excel Books

Course Code	**CSA140**
Course Title	**Programming in C++ Lab**
Type of Course	Major
L T P	0:0:4
Credits	2
Course Prerequisites	Basic Knowledge about Computers
Course objective(s)	Acquire knowledge about the basic concept of writing a program. Understanding the practical use of functions, classes, objects, inheritance and polymorphism.
Course Outcome (CO)	The students will be able to: 1. Understand how **C++** improves C with object-oriented features. 2. Learn how to write inline functions for efficiency and performance. 3. Learn the syntax and semantics of the **C++** programming language. 4. Learn how to design C++ classes for code reuse.

SYLLABUS

1. Write and execute simple program to show the working of input/output statements.
2. Write and execute programs to show the use of different types of operators.
3. Write and execute programs based on use of functions.
4. Write and execute programs to demonstrate function call by value and call by reference.
5. Write and execute programs to demonstrate inline functions.
6. Write and execute programs to demonstrate function overloading.
7. Write and execute programs to show concept of classes using public, private, protected members.
8. Write and execute programs to demonstrate use of constructor (parameterized and un parameterized constructor, copy constructor, multiple constructors in a class, and constructors with default parameters).
9. Write and execute programs to demonstrate use of destructor.
10. Write and execute programs to demonstrate use of static variables and static functions.
11. Write and execute programs to illustrate different types of inheritance.
12. Write and execute programs to illustrate different access specifiers in inheritance (public, private, protected).
13. Write and execute programs to show the use of pointers to classes.
14. Write and execute programs to show the use of this pointer.
15. Write and execute programs to show the use of friend function.
16. Write and execute programs to show the concept of friend class.

17. Write and execute programs to demonstrate method overloading in classes using different parameters and different return types.
18. Write and execute programs to show the use of virtual function and pure virtual function.
19. Write and execute programs to demonstrate operator overloading in classes with different operators.
20. Write and execute programs using concept of dynamic memory allocation.

Course Code	**CSA142**
Course Title	**Operating System Lab**
Type of Course	Major
L T P	0:0:4
Credits	2
Course Prerequisites	Basic computer knowledge and OS DOS Windows
Course objective(s)	The goal of this course is to have students understand and appreciate the principles in the design and implementation of operating systems software.
Course Outcome (CO)	The students will be able to: 1. Describe the importance of computer system resources and the role of operating system in their management policies and algorithms 2. Understand the process management policies and scheduling of processes by CPU 3. Evaluate the requirement for process synchronization and coordination handled by operating system 4. Describe and analyze the memory management and its allocation policies

SYLLABUS

1. Simulate the following CPU scheduling algorithms.
   a) FCFS b) SJF c) Round Robin d) Priority.
2. Write a C program to simulate producer-consumer problem using Semaphores.
3. Write a C program to simulate the concept of Dining-philosophers problem.
4. Simulate MVT and MFT.
5. Write a C program to simulate the following contiguous memory allocation Techniques
   a) Worst fit b) Best fit c) First fit
6. Simulate all page replacement algorithms
   a)FIFO b) LRU c) OPTIMAL.
7. Simulate all File Organization Techniques
   a) Single level directory b) Two level directory
8. Simulate all file allocation strategies

a) Sequential b) Indexed c) Linked.

9. Simulate Bankers Algorithm for Dead Lock Avoidance.
10. Simulate Bankers Algorithm for Dead Lock Prevention.
11. Write a C program to simulate disk scheduling algorithms.
    a) FCFS b) SCAN c) C-SCAN

Third Semester

Course Code	**CSA231**
Course Title	**Data Structure and Algorithms**
Type of Course	Major
L T P	3 0 0
Credits	3
Course Prerequisites	Knowledge of Programming Language
Course Objectives (CO)	This course is intended as an introduction to data structures, algorithms, and more advanced programming techniques. Students will be able to solve real-world problems by reasoning about data structure choices, choose appropriate implementations, and analyze the costs associated with those choices. Students will learn to write, debug, and test large programs systematically.
Course Outcome (CO)	The students will able to: 1. Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory 2. Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs 3. Demonstrate different methods for traversing trees. 4. Learn various sorting and searching techniques.

SYLLABUS

UNIT I:

Introduction to Data Structure and its Characteristics

Data Structure and its terminology, types of data structure, operations on data structure, Time & Space Complexity, Trade Off Complexity, Divide and Conquer, Introduction to Dynamic Programming

Array: Introduction. Linear array, Representation of linear array in memory, Traversing linear array, Inserting and Deleting

UNIT II:

Stacks and Queues

Introduction and primitive operations on stack; Stack application; Infix, postfix, prefix expressions; Evaluation of postfix expression; Conversion between prefix, infix and postfix, introduction and primitive operation on queues, D- queues and priority queues

Linked List: Introduction to linked lists; Sequential and linked lists, operations such as traversal, insertion, deletion searching, Two way lists and Use of headers

UNIT III:

Tree: Introduction and terminology; Traversal of binary trees; Recursive algorithms for tree operations such as traversal, insertion, deletion; Binary Search Tree, Heap, AVL Tree, B- Tree,

B^+ Tree.
Graph: Introduction, Traversal of Graph- Breadth First Search, Depth First Search.

UNIT IV:
Sorting & Searching
Sorting Techniques: Bubble sort, Insertion sort, selection sort, merge sort, heap sort, radix sort, quick sort.
Searching Techniques: linear search, binary search and hashing.

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Fundamentals of Data structures	E.Horowiz and S.Sahani	Galgotia Book source Pvt. Ltd.
2.	Data Structures & Algorithms	R.S.Salaria	Khanna Book Publishing Co. (P) Ltd.
3.	Data Structures using C and C++	Y.Langsam et. Al.,	PHI

Course Code	**CSA233**
Course Title	**System Programming**
Type of Course	Major
L T P	3:0:0
Credits	3
Course Prerequisites	Knowledge of Programming Language
Course Objectives (CO)	This course is intended to design various system programs.
Course Outcome (CO)	The students will able to: 1. Design various system programs. 2. Understand the concept of Macro processors. 3. Understand the concept of Linker and Loader. 4. Understand the concept of Editors.

Syllabus

UNIT-I: Introduction: Introduction to system programming and different types of system programs –editors, assemblers, macro-processors, compilers, linkers, loader, debuggers. Assemblers: Description of single pass and two pass assemblers, use of data structures like OPTAB and SYMTAB, etc.

UNIT-II: Macro processors: Description of macros, macro expansion, conditional and recursive macro expansion. Compilers: Various phases of compiler – lexical, syntax and semantic analysis, intermediate code generation, code optimization techniques, code generation, Case study : LEX and YACC.

UNIT-III: Linkers and Loaders: Concept of linking, different linking schemes, concept of loading and various loading schemes.

UNIT-IV: Editors: Line editor, full screen editor and multi window editor, Case study MS-Word, DOS Editor and vi editor. Debuggers: Description of various debugging techniques.

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Systems Programming	Donovan J.J.	McGraw Hill
2.	Introduction to Systems Software	Dhamdhere, D.M	Tata McGraw Hill
3.	”Principles of compiler Design	Aho A.V. and J.D. Ullman	Addison Wesley/ Narosa

Course Code	**CSA235**
Course Title	**Web System and Technologies**
Type of Course	Major
L T P	4:0:0
Credits	4
Course Prerequisites	Student must have the basic knowledge of any text editor like Notepad, Notepad++ and Edit plus etc. Also student must know the background of Markup Language.
Course Objective(s)	This course is intended to teach the basics involved in publishing content on the World Wide Web. This includes the 'language of the Web' – HTML, the fundamentals of how the Internet and the Web function, a basic understanding of graphic production with a specific stress on creating graphics for the Web, and a general grounding introduction to more advanced topics such as programming and scripting.
Course Outcome (CO)	The students will be able to: 1. Understand the basics of Internet and Web Services. 2. Describe and differentiate Programming Language and Markup Language. 3. Connect various web pages and web sites together. 4. Capture user input from the remote users. 5. Learn connectivity concepts of Front End and Back End.

Syllabus

UNIT I:

Web Essentials: Markup languages, CSS Basics of Client side programming, Java script language, java script objects, host objects, Browsers and DOM.

UNIT II:

Basics of Server side programming: Java servlets ASP/JSP, Basics of ASP/JSP objects, simple ASP and JSP pages

UNIT III:

Representing Web data: Data base connectivity, JDBC. **Introduction to PHP**: basics, PHP File handling, file upload, cookies, error handling, PHP MySQL introduction.

UNIT IV:

Middleware Technologies: Ecommerce architecture and technologies, Ajax, Advanced web technologies and tools **Case Studies**: PHP and MySQL case studies.

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Web Technology- A Computer Science Perspective	Jeffery C Jackson	Pearson Education, 2007.
2.	Web Programming- Building Internet Applications	Chris Bates	Wiley India, 2006.
3.	Web Technologies	Achyut S Godbole and Atul Kahate	Tata McGraw Hill.

Course Code	**MGT003**
Course Title	**Essentials of Management**
Type of Course	Minor (ID)
L T P	3 0 0
Credits	3
Course Prerequisites	Nil
Course Objectives (CO)	The objective of this course is to develop a basic understanding about the management concepts as well as of human in various managerial processes in organization.
Course Outcome (CO)	The outcomes of this course are: 1. The students will able to recognize the role of a manager and how it relates to the organization's mission. 2. The students will define management, its four basic functions and skills. 3. The students will know critical management theories and philosophies and how to apply them. 4. Learn about the system and process of controlling.

SYLLABUS

Unit-I

Management: meaning, objectives, functions, management as science and art, the evolution of management thought and the patterns of management analysis.

Management and society: the external environment. Social responsibility and ethics

Unit-II

The Nature and Purpose of Planning: objectives, strategies, policies and planning premises. **Organizing:** nature of organization, organizational structure, departmentation, line/staff authority and decentralization, effective organizing, organizational Culture.

Unit-III

Staffing: meaning, objectives and functions of staffing**, Directing:** motivation. Leadership, decision making, Communication. Co-ordination functions in Organization.

Unit-IV

The System and Process of Controlling – control need and objectives, process of control,

types of control, planning and control relationship. **International Management Practices**: a comparative study of management practices in India, Japan, USA and China with particular reference to planning, organizing, directing, staffing and controlling.

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Essential of Management	Horold Koontz and Iteinz Weibrich	McGrawhills International
2.	Principles & practice of management	Dr. L.M.Parasad	Sultan Chand & Sons – New Delhi
3.	Management: Concept and Strategies	J.S. Chandan	Vikas Publishing

Course Code	**CSA237**
Course Title	**Data Structure and Algorithms Lab**
Type of Course	Major
L T P	0 0 4
Credits	2
Course Prerequisites	Knowledge of Programming Language
Course Objectives (CO)	The objective of this course is to teach students various data structures and to explain them algorithms for performing various operations on these data structures. It demonstrates familiarity with major algorithms and data structures. It helps in choosing the appropriate data structure and algorithm design method for a specified application.
Course Outcome (CO)	The students will able to: 1. Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory 2. Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs 3. Demonstrate different methods for traversing trees. 4. Learn various sorting and searching techniques.

SYLLABUS

1. Implementation of 1D Array
2. Implementation of Matrix using 2D Array
3. Implementation of singly linked lists
4. Practicing types of Linked list (double, circular)
5. Implementation of linked list operations
6. Implementation of Stack using Array
7. Implementation of Stack using Linked List
8. Implementation of stack operations
9. Implementation of Queue (Circular queue) using Array
10. Implementation of Queue (Circular queue) using Linked List

11. Implementation of queue operations

12. Implementation of Binary Tree

13. Implementation of Pre-order, Post-order and in-order traversal of tree

14. Implementation of BFS and DFS

Course Code	**CSA239**
Course Title	**Web System and Technologies Lab**
Type of Course	Major
L T P	0:0:4
Credits	2
Course Prerequisites	Student must have the basic knowledge of any text editor like Notepad, Notepad++ and Edit plus etc. Also student must know the background of Markup Language.
Course Objective(s)	To become familiar with the operation of ASP.Net and Acquire knowledge about the basic concept of writing a program in ASP.Net.
Course Outcome (CO)	The students will be able to: 1. Understand the basics of Internet and Web Services. 2. Describe and differentiate Programming Language and Markup Language. 3. Connect various web pages and web sites together. 4. Capture user input from the remote users. 5. Learn connectivity concepts of Front End and Back End.

SYLLABUS

1. Write a simple ASP.NET program to receive the text and print it using button.
2. Create an ASP.Net Web Forms using the Applications.
3. Write a simple ASP.NET program to design an application for dynamically populating checkbox list
4. Write a simple ASP.NET program to design an application using grid view control in web page.
5. Write a simple ASP.NET program to book rooms in a hotel using controls.
6. Write a simple ASP.NET program to upload files using file upload control.
7. Create an ASP.Net Program to create Validation Controls.
8. Create an ASP.Net Program Using Web User controls.
9. Write a ASP.NET program to illustrate the working of widgets (checkbox, radio box, calendar, search bar).
10. Write a ASP.NET program to connect with MYSQL Database.

11. Write a program to insert data using ASP.NET in MYSQL.
12. Write a program to insert data using ASP.NET in MYSQL.
13. Write a program to insert, delete, update, retrieve, images using ASP.NET in MYSQL/
14. Write a program to work with cascading style sheet using ASP.NET.
15. Create an ASP.Net Program using Database Programming concepts in ADO.Net.
16. Create an ASP.Net Program, to create a Web service.

Course Code	**CSA241**
Course Title	**Cyber Security and laws**
Type of Course	OE
L T P	4 0 0
Credits	4
Course Prerequisites	Basic knowledge of computer system
Course Objective (CO)	The main aim of this course is to provide knowledge about how to secure our data on the Internet.
Course Outcome (CO)	The students will able to: 1. Implement cyber security best practices and risk management 2. Integrate network monitoring and present real-time solutions 3. Impact cyber security risk in an ethical, social, and professional manner. 4. Learn various concepts of cyber laws and cyber forensics.

SYLLABUS

UNIT I:

Introduction to Cyber Security: Overview of Cyber Security, Cyber Threats:- Cyber Warfare-Cyber Crime-Cyber terrorism-Cyber Espionage

Cyber Security Vulnerabilities and Cyber Security Safeguards: Cyber Security Vulnerabilities-Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Unprotected Broadband communications, Poor Cyber Security Awareness. Cyber Security Safeguards-Overview, Access control, Audit, Authentication, Biometrics, Cryptography, Deception, Denial of Service Filters, Ethical Hacking, Firewalls, Intrusion Detection Systems, Response, Scanning, Security policy, Threat Management.

UNIT II:

Securing Web Application, Services and Servers: Introduction, Basic security for HTTP Applications and Services, Basic Security for SOAP Services, Identity Management and Web Services, Authorization Patterns, Security Considerations, Challenges.

Intrusion Detection and Prevention: Intrusion, Physical Theft, Abuse of Privileges, Unauthorized Access by Outsider, Malware infection, Intrusion detection and Prevention

Techniques, Anti-Malware software, Network based Intrusion detection Systems, Network based Intrusion Prevention Systems, Host based Intrusion prevention Systems, Security Information Management, Network Session Analysis, System Integrity Validation.

UNIT III:

Cryptography and Network Security: Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography. Overview of Firewalls- Types of Firewalls, User Management, VPN Security Security Protocols: - security at the Application Layer- PGP and S/MIME, Security at Transport Layer- SSL and TLS, Security at Network Layer-IPSec.

UNIT IV:

Cyberspace and the Law: Introduction, Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, National Cyber Security Policy 2013.

Cyber Forensics: Introduction to Cyber Forensics, Handling Preliminary Investigations, Controlling an Investigation, Conducting disk-based analysis, Investigating Information-hiding, Scrutinizing E-mail, Validating E-mail header information, Tracing Internet access, Tracing memory in real-time

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Cybersecurity and Cyberwar: What Everyone Needs to Know®	Allan Friedman and P. W. Singer	Oxford University Press
2.	Cybersecurity for Beginners	Raef Meeuwisse	Cyber Simplicity Limited
3.	Cybersecurity Essentials	Charles J. Brooks, Christopher Grow, Donald Short, and Philip Craig	Sybex

Course Code	**CSA243**
Course Title	**Compiler Design**
Type of Course	OE
L T P	4 0 0
Credits	4
Course Prerequisites	Basic knowledge of computer system
Course Objective (CO)	The main aim of this course is to provide knowledge about how to compiler work.
Course Outcome (CO)	The students will able to: 1. To teach concepts of language translation and phases of compiler design. 2. Analyze different representations of intermediate code. 3. Participate in GATE, PGECET and other competitive examinations. 4. Use compiler construction tools and describes the Functionality of each stage of compilation process.

SYLLABUS

UNIT I:

INTRODUCTION TO COMPILERS: Definition of compiler, interpreter and its differences, the phases of a compiler, role of lexical analyzer, regular expressions, finite automata, from regular expressions to finite automata, pass and phases of translation, bootstrapping, LEX-lexical analyzer generator.

PARSING: Parsing, role of parser, context free grammar, derivations, parse trees, ambiguity, elimination of left recursion, left factoring, eliminating ambiguity from dangling-else grammar, classes of parsing, top down parsing - backtracking, recursive descent parsing, predictive parsers, LL(1) grammars.

UNIT II:

BOTTOM UP PARSING: Definition of bottom up parsing, handles, handle pruning, stack implementation of shift-reduce parsing, conflicts during shift-reduce parsing, LR grammars, LR parsers-simple LR, canonical LR(CLR) and Look Ahead LR (LALR) parsers, error recovery in parsing, parsing ambiguous grammars, YACC-automatic parser generator.

UNIT III:

SYNTAX DIRECTED TRANSLATION: Syntax directed definition, construction of syntax trees, Sattributed and L-attributed definitions, translation schemes, emitting a translation.

INTERMEDIATE CODE GENERATION: intermediate forms of source programs– abstract syntax tree, polish notation and three address code, types of three address statements and its implementation, syntax directed translation into three-address code, translation of simple statements, Boolean expressions and flow-of-control statements.

UNIT IV:

TYPE CHECKING: Definition of type checking, type expressions, type systems, static and dynamic checking of types, specification of a simple type checker, equivalence of type expressions, type conversions, overloading of functions and operators.

RUN TIME ENVIRONMENTS: Source language issues, Storage organization, storage-allocation strategies, access to non-local names, parameter passing, symbol tables and language facilities for dynamic storage allocation.

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Compilers Principles	Alfred V Aho	Pearson Education 2002

Course Code	**CSA245**
Course Title	**Digital Marketing**
Type of Course	OE
L T P	4 0 0
Credits	4
Course Prerequisites	Basic knowledge of Digital Marketing
Course Objective(s)	This course will provide knowledge about functional and operational details of various peripheral devices.
Course Outcome (CO)	The students will be able to: 1. Demonstrate cognitive knowledge of the skills required in conducting online research and research on online markets, as well as in identifying, assessing and selecting digital market opportunities. 2. Explain emerging trends in digital marketing and critically assess the use of digital marketing tools by applying relevant marketing theories and frameworks. 3. Investigate and evaluate issues in adapting to globalised markets that are constantly changing and increasingly networked. 4. Interpret the traditional marketing mix within the context of a changing and extended range of digital strategies and tactics.

SYLLABUS

UNIT I:

Introduction: Marketing and its definition, Digital Marketing, How we do Marketing, Benefits of Digital marketing ,Digital marketing platforms and Strategies , Defining Marketing Goals, Latest Digital marketing trends, introduction to traditional and new methods of marketing

Requirement: Requirements for digital marketing, its uses .

UNIT II:

Search Engine Optimization: Introduction to Search Engines, How the search engine works, Components of Search Engines.

Keyword Research and Competition: Introduction to Keyword Research, Types of Keywords, Keyword Research Methodology, Business Analysis & Categorization, Google Keyword Planner, Market Research and Analysis, New Keyword Ideas, Competition Analysis, Finalizing the Keywords List.

UNIT III:

Onpage Optimization: Introduction to Onpage ,What is Webmaster Tools, Selecting Target Location, Onpage Analysis Methodology, Fundamental On-page Factors , Website Speed ,

Domain name in SEO, URL Optimization , Title Tag Optimization , Meta Tags Optimization , Content Optimization , Sitemaps Generation , Using Robot.txt in Site URL , Redirecting Techniques , Canonical Links , Rich Snippets.

UNIT IV:

Offpage Optimization : What is Link Building , Types of Linking Methods , DoFollow Vs. NoFollow Link building Guidelines , Linking Building Methodology , Links Analysis Tools , Directory Submissions , Local Business Directories , Social Bookmarking , Using Classifieds for Inbound traffic ,Question and Answers , Blogging & Commenting , Guest Blogging.

Local SEO: What is Local SEO, Importance of Local SEO , Submission to Google My Business , Completing the Profile , Local SEO Ranking Signals , Local SEO Negative Signals , Citations and Local Submissions.

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Digital world	Hall Man	PHI,New delhi

Course Code	**CSA247**
Course Title	**System Analysis and Design**
Type of Course	OE
L T P	4 0 0
Credits	4
Course Prerequisites	Basic knowledge of System operation
Course Objective(s)	The general objective of this course is to provide concepts related to information systems development in a systematic approach including foundations, planning, analysis, design, implementation and maintenance.
Course Outcome (CO)	The students will be able to: Define a system 2. Explain the different phase of SDLC and their uses 3. Describe the components of System Analysis and Design Define a system 2. Explain the different phase of SDLC and their uses 3. Describe the components of System Analysis and Design.

SYLLABUS

UNIT I:
Introduction: Introduction, Modern Approach of System Analysis and Design, Information System and its Type, Developing Information System and its Type, Developing Information Systems and the Systems Development Life Cycle, The Heart of the Systems Development Process, The Traditional Waterfall SDLC, Approaches for Improving Development, CASE Tools, Rapid Application Development, Service-Oriented Architecture, Agile Methodologies, extreme Programming, Object-Oriented Analysis and Design.

UNIT II:
a. System Development Projects: Identification and Selection
Introduction, Identifying and Selecting Systems Development Projects, Corporate and Information Systems Planning.

b. System Development Projects: Initiation and Planning

Introduction, Initiating and Planning Systems Development Projects, Process of Initiating and Planning IS Development Projects, Assessing Project Feasibility, Building and Reviewing the Baseline Project Plan.

UNIT III:
a. System Requirements

Introduction, Performing Requirements Determination, Traditional Methods for Determining

System Requirements, Contemporary Methods for Determining System Requirements, Requirements Management Tools, Requirements Determination Using Agile Methodologies.

b. System Process Requirements
Introduction, Process Modeling, Data Flow Diagramming Mechanics, Using Data Flow Diagramming in the Analysis Process, Modeling Logic witth Decision Tables

c. System Data Requirements
Introduction, Conceptual Data Modeling, Gathering Information for Conceptual Data Modeling, Introduction to E-R Modeling, Conceptual Data Modeling and the E-R Model, Representation Super-types and Sub-types, Business Rules, Role of Packaged Conceptual Data Models-Database Patterns

UNIT IV:

a. System Implementation

Introduction, System Implementation, Software Application Testing, Installation, Documenting the System, Training and Supporting Users, Organizational Issues in Systems Implementation

b. System Maintenance

Introduction, Maintaining Information Systems, Conducting Systems Maintenance

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	System Design	Hall Man	PHI,New delhi

Fourth Semester

Course Code	**CSA232**
Course Title	**Data Communication and Networks**
Type of Course	Major
L T P	3:1:0
Credits	4
Course Prerequisites	Fundamentals of Data and Computer Communications.
Course objective(s)	The objective of this course is to provide the students with the conceptual foundation for study of data communications. Also provide the knowledge about computer network related concepts.
Course Outcome (CO)	The students will be able to: 1. To focus on information sharing and networks. 2. Describe the functions of each layer of OSI and TCP/IP model. 3. Describe various layers and services provided by them in detail. 4. Understand how the data is routed. 5. Understand the various protocols that are used in application layer.

SYLLABUS

UNIT I: Fundamentals of communication: Introduction to data communication and networking: Why study data communication? Data Communication, Networks, Protocols and Standards, Standards Organizations. Line Configuration, Topology, Transmission Modes, Categories of Networks Internet works Data communication networks and open system standards. The OSI Model & TCP/IP Protocol, The layers and their functions. Signals: Digital signals, Analog signals. Data transmission: Asynchronous and Synchronous transmissions. Data Communication System and its components, Data Flow, Computer network and its goals, Types of computer networks: LAN, MAN, WAN, Wireless and wired networks, broadcast and point to point networks, Network topologies.

UNIT II: Study of Signals: Analog and Digital, Periodic and A periodic Signals, Analog Signals, Time and Frequency Domains, Composite Signals, Digital Signals. **Study of Digital transmission**: Digital to Digital Conversion, Analog to Digital Conversion. **Study of Analog transmission:** Digital to Analog Conversion, Analog to Analog Conversion. **Physical Layer:** Types of Signals, Multiplexing: Frequency Division, Time Division, Wavelength Division, Transmission Media: Twisted pair, Coaxial cable, Fiber optics, Wireless transmission (radio, microwave, infrared), Circuit Switching, Message Switching, Packet Switching & their comparisons**.**

UNIT III: Introduction to networks and devices: Network classes, Repeaters, Hub, Bridges, Switches, Routers, Gateways Routers, Routing Algorithms, Distance Vector Routing, Link State Routing. **Data Link Layer:** Design issues, Framing, Error detection and correction codes: checksum, CRC, hamming code, Data Link Layer Protocols: Sliding Window (Go Back N, Selective Repeat), Framing, Ethernet, Wireless LANs, Data transmission: Asynchronous and Synchronous transmissions. **Duties of network and transport layer**: Routing algorithms, Subnetting, IP addressing, hubs/repeaters, switches, bridges, routers.

UNIT IV: Elements of transport protocols: addressing, connection establishment and release, flow control and buffering, multiplexing and de-multiplexing, crash recovery, Congestion Control Algorithms. **Application Layer**: World Wide Web (WWW), Domain Name System (DNS), E-mail, File Transfer Protocol (FTP), network security

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Computer Networks, 4th Edition,	Andrew S. Tanenbaum	Pearson Education
2.	Data Communication & Networking, 4th Edition,	Behrouz A. Forouzan	Tata McGraw Hill.
3.	Computer Networking, 3rd Edition	James F. Kurose and Keith W. Ross	Pearson Education

Course Code	**CSA234**
Course Title	**Database Management System**
Type of Course	Major
L T P	3:0:0
Credits	3
Course Prerequisites	Computer fundamentals and record keeping
Course Objective(s)	This course covers fundamentals of database architecture, database management systems, and database systems. Principles and methodologies of database design, and techniques for database application development.
Course Outcome (CO)	The students will be able to: 1. Explain the features of database management systems and Relational database. 2. Design conceptual models of a database using ER modeling and also construct queries in Relational Algebra. 3. Analyze the existing design of a database schema and apply concepts of normalization to design an optimal database. 4. Formulate query, using SQL, solutions to a broad range of query and data update problems.

SYLLABUS

UNIT I: Database Management System Concepts: Introduction, Significance of Database, Database System Applications; Data Independence; Data Modeling for a Database; Entities and their Attributes, Entities, Attributes, Relationships and Relationships Types, Advantages and Disadvantages of Database Management System, DBMS Vs RDBMS.

UNIT II: Database System Architecture: Three Level Architecture of DBMS, The External Level or Subschema, The Conceptual Level or Conceptual Schema, The Internal Level or Physical Schema, Mapping; MySQL Architecture; SQL Server 2000 Architecture; Oracle Architecture; Database Management System Facilities, Data Definition Language, Data Manipulation Language; Database Management System Structure, Database Manager, Database Administrator, Data Dictionary; Distributed Processing, Information and Communications Technology System (ICT), Client / Server Architecture.

UNIT III: Database Models and Implementation: Data Model and Types of Data Model, Relational Data Model, Hierarchical Model, Network Data Model, Object/Relational Model, Object-Oriented Model; Entity-Relationship Model, Modeling using E-R Diagrams, Notation

used in E-R Model, Relationships and Relationship Types; Associative Database Model.

File Organization for Conventional DBMS: Storage Devices and its Characteristics, Magnetic Disks, Physical Characteristics of Disks, Performance Measures of Disks, Optimization of Disk-Block Access; File Organization, Fixed-Length Records, Variable-Length Records, Organization of records in files; Sequential file Organization; Indexed Sequential Access Method (ISAM); Virtual Storage Access Method (VSAM).

UNIT IV: Transaction Management: ACID properties, Serializability, Two-phase commit protocol, Concurrency Control, Lock Management, Lost update problem, inconsistent read problem, Deadlock Handling, Recovery and Security.

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Database System Concepts	Henry Korth and A. Silberschatz	McGraw-Hill
2.	File Structure	Michael J. Folk, Greg, Riccardi	Pearson Education
3.	An Introduction to Database System	Bipin Desai	West Publishing Company

Course Code	**CSA236**
Course Title	**Probability And Statistics**
Type of Course	Major
L T P	3:0:0
Credits	3
Course Prerequisites	Knowledge of Matrix and Kinear Algebra
Course Objective(s)	To introduce the basic concepts of probability and random variables.
Course Outcome (CO)	1. To acquaint the knowledge of testing of hypothesis for small and large samples which plays an important role in real life problems. 2. To introduce the basic concepts of classifications of design of experiments which plays very important roles in the field of agriculture and statistical quality control. 3. The students will able to learn various techniques to find probability. 4**.** The students will able to learn various transformation techniques.

SYLLABUS

UNIT I: Algebra of Sets: sets and classes, limit of a sequence of sets, rings, sigmarings, fields, sigma-fields, monotone classes. Probability: Classical, relative frequency and axiomatic definitions of probability, addition rule and conditional probability, multiplication rule, total probability, Bayes' Theorem and independence, problems.

UNIT II: Random Variables: Discrete, continuous and mixed random variables, probability mass, probability density and cumulative distribution functions, mathematical expectation, moments, probability and moment generating function, median and quantiles, Markov inequality, Chebyshev's inequality, problems. Special Distributions: Discrete uniform, binomial, geometric, negative binomial, hyper geometric, Poisson, continuous uniform, exponential, gamma, Weibull, Pareto, beta, normal, lognormal, inverse Gaussian, Cauchy, d o u b l e exponential distributions, reliability and hazard rate, reliability of series and parallel systems, problems.

UNIT III: Function of a random variable, problems. Joint Distributions: Joint, marginal and conditional distributions, product moments, correlation and regression, independence of random variables, bivariate normal distribution, problems.

UNIT-IV: Transformations: functions of random vectors, distributions of order statistics, distributions of sums of random variables, problems. Sampling Distributions: The Central Limit

Theorem, distributions of the sample mean and the sample variance for a normal population, Chi-Square, t and F distributions, problems.

RECOMMENDED BOOKS		
Name	**AUTHOR(S)**	**PUBLISHER**
An Introduction to Probability and Statistics	V.K. Rohatgi & A.K. Md.E.Saleh.	Wiley
Introduction to Probability and Statistics	J.S. Milton & J.C.Arnold.	Pearson
A First Course in Probability	S.M. Ross	THM

Course Code	**CSA238**
Course Title	**Java Programming**
Type of Course	Major
L T P	3:0:0
Credits	3
Course Prerequisites	Java
Course Objective(s)	This course will help students to learn about advance topics of java like swing, Servlet, Java Beans, JSP.
Course Outcome (CO)	The students will be able to: 1. Know the structure and model of the Java programming language, (knowledge) 2. Use the Java programming language for various programming technologies (understanding) 3. Develop software in the Java programming language, (application) 4. Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements (analysis)

SYLLABUS

UNIT I:

Fundamentals of Object Oriented Programming: - Introduction; Object-Oriented Paradigm; Basic Concepts of Object-Oriented Programming Benefits of OOP; Applications of OOP.

Java Evolution: - Java History; Java Features; How Java Differs from C and C++; Java and Internet, Java and World Wide Web, Web Browsers; Hardware and Software Requirements.

Overview of Java language: - Introduction; Simple Java Program; Comments in java; An application with Two Classes; Java Program Structure; Java Tokens; Java Statements; Implementing a Java Program; Java Virtual Machine; Command Line Arguments; Programming Style.

UNIT II:

Constants, Variables and Data Types: - Introduction; Constants; Variables; Data Types; Variables, Constants, Standard Default Values.

Operators and Expressions: - Introduction to Operators, Expressions; Operator Precedence; Mathematical Functions. DECISION MAKING, BRANCHING AND LOOPING: - Decision making and Branching Statements, Looping Statements, Labeled loops, Jumping Statements.

Classes, Objects And Methods: - Introduction, Defining a Class; Adding Variables; Adding Variables; Adding Methods; Creating Objects; Accessing Class Members; Constructors;

Methods Overloading; Static Members; Nesting of Methods; Inheritance, Extending a class, Visibility Control, Wrapper Classes.

UNIT III:

Packages and Interfaces: Introduction, System Packages, Using System Packages, Creating and using Packages, Defining Interfaces; Extending and Implementing Interfaces.
Inheritance and Polymorphism: Introduction, Types of inheritance, Polymorphism: run time and compile time polymorphism, implementation of polymorphism.

Arrays, Strings and Vectors: - Arrays; Zagged Arrays:; Strings; String functions: Vectors; Wrapper Classes.

Interfaces: Introduction; Defining Interfaces; Extending Interfaces; Implementing Interfaces; Accessing Interface Variables, Implementing Multiple Inheritence using Interfaces.

Packages: Introduction; System Packages; Using System Packages; Naming Conventions; Creating Packages; Accessing a Package; Using a Package; Adding a Class to a Package; Hiding Classes.

UNIT IV:

Managing Errors and Exceptions: - Introduction; Types of Errors; Exceptions; Exception Handling using Try, Catch and finally block: Throwing Our Own Exceptions; Using Exceptions for Debugging.

Applet Programming : - Introduction; How Applets Differ from Applications; Applet Life Cycle; Creating an Executable Applet; Passing Parameters to Applets; Aligning the Display; More about HTML Tags; Displaying Numerical Values; Getting Input from the User.

Graphics Programming: - Introduction; The Graphics Class; Lines and Rectangles; Circles and Ellipses; Drawing Arcs; Drawing Polygons; Line Graphs; Using Control Loops in Applets; Drawing Bar Charts

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Java-2 The Complete Reference	Patrick Naughton and HerbertzSchildt	TMH
2.	Dynamic Web Publishing	Shelley Powers	Techmedia
3.	Beginning Java-2	Ivor Horton	SPD Publication

Course Code	**EVS001**
Course Title	**Environmental Science**
Type of course	Minor (ID)
L T P	3:0:0
Credits	3
Course prerequisite	NA
Course objective	To connect and sensitize the students towards the environment and prevailing environmental issues (natural, physical, social and cultural).
Course Outcomes	The students will able to: 1. Understand about environment, natural resources and ecosystems. 2. Learn about causes, effects and control measures of various types of environmental pollution. 3. Understand about sustainable development and resettlement and rehabilitation of people. 4. Learn about role of Information technology on environment and human health.

UNIT I

Introduction: Definition and scope and importance of multidisciplinary nature of environment. Need for public awareness.

Natural Resources: Natural Resources and associated problems, use and over exploitation, case studies of forest resources and water resources.

Ecosystems: Concept of Ecosystem, Structure, interrelationship, producers, consumers and decomposers, ecological pyramids-biodiversity and importance. Hot spots of biodiversity

UNIT II

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

UNIT III

Social Issues and the Environment: From Unsustainable to Sustainable development, urban problems related to energy, Water conservation, rain water harvesting, and watershed management.

Resettlement and rehabilitation of people: Its problems and concerns, Case studies. Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Case studies. Waste land reclamation. Consumerism and waste products, Environment Protection Act Air (Prevention and Control of Pollution), Water Protection Act (Prevention and control). Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation Public awareness

UNIT IV

Human Population and the Environment: Population growth, variation among nations. Population explosion and family welfare programme. Environment and human health, Human Rights, Value Education. HIV/AIDS. Women and child Welfare. Role of Information Technology in Environment and human health.

Text and Reference Books:

S. No	Name	Author(S)	Publisher
1	Environmental Biology	Agarwal, K.C. 2001	Nidi Publ. Ltd. Bikaner.
2	Environmental Science	Miller T.G. Jr.	Wadsworth
3	Perspectives in Environmental Studies	Anubha Kaushik and Gaurav Garg	New Age International Publishers

Course Code	**CSA240**
Course Title	**Java Programming Lab**
Type of Course	Major
L T P	0:0:4
Credits	2
Course Prerequisites	NA
Course Objective(s)	This subject aims to introduce students to the Java programming language. Upon successful completion of this subject, the students should be able to create Java programs that leverage the object-oriented features of the Java language, such as encapsulation, inheritance and polymorphism; use data types, arrays and other data collections; implement error-handling techniques using exception handling.
Course Outcome (CO)	The students will be able to: 1. Know the structure and model of the Java programming language, (knowledge) 2. Use the Java programming language for various programming technologies (understanding) 3. Develop software in the Java programming language, (application) 4. Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements (analysis)

SYLLABUS

1. Implementation of Operators and Mathematical Functions
2. Implementation of Decision making, Branching and Looping Statements
3. Implementation of classes.
4. Implementation of Arrays, Strings and Vectors.
5. Implementation of inheritance.
6. Implementation of packages and interfaces.
7. Implementation of threads.
8. Using exception handling mechanisms.
9. Implementation of Applets.
10. Implementation of mouse events, and keyboard events.
11. Implementing basic file reading and writing methods.
12. Connecting to Database using JDBC.

Course Code	**CSA242**
Course Title	**Database Management System**
Type of Course	Major
L T P	0:0:4
Credits	2
Course Prerequisites	Computer fundamentals and record keeping
Course Objective(s)	To educate students with fundamental concepts of Data Base Design, Data Models, Different Data Base Languages (SQL/Oracle).
Course Outcome (CO)	The students will be able to: 1. Explain the features of database management systems and Relational database. 2. Design conceptual models of a database using ER modeling and also construct queries in Relational Algebra. 3. Analyze the existing design of a database schema and apply concepts of normalization to design an optimal database. 4. Formulate query, using SQL, solutions to a broad range of query and data update problems.

SYLLABUS

1. Steps for Installation of ORACLE.
2. Implementation of create table commands, inserting data into tables.
3. Create a program to view data in table.
4. Create a program for sorting of data in table.
5. Create a program for elimination of duplicate rows in a table.
6. Create a program to update the contents of a table.
7. Execute delete operations in a table.
8. Create a program to modify structure of a table.
9. Create a program for implementation of Transaction control statements: commit and rollback.
10. Create a program to implement aggregate functions: count, sum, max, min, avg.

11. Create a program for implementation of data control languages: Granting and revoking permissions in a table.
12. Introduction to PL/SQL.
13. How to apply Conditional Controls in PL/SQL.

Course Code	**CSA244**
Course Title	**Six Weeks Industrial/Institutional Training**
Type of Course	Major
L T P	0:0:0
Credits	NA
Course Prerequisites	NA
Course Objective (CO)	The objective of this course is to understand how task is performed in Industries.

Guidelines for Industrial Training

The 6-week industrial training must be undertaken in reputed industry. The student must submit a mid-term report after one month. The student will submit Training Report along with training certification from industry. A presentation will be given by the student in front of Faculty of concerned department.

Course Code	**CSA246**
Course Title	**Management of Banking operations**
Type of Course	OE
L T P	3:0:0
Credits	3
Course Prerequisites	Basic knowledge about accountancy.
Course Objectives (CO)	To enlighten the students with the Introduction of Banking Concepts and dynamics of Financial Markets and Financial Services.
Course Outcomes	1. After this course the students would have the fundamental knowledge of banking as service and bank as an institution. 2. To make them aware of various banking innovations after nationalization. 3. After this course the students would have the knowledge of Banking lending policies and procedures. 4. After this course students will able to know about financial Inclusion and procedure about loans.

SYLLABUS

UNIT I: Introduction: Mutual introduction, Understanding self and others Understanding what is banking history, types of banks in India, Appreciate role of banks in the economy and the importance of trust Get an overview of banking functions Intermediary, payment mechanism and financial services, Identify the different types of products and services offered by banks. Understanding the trends and challenges in banking

UNIT II: Basic Banking: Understanding the types of Deposits and explain features, benefits, variants of Savings, Current, Fixed and recurring deposit Types of Loans- Retail lending, secured and unsecured, Understanding the rights, duties and responsibilities of bankers and banker- customer relationship Understanding the basic concepts of Business Mathematics interest on savings, FD, Loans and overdrafts, Understanding the basic accounting in banking transactions

UNIT III: Financial System: Structure, institution and operating mechanism and its role in Economic Development. Developed and Underdeveloped Markets, Money Market in India

Importance, features instruments, Measures to strengthen money market in India, Recommendations of the working group on money market, Report of the task force on money market and mutual funds

UNIT IV: Objectives and role of SEBI, Capital Market Reforms.

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Banking System	Hitesh Kumar	Kalyani Publication

Course Code	**CSA248**
Course Title	**Cyber Laws**
Type of Course	Open Elective
L T P	3:0:0
Credits	3
Course Prerequisites	Basic knowledge about computer and internet
Course Objectives (CO)	Cyberspace is a rapidly growing industry, and anybody looking to join this industry should be wary of the fact that the industry changes quickly. Anybody who is looking to join the cyber law industry must have a constantly learning attitude as new kinds of cybercrimes will be popping up, new malware keeps getting developed every day.
Course Outcome (CO)	The students will able to: 1. Introduction to the Cyber World and Cyber Law 2. The internet and online resources 3. Security of information, Digital signature 4. Learn various cyber laws in India.

SYLLABUS

UNIT I: Introduction to Cyber Law, Legislative Framework, Judicial Framework, Quasi-judicial Framework, Investigative Framework, International Framework, Basic legal terms and concepts, Cyber Law & Your World, Introduction to Cyber Law, Computer Software & Copyright Law.

Copyright, Domain Names & Law, Trademark Issues in Cyberspace, Understanding Computer Software, Semiconductor Layout & Design Law.

Software Licenses, Computer Databases & Law, Violation of Privacy, Cyber Frauds, Computer Source Code, Cyber Pornography, Cyber Security,Cyber Terrorism, Data Privacy & Confidentiality, Digital Signature, Freedom of Speech, Information & Traffic Data, Intermediaries, Malware,

Other Computer Related Offences, Unauthorized Access, Electronic Contracts, Digital Signatures – Technical Issues, Electronic & Digital Signatures – Legal Issues

UNIT II: Basics of Computer and Cyber Security: Information Technology Law (Cyber Law)

Cyber Crimes and Investigation Procedures.
UNIT III: **Criminology and Criminal Justice** Administration, Forms of Cyber Crimes & Frauds, Fundamentals of Information Security, Cyber Laws, Intellectual Property Rights

Introduction to IT Law, Electronics Contract and Digital Signature, Cyber Crimes, Privacy & Data Security, E-Commerce & the Law, Software-As-A-Service & Licensing, Technology Outsourcing, Online Reputation Management

UNIT IV: **Law and Policy in 'Indian' Cyberspace**: Jurisdiction in Cyberspace, Designing On-Line Agreements: Contractual Closure and Indian Contract Law Electronic Signatures & Digital Signatures, Regulation of Certifying Authorities, Electronic Evidence, Data Protection, Privacy and Corporate Compliance, Intellectual Property, The Internet and Electronic Commerce, Managing Legal Risks when promoting a business online, Insurance and the Internet, The Legal Challenges to Internet Banking, Privacy Bill, 2011: Critical Analysis, The E-Policy Handbook, Intermediary Liability, Internet Law Regulation.
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RECOMMENDED BOOKS

Sr. no.	Name	AUTHOR(S)	PUBLISHER
1.	Cyber law Technology Act2000	Talat Fahim	PHI

Course Code	**CSA250**
Course Title	**Internet of Things (IoT)**
Type of Course	Open Elective
L T P	3:0:0
Credits	3
Course Prerequisites	Basic knowledge about computer and internet
Course Objectives (CO)	To implement IOT use cases using various IOT platforms
Course Outcome (CO)	The students will able to: 1. Comprehend the essentials of IoT and its applications 2. Understand the concepts of IoT Architecture Reference model and IoT reference architecture 3. Analyze various IoT Application layer Protocols. 4. Apply IP based protocols and Authentication Protocols for IoT

SYLLABUS

UNIT I: Introduction: IoT-An Architectural Overview, Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. M2M and IoT Technology Fundamentals, Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management.

UNIT II: IOT Architecture & Protocols: IoT Architecture-State of the Art – Introduction, State of the art, Reference Model and architecture, IoT reference Model - IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. Real-World Design Constraints- Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control.

UNIT III: Reference Architecture: IOT architecture-state of the art, Reference model & architecture, IOT reference model-IOT reference architecture-Introduction, functional view, Deployment and operational view, other relevant architectural views.

PHY/MAC Layer(3GPP MTC, IEEE 802.11, IEEE 802.15), Wireless HART,ZWave,Bluetooth Low Energy, Zigbee Smart Energy, DASH7 - Network Layer-IPv4, IPv6, 6LoWPAN,

6TiSCH,ND, DHCP, ICMP, RPL, CORPL, CARP.

UNIT IV: Transport Layer (TCP, MPTCP, UDP, DCCP, SCTP)-(TLS, DTLS) ,Session Layer HTTP, CoAP, XMPP, AMQP, MQTT

Performance and security in IOT: Security considerations, firmware updates, cryptography basics and cryptography in IOT, privacy considerations and design guidelines.

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Learning Internet of Things	Peter Waher	PACKT Publishing
2.	Building the Internet of Things	MaciejKranz	Wiley Publishing
3.	Internet of things and architects	Perry Lea	PACKT Publishing

Course Code	**CSA252**
Course Title	**Wireless Sensor and Communication Networks**
Type of Course	OE
L T P	3 0 0
Credits	3
Course Prerequisites	Basic knowledge of computer system
Course Objective(s)	This course will provide knowledge about wireless communication network.
Course Outcome(CO)	The students will be able to: 1. Understand fundamentals of wireless communications. 2. Analyze security, energy efficiency, mobility, scalability, and their unique characteristics in wireless networks. 3. Demonstrate basic skills for cellular networks design. And to apply knowledge of TCP/IP extensions for mobile and wireless networking. 4. Apply knowledge of TCP/IP extensions for mobile and wireless networking.

SYLLABUS

UNIT I:

Services And Technical Challenges: Types of Services, Requirements for the services, Multipath propagation, Spectrum Limitations, Noise and Interference limited systems, Principles of Cellular networks, Multiple Access Schemes.

UNIT II:

Wireless Propagation Channels: Propagation Mechanisms (Qualitative treatment), Propagation effects with mobile radio, Channel Classification, Link calculations, Narrowband and Wideband models.

UNIT III:

Wireless Transceivers: Structure of a wireless communication link, Modulation and demodulation – Quadrature Phase Shift Keying, □/4-Differential Quadrature Phase Shift Keying, Offset-Quadrature Phase Shift Keying, Binary Frequency Shift Keying, Minimum Shift Keying, Gaussian Minimum Shift Keying, Power spectrum and Error performance in fading channels.

UNIT IV:

Signal Processing In Wireless Systems : Principle of Diversity, Macro diversity, Micro diversity, Signal Combining Techniques, Transmit diversity, Equalizers- Linear and Decision Feedback equalizers, Review of Channel coding and Speech coding techniques.

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Wireless Communications	Andreas.F. Molisch	John Wiley
2.	Modern Wireless Communications	Simon Haykin& Michael Moher	Pearson Education
3.	Wireless communications	Rappaport. T.S.	Pearson Education

Fifth Semester

Course Code	**CSA331**
Course Title	**PL/SQL**
Type of Course	Major
L T P	3:0:0
Credits	3
Course Prerequisites	Basic knowledge of Query Language
Course Objectives (CO)	This course will provide knowledge about Programming Language and structured Query Language.
Course Outcomes (CO)	The students will able to: 1. Enhance the knowledge and understanding of database analysis and design. 2. Enhance the knowledge of the processes of database development and administration using SQL and PL/SQL. 3. Enhance programming and database skills using SQL and PL/SQL

SYLLABUS

UNIT-I:

Introduction to SQL: Purpose of SQL, Who should learn SQL, Subsets of SQL, Data definition language, Data Manipulation Lanagauge, Data Control Language.
Database objects, Database Tables, Table Records, Types of Database mgt system, RDBMS, SQL and NO SQL Databases.

UNIT-II:

Install a Database Engine: MySQL Database engine, Type of SQL Commands and Execute, SQL Keywords, SQL Syntax, SQL is not case sensitive, SQL Statements.SQL Numeric Data Types, Time data types, Character and string data types, Unicode character string data types, Binary data types.

UNIT-III:

PL/SQL Introduction: Execution environment, syntax, blocks structure.
Oracle transactions, Cursors implicit and explicit, store procedures, syntax for creating procedure, an application using procedure.

UNIT-IV:

Data definition language commands and operations: Data definition commands create, alter, drop, Truncate and rename. Data Definition Language Operations, Create a Database, Use Database, Rename a Database, Drop Database, Create a Table, Rename Table, Add a Column to exiting Table, Add multiple columns to existing Table, Modify an existing column, Rename a Column, Drop a Column, Truncate a Table, and Drop a Table. Data Manipulation Language Operations, Retrieving data from a table, inserting data into a table, updating existing data into a

table, and deleting all records from a table.SQL Joins, SQL Views, SQL Indexes, SQL Transactions, SQL vs. NO SQL.

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Programming using SQL	Ivan Bayross	BPB Publications, 2006
2.	Oracle complete reference	Herbert Schidlt	Oracle Press, 2006
3.	Database Systems	Korth	McGraw Hill, 2006

Course Code	**CSA333**
Course Title	**Android Programming**
Type of Course	Major
L T P	4:0:0
Credits	4
Course Prerequisites	Basic knowledge of computer system
Course Objective(s)	This course will provide knowledge about android and core java.
Course Outcome (CO)	The students will be able to: 1. Experiment on Integrated Development Environment for Android Application Development. 2. Design and Implement User Interfaces and Layouts of Android App. 3. Use Intents for activity and broadcasting data in Android App and Design and Implement Database Application and Content Providers 4. Experiment with Camera and Location Based service and Develop Android App with Security features.

SYLLABUS

UNIT I:

Introduction to Android: The Android Platform, Android SDK, Eclipse Installation, Android Installation, Building you First Android application, Understanding Anatomy of Android Application, Android Manifest file. **Android Architecture and OOPS:** Building Blocks of Android, Java Classes and Objects, Class Methods and Instances, Inheritance and Polymorphism in Java, Interface and Abstract class

UNIT II:

Android Application Design Essentials: Anatomy of an Android applications, Android terminologies, Application Context, Activities, Services, Intents, Receiving and Broadcasting Intents, Android Manifest File and its common settings, Using Intent Filter, Permissions.

Android User Interface Design Essentials: User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation.

UNIT III:

Testing Android applications: Publishing Android application, Using Android preferences, Managing Application resources in a hierarchy, working with different types of resources.

UNIT IV:

Using Common Android APIs: Using Android Data and Storage APIs, Managing data using Sqlite, Sharing Data between Applications with Content Providers, Using Android Networking

APIs, Using Android Web APIs, Using Android Telephony APIs, Deploying Android Application to the World.

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Learn Java for Android Development	Jeff Friesen	Apress
2.	Android Essentials	Chris Haseman	Apress
3.	Beginning Android Application Development	Wei-Meng Lee	John Wiley & Sons

Course Code	**CSA335**
Course Title	**Systems and Network Administration**
Type of Course	Major
L T P	3:1:0
Credits	4
Course Prerequisites	Familiarity with the LINUX/UNIX operating system and knowledge of a programming language, preferably C
Course Objective(s)	This course will help to evaluate and critique a design for a systems and network solution.
Course Outcome (CO)	The students will be able to: 1. Design and configure peer-to-peer networks to share resources 2. Analyze requirements and design network architecture for a given scenario 3. Design and configure IP addressing schemes for a given scenario. 4. Learn basics concepts of File Server.

Unit I: Understanding System Administration – Network Operating System – Network File System – Admin User – Administration Tools – Commands – Configuration Files – Log Files – Backup and Restore Files.

Unit II: User Management – Issues – Registration – Account Policy – Login environment – Setting up and Supporting Users – Disk Quotas.

Unit III: Network Administration – Topologies – Network Devices – Understanding TCP/IP – Administering TCP/IP – Network Configuration – Static and Dynamic.

Unit IV: Introduction to File Server – Setting Up a File Server – Network File Systems – SAMBA – Web Server. Understanding Directory Services – Active Directory – Network Security – Importance of Port Number – Tracking Services – Monitoring your System – Network Security Tools.

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Principles of Network and System Administration	Mark Burgess	Wiley india Pvt. Ltd
2.	Networking for Systems Administrators	Michael W Lucas	

Course Code	**CSA337**
Course Title	**Computer Graphics**
Type of Course	Major
L T P	4:0:0
Credits	4
Course Prerequisites	Knowledge of C++ programming
Course Objective(s)	This course is designed to provide a comprehensive introduction to computer graphics leading to the ability to understand contemporary terminology, progress, issues, and trends.
Course Outcome (CO)	The students will be able to: 1. Understand the basics of computer graphics, different graphics systems and applications of computer graphics. 2. Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis. 3. Use the geometric transformations on graphics objects. 4. Extract scene with different clipping methods.

SYLLABUS

UNIT I: Introduction to Computer Graphics: Definition, Advantages of computer graphics, Applications of computer graphics, Graphics Hardware, Display devices, Raster Scan and Random Scan.

UNIT II: Raster Scan Graphics: Points, Lines and Line segment, Line drawing algorithms, Digital Differential Algorithm, Bresenham's Line Drawing Algorithm, Midpoint Circle Generation Algorithm, Scan line Polygon Filling Algorithm.

UNIT III: Transformation: Two Dimensional Transformation, Matrix Representation, Translation,
Rotation, Scaling, Reflection, Shear.
Clipping & Windowing: Viewing transformation, 2-D clipping, Simple Visibility Algorithm, End point codes, Midpoint Subdivision Algorithm, Cohen Sutherland Line Clipping Algorithm, Polygon Clipping Algorithm (Sutherland-Hodgman algorithm), Windowing Transformation

UNIT IV: Three Dimensional Viewing: Viewing Coordinates, 3D Viewing Pipeline, Projections, Types of Projections- Perspective Projection-Transformation matrix, Applications, Anomalies and types of perspective projections, Parallel Projection-Transformation matrix, Applications and types of parallel projections, Comparison of perspective and parallel projections, 3D Clipping, Fractals and their classification.

Recommended Books

Sr. no.	Name	AUTHOR(S)	PUBLISHER
1.	Computer Graphics	Donald Hearn & M. Pauline Baker	PHI
2.	Computer Graphics	Hill Jr	PrenticeHall
3.	Computer Graphics	Steven Harrington	McGraw-Hill

Course Code	**CSA339**
Course Title	**Computer Graphics Lab**
Type of Course	Major
L T P	0:0:4
Credits	2
Course Prerequisites	Knowledge of C++ programming
Course Objective(s)	This course is designed to provide a comprehensive introduction to computer graphics leading to the ability to understand contemporary terminology, progress, issues, and trends.
Course Outcome (CO)	The students will be able to: 1. Understand the basics of computer graphics, different graphics systems and applications of computer graphics. 2. Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis. 3. Use the geometric transformations on graphics objects. 4. Extract scene with different clipping methods.

SYLLABUS

1. Write a program for 2D line drawing using Breshenham's algorithm.
2. Write a program for 2D line drawing using DDA algorithm.
3. Write a program for circle drawing using Breshenham's algorithm.
4. Write a program for drawing ellipse using mid-point algorithm.
5. Write a program for Line Clipping.
6. Write a program for rotation of an object.
7. Write a program for scaling of an object to a desired scale.
8. Write a program for translation.
9. Write a program for reflection of an object.
10. Write a program for Polygon filling as Raster Graphics Display.
11. Write a program for Polygon Clipping.
12. To implement Cohen–Sutherland 2D clipping and window–viewport mapping.\
13. Write a program to draw a complex object of your choice such as a hut using simple graphic functions.

Course Code	**CSA341**
Course Title	**Android Programming Lab**
Type of Course	Major
L T P	0:0:4
Credits	2
Course Prerequisites	Basic knowledge of computer system
Course Objective(s)	To become familiar with the operation of Android and Acquire knowledge about the basic concept of writing a program in Android.
Course Outcome (CO)	The students will be able to: 1. Experiment on Integrated Development Environment for Android Application Development. 2. Design and Implement User Interfaces and Layouts of Android App. 3. Use Intents for activity and broadcasting data in Android App and Design and Implement Database Application and Content Providers 4. Experiment with Camera and Location Based service and Develop Android App with Security features.

SYLLABUS

1. Introduction to android operating system and study of basic widgets.
2. Study of android life cycle and demonstration of it.
3. Study of intents and its types.
4. Study of list views and adapters.
5. Study of sensors in android.
6. Study of services in android.
7. Study of dialog interfaces in android.
8. Study of touch in android.
9. Study of android database (SQLite)

Course Code	**CSA343**
Course Title	**Ruby on Rail**
Type of Course	OE
L T P	3 0 0
Credits	3
Course Prerequisites	Basic knowledge of Ruby
Course Objectives (CO)	The objective of this course is to make students familiar with object Oriented Programming Language and Ruby for web Based Applications
Course Outcomes (CO)	The students will able to: 1. Learn to program in ruby 2. Understand the rails framework 3. Harness the speed and ease of developing a rails application 4. Learn various models of ruby on rails.

SYLLABUS

UNIT I:

Introduction: What is Ruby, Why ruby, General purpose of ruby, Brief History of Ruby, Where does ruby get its ideas, Ruby Installation with RVM, Installations of Software (RVM, Rails , GIT, Mysql, Ruby, Sublime Text Editior), Rvm Commands, Rvm Usage, Creating a basic script in ruby**,** Sample demo of ruby program.

UNIT II:

Working with Linux(Ubuntu Platform): Basic Linux Commands, file directory permissions , changing access rights, Text Editors used for ROR, Ruby Operators & Ruby Shell, Working with Ruby operators and expressions, Numeric Methods, Rand and Ranges, Strings, Escaping, Interpolation, String methods, Dates and Times, Ruby methods and modules, OOP in Ruby, Basic loops and iterators.

UNIT III:

Rails Installation and Ruby Gems: What is Rails, Full tack Framework, Rails Strength, COC(convention over configuration),Rails Installation, Ruby and Rails installation on linux, Ruby Gems, Working with Ruby Gems, Gem commands Framework Technology MVC Rails Components

UNIT IV:

Models: What is model, Active record Basics, Destroy a model, Migrations, Modify, update a

model, Dropping a database, Association, Validation and callbacks, Why Association, Without and with Association ,Types of Association, Active Record validations, Callbacks & types of callbacks Views, Embedded ruby, Working in HAML, Working with Ajax, Jquery in Rails framework, Testing, TDD & BDD.

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Learn Ruby on Rails	Daniel Kehoe	RailsApps
2.	Ruby on rails tutorials	Micheal Hartl	Covers Rail
3.	Beginning Ruby	Peter Cooper	Apress

Course Code	**CSA345**
Course Title	**Software Testing**
Type of Course	OE
L T P	3 0 0
Credits	3
Course Prerequisites	Concepts of Software Engineering
Course Objectives (CO)	Learning about testing techniques and how to attain the quality
Course Outcomes (CO)	The students will able to: 1. Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics 2. Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors 3. Communicate effectively with a range of audiences. 4. Learn various technical Metrices for Software

SYLLABUS

UNIT I:

Software Engineering introduction: software development models. Testing and its concepts: significance and potentials, Testability and features of test cases.

UNIT II:

Software Testing Techniques: White box testing, Black Box Testing, Static analysis, symbolic testing, program mutation testing, functional program testing, regression testing, data flow testing.
Software Testing Stratgies: Approach, issue, integration, incremental, system, alpha, beta testing.

UNIT III:

Comparative evaluation of techniques: testing tools, dynamic analysis tools, test data generators, debugger and test drivers.

UNIT IV:

Technical Metrices for Software: Quality factors, framework, metrices for analysis, design, testing source code.

RECOMMENDED BOOKS

Sr. no.	Name	AUTHOR(S)	PUBLISHER
1.	Learnig Software Testing with Test Studio	RawaneMadi	Shroff and Pactt
2.	Exploratory Software Testing: Tips, Tricks, Tours and Techniques to guide Test Design	James A. Whittaker	Addison Wesley

Course Code	**CSA347**
Course Title	**Mobile Architecture & Security**
Type of Course	OE
L T P	3 0 0
Credits	3
Course Prerequisites	To understanding the basic Mobile Computing
Course Objectives (CO)	The main objective of this course is to provide conceptual as-well-as practical knowledge about basic Mobile architecture, Mobile Database and various security issues in Mobile computing.
Course Outcomes (CO)	The students will able to: 1. Understand fundamentals of wireless communications 2. Analyze security, energy efficiency, mobility, scalability, and their unique characteristics in wireless networks. 3. Demonstrate basic skills for cellular networks design. 4. Learn security Issues in Single Hop Wireless Networks

SYLLABUS

UNIT I:
Hardware Architecture, Symmetric Multiprocessing, Distributed and Shared Memory. Multicomputer. Software Architecture, Client server architecture, 3-tier architecture, N-tier architecture, Peer-to-peer. Cluster computing concepts, Grid computing, Virtualisation and Cloud Computing. Recent trends in processor technologies -Superscalar processors, Multi-core processors, Embedded processors.

UNIT II:
Introduction to conventional databases, distributed databases Mobile Data Access Systems: Mobility issues, On-demand services, Broadcast services, Transaction Processing, Security Moving Object Databases: Basic concepts and challenges, Accessing methods of moving object databases, Current Information Oriented Indexing, Historical Information Oriented Indexing, Mixed-type indexing, Indexing

UNIT III:
IP Layer Security, Link Layer Security, Network Security options. Security Issues in a Mobile IPV6 Network, Mobile Code Issues: Security Measures for Mobile Agents, Security Issues for Downloaded code in Mobile phones Secure Mobile Commerce: MCommerce and its security challenges, Security of the radio interface.

UNIT IV:
Security Issues in Single Hop Wireless Networks: Cellular Network Security, Access Control

and Roaming Issues, Mobile IP Security Security Issues in Multihop Wireless Networks: Mobile Adhoc Network Security, Trust Management and Routing Issues, Wireless Sensor Network Security, Key Management, Sybil Attacks and Location Privacy, Vehicular Network Applications and Security, Wireless Metropolitan Area Networks (e.g. 802.11b)

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Wireless Security - Models,	Raymond Greenlaw and Ellen Hepp	TMH
2.	Mobile Database Systems.	Deitel, Deitel& Nieto	Pearson Education
3.	Mobile Vas	Kironjeetsyan	New Rider Publications

Course Code	**CSA349**
Course Title	**Parallel Computing**
Type of Course	OE
L T P	3 0 0
Credits	3
Course Prerequisites	Basic knowledge of computer system
Course Objectives (CO)	This course will provide knowledge about parallel computing.
Course Outcomes (CO)	The students will able to: 1. Construct and use the parallel computers 2. Use the content and terminology for how one measures the performance of parallel algorithms and parallel computers 3. Develop computer programs for different processors. 4. Learn basics of parallel programming paradigms and message passing.

SYLLABUS

UNIT I:
Scalability And Clustering: Evolution of Computer Architecture – Dimensions of Scalability – Parallel Computer Models – Basic Concepts Of Clustering – Scalable Design Principles – Parallel Programming Overview – Processes, Tasks and Threads – Parallelism Issues – Interaction / Communication Issues – Semantic Issues In Parallel Programs.

UNIT II:
Enabling Technologies : System Development Trends – Principles of Processor Design – Microprocessor Architecture Families – Hierarchical Memory Technology – Cache Coherence Protocols – Shared Memory Consistency – Distributed Cache Memory Architecture – Latency Tolerance Techniques – Multithreaded Latency Hiding.

UNIT III:
System Interconnects: Basics of Interconnection Networks – Network Topologies and Properties – Buses, Crossbar and Multistage Switches, Software Multithreading – Synchronization Mechanisms.

UNIT IV :
Parallel Programming: Paradigms And Programmability – Parallel Programming Models – Shared Memory Programming.

Message Passing Programming: Message Passing Paradigm – Message Passing Interface – Parallel Virtual Machine.

RECOMMENDED BOOKS

Sr. no.	Name	AUTHOR(S)	PUBLISHER
1.	Scalable Parallel Computing	Kai Hwang and Zhi.Wei Xu	Tata McGraw-Hill
2.	Parallel Computing Architecture: A Hardware/Software Approach	David E. Culler & Jaswinder Pal Singh	Morgan Kaufman
3.	Parallel Programming in C with MPI & Open	Michael J. Quinn	Tata McGraw-Hill

Sixth Semester

Course Code	**CSA332**
Course Title	**Network Security & Cryptography**
Type of Course	Major
L T P	3:1:0
Credits	4
Course Prerequisites	Basic knowledge of computer system
Course Objectives (CO)	It aims to introduce students to the fundamental techniques used in implementing secure network communications, and to give them an understanding of common threats and attacks, as well as some practical experience in attacking and defending networked systems
Course Outcomes (CO)	The students will able to: 1. Classify the symmetric encryption techniques 2. Illustrate various public key cryptographic techniques 3. Evaluate the authentication and hash algorithms. 4. Learn the aims and objectives of IT acts.

SYLLABUS

UNIT I:

Introduction - Cyber Attacks, Defense Strategies and Techniques, Guiding Principles, Mathematical Background for Cryptography - Modulo Arithmetic's, The Greatest Comma Divisor, Useful Algebraic Structures, Chinese Remainder Theorem, Basics of Cryptography - Preliminaries, Elementary Substitution Ciphers, Elementary Transport Ciphers, Other Cipher Properties, Secret Key Cryptography – Product Ciphers, DES Construction.

UNIT II:

Public Key Cryptography and RSA :RSA Operations, Why Does RSA Work?, Performance, Applications, Practical Issues, Public Key Cryptography Standard (PKCS), Cryptographic Hash, Introduction, Properties, Construction, Applications and Performance, The Birthday Attack, Discrete Logarithm and its Applications - Introduction, Diffie-Hellman Key Exchange, Other Applications.

UNIT III:

Secure Hash and Key management: Digital Signature and Non-repudiation, cryptanalysis. Network Security, Objectives and Architectures, Internet Security Protocols, IP encapsulating.

Key Management - Introduction, Digital Certificates, Public Key Infrastructure, Identity–based Encryption, Authentication–I - One way Authentication, Mutual Authentication, Dictionary Attacks, Authentication ,II – Centralized Authentication, The Needham-Schroeder Protocol, Kerberos, Biometrics, IPSec- Security at the Network Layer – Security at Different layers: Pros and Cons, IPSec in Action, Internet Key Exchange (IKE) Protocol, Security Policy and IPSEC, Virtual Private Networks, Security at the Transport Layer - Introduction, SSL Handshake Protocol, SSL Record Layer Protocol, OpenSSL.

UNIT IV:

IT act aim and objectives, Scope of the act, Major Concepts, Important provisions, Attribution,

acknowledgement, and dispatch of electronic records, Secure electronic records and secure digital signatures, Regulation of certifying authorities: Appointment of Controller and Other officers, Digital Signature certificates, Duties of Subscribers, Penalties and adjudication, The cyber regulations appellate tribunal, Offences, Network service providers not to be liable in certain cases, Miscellaneous Provisions.

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Network Security Essentials	William Stallings	Prentice-Hall
2.	Fundamentals of Computer Security Technology	Edward Amoroso	Prentice-Hall
3.	Cryptography and Data Security	Dorothy E. Denning	Addison-Wesley

Course Code	**CSA334**
Course Title	**Python Programming**
Type of Course	Major
L T P	4:0:0
Credits	4
Course Prerequisites	Basic knowledge of Programming
Course Objective(s)	The objective of this course is to develop a basic understanding about the Python Concept.
Course Outcome (CO)	The students will be able to: 1. Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements. 2. Express proficiency in the handling of strings and functions. 3. Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets. 4. Identify the commonly used operations involving file systems and regular expressions.

SYLLABUS

UNIT I:

Introduction: Algorithms, installing, python basic syntax, interactive shell, editing, saving, and running a script. The concept of data types, variables, assignments; immutable variables; numerical types; arithmetic operators and expressions; comments in the program; understanding error messages; Conditions, Control statements.

UNIT II:

Strings and Text Files: manipulating files and directories, text files: reading/writing text and numbers, creating and reading a formatted file, String manipulations: subscript operator, indexing, slicing a string; strings and number system.

UNIT III:

Lists, Tuples and Dictionaries: basic list operators, replacing, inserting, removing an element, searching and sorting lists, dictionary literals, adding and removing keys, accessing and replacing values, Design with functions: hiding redundancy, complexity.

UNIT IV:

Graphics and Image Processing: turtle module, simple 2d drawing - colors, shapes, digital images, Simple image manipulations with 'image' module, Classes and OOP: classes, objects, attributes and methods, defining classes, design with classes, data modeling.

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	Fundamentals of Python:	Kenneth Lambert	Course Technology,
2.	Learning Python	O' Reilly	Mark Lutz

Course Code	**CSA336**
Course Title	**Object Oriented Analysis and Design**
Type of Course	Major
L T P	4:0:0
Credits	4
Course Prerequisites	Any course with intermediate level of programming in object oriented language
Course Objective(s)	The objective of this course is to: 1. Develop a working understanding of formal object-oriented analysis and design processes. 2. Develop an appreciation for and understanding of the risks inherent to large-scale software development.
Course Outcome (CO)	1. Develop the skills to determine which processes and OOAD techniques should be applied to a given project. 2. Develop an understanding of the application of OOAD practices from a software project management perspective. 3. Learn the implementations of UML diagrams. 4. Understand the design patterns of the system.

UNIT I: UNIFIED PROCESS AND USE CASE DIAGRAMS

Introduction to OOAD with OO Basics — Unified Process — UML diagrams — Use Case – Case study — the Next Gen POS system, Inception -Use case Modelling — Relating Use cases — include, extend and generalization — When to use Use-cases

UNIT II: STATIC UML DIAGRAMS

Class Diagram—- Elaboration — Domain Model — Finding conceptual classes and description classes — Associations — Attributes — Domain model refinement — Finding conceptual class Hierarchies — Aggregation and Composition — Relationship between sequence diagrams and use cases — When to use Class Diagrams

UNIT III: DYNAMIC AND IMPLEMENTATION UML DIAGRAMS

Dynamic Diagrams — UML interaction diagrams — System sequence diagram — Collaboration diagram — When to use Communication Diagrams — State machine diagram and Modelling – When to use State Diagrams — Activity diagram — When to use activity diagrams Implementation Diagrams — UML package diagram — When to use package diagrams — Component and Deployment Diagrams — When to use Component and Deployment diagrams

UNIT IV: DESIGN PATTERNS

GRASP: Designing objects with responsibilities — Creator — Information expert — Low Coupling — High Cohesion — Controller Design Patterns — creational — factory method — structural — Bridge — Adapter — behavioral — Strategy — observer –Applying GoF design patterns — Mapping design to code

RECOMMENDED BOOKS		
Name	**AUTHOR(S)**	**PUBLISHER**
Object Oriented Modeling and Design	Michael Blaha	William Premerlani, and Prentice Hall.

Course Code	**CSA338**
Course Title	**Python Programming Lab**
Type of Course	Major
L T P	0:0:4
Credits	2
Course Prerequisites	Basic knowledge of Programming
Course Objective(s)	To become familiar with the operation of Python and Acquire knowledge about the basic concept of writing a program in Python.
Course Outcome (CO)	The students will be able to: 1. Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements. 2. Express proficiency in the handling of strings and functions. 3. Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets. 4. Identify the commonly used operations involving file systems and regular expressions.

SYLLABUS

1. To write a python program that takes in command line arguments as input and print the number of arguments.
2. To write a python program to perform Matrix Multiplication.
3. To write a python program to compute the GCD of two numbers.
4. To write a python program to find the most frequent words in a text file.
5. To write a python program find the square root of a number (Newton's method).
6. To write a python program exponentiation (power of a number).
7. To write a python program find the maximum of a list of numbers.
8. To write a python program linear search.
9. To write a python program Binary search.
10. To write a python program selection sort.

11. To write a python program Insertion sort.

12. To write a python program merge sort.

13. To write a python program first n prime number.

14. To write a python program simulate bouncing ball in Pygame

Course Code	**CSA340**
Course Title	**Object Oriented Analysis and Design**
Type of Course	Major
L T P	4:0:0
Credits	4
Course Prerequisites	Any course with intermediate level of programming in object oriented language
Course Objective(s)	The objective of this course is to: 1. Develop a working understanding of formal object-oriented analysis and design processes. 2. Develop an appreciation for and understanding of the risks inherent to large-scale software development.
Course Outcome (CO)	1. Develop the skills to determine which processes and OOAD techniques should be applied to a given project. 2. Develop an understanding of the application of OOAD practices from a software project management perspective. 3. Learn the implementations of UML diagrams. 4. Understand the design patterns of the system.

SYLLABUS

Draw standard UML diagrams using an UML modeling tool for a given case study and map design to code and implement a 3 layered architecture. Test the developed code and validate whether the SRS is satisfied.

1. Identify a software system that needs to be developed.
2. Document the Software Requirements Specification (SRS) for the identified system.
3. Identify use cases and develop the Use Case model.
4. Identify the conceptual classes and develop a Domain Model and also derive a Class Diagram from that.
5. Using the identified scenarios, find the interaction between objects and represent them using UML Sequence and Collaboration Diagrams
6. Draw relevant State Chart and Activity Diagrams for the same system.
7. Implement the system as per the detailed design
8. Test the software system for all the scenarios identified as per the usecase diagram
9. Improve the reusability and maintainability of the software system by applying appropriate design patterns.
10. Implement the modified system and test it for various scenarios

Course Code	**CSA342**
Course Title	**Minor Project**
Type of Course	Major
L T P	0:0:4
Credits	2
Course Prerequisites	NA
Course Objective (CO)	The objectives of the project is to help the student develop the ability to apply theoretical and practical tools/techniques to solve real life problems related to industry, academic institutions and laboratories.
Course Outcomes (CO)	The students will able to: 1. Enhance their knowledge in their specialization. 2. Understand the difference between front end and backend. 3. Get knowledge about how to develop software.

Guidelines for project work

1. Student can opt any programming language/software, Foxpro, C, C++, VC++, Oracle, VB, Java etc. package for project work.
2. An individual or group of maximum 3 (three) students can work on single project
3. Project should strictly developed in LAB and student should get it checked from guide time to time.
4. Student should get the Synopsis of project approved from guide well in advance
5. The project work should covers …….

- Cover page
- Certificate
- Declaration
- Acknowledgment
- Index
- Introduction of project
- Data flow diagram
- Source code
- Result/output
- Limitations
- Conclusion
- Bibliography

Student should submit one copy of project to the institute/university.

Course Code	**CSA344**
Course Title	**Linux Administration**
Type of Course	OE
L T P	3:0:0
Credits	3
Course Prerequisites	NA
Course Objective (CO)	The main objective of this course is to provide knowledge about fundamentals of the Bourne again shell (bash), shell programming, pipes, input and output redirection Control structures, arithmetic in shell interrupt processing, functions, debugging shell scripts.
Course Outcomes (CO)	The students will able to: 1. Understand the technical details of DOS, Windows and UNIX, LINUX operating system. 2. Ability to use various Linux commands that are used to manipulate system operations at admin level and a prerequisite to pursue job as a Network administrator. 3. Ability to develop IPC-API's that can be used to control various processes for synchronization. 4. Know and configure the various internet services

SYLLABUS

UNIT I Introduction: Introduction: Basic OS functions, resource abstraction, types of operating systems–multiprogramming systems, batch systems, time sharing systems; operating systems for personal computers & workstations, process control & real time systems.

Operating System Organization: Processor and user modes, kernels, system calls and system programs.

Linux: The Operating System: Linux Distributions, Difference Between Linux and Windows, Separation of the GUI and the Kernel, Understanding Linux Kernel, Installing Linux in a Server Configuration, Booting and Shutting Down Process, Concept of Root, Basic commands, working with vi Editor, Understanding files and File System:

UNIT II Linux commands: PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, unlink, du, df, mount, umount, find, unmask, ulimit, ps, w, finger, arp, ftp, telnet, rlogin.Text Processing utilities and backup utilities , tail, head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, cpio.

UNIT III Introduction to Shells: Linux Session, Standard Streams, Redirection, Pipes, Tee

Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control Aliases, Variables, Predefined Variables, Options, Shell/Environment Customization. Filters: Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count Characters, Words or Lines, Comparing Files.

Process and Signals: Process, process identifiers, process structure: process table, viewing processes, system processes, process scheduling, starting new processes: waiting for a process, zombie processes, orphan process, fork, vfork, exit, wait, waitpid, exec, signals functions, unreliable signals, interrupted system calls, kill, raise, alarm, pause, abort, system, sleep functions, signal sets. File locking: creating lock files, locking regions, use of read and write with locking, competing locks, other lock commands, deadlocks

UNIT IV DNS: Installing a DNS Server, Configuring a DNS Server, DNS Records Types, Setting Up BIND Database Files, The DNS Toolbox, Configuring DNS Clients.

Web Server: Understanding the HTTP Protocol, Installing the Apache HTTP Server, Starting Up and Shutting Down Apache, Configuring Apache E-Mail Server: Understanding SMTP, Installing the Postfix Server, Configuring the Postfix Server, Running the Server, POP and IMAP Basics, Installing the UW-IMAP and POP3 Server.

Samba Server: The Mechanics of SMB, Samba Administration, Using SWAT, Creating a Share, Mounting Remote Samba Shares, Creating Samba Users, Using Samba to Authenticate Against a Windows Server.

Introduction to Sockets: Socket, socket connections, socket attributes, socket addresses, socket, connect, bind, listen, accept, socket communications

RECOMMENDED BOOKS

SR.NO	NAME	AUTHOR(S)	PUBLISHER
1	Linux Administration: A Beginner's Guide	Wale Soyinka	McGrawHill
2	UNIX and Linux system administration Handbook	Evi Nemeth, Garth Snyder, et. al	Pearson Education
3	Linux All-In-One for Dummies,	Emmett Dulaney,	Wiley India

Course Code	**CSA346**
Course Title	**Distributed DBMS**
Type of Course	OE
L T P	3 0 0
Credits	3
Course Prerequisites	Basic knowledge of computer system
Course Objectives (CO)	This course is intended to provide an understanding of the current theory and practice of distribute database management systems, a solid technical overview of database management systems, using a current database product as a case study.
Course Outcomes (CO)	The students will able to: 1. Identify the introductory distributed database concepts and its structures 2. Describe terms related to distributed object database design and management 3. Produce the transaction management and query processing techniques in DDBMS. 4. Learn various locking protocols and query processing and optimization.

SYLLABUS

UNIT I:

I**ntroduction:** Concepts, Advantages and Disadvantages of Distributed Database Management System (DDBMS), Homogenous and Heterogeneous DDBMS. Functions of a DDBMS.

UNIT II:

Distributed Database Management System Architecture: Architectural Models for DDBMS (Distributed Database Management System): Autonomy, Distribution, Heterogeneity factors; Client Server Systems, Peer-to-Peer Distributed Systems, Global Directory Issues.

UNIT III:

Distributed Relational Database Design Fragmentation: Reasons, Alternatives, Degree, Information requirement. Horizontal, Vertical, Hybrid Fragmentation. Allocation: Allocation Problem, Information Requirements for allocation.

UNIT IV:

Distributed Relational Database Query Processing & Optimization Query Decomposition, Localization of Distributed Data, Query Optimization, Introduction to Distributed Query Optimization Algorithms Distributed Concurrency Control, Objectives, Distributed Serializability, Centralized two-phase locking, Distributed two-phase locking.

RECOMMENDED BOOKS

Sr. no.	Name	AUTHOR(S)	PUBLISHER
1.	Principles of Distributed Database Systems	M.Tamer Ozsu, Patrick Valdureiz	Prentice Hall
2.	Fundamentals of Database Systems	Romez Elmasri, Shamkant B.Navathe	Pearson Education,

Course Code	**CSA348**
Course Title	**Programming for Mobile Device**
Type of Course	OE
L T P	3 0 0
Credits	3
Course Prerequisites	Basic knowledge of Programming for Mobile Device
Course Objectives (CO)	The main objective of this course is to provide knowledge about various issues, tools and techniques used for mobile devices programming. After completing the course the student should be competent in mobile device programming and iOS for iPhone.
Course Outcomes (CO)	The students will able to: 1. Determine solutions using problem solving principles, logic and systematic methodologies. 2. Evaluate the architecture and principles of operation of computer systems and networks 3. Study the iOS applications and infrastructure. 4. Learn about MIDP Java and Web services.

SYLLABUS

UNIT I:
Memory Management - Design Patterns for Limited Memory, Memory Management in Mobile Java, Memory Management in example OS **Applications** - Workflow for Application Development, Techniques for Composing Applications, Application Models in Mobile Java, Case study: iOS Application Infrastructure

UNIT II:
Dynamic Linking - Implementation Techniques, Implementing Plugins, Managing Memory Consumption Related to Dynamically Linked Libraries, Rules of Thumb for Using Dynamically Loaded Libraries, Mobile Java and Dynamic Linking.

UNIT III:
Concurrency - Infrastructure for Concurrent Programming, MIDP Java and Concurrency, Case study: iOSand Concurrency **Resource Management** - Resource-Related Concerns in Mobile Devices, MIDP Java.

UNIT IV:
Networking - MIDP Java and Web Services, Bluetooth Facilities with an example OS **Security** – Secure Coding and Design, Infrastructure for Enabling Secured Execution, Security Features in MIDP Java, Case study: iOS Security Features.

RECOMMENDED BOOKS

Name	AUTHOR(S)	PUBLISHER
Programming the Mobile Web	Maximiliano Firtman	O'Reilly Media, Inc.
LiveCode Mobile Development Beginner's Guide	Colin Holgate	Packt Publishing Ltd.
Professional Mobile Application Development	Jeff Mcwherter	Wrox

Course Code	**CSA350**
Course Title	**MATLAB Language**
Type of Course	OE
L T P	3 0 0
Credits	3
Course Prerequisites	Nil
Course Objectives (CO)	It explains the main concepts related to MATLAB.
Course Outcomes (CO)	The students will able to: 1. Use MATLAB for interactive computations 2. Familiar with memory and file management in MATLAB 3. Generate plots and export this for use in reports and presentations. 4. Learn how to process image with the help of MATLAB.

SYLLABUS

UNIT I:

Introduction to Programming: Components of a computer, working with numbers, Machine code, Software hierarchy. Programming Environment MATLAB Windows, A First Program, Expressions, Constants, Variables and assignment statement, Arrays.

UNIT II:

Graph Plots: Basic plotting, Built in functions, Generating waveforms, Sound replay, load and save. Procedures and Functions Arguments and return values, M-files, Formatted console input-output, String handling. (Control Statements) If, Else, Else-if, Repetition statements: While, for loop.

UNIT III:

Manipulating Text Writing to a text file, Reading from a text file, Randomizing and sorting a list, searching a list. GUI Interface Attaching buttons to actions, Getting Input, Setting Output

UNIT IV:

Image Processing With MATLAB: Importing and Visualizing Images Importing and displaying images Converting between image types Exporting images Interactive Exploration of Images Obtaining pixel intensity values Extracting a region of interest Computing pixel statistics Measuring object sizes Creating a custom interactive tool Preprocessing Images Adjusting image contrast Reducing noise in an image Using sliding neighborhood operations Using block processing operations

RECOMMENDED BOOKS			
Sr. no.	**Name**	**AUTHOR(S)**	**PUBLISHER**
1.	MATLAB for engineering	Holly Moore	Pearson
2.	Essential MATLAB for engineers and scientists	Brain Hahn, Danel T. Valentine	Elesvier Science


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