ONLINE BCA

Bachelor of Computer Applications (BCA)

PROGRAMME GUIDE

TABLE OF CONTENTS	

INTRODUCTION

The programme is designed to build programming skills for developing efficient and resource-optimized software/website/cloud/mobile applications.

PROGRAMME OUTCOMES

Program outcomes are narrower statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire in their matriculation through the program

1. **Domain Knowledge:** Ability to apply exploration to study and analyze problems in different areas of information technology. To enhance the core knowledge of the students.
2. **Knowledge enhancement:** Comprehend the fundamentals, principles, applications, and importance of computational concepts.
3. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of upcoming information technology changes.
4. **Modern tool usage:** Ability to use the modern programming languages, tools, techniques, and skills necessary for designing, developing, and deploying software-based applications.
5. **Environment and sustainability:** Understand the impact of sciences and computers to craft solutions in a global, economic, environmental, and societal context.
6. **Higher Education:** Capability to move on to higher-level learning based on computer science fundamentals.
7. **Employability:** Ability to get employment opportunities in corporate/government/private sectors or to be a successful entrepreneur

PROGRAMME SPECIFIC OUTCOMES

PSOs are statements that describe what the graduates of a specific engineering program should be able to do:

1. **PSO1:** Ability to analyze, interpret and present findings effectively using mathematical and communication skills.
2. **PSO2:** Understand the fundamentals and applications of programming, data structures, databases, networking, mobile computing, information security, and data analysis.
3. **PSO3:** Amalgamate knowledge of information technology and computational tools for simulation.
4. **PSO4:** Ability to effectively apply computer science concepts to analyze, design, and develop cost-effective, efficient, and secure solutions to societal problems.

SALIENT FEATURES

- **Projects:** Seminar and Project driven courses are designed to enhance technical and presentation skills
- **Contemporary Curriculum:** Instill knowledge in the major areas of computing such as Programming, Databases, Web Development, etc.
- **Interdisciplinary Minors:** Minor elective gives the students a choice to develop expertise in the interdisciplinary areas of interest, for example, Management and computers.
- **Holistic Development:** Participation in technical events, sports, and cultural activities help in the holistic development of students
- **Professional Enhancement:** In addition to core curricula, the course offers subjects like communication, analytical and soft skills to enhance personality and employability.
- **Software Skills:** The curriculum is equipped with 21st-century digital technologies for game designing, animations, and web development.

PROGRAMME CODE: OL1124

DURATION OF THE PROGRAMME:

Minimum Duration: 3 years

Maximum Duration: 6 years

MEDIUM OF INSTRUCTION/EXAMINATION:

The medium of Instruction and Examination shall be English.

PROGRAMME STRUCTURE						
Term	**Core Courses (CR I, CR II, CR III A, CR III B) CR I+II – (8+4) 12 x 4 Credits CR III (A) - 1 x 4 Credits CR III (B) - 1 x 8 Credits**	**Discipline Specific Electives (DSE) 4 x 4 Credits**	**Ability Enhancement Courses (AECC) 4 x 4 Credits**	**Skill Enhancement Courses (SEC) 4 x 4 Credits**	**Generic Electives (GE) 4 x 4 Credits**	**Credits**
I	Discipline Specific Core- I Discipline Specific Core- II Discipline Specific Core- III		**AECC- I** Environmental Sciences **AECC-II** English Communication Skills			**20**
II	Discipline Specific Core- IV Discipline Specific Core- V Discipline Specific Core- VI Discipline Specific Core- VII		**AECC-III** Advanced English Communication Skills			**20**
III	Discipline Specific Core- VIII Discipline Specific Core- IX Discipline Specific Core- X		**AECC-IV** Community Development Project		**GE-I** (Accounting, English, Gen. Mgt., Law and Taxation, Math's, Sales and Mkt.)	**20**
IV	Discipline Specific Core- XI Discipline Specific Core- XII	**DSE- I**		**SEC-I**	**GE-II**	**20**
V	**CR-III (B)** Field Project	**DSE-II** **DSE-III**		**SEC-II**	**GE-III**	**24**
VI	**CR-III (A)** Term Paper	**DSE-IV**		**SEC-III** **SEC-IV**	**GE-IV**	**20**
Total	**60 Credits**	**16 Credits**	**16 Credits**	**16 Credits**	**16 Credits**	**124**

BACHELOR OF COMPUTER APPLICATIONS (BCA) PROGRAMME SCHEME (ONLINE)					
COURSE CODE	**COURSE TITLE**	**Cr.**	**CA**	**ETE (Th.)**	**ETE (Pr.)**
TERM1					
ECAP170	FUNDAMENTALS OF INFORMATION TECHNOLOGY	4	30	40	30
ECAP172	PROGRAMMING METHODOLOGY	4	30	40	30
EMTH136	DISCRETE STRUCTURES	4	30	70	0
EENG139	ENGLISH COMMUNICATION SKILLS	4	30	70	0
ECHE110	ENVIRONMENTAL SCIENCES	4	30	70	0
TERM2					
ECAP200	DATABASE MANAGEMENT SYSTEMS	4	30	40	30
ECAP202	OBJECT ORIENTED PROGRAMMING	4	30	40	30
ECAP256	COMPUTER NETWORKS	4	30	40	30
ECAP268	COMPUTER SYSTEM ARCHITECTURE	4	30	40	30
EENG140	ADVANCED ENGLISH COMMUNICATION SKILLS	4	30	70	0
TERM3					
ECAP214	FUNDAMENTALS OF WEB PROGRAMMING	4	30	40	30
ECAP267	DATA STRUCTURES	4	30	40	30
ECAP462	COMMUNITY DEVELOPMENT PROJECT	4	0	0	100
ECAP560	OPERATING SYSTEM	4	30	70	0
GE-I	GENERIC ELECTIVE- I		30	70	0
TERM4					
ECAP509	SOFTWARE ENGINEERING	4	30	70	0
ECAP653	ARTIFICIAL INTELLIGENCE	4	30	70	0
DSE-I	DISCIPLINE SPECIFIC ELECTIVE I	4	30	40	30
SEC-I	SKILL ENHANCEMENT COURSE I	4	30	70	0
GE-II	GENERIC ELECTIVE II	4	30	70	0
TERM5					
DSE-II	DISCIPLINE SPECIFIC ELECTIVE II	4	30	40	30
DSE-III	DISCIPLINE-SPECIFIC ELECTIVE III	4	30	40	30
SEC-II	SKILL ENHANCEMENT COURSE II	4	30	70	0
GE-III	GENERIC ELECTIVE III	4	30	70	0
ECAP463	FIELD PROJECT OR 2 courses of other area from the GE basket 1 & 2 which is not chosen as generic elective (GE)	8	0 Assessment Parameters are as per details given in the respective baskets	0	100

TERM6					
DSE-IV	DISCIPLINE SPECIFIC ELECTIVE IV	4	30	40	30
SEC-III	SKILL ENHANCEMENT COURSE III	4	30	70	0
SEC-IV	SKILL ENHANCEMENT COURSE IV	4	30	40	30
GE-IV	GENERIC ELECTIVE IV	4	30	70	0
	TERM PAPER	4	0	0	100
	OR 1 Course from the Generic Elective basket 1 which is not chosen as Generic Elective (GE).	4	Assessment Parameters are as per details given in the respective baskets		
TOTAL CREDITS		**124**			

DISCIPLINE SPECIFIC ELECTIVE (DSE) BASKET 1								
S. No	**Course Code**	**Course Title**	**Credit**	**CA**	**ETE**	**ETP**	**Elective**	**Term**
1	ECAP916	FRONT-END WEB UI FRAMEWORKS AND TOOLS	4	30	40	30	Web Development	4
2	ECAP495	WIRELESS AND MOBILE NETWORK	4	30	40	30	Network Security	4

DISCIPLINE-SPECIFIC ELECTIVE (DSE) BASKET 2								
S. No	**Course Code**	**Course Title**	**Credit**	**CA**	**ETE**	**ETP**	**Elective**	**Term**
1	ECAP917	FRONT-END JAVASCRIPTFRAMEWORKS	4	30	40	30	Web Development	5
2	ECAP496	CRYPTOGRAPHY AND SECURITY RISK MANAGEMENT	4	30	40	30	Network Security	5

DISCIPLINE-SPECIFIC ELECTIVE (DSE) BASKET 3								
S. No	**Course Code**	**Course Title**	**Credit**	**CA**	**ETE**	**ETP**	**Elective**	**Term**
1	ECAP918	MULTIPLATFORM MOBILE APP DEVELOPMENT WITH WEB TECHNOLOGIES	4	30	40	30	Web Development	5
2	ECAP497	CYBER SECURITY AWARENESS	4	30	40	30	Network Security	5

DISCIPLINE-SPECIFIC ELECTIVE (DSE) BASKET 4								
S. No	**Course Code**	**Course Title**	**Credit**	**CA**	**ETE**	**ETP**	**Elective**	**Term**
1	ECAP919	SERVER-SIDE DEVELOPMENT WITH NODEJS	4	30	40	30	Web Development	6
2	ECAP498	DIGITAL FORENSIC	4	30	40	30	Network Security	6

GENERIC ELECTIVE (GE) BASKET 1								
S. No	**Course Code**	**Course Title**	**Credit**	**CA**	**ETE**	**ETP**	**Elective Area**	**Term**
1	EACC105	FINANCIAL ACCOUNTING	4	30	70	0	Accounting	3
2	EBSL101	BUSINESS LAW	4	30	70	0	Law & Taxation	3
3	EMGN101	BUSINESS ORGANISATION AND MANAGEMENT	4	30	70	0	General Management	3
4	EMKT201	PRINCIPLES OF MARKETING	4	30	70	0	Sales & Marketing	3
5	EENG112	INDIAN WRITING IN ENGLISH	4	30	70	0	English	3
6	EMTH137	CALCULUS	4	30	70	0	Mathematics	3

GENERIC ELECTIVE (GE) BASKET 2								
S. No	**Course Code**	**Course Title**	**Credit**	**CA**	**ETE**	**ETP**	**Elective Area**	**Term**
1	EACC204	COST ACCOUNTING	4	30	70	0	Accounting	4
2	EBSL102	COMPANY LAW	4	30	70	0	Law & Taxation	4
3	EECO113	BUSINESS ECONOMICS	4	30	70	0	General Management	4
4	EMGN251	SPREADSHEET MODELLING (USING EXCEL)	4	30	70	0	Sales & Marketing	4
5	EENG114	BRITISH POETRY AND DRAMA 14TH-18TH CENTURIES	4	30	70	0	English	4
6	EMTH159	MULTIVARIATE CALCULUS	4	30	70	0	Mathematics	4

GENERIC ELECTIVE (GE) BASKET 3								
S. No	**Course Code**	**Course Title**	**Credit**	**CA**	**ETE**	**ETP**	**Elective Area**	**Term**
1	EACC210	CORPORATE ACCOUNTING	4	30	70	0	Accounting	5
2	EBSL301	INCOME TAX LAW AND PRACTICE	4	30	70	0	Law & Taxation	5
3	EFIN302	FUNDAMENTALS OF FINANCIAL MANAGEMENT	4	30	70	0	General Management	5
4	EMKT309	DIGITAL MARKETING	4	30	70	0	Sales & Marketing	5
5	EENG115	BRITISH LITERATURE 18TH-20TH CENTURIES	4	30	70	0	English	5
6	EMTH256	DIFFERENTIAL EQUATIONS	4	30	70	0	Mathematics	5

GENERIC ELECTIVE (GE) BASKET 4								
S. No	**Course Code**	**Course Title**	**Credit**	**CA**	**ETE**	**ETP**	**Elective Area**	**Term**
1	EACC301	MANAGEMENT ACCOUNTING	4	30	70	0	Accounting	6
2	EBSL304	GOODS AND SERVICES TAX AND CUSTOMS LAW	4	30	70	0	Law & Taxation	6
3	EMGN358	E-COMMERCE	4	30	70	0	General Management	6
4	EMKT312	SELLING SKILLS	4	30	70	0	Sales & Marketing	6
5	EENG316	WOMEN'S WRITING	4	30	70	0	English	6
6	EMTH290	REAL ANALYSIS	4	30	70	0	Mathematics	6

SKILL ENHANCEMENT COURSES (SEC)								
S. No	**Course Code**	**Course Title**	**Credit**	**CA**	**ETE**	**ETP**	**Elective**	**Term**
1	EPEA204	ANALYTICAL SKILLS	4	30	70	0	SEC-I	4
2	ECAP392	FUNDAMENTALS OF JAVA PROGRAMMING	4	30	40	30	SEC-II	5
3	ECAP460	FUNDAMENTALS OF PYTHON	4	30	40	30	SEC-III	6
4	ECAP512	OPEN-SOURCE WEB APPLICATION DEVELOPMENT	4	30	70	0	SEC-IV	6

Note:

1. Students can adopt only one area from the discipline-specific elective basket that will be applicable for the whole program.
2. Students can adopt only one area from the generic elective basket that will be applicable for the whole program.
3. In the case of Term Paper students may choose one course against Term Paper from the Generic Elective Basket 1which is not chosen as Generic Elective (GE).
4. In case of Project student may choose two courses of the other area against Project from the Generic Basket 1 & 2 which is not chosen as GE and in case of Term Paper student may choose one course against Term Paper from the Generic Basket 3 of the same area from which the courses chosen against Project.

Course Code	ECAP170	Course Title	FUNDAMENTALS OF INFORMATION TECHNOLOGY		
			WEIGHTAGE		
			CA	ETE(Th.)	ETE (Pr.)
			30	40	30

Course Outcomes:

CO1: Understand basic concepts and terminology of information technology.
CO2: Have a basic understanding of personal computers and their operations.
CO3: Understand various software and hardware, and various security issues.
CO4: Familiarize students with complete fundamentals and the packages commonly used in computing software.
CO5: Gain writing skills and various presentation aspects using word processing software.

Unit No.	Contents
Unit1	**Computer Fundamentals:** Characteristics & Generation of Computers, Block diagram of Computer. Application of IT in various sectors. **Data Representation:** Binary Number System, Octal, Hexadecimal, decimal and their Conversion.
Unit2	**Memory:** Types, Units of memory, RAM, ROM, Secondary storage devices – HDD, Flash Drives, Optical Disks: DVD, SSD **I/O Devices** – Keyboard, Mouse, LCDs, Scanner, Plotter, Printer& Latest I/O devices in market
Unit3	**Processing Data:** Transforming data into information, how computers represent data, how computers process data, Machine cycles, Memory, Registers, The Bus, Cache Memory
Unit4	**Operating Systems:** operating system basics, Purpose of the operating system, types of operating system, providing a user interface, Running Programs, Sharing Information, Managing Hardware, Enhancing an OS with utility software.
Unit5	**Data Communication**: Local and Global reach of the network, Digital and Analog Transmission, Data communication with standard telephone lines and Modems, Using Digital Data Connections, Wireless networks
Unit6	**Networks:** Sharing data anytime anywhere, uses of a network, Common types of a network, Hybrid Networks, how networks are structured, Network topologies and Protocols, Network Media, Network Hardware
Unit7	**Graphics and Multimedia:** Understanding graphics File Formats, Getting Images into your Computer, Graphics Software, Multimedia Basics
Unit8	**Data Base Management Systems**: The Database, The DBMS, Working with a database, Databases at Work, Common Corporate Database Management Systems
Unit9	**Software Programming and Development:** What is computer Program, hardware/Software Interaction, planning a Computer Program, how programs Solve Problems
Unit 10	**Programming Languages and Programming Process:** Categories of Programming Languages, Machine and Assembly Language, Higher Level Languages, WWW development languages, The SDLC of Programming
Unit11	**Internet:** Basic Internet terms: Web Page, Website, Home page, Browser, URL, Hypertext, ISP, Web Server, HTML, DHTML, XML, Introduction to client side and server side scripting. **Applications:** WWW, e-mail, Instant Messaging, Internet Telephony, Videoconferencing, Web Browser & its environment

Unit12	**Understanding The Need of Security Measures:** Basic Security Concepts, Threats to Users, Threats to Hardware, Threat to Data, Cyber Terrorism. **Taking Protective Measures:** Keeping your System Safe, Protecting Yourself, protecting your Privacy, Managing Cookies, Spyware and other BUGS, keeping your data secure, Backing Up data, Safeguarding your hardware
Unit13	**Cloud Computing and IoT**: SaaS, PaaS, IaaS, Public and Private Cloud; Virtualization, Virtual Server, Cloud Storage, Database Storage, Resource Management, Service Level Agreement, Basics of IoT and its applications
Unit14	**Futuristic World of Data Analytics:** Introduction to Big data and Analysis Techniques: Elements, Variables, and Data categorization, Levels of Measurement, Data management and indexing, Introduction to statistical learning and overview of various tools used for data analysis

LABORATORY WORK:

1. Hardware familiarizing with various I/O Peripheral devices, and storage devices.
2. Familiarity with DOS, Implementing various internal and external command sin DOS.
3. **MS-Windows:** Familiarizing with windows operating system; using built-in accessories; managing files and folders using windows explorer; working with control panel; installing hardware and software.
4. MS-Office (or any other Office Suite), meaning and features, its components.
5. MS-Word (or any other word processor): Creating Document Files, Saving, Closing Files, Page Settings, and Formatting Text. Spell Checking, Thesaurus, Creating Tables, Adding rows, columns. Printing Documents, Setting Print Settings, creating labels and mail merge, taking Printout
6. MS-Excel-Working with worksheets, formulas & functions, Inserting charts, printing in Excel.
7. MS Power Point-Views, Designing, viewing, presenting & Printing of Slides.
8. Internet: Navigating with Internet Explorer; surfing the net, using search engines; using email facility.

Course Code	ECAP172	Course Title	PROGRAMMING METHODOLOGY

WEIGHTAGE		
CA	ETE(Th.)	ETE (Pr.)
30	40	30

Course Outcomes:

CO1: Develop programming skills and familiar with the programming environment with the C Program structure.

CO2: Declaration of variables and constants.

CO3: Understand arrays, its declaration and uses.

CO4: Implement, test, debug, and document programs in C

Unit No.	Content
Unit-1	**Introduction:** Introduction to Programming, Program concept, Characteristics of programming, stages in program development, Algorithms, Notations, Flowchart, and Types of programming methodologies.
Unit-2	**Constant and Variable:** Machine Language, Assembly Language, High-Level Languages, C Program Structure, Character Set, Identifiers and Keywords, Constants and Variables.
Unit-3	**Unformatted and Formatted I/O:** Functions- printf(), scanf(), getchar(), putchar(), gets(), puts(), Expressions.
Unit-4	**Data Types & Operators:** Various data types - data range, size, Unary and Binary operators, Arithmetic Operators, Relational Operators, Logical Operators, Conditional Operators, Assignment Operators, Bitwise Operators.
Unit-5	**Control Structure:** Designing structured programs by using Top-Down design, Type conversion, and Type modifiers, if statements - simple if, if-else, multiple if, if-else ladder, nested if, switch-case statement, while, do-while & for statements, break and continue statements, go to statement.
Unit-6	**Functions:** Function Definition and Prototypes, Scope rules - Local and Global scope of functions, Function arguments - passing arguments by value and passing arguments by reference, Return Type of function, Recursion, Library Functions.
Unit-7	**Arrays:** Declaring arrays in C, Defining and Processing 1-dimensional and 2-dimensional arrays, Passing array as an argument to function, Multi-dimensional Arrays.
Unit-8	**Array Applications:** Sorting and Searching, Character Arrays.
Unit-9	**Strings:** Defining and Initializing strings, Reading and Writing strings, Processing of strings, String Library Functions - strcat(), strcpy(), strcmp(), strlen(), strrev().
Unit-10	**Storage Classes:** Storage class specifiers, Scope of a variable, Auto, Static, Extern, Register, Static variables and functions, Const Qualifier.
Unit-11	**Pointers:** Pointer data type, Pointer declaration, Initialization, accessing values using pointers, Pointer expressions, and arithmetic, Operations on Pointers.
Unit-12	**Dynamic Memory Management:** Dynamic Memory Management functions, malloc(), calloc(), realloc() and free(), Pointers and arrays, Pointers and functions.
Unit-13	**Structures and Unions:** Structure declaration, definition, and initialization accessing structures in functions, Structures and Pointers, the array of structures, nested structures, Self-referential structures, and Unions.
Unit-14	**File Structure:** Categories of files, opening and closing files, file opening modes, Text, and binary files, Reading and writing in files, appending in files, Creating Header files, Preprocessor Directives, and Macros.

LABORATORY WORK:

1. **Data Types & Operators:** Various data types - data range, size, Unary and Binary operators, Arithmetic Operators, Relational Operators, Logical Operators, Conditional Operators, Assignment Operators, Bitwise Operators.
2. **Control Structure:** if statements - simple if, if-else, multiple if, if-else ladder, nested if, switch-case statement, while, do-while & for statements, break and continue statements, go to statement.
3. **Functions:** Function Definition and Prototypes, Scope rules - Local and Global scope of functions, Function arguments - passing arguments by value and passing arguments by reference, Return Type of function, Recursion, Library Functions.
4. **Arrays:** Declaring arrays in C, Defining and Processing 1-dimensional and 2-dimensional arrays, Passing array as an argument to function, Multi-dimensional Arrays.
5. **Pointers:** Pointer declaration, Initialization, accessing values using pointers, Pointer expressions and arithmetic, Operations on Pointers.
6. **Structures and Unions:** Structure declaration, definition and initialization, accessing structures in functions, Structures and Pointers, an array of structures, nested structures, Self-referential structures, Unions.
7. **File Structure:** Opening and closing files, file opening modes, Text and binary files, Reading and writing in files, appending in files, and Creating Header files.

READINGS:

1. C: THE COMPLETE REFERENCE by HERBERT SCHILDT, MC GRAW HILL.
2. PROGRAMMING IN ANSI C by E. BALAGURUSWAMY, MC GRAW HILL.

Course Code	EMTH136	Course Title	DISCRETE STRUCTURES

WEIGHTAGE	
CA	ETE (Th.)
30	70

Course Outcomes:

CO1: Write formal logical arguments using propositional logic
CO2: Discuss problem solving through the basics of combinatorics.
CO3: Relate basic discrete structures and algorithms.
CO4: Apply the concepts of trees to find the shortest path
CO4: Discuss properties of graphs and be able to relate these to practical examples.
CO5: Determine when a recursive solution is appropriate for a problem

Unit No.	Content
Unit-1	Sets, Description of a Set, Types of Sets, Subsets, Power Set, Venn Diagrams, Operation on Sets (Union, Intersection and Difference), Laws of Set Theory, Cartesian product of sets,
Unit-2	Relations, Functions, Some functions and their graphs (Identity, Polynomial, Modulus function and greatest integer function). One-One and onto functions.
Unit-3	Introduction to logic, Propositions and compound propositions, Basic logical operations (Conjunction, Disjunction, Negation), Propositions and truth tables,
Unit-4	Tautologies and contradiction, Logical equivalence, Conditional and biconditional statements.
Unit-5	Introduction to Logic Gates, Combinations of Gates, Implementation of Logic Expressions with Logic Gates and Switching circuits,
Unit-6	Introduction to Recursion, Recurrence Relation, Solving Recurrence Relation, Linear Homogenous Recurrence Relation with constant coefficient and their solution.
Unit-7	Introduction and Basic terminology, Graphs, Multigraphs, Degree of a vertex, Handshaking theorem, Sub graphs, Homeomorphic and Isomorphic graphs
Unit-8	Paths, Connectivity, Connected Components, Distance and Diameter, Cut points and bridges
Unit-9	Eulerian Graphs, Hamiltonian Graphs, Euler theorem, Planar Graphs, Maps, Regions, Euler Formula,
Unit-10	Non-planar graphs, Kuratowski's Theorem (without proof). Graph coloring, Chromatic Number of a Graph
Unit-11	Complete graph and its coloring, Regular and Bipartite Graphs and their coloring.
Unit-12	Labeled and Weighted Graph, Shortest Path in weighted Graphs, Dijkstra's Algorithm to find the shortest path
Unit-13	Introduction to Tree, Rooted Tree, Binary Tree,
Unit-14	Spanning Tree, Minimum Spanning Tree, Kruskal and Prims Algorithms to find minimum spanning tree

READINGS:

1. DISCRETE MATHEMATICS (SCHAUM'S OUTLINES) (SIE) by SEYMOUR LIPSCHUTZ, MARC LIPSON, VARSHA H. PATIL, MCGRAW HILL EDUCATION.

Course Code	EENG139	Course Title	ENGLISH COMMUNICATION SKILLS

WEIGHTAGE	
CA	ETE (Th.)
30	70

Course Outcomes:

CO1: Identify deviant use of English both in written and spoken forms and understand the importance of writing in academic life

CO2: Reorganize and correct the errors of usage to write simple sentences without committing errors of spelling and grammar

CO3: Assess their own ability to improve their competence in using the language

CO4: Understand and appreciate English spoken by people from different regions and read independently unfamiliar texts with comprehension

CO5: Use language for speaking with confidence in an intelligible and acceptable manner

CO6: Understand the importance of reading for life and develop an interest in reading

Unit No.	Content
Unit-1	**Grammar**: introduction to the sentence structure in English
Unit-2	**Grammar:** introduction to articles
Unit-3	**Grammar:** introduction to parts of speech
Unit-4	**Grammar:** common errors
Unit-5	**Listening Skills:** introduction to the importance of listening skills
Unit-6	**Listening Skills**: types of listening – informational, critical, empathetic listening
Unit-7	**Listening Skills**: problems with listening to unfamiliar dialects
Unit-8	**Speaking Skills**: aspects of pronunciation, introduction to vowels, consonants and diphthongs
Unit-9	**Speaking Skills**: fluency in speaking, intelligibility in speaking
Unit-10	**Reading Skills**: introduction to reading skills, types of texts – narrative, descriptive, extrapolative
Unit-11	**reading skills**: essential skills for reading comprehension – decoding, fluency, vocabulary, reasoning and background knowledge
Unit-12	**writing skills**: introduction to writing skills, cohesion and coherence, expansion of given sentence
Unit-13	**writing skills**: reorganizing jumbled sentences into a coherent paragraph, paragraph writing
Unit-14	**Composition**: introduction to letter writing, types of letters, notices, complaints, appreciation, conveying sympathies

READINGS:

1. OXFORD PRACTICE GRAMMAR by JOHN EASTWOOD, OXFORD UNIVERSITY PRESS
2. TEXTBOOK OF ENGLISH PHONETICS FOR INDIAN STUDENTS by BALASUBRAMANIAN, LAKSHMI PUBLICATIONS
3. OXFORD ADVANCED LEARNER'S DICTIONARY OF ENGLISH by DEUTER, M ET.AL. (, OXFORD UNIVERSITY PRESS
4. INTERMEDIATE GRAMMAR, USAGE AND COMPOSITION by TOCKOO, M. L., A. E. SUBRAMANIAM, P. R. SUBRAMANIAM, ORIENT BLACKSWAN PVT. LTD.

Course Code	ECHE110	Course Title	ENVIRONMENTAL SCIENCES

WEIGHTAGES	
CA	ETE (Th.)
30	70

Course Outcomes:

CO1: Observe the current environmental issues and associated problems.
CO2: Illustrate the basic knowledge of the environment and its various components.
CO3: Devise new approaches to reduce various types of environmental pollution.
CO4: Identify the environmental policies and practices.

Unit No.	Content
Unit-1	**Multidisciplinary nature of environmental studies, Scope and importance:** Concept of sustainability and sustainable development, Land resources: Land degradation, soil erosion and desertification.
Unit-2	**Deforestation**: Causes and impacts due to mining, dam building on the environment, forests, biodiversity and tribal populations.
Unit-3	**Water**: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water, Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs.
Unit-4	**Ecosystem, structure and function of ecosystem, Energy flow in an ecosystem**: food chains, food webs and ecological succession ecological pyramids, Case studies of the following ecosystems: a) forest ecosystem b) grassland ecosystem c) desert ecosystem d) aquatic ecosystem.
Unit-5	**Levels of biological diversity**: genetic, species and ecosystem diversity, Biogeographic zones of India, Biodiversity patterns and global biodiversity hot spots, India as a mega diversity nation, Endangered and endemic species in India.
Unit-6	**Threats to biodiversity**: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions, Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity, Ecosystem and biodiversity services: ecological, economic, social, ethical, aesthetic and Informational value.
Unit-7	**Environmental pollution**: Types, causes, effects and controls; Air pollution, Ill-effects of Fireworks.
Unit-8	**Environmental pollution**: Types, causes, effects and controls: water, soil and noise pollution, Nuclear hazards and human health risks, Pollution case studies.
Unit-9	Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture.
Unit-10	**Environment Laws**: Environment Protection Act, Air (Prevention & Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act.
Unit-11	**International agreements**: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD), Nature reserves, tribal populations and rights, and human-wildlife conflicts in Indian context, Solid waste management: Control measures of urban and industrial waste
Unit-12	**Human population growth**: Impacts on environment, human health and welfare.
Unit-13	**Disaster management**: floods, earthquakes, cyclones and landslides, Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan.
Unit-14	**Environmental ethics**: Role of Indian and other religions and cultures in environmental conservation, Environmental communication and public awareness

READINGS:

1. PERSPECTIVE IN ENVIRONMENTAL STUDIES by ANUBHA KAUSHIK, C P KAUSHIK, NEW AGE INTERNATIONAL PUBLISHERS
2. TEXT BOOK OF ENVIRONMENTAL STUDIES by D. DAVE AND S. S. KATEWA, CENGAGE LEARNING

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Course Code	ECAP200	Course Title	DATABASE MANAGEMENT SYSTEMS

WEIGHTAGE		
CA	ETE(Th.)	ETE (Pr.)
30	40	30

Course Outcomes:

CO1: Understand the database concepts and database management system software.

CO2: Identify the basic concepts and various data models used in database design ER modeling concepts and architecture use and design queries using SQL.

CO3: Discuss the normalization theory and apply such knowledge to the normalization of a database.

CO4: Apply and relate the concept of transaction, concurrency control and recovery in the database.

CO5: Examine the recovery system and be familiar with cloud databases and distributed databases.

Unit No.	Content
Unit-1	**Introduction to fundamentals of DBMS:** Database applications, Purpose of database systems, Components of DBMS, DBMS Architecture, Different Data Models, Data Independence, Various types of constraints
Unit-2	**Database design and ER model:** Overview of the Design process, Entity-relationship model, constraints, ER Diagrams, ER Design issues, Weak entity sets, extended ER features
Unit-3	**Relational Databases:** Relational Model, Structure of Relational databases, fundamental, additional and extended relational algebra operations, Views, DDL statements in SQL, DML statements in SQL, JOINS
Unit-4	**SQL (DDL):** Implementation of Data Definition Language, datatypes, schema definition, Basic structure of SQL Queries- CREATE, ALTER, DROP, RENAME, TRUNCATE
Unit-5	**SQL (DML):** DML commands - SELECT, INSERT, DELETE and UPDATE operations, implementation of constraints, implementation of joins, Nested subqueries, Complex queries, Views, Joined relations.
Unit-6	**Relational Languages**: Tuple Relational calculus, Domain relational calculus, Query by Example, Data log, Set Operations – UNION, INTERSECT, EXCEPT, Aggregate Functions, NULL values.
Unit-7	**Relational Database Design:** Features, Atomic Domains and first normal form, Functional dependency theory decomposition using functional dependencies, decomposition using Multivalued dependencies, more normal forms, database design process.
Unit-8	**Transaction Management:** Concept of Transaction, Transaction State, Implementation of atomicity and durability, concurrent execution, Serializability, Recoverability, Implementation of Isolation, testing for Serializability.
Unit-9	**Concurrency Control:** Lock-based protocols, Timestamp based protocols, Validation based protocols, Deadlock handling, Insert and Delete operations, Weak levels of consistency
Unit-10	**SQL (DCL/TCL):** implementation of GRANT, REVOKE, ROLLBACK, COMMIT, SAVEPOINT, implementation of aggregate functions, implementation of inbuilt character functions, implementation of inbuilt numeric functions, implementation of inbuilt date & time functions
Unit-11	**Recovery system:** Failure classification, storage structure, recovery and atomicity, log-based recovery, recovery with concurrent transactions, buffer management, failure with loss of non-volatile storage.
Unit-12	**Distributed Databases:** Distributed Databases, Data Fragmentation, Replication and Allocation Techniques, Semi Join, Homogeneous and Heterogeneous Databases, Distributed Data Storage, Distributed Transactions.

Unit-13	**Cloud-Based Databases:** From collaborative to the Cloud – A short history, Introduction to Client-Server Computing, Peer-to-Peer Computing, Distributed Computing, Grid Computing, Collaborative Computing, Cloud Computing. Functioning of Cloud Computing, Differences between Distributed computing and Cloud computing.
Unit-14	**Introduction to PL/SQL:** Introduction to PL/SQL blocks, conditional statements, loops, cursors and triggers.

LABORATORY WORK:

1. **SQL (DDL):** Implementation of Data Definition Language, datatypes, schema definition, Basic structure of SQL Queries- CREATE, ALTER, DROP, RENAME, TRUNCATE
2. **SQL (DML):** DML commands - SELECT, INSERT, DELETE and UPDATE operations, implementation of constraints, implementation of joins, Nested subqueries, Complex queries, Views, Joined relations.
3. **SQL (DCL/TCL):** implementation of GRANT, REVOKE, ROLLBACK, COMMIT, SAVEPOINT, implementation of aggregate functions, implementation of inbuilt character functions, implementation of inbuilt numeric functions, implementation of inbuilt date & time functions.
4. **Introduction to PL/SQL:** Introduction to PL/SQL blocks, conditional statements, loops, cursors and triggers.

READINGS:

1. Author: H. F. Korth& A. Silberschatz, Title: Database System Concepts, Publishers: Tata McGraw Hill, New Delhi, the Year 2006.
2. Ivan Bayross, SQL, PL/SQL The Programming Language of Oracle, BPB Publication.
3. Elmasri & Navathe, Fundamentals of Database Systems, Addison & Weisely, New Delhi.
4. C. J. Date, Database Systems, Prentice Hall of India, New Delhi.
5. P. Bhatia & G. Singh, Simplified Approach to DBMS, Kalyani Publishers.
6. Martin Gruber, Understanding SQL, BPB Publication, New Delhi.
7. Val Occardi, Relational Database: Theory & Practice, BPB Publication, New Delhi

Course Code	ECAP202	Course Title	OBJECT-ORIENTED PROGRAMMING

WEIGHTAGE		
CA	ETE(Th.)	ETE (Pr.)
30	40	30

Course Outcomes:

CO1: Familiarize with the basic concepts of object-oriented programming

CO2: Understand the object construction, memory allocation and deallocation

CO3: Develop programs using object-oriented concepts like encapsulation, inheritance and polymorphism

CO4: Analyse the different behavior of overloaded operations in different situations

Unit No.	Content
Unit-1	**Principles of OOP:** introduction, procedural vs object-oriented programming, basic concepts of object-oriented programming, object-oriented languages, benefits of OOP's
Unit-2	**Basics of C++:** C Vs C++, a simple C++ program, compiling & linking, tokens, keywords, identifiers & constants, data types, reference variables
Unit-3	**Operators and type casting:** operators in C++, scope resolution operator, member de-referencing operators, type casting: implicit and explicit type casting
Unit-4	**Control structures:** decision-making controls, iter ative controls and jumping controls
Unit-5	**Pointers and structures:** main function, function prototyping, handling pointers, C structures and limitations
Unit-6	**Classes and objects:** specifying class, a sample C++ program with class, access specifiers, defining member functions, nesting of member functions
Unit-7	**More on classes and objects:** function definition inside the class and outside the class, private member functions, arrays within the class, memory allocation of objects
Unit-8	**Handling functions:** function calling mechanisms: call by Value, call by address & call by reference, objects as function arguments
Unit-9	**More on functions:** inline functions, making outside function inline, friend functions
Unit-10	**Static members and polymorphism:** Static Data Members & Static Functions, Function Overloading
Unit-11	**Constructors and destructors:** constructors, parameterized constructors, copy constructors and dynamic constructors, multiple constructors in a class
Unit-12	**More on constructors and destructors:** constructors with default arguments, dynamic initialization of objects, destructors
Unit-13	**Inheritance:** defining derived classes, single inheritance, making a private member inheritable, multilevel inheritance, hierarchical inheritance, multiple inheritances, hybrid inheritance
Unit-14	**File handling:** file handling operations: open, close, read and write

LABORATORY WORK:

Implementation of C++ Programming Concepts (Classes and objects, inline functions, friend functions, constructor and destructors, function overloading, inheritance, working with files)

READINGS:

1. OBJECT ORIENTED PROGRAMMING WITH C++ by E BALAGURUSAMY, MC GRAW HILL
2. LET US C++ by YASHAVANT KANETKAR, BPB PUBLICATIONS
3. OBJECT ORIENTED PROGRAMMING IN C++ by ROBERT LAFORE, GALGOTIA PUBLICATIONS 3. THE C++ PROGRAMMING LANGUAGE by BJARNE STROUSTRUP, PEARSON

Course Code	ECAP256	Course Title	COMPUTER NETWORKS

WEIGHTAGE		
CA	ETE(Th.)	ETE (Pr.)
30	40	30

Course Outcomes:

CO1: Examine the importance of data communication in daily activities

CO2: Recognize the different networking devices and their functionalities

CO3: Utilize the role of protocols in networking and analyze the services and features of the various layers of the network

CO4: Validate the program, date and hardware is available to everyone on the network without regard to the physical location of the resource and the users

Unit No.	Content
Unit-1	**Introduction to computer networks:** definition, characteristics, applications and classification of computer networks –PAN, LAN, MAN, WAN, internetworks, network topology.
Unit-2	**Data communication:** data communication components, characteristics, transmission impairments, transmission modes, protocol – its composition and functions.
Unit-3	**Network models:** layered architecture, benefits of layered architecture, OSI reference model, TCP/IP protocol suite, functions of layers in OSI and TCP/IP models.
Unit-4	**Physical layer:** services of a physical layer, transmission medium – wired and wireless, networking devices.
Unit-5	**Data link layer - error detection and correction methods:** one and two-dimensional parity method, hamming code, cyclic redundancy check (CRC); framing-character stuffing, bit stuffing.
Unit-6	**Data link layer - flow and error control protocols:** protocols for noiseless and noisy channels - simplest protocol, stop-and-wait protocol; stop-and-wait ARQ, go-back-n ARQ, selective repeat ARQ.
Unit-7	**Data link layer - medium access control protocols:** pure ALOHA and slotted ALOHA, persistent and non-persistent CSMA, CSMA/CD, CSMA/CA
Unit-8	**Network layer - logical addressing:** IPV4 addressing, classful addressing, classless addressing, subnetting, network address translation, IPV6 addressing, address resolution protocol (ARP), reverse address resolution protocol
Unit-9	**Network layer – routing: unicast routing:** routing characteristics, routing algorithms, comparison of routing algorithms. **broadcast and multicast routing:** broadcast routing, multicast routing, routing in Adhoc networks.
Unit-10	**Transport layer - protocols:** services of the transport layer, connection-oriented and connectionless services, connection establishment, connection release, TCP, UDP.
Unit-11	**Transport layer - congestion control and QoS:** general principles of congestion control, congestion avoidance and prevention policies; quality of service- types of traffic, traffic shaping, leaky bucket algorithm, token bucket algorithm.
Unit-12	**Application layer – services and protocols:** remote login (TELNET), file transfer protocol (FTP), domain name system (DNS), e-mail - simple mail transfer protocol (SMTP), post office protocol (POP), internet message access protocol (IMAP).

Unit-13	**Internet and WWW:** internet basics, hypertext transfer protocol (HTTP), world wide web (www), security on the internet – IPsec, VPN.
Unit-14	**Network Security:** goals of network security, principles of cryptography, message integrity, securing e-mail, operational security: firewalls, types of firewalls.

LABORATORY WORK:

1. **Network models:** layered architecture, benefits of layered architecture, OSI reference model, TCP/IP protocol suite, functions of layers in OSI and TCP/IP models.

2. **Network layer - logical addressing:** IPV4 addressing, classful addressing, classless addressing, subnetting, network address translation, IPV6 addressing, address resolution protocol (ARP), reverse address resolution protocol.

READINGS:

1. DATA COMMUNICATION AND NETWORKING by B.A. FOROUZAN, MCGRAW HILL EDUCATION.
2. DATA AND COMPUTER COMMUNICATIONS by WILLIAM STALLINGS, PEARSON.

Course Code	ECAP268	Course Title	COMPUTER SYSTEM ARCHITECTURE

WEIGHTAGE		
CA	ETE(Th.)	ETE (Pr.)
30	40	30

Course Outcomes:

CO1: Classify the functioning of digital systems and discuss the working of gates and circuits
CO2: Identify the factors influencing the design of hardware and software elements of computer system
CO3: Evaluate the various processor components and their interconnection
CO4: Analyze the types of instructions and interrupts in the computer system

Unit No.	Content
Unit-1	**Binary Systems:** Number System, Number System Conversions, Complements, Fixed point and floating-point representation
Unit-2	**Boolean algebra:** Basic definitions of Boolean algebra, Axiomatic definition of Boolean algebra, Basic theorems and properties, Boolean functions, Karnaugh map & tabulation methods
Unit-3	**Implementation of combinational logic design:** Logic gates and combinational circuits, Binary adder and subtractor, Decimal adder, Encoder and decoder Multiplexer and demultiplexer, Binary parallel adders
Unit-4	**Design of synchronous sequential circuits:** Sequential circuits, Latches and flip-flops, Analysis of clocked sequential circuits, State reduction and state assignment, Design of counters, Shift registers and ripple-counters
Unit-5	**Register Transfer and Microoperations:** Register Transfer Language, Register Transfer, Bus and Memory Transfer, Arithmetic Microoperations, Logic microoperations, Shift Microoperations
Unit-6	**Instruction Codes and Instruction Cycle:** Instruction codes, Common Bus System, Timing and control, Instruction Cycle, Types of instructions
Unit-7	**Machine Language:** Introduction of Machine Language, Assembly Language, Assembler Basics, program loops
Unit-8	**Machine Programming:** Arithmetic and Logic Operation programming, Subroutines, Input-Output programming, Programming loops
Unit-9	**Register Organization:** General Register Organization, Organization of stacks, Reverse Polish Notation
Unit-10	**Addressing Modes:** Addressing Modes, RISC Instructions, Zero Address Instructions, One Address Instructions, Two Address Instructions, three address Instructions
Unit-11	**Pipeline processing:** Instruction and arithmetic pipeline, Pipeline hazards and their resolution, Parallel processing
Unit-12	**Memory technology:** Cache memory and memory hierarchy, Virtual memory and memory management unit, Memory hierarchy, Associative memory, Cache memory
Unit-13	**I/O subsystems:** Input-output devices, Interfacing with IO devices, Concept of handshaking, DMA data transfer, Asynchronous data transfer
Unit-14	**Hardware description logic:** Introduction to hardware description language, HDL for combinational circuits

Laboratory Work

Implementation of combinational logic design: Logic gates and combinational circuits, Binary adder and subtractor, Decimal adder, Encoder and decoder Multiplexer and demultiplexer, Binary parallel adders

READINGS:

1. COMPUTER SYSTEM ARCHITECTURE by MORRIS MANO, PEARSON
2. DIGITAL-LOGIC AND COMPUTER DESIGN by MORRISMANO, M., PRENTICEHALL
3. COMPUTER ARCHITECTUREA QUANTITATIVE APPROACH by DAVIDAPATTERSON, PRENTICEHALL

Course Code	EENG140	Course Title	ADVANCED ENGLISH COMMUNICATION SKILLS

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Read and understand longer pieces of discourse independently

CO2: Read and compare two texts for evaluating them

CO3: Summarise a text for the benefit of peers orally or in writing

CO4: Write a review of a text read for academic purposes or for pleasure

CO5: Understand the purpose and process of communication

Unit No.	Content
Unit-1	Reading texts of different genres and varying length
Unit-2	Different strategies of comprehension
Unit-3	Reading and interpreting non-linguistic texts
Unit-4	Reading and understanding incomplete texts (Cloze of varying lengths and gaps; distorted texts.)
Unit-5	Analyzing a topic for an essay or a report
Unit-6	Editing the drafts arrived at and preparing the final draft
Unit-7	Re-draft a piece of text with a different perspective (Manipulation exercise)
Unit-8	Summarise a piece of prose or poetry
Unit-9	Using phrases, idioms and punctuation appropriately
Unit-10	Introduction to communication – principles and process
Unit-11	Types of communication – verbal and non-verbal
Unit-12	Identifying and overcoming problems of communication
Unit-13	Communicative competence
Unit-14	Cross-cultural communication

READINGS:

1. Pal, Rajendra, et al (2019). English Grammar and Composition. Sultan Chand.
2. Bailey, Stephen (2003). Academic Writing. London and New York, Routledge.
3. Department of English, Delhi University (2006). Fluency in English Part II. New Delhi, OUP
4. Grellet, F (1981). Developing Reading Skills: A Practical Guide to Reading Skills. New York, CUP
5. Hedge, T. (2005). Writing. London, OUP
6. Kumar, S and PushpLata (2015). Communication Skills. New Delhi, OUP
7. Lazar, G. (2010). Literature and Language Teaching. Cambridge, CUP
8. Nuttall, C (1996). Teaching Reading Skills in a Foreign Language. London, Macmillan
9. Raman, Meenakshi and Sangeeta Sharma (2011). Technical Communication: Principles and Practice. New Delhi, OUP

Course Code	ECAP214	Course Title	FUNDAMENTALS OF WEB PROGRAMMING

WEIGHTAGE		
CA	ETE(Th.)	ETE
30	40	30

Course Outcomes:

CO1: Understand the website layout creation using HTML language.
CO2: Apply the website planning, management and maintenance techniques
CO3: Apply dynamic website creation using JavaScript and JQuery
CO4: Illustrate logic implementation on a web page
CO5: Understand how to manage versatile data on a web page

Unit No.	Content
Unit-1	**Internet Basic:** Basic concepts, communicating on the internet, internet domains, establishing connectivity to the internet, client IP address, IP address, TCP/IP
Unit-2	**HTML Introduction: i**ntroduction, web server, web client/ browser, HTML tags
Unit-3	**HTML Command and Structure & Formatting: c**ommonly used HTML commands, structure of HTML program, formatting, text styles, text effects
Unit-4	**HTML List and Graphics:** HTML lists, types of lists, adding graphics to HTML document
Unit-5	**Creating Tables & Frames:** creating tables, linking documents, frames
Unit-6	**DHTML:** cascading style sheets, class, external style sheets
Unit-7	**Introduction to Java Script:** JavaScript and web, <script> tag and browser compatibility. data types: numeric, text, Boolean, type casting, arrays, operators and expressions in JavaScript
Unit-8	**Programming Constructs in JavaScript:** programming constructs, conditional and looping statements
Unit-9	**Functions in JavaScript:** functions, user defined functions, dialog boxes
Unit-10	**DOM Model & Browser Objects:** understanding DOM model, objects in HTML, browser objects, window, history, location, navigator, and document object.
Unit-11	**Handling Events Using JavaScript:** handling events using JavaScript
Unit-12	**HTML Forms:** properties and methods, button, text, text area, checkboxes, radio buttons, select and option elements
Unit-13	**Built-in Objects in JavaScript:** built-in objects in JavaScript, string objects, math objects, date objects, user-defined objects
Unit-14	**Basics of JQuery:** Introduction to JQuery, JQuery events, animations and effects using JQuery DOM using JavaScript: DOM concept in JavaScript, windows navigator, locations object with methods

LABORATORY WORK:

1. **HTML Command and Structure & Formatting: c**ommonly used HTML commands, structure of HTML program, formatting, text styles, text effects.
2. **Introduction to JavaScript:** JavaScript and web, <script> tag and browsers compatibility. data types: numeric, text, boolean, type casting, arrays, operators and expressions in JavaScript.
3. **HTML Forms:** properties and methods, button, text, text area, checkboxes, radio buttons, select and option elements.

READINGS:

1. HTML: THE COMPLETE REFERENCE by THOMAS A. POWELL, OSBORNE, MCGRAW HILL EDUCATION
2. WEB ENABLES COMMERCIAL APPLICATION DEVELOPMENT USING HTML, DHTML, JAVASCRIPT, PERL, CGI, BPB PUBLICATIONS, 2000. by IVAN BAYROSS, BPB PUBLICATIONS

Course Code	ECAP267	Course Title	DATA STRUCTURES

WEIGHTAGE		
CA	ETE(Th.)	ETE (Pr.)
30	40	30

Course Outcomes:

CO1: Understand how basic data structures are represented in memory
CO2: Comprehend the computational efficiency of the principal algorithms for searching and sorting
CO3: Implement various data structures using sequential and linked representations
CO4: Apply appropriate data structures to solve real-world problems efficiently
CO5: Analyze the alternate implementations of data structures to enhance performance
CO6: Demonstrate different methods for traversing binary trees

Unit No.	Course Contents
Unit-1	**Basic concepts**: introduction to data structures and algorithms, data structure Operations
Unit-2	**The complexity of algorithms**: asymptotic notations for complexity, control structures,
Unit-3	**Introduction to pointers**: advantages, pointer arithmetic, self-referential structures
Unit-4	**Arrays:** the concept of arrays: single-dimensional, two-dimensional, memory representation of arrays
Unit-5	**Operations on arrays**: searching, traversal, insertion, deletion, concatenation and merging of two arrays
Unit-6	**Linked lists:** introduction to a linked list, dynamic memory allocation, representation of linked lists in memory, traversing a linked list, searching linked list, insertion and deletion into the linked list
Unit-7	**Doubly linked lists:** traversing a doubly-linked list, insertion and deletion from doubly linked lists, circular linked list
Unit-8	**Introduction to stacks**: representation of stacks, implementation of stacks using sequential and linked representation
Unit-9	**Introduction to queues**: representation of queues, implementation of queues using sequential and linked representation
Unit-10	**More on stacks and queues**: circular queues, deque, recursion
Unit-11	**Trees**: the concept of trees, representation of binary trees, binary search trees, traversal: recursive and non-recursive, searching, insertion and deletion in binary search trees
Unit-12	**Graphs**: terminology of graphs, depth-first search, breadth-first search
Unit-13	**Searching:** linear and binary search
Unit-14	**Sorting**: bubble sort, shell sort, insertion sort, selection sort, merge sort, radix sort

LABORATORY WORK:

Implementation of data structures concepts (arrays, singly linked list, doubly linked list, stacks, queues, binary search tree, depth-first search, breadth-first search, sorting and searching)

READINGS:

1. DATA STRUCTURES by SEYMOUR LIPSCHUTZ, MCGRAW HILL EDUCATION
2. DATA STRUCTURES USING C by REEMA THAREJA, OXFORD UNIVERSITY PRESS
3. DATA STRUCTURE USING C by MANOJ KUMAR, EAGLE PRAKASHAN
4. DATA STRUCTURES USING C by E BALAGURUSAMY, Tata McGraw Hill, India
5. DATA STRUCTURE AND ALGORITHM USING C by RS SALARIA, KHANNA PUBLISHERS

Course Code	ECAP560	Course Title	OPERATING SYSTEM

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Understand the services and design of an operating system**.**

CO2: Experiment with various process management and memory management techniques in Operating system

CO3: Evaluate the performance of different disk scheduling techniques

CO4: Visualize the importance of the software development process

Unit No.	Content
Unit-1	Introduction to operating system: Introduction, Types of operating systems, System components
Unit-2	Operating system services, System calls, Types of System Calls
Unit-3	Process: Process concept, Process states, Operations on processes
Unit-4	Process Management: Process control block, Context switching, Process scheduling
Unit-5	Inter process communication, Threads and Multithreading, a case study on windows/Linux
Unit-6	CPU Scheduling: Introduction, Types of scheduling, Scheduling Criteria.
Unit-7	Scheduling Algorithms, a case study on Windows/Linux
Unit-8	Process Synchronization: Background, Critical section problem, Semaphores, Concept of serializability
Unit-9	Deadlocks: Deadlock Characterization, Methods for handling deadlocks, Deadlock Prevention, Deadlock avoidance, Recovery from Deadlock, a case study on Windows/Linux
Unit-10	Memory Management: logical versus physical address space, Address Binding, Dynamic Loading & Dynamic Linking
Unit-11	Memory Management: Overlays, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging
Unit-12	Memory Management: Page Replacement Algorithms, Allocation of frames, Thrashing, Working-set model, a case study on Windows/Linux
Unit-13	Protection: Introduction, File Access Methods, Access Matrix.
Unit-14	Disk Management: Disk structure, disk scheduling, FCFS scheduling, SSTF scheduling, SCAN scheduling, C-SCAN scheduling, a case study on Windows/Linux

READINGS:

1. OPERATING SYSTEMS CONCEPTS BY A SILBERSCHARTZ AND GALVIN, ADDISON-WESLEY
2. OPERATING SYSTEMS CONCEPTS AND DESIGN by MILAN MILANKOVIC, MCGRAW HILL EDUCATION
3. MODERN OPERATING SYSTEM by ANDREW S. TANENBAUM, PRENTICE HALL
4. THE DESIGN OF THE UNIX OPERATING SYSTEM by MAURICE J. BACH, PEARSON
5. BEGINNING LINUX PROGRAMMING by NEIL MATTHEW, WILEY
6. OPERATING SYSTEMS: PRINCIPLES AND DESIGN by CHOUDHURY, PABITRA PAL, PHI Learning Pvt Ltd

Course Code	ECAP462	Course Title	COMMUNITY DEVELOPMENT PROJECT

Course Outcomes:

CO1: Identify the issues related to community development and find solutions for improvement

CO2: Develop creative thinking processes and evolving behavioral changes for an effective solution to the identified problem

CO3: Employ the skills to promote the unique idea among the public aiming to originate substantial and sustainable development bringing in difference in the community at large

CO4: Illustrate the ability to deliver an effective presentation and written report covering major issues and suggestions related to the Project

Description:

The purpose of the clinical postings at the hospital is to provide an opportunity to seek, identify and further develop an appropriate level of professionalism while dealing with patients/clients and learning the latest techniques and skills to build a strong foundation for their career growth.

Course Weightages:

ATT	CA	MTP	ETP1	ETP2
0	0	0	100	0

Attendance Requirement: NA

Continuous Assessment (CA): NA

ETP Evaluation Parameter:

Parameter	Marks
Action Taken to Achieve Objectives and their supportive documents including Photographs before and after, videos and testimonials	20
Cause of the Problem Identified	10
Effectiveness of the Project	10
Innovativeness and Uniqueness of the Project undertaken	20
Objective	10
Presentation	20
Problem identification	10
Total	**100**

Course Code	ECAP463	Course Title	FIELD PROJECT

Course Outcomes:

CO1: Visualize the concepts beyond the classroom teaching
CO2: Represent the knowledge acquired in a more professional way
CO3: Transfer conceptual thoughts into required practical themes
CO4: Interpret the things as per the industry needs

Description:

The purpose is to provide an opportunity to seek, identify and further develop an appropriate level of professionalism while dealing with clients and learning the latest techniques and skills to build a strong foundation for their career growth.

Course Weightages:

ATT	CA	MTP	ETP1	ETP2
0	0	0	100	0

Attendance Requirement: NA

Continuous Assessment (CA): NA

ETP Evaluation Parameter:

Parameter	Marks
Organizational Knowledge	10
Presentation	30
Quality	20
Question Response	20
Skill Set	20
Total	**100**

Course Code	ECAP509	Course Title	SOFTWARE ENGINEERING

WEIGHTAGE	
CA	ETE (Th.)
30	70

Course Outcomes:

CO1: Apply theoretical foundation of software engineering in practical software development

CO2: Analyze the need for software maintenance activities

CO3: Discuss the software life cycle models

CO4: Apply software engineering practices to create complex software designs

CO5: Identify the importance of the software development process

Unit No.	Content
Unit-1	**Introduction to software engineering:** define software engineering, software process, software engineering practices
Unit-2	**Software process models:** software development life cycle (SDLC), classical software development lifecycle model, prototyping model, V model, incremental model, introduction to the agile method of software development
Unit-3	**Requirement engineering:** requirement engineering, requirement eliciting/gathering, negotiating requirement, validating requirement, requirement analysis, stakeholder analysis
Unit-4	**Software Requirement Specification:** software requirement specification document, characteristics of a good SRS, functional and non-functional requirement
Unit-5	**Design:** design process, design concepts, coupling, cohesion, data flow diagram (DFD), flow chart, architectural design, component-based design, object-oriented design, class-based components, use case diagram, class diagram, activity diagram
Unit-6	**User interface design:** golden rules, interface design models, interface design process, interface design activities
Unit-7	**Standards**: good coding practices, coding standards, code reusability, documentation, documentation standards
Unit-8	**Software testing:** test design, test planning, test case definition, test case template
Unit-9	**Testing strategies:** black-box testing, white box testing, sanity testing, smoke testing
Unit-10	**Testing levels:** unit testing, integration testing, system testing, acceptance testing, regression testing
Unit-11	**Bugs:** bug/defect definition, bugs life cycle, bug tracking, bug tracking tool (Bugzilla overview)
Unit-12	**Software maintenance:** software maintenance, software supportability, reengineering, business process reengineering, software reengineering, restructuring, the economics of reengineering
Unit-13	**Product metrics:** measure, metrics and indicators, measurement principles, function-based metrics, metrics for specification quality
Unit-14	**Software process improvement:** approaches to SPI, maturity models, SPI process

READINGS:

1. AN INTEGRATED APPROACH TO SOFTWARE ENGINEERING by PANKAJ JALOTE, NAROSA PUBLISHING HOUSE
2. SOFTWARE ENGINEERING: A PRACTITIONER'S APPROACH by ROGER S. PRESSMAN, MCGRAW HILL EDUCATION
3. FUNDAMENTALS OF SOFTWARE ENGINEERING by RAJIB MALL, PRENTICE HALL

Course Code	ECAP653	Course Title	ARTIFICIAL INTELLIGENCE

WEIGHTAGE	
CA	ETE (Th.)
30	70

Course Outcomes:

CO1: Validate the problem-solving and learning methods of Artificial Intelligence
CO2: Identify problems that may be solved using artificial intelligence and machine learning
CO3: Develop intelligent systems by assembling solutions to concrete computational problems
CO4: Demonstrate awareness and a fundamental understanding of various applications of AI techniques
CO5: Apply basic principles of AI in solutions that require problem-solving, inference, perception, knowledge representation, and learning.
CO6: Demonstrate an ability to share in discussions of AI, its current scope and limitations, and societal implications.

Unit No.	Contents
Unit-1	**Introduction:** Introduction to artificial intelligence, Types of Intelligence, Applications of AI, Approaches of artificial intelligence, Difference between human and machine intelligence
Unit-2	**Formulating Problems:** Problem-solving, formulating problems-Water jug problem, 8 Puzzle problem, Missionaries and cannibals' problem, States and State-space, Problem types
Unit-3	**Uninformed Search Strategies:** Introduction to uninformed search strategies, Depth-first search, Breadth-first search, Heuristic functions
Unit-4	**Informed Search Strategies:** Introduction to informed search strategies, best first search, A*algorithm, Iterative deepening A*(IDA), Small memory A*(SMA)
Unit-5	**Game Playing:** Introduction to game playing, Applications of game playing, Perfect decision game, Imperfect decision game, Evaluation function, Alpha-beta running
Unit-6	**Reasoning-Representation: Inference**, Propositional Logic, Predicate logic (first order logic), Logical reasoning, Forward chaining, Backward chaining
Unit-7	**AI language sand tools**: Lisp, Prolog, Resolution and clausal form
Unit-8	**Planning**: Basic representation of plans, Partial order planning, Planning in the block's world, Hierarchical planning, Conditional planning
Unit-9	**Constraints:** Representation of resource constraints, Temporal constraints, Total Order Planning
Unit-10	**Uncertainty:** Introduction to uncertainty, Basic probability, Bayes rule, Belief networks, Prior probability, Posterior Probability,
Unit-11	**Fuzzy set and fuzzy logic:** Default reasoning, Fuzzy sets and fuzzy logic, Decision theoretic expert systems, Decision trees
Unit-12	**Learning and its types:** Introduction to machine learning, Need of learning, Types of learning, Supervised learning, Unsupervised learning, Inductive learning, Rule-based learning, Reinforcement learning
Unit-13	**Artificial Neural Network:** Neural network and artificial neural network, how neurons activate
Unit-14	**Natural language processing:** Introduction to NLP, Phases of natural language processing, Formal grammar and parsing

READINGS:

1. ARTIFICIAL INTELLIGENCE A MODERN APPROACH by STUART RUSSELL AND PETERNORVIG, PEARSON
2. ARTIFICIAL INTELLIGENCE by GEORGEF.LUGER, PEARSON
3. ARTIFICIAL INTELLIGENCE by RICH, KNIGHT, MCGRAWHILLEDUCATION

Course Code	ECAP916	Course Title	FRONT-END WEB UI FRAMEWORKS AND TOOLS

WEIGHTAGE		
CA	ETE(Th.)	ETE (Pr.)
30	40	30

Course Outcomes:

CO1: Associate the front-end web framework
CO2: Define applications with front-end web frameworks
CO3: Reframe the web applications using a front-end web framework
CO4: Compose programs with HTML and CSS-based design templates for typography

Unit No.	Content
Unit-1	**Introduction to bootstrap** Introduction to Bootstrap 4 and UI Development
Unit-2	**GIT** Configuring GIT, creating a repository, GIT Basic Commands, Linking GIT with the Cloud Repository, what is a Full Stack developer, Starting a GIT basics project
Unit-3	**NodeJS and NPM** Getting Started with NodeJS and NPM, Setting Up Bootstrap, Front-End Frameworks
Unit-4	**Responsive Design** Responsive Design, Grid system, Using Flex
Unit-5	**Navigation** Navigability, Navigation bar, and breadcrumbs
Unit-6	**Navigability Elements** Pagination, Labels, Badges, Typographic elements
Unit-7	**Bootstrap CSS** Tables, Buttons, Images
Unit-8	**Forms** Using Icons and Fonts, Forms, Showing content
Unit-9	**Tabs and Pills** Working with tabs and pills
Unit-10	**Collapse and Modals** Working with Collapse, working with accordions, Displaying content with modals
Unit-11	**Tooltips** Using tooltips, using popovers, Working with carousel
Unit-12	**JQuery** JQuery Basics, Selectors, Event Handling
Unit-13	**SASS** Working with SASS, Working with Less
Unit-14	**NPM Scripts** Implementing Tools with NPM Scripts, Grunt, Task Automator, Gulp

LABORATORY WORK:

1.	Experiment to configure the GIT and basic GIT commands.
2.	Experiment to implement a basic GIT project.
3.	Experiment to introduce the NodeJS and NPM and configure the bootstrap.
4.	Experiment to create responsive designs.
5.	Experiment work with navigability elements.
6.	Experiment to work with forms and images.
7.	Experiment to work with tabs and pills.
8.	Experiment working with tooltips, popovers, and carousels.
9.	Experiment to work with JQuery and SASS.
10.	Experiment to work with NPM scripts, Grunt, Gulp and Task animator.

Text Book:

1. BOOTSTRAP RESPONSIVE WEB DEVELOPMENT by JAKE SPURLOCK, O'REILLY.

Reference Book:

1. LEARNING BOOTSTRAP by ARAVIND SHENOY, ULRICH SOSSOU, PACKT PUBLISHING

Course Code	ECAP495	Course Title	WIRELESS AND MOBILE NETWORK

WEIGHTAGE		
CA	ETE(Th.)	ETE (Pr.)
30	40	30

Sr. No.	Topics
1.	**Introduction to wireless and Mobile Networks:** Transmission Fundamentals, Communication Networks, Protocols and the TCP/IP Suite, The Cellular revolution, The global cellular networks
2.	**Cellular Wireless Networks**: Principles of Cellular Networks, First Generation Analog, Second Generation TDMA, Second Generation CDMA, Third Generation Systems
3.	**Modulation Techniques**: Signal Encoding, Digital Data Analog Signals, Analog Data Digital Signals, Analog Data Analog Signals
4.	**Spectrum Modulation Techniques**: Spread Spectrum Modulation, Frequency Hopping Spread Spectrum, CDMA
5.	**Multiple Access in Wireless System**: Multiple Access Scheme, Frequency Division Multiple Access
6.	**Multiple Access Technology**: Time Division Multiple Access, Code Division Multiple Access, Space Division Multiple Access
7.	**Mobile Adaptive Computing**: Mobile Adaptive Computing, Mobility Management, Data Dissemination and Management
8.	**Wireless LAN Technology:** Overview of LAN, Infrared LANs, Spread Spectrum LANs, Narrowband Microwave LANs
9.	**Wi-Fi and IEEE802.11:** IEEE 802.11 Architecture and Services, IEEE 802.11 Medium Access Control.
10.	**Wireless LAN Standards:** IEEE 802.11 Physical Layer, Wi-Fi Protected Access.
11.	**Introduction to Mobile Middleware**: Middleware for Application Development, Adaptation and Agents, Service Discovery Middleware, Finding Needed Services
12.	**Wireless Application Protocol and Mobile IP:** Mobile IP395, Wireless Application Protocol, Internet Control Message Protocol, Message Authentication
13.	**Wireless Security:** Introduction to wireless security and Approaches to Security in the wireless system.
14.	**Security in Wireless Networks:** Security in Wireless Personal Area Network, Security in Wireless Local Area Networks, Security in Wireless Metropolitan Area Networks (802.16), Security in Wide Area Networks

Text Books:

1. WIRELESS COMMUNICATIONS & NETWORKS by WILLIAM STALLINGS, PEARSON

Reference Books:

1. PRINCIPLES OF WIRELESS NETWORKS by KAVEH PAHLAVAN, PEARSONFUNDAMENTALS OF
2. WIRELESS NETWORKING by RON PRICE, MCGRAW HILL EDUCATION
3. WIRELESS NETWORKS FIRST-STEP by JIM GEIER, CISCO PRESS

Course Code	ECAP917	Course Title	FRONT-END JAVASCRIPT FRAMEWORKS

WEIGHTAGE		
CA	ETE(Th.)	ETE (Pr.)
30	40	30

Course Outcomes:

CO1: Associate client-side JavaScript frameworks and the MVC design pattern
CO2: Define single-page applications in AngularJS for typography
CO3: Construct a functional front-end web application using AngularJS
CO4: Compose web contents using reusable components

Unit No.	Content
Unit-1	**Introduction**: what is Angular, architecture, development environment
Unit-2	**Angular Projects/Programs:** your first Angular app, the structure of Angular projects, web pack, promise
Unit-3	**Type Script fundamentals:** declaring variables, types, type assertions, arrow functions
Unit-4	**Classes and Objects in Angular**: interfaces, classes, objects, constructors, access modifiers, access modifiers in constructor parameters, properties, modules
Unit-5	**Angular fundamentals:** building blocks of angular apps, components, generating, components using Angular CLI, templates directives, services, dependency injection
Unit-6	**Displaying data and handling events**: property binding, attribute binding, adding bootstrap class binding, style binding, template variables, two-way binding, pipes
Unit-7	**Directives**: commonly used angular directives,
Unit-8	**Building re-usable components**: component API
Unit-9	**Template-driven forms**: building a bootstrap form, types of forms, ngModel, adding validation, specific validation errors, styling invalid input fields, cleaner templates ngForm, ngModel Group
Unit-10	**Form Handling in Angular:** control classes and directives, disable the submit button, work with check boxes, work with drop-down lists, work with radio buttons
Unit-11	**Consuming HTTP services**: JSONPlace Holder, getting data, creating data, updating data deleting data, handling errors
Unit-12	**Routing and navigation:** routing in a nutshell, configuring routes. Router Outlet
Unit-13	**Authentication and authorization**: application overview, architecture, JSON web tokens, starter code. implementing login, implementing logout
Unit-14	**Deployment**: preparing for deployment, deploying to GitHub pages, deploying to firebase

Text Books:

1. LEARNING ANGULARJS A GUIDE TO ANGULARJS DEVELOPMENT by KEN WILLIAMSON, O'REILLY

References:

1. ANGULARJS: UP AND RUNNING- ENHANCED PRODUCTIVITY WITH STRUCTURED WEB APPS by BRAD GREEN, SHYAM SESHADRI, O'REILLY

Course Code	ECAP496	Course Title	CRYPTOGRAPHY AND SECURITY RISK MANAGEMENT

WEIGHTAGE		
CA	ETE(Th.)	ETE (Pr.)
30	40	30

Course Outcomes:

CO1: Describe computer and network security fundamental concepts and principles
CO2: Create concepts with different cryptographic algorithms
CO3: Identify the different functionalities in a risk management process
CO4: Understand the different systems as well as security attacks

Unit No.	Content
Unit-1	**Computer Security and Privacy**: Introduction to security and privacy, Security Threats, assets, vulnerabilities, Software security, User Authentication and its types, Network Security
Unit-2	**Introduction to cryptography:** Symmetric & asymmetric encryption, Concept of Block Cipher and Stream Cipher
Unit-3	**Cryptocurrency:** Introduction to cryptocurrency and bitcoin, Decentralization, Mechanics of Bitcoin, Storage and Usage of Bitcoins, Bitcoin mining, Bitcoin anonymity and its future
Unit-4	**Introduction to Risk Management**: Information security fundamentals, Security design principles, Information security challenges, Risk management and its cycle
Unit-5	**Risk Assessment and Analysis Techniques:** Risk profiling and formulating, Security services and controls, Risk Assessment techniques
Unit-6	**Building and Running a Risk Management Programme**: Threat and Vulnerability Management, A Blueprint for Security
Unit-7	**PUBLIC KEY CRYPTOGRAPHY AND RSA**: Principles Public key crypto Systems, Diffie Hellman Key Exchange, RSA algorithm, Key Management, Elliptic Curve Arithmetic, Elliptic Curve Cryptography
Unit-8	**MESSAGE AUTHENTICATION AND HASH FUNCTIONS**: Authentication Requirement, Authentication Function, Message Authentication Code, Hash Function, Security of Hash Function and MACs.
Unit-9	**DIGITAL SIGNATURE**: Digital Signature, Authentication Protocol, Digital Signature Standard.
Unit-10	**IP SECURITY:** Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management
Unit-11	**AUTHENTICATION APPLICATION**: Kerberos, X.509 Authentication Service, Public Key Infrastructure.
Unit-12	**EMAIL SECURITY:** Pretty Good Privacy (PGP) and S/MIME.
Unit-13	**WEB SECURITY**: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET), Intruders, Viruses and related threats.
Unit-14	**FIREWALL**: Firewall Design principles, Trusted Systems.

Text Books:

1. CRYPTOGRAPHY AND NETWORK SECURITY: PRINCIPLES AND PRACTICE by WILLIAM STALLINGS, PEARSON

2. SECURITY RISK MANAGEMENT, BUILDING AN INFORMATION SECURITY RISK MANAGEMENT PROGRAM FROM THE GROUND UP by EVAN WHEELER, SYNGRESS (ELSEVIER)

References:

1. CRYPTOGRAPHY AND NETWORK SECURITY by ATUL KAHATE, MCGRAW HILL EDUCATION

Course Code	ECAP918	Course Title	MULTIPLATFORM MOBILE APP DEVELOPMENT WITH WEB TECHNOLOGIES

WEIGHTAGE		
CA	ETE(Th.)	ETE (Pr.)
30	40	30

Course Outcomes:

CO1: Develop cross-platform mobile apps for phones and tablets.

CO2: Apply web development skills to build apps that are indistinguishable from native iOS or Android projects.

CO3: Develop mobile applications targeting multiple platforms with a single codebase.

CO4: Analyze the integration of angular and ionic.

Unit No.	Content
Unit-1	**Introduction to Ionic course**: introduction, what is ionic, look at the ionic platform,
Unit-2	**Angular and Ionic:** what is angular, our first ionic app
Unit-3	**Angular basics module introduction:** understanding components, installing Angular with the CLI installing the IDE
Unit-4	**Angular Project Structure**: understanding the folder structure
Unit-5	**Components:** the app component, creating our first component
Unit-6	**Ionic components**: basics module introduction, core app building blocks, Ionic components, setting up a non-angular ionic project
Unit-7	**Ionic Components**: basic ionic components, component categories, Ionic grid, adding icons, using slots, CSS utility attributes, Ionic elements,
Unit-8	**JavaScript and Ionic**: JavaScript logic and layout, controller components
Unit-9	**Angular and Ionic**: why use angular, creating and analyzing a new ionic angular project, how both works
Unit-10	**Additional Angular Features:** adding and loading a new page, integrating angular features
Unit-11	Building native apps with capacitor module introduction, general information,
Unit-12	**Creating Apps:** creating an android / iOS app, wrap up
Unit-13	Debugging error messages & console.log (), browser Dev Tools & breakpoints,
Unit-14	**UI Debugging**: debugging the UI & performance debugging android / iOS apps

Text Books:

1. LEARNING IONIC – BUILD REAL TIME AND HYBRID MOBILE APPLICATIONS WITH IONIC by ARVIND RAVULAVARU, PACKT PUBLISHING

References:

1. MOBILE APP DEVELOPMENT WITH IONIC 2 CROSS-PLATFORM APPS WITH IONIC, ANGULAR, AND CORDOVA by CHRIS GRIFFITH, O'REILLY
2. HYBRID MOBILE DEVELOPMENT WITH IONIC - BUILDING HIGHLY INTERACTIVE MOBILE APPS by GAURAV SAINI, PACKT PUBLISHING

Course Code	ECAP497	Course Title	CYBER SECURITY AWARENESS

WEIGHTAGE		
CA	ETE(Th.)	ETE (Pr.)
30	40	30

Course Outcomes:

CO1: Utilize the basic knowledge about computer security, basic cyber-attack skills and corresponding detection and defense techniques

CO2: Identify an in-depth understanding of the root cause of cyber-attacks

CO3: Identify how to exploit a simple vulnerable service and how to patch a service

Unit No.	Content
Unit-1	**Cyber security overview**: introduction, security from a global perspective, vulnerability naming schemes, zero-day vulnerabilities, attacks on the power grid and utility networks
Unit-2	**Introduction to cyber-crime**: classification of cyber-crimes, reasons for commission of cyber-crimes, kinds of cyber-crime, domain name system protection, router security, cyberstalking, forgery and counterfeiting, software piracy and crime related to IPRS, cyber terrorism, phishing, computer vandalism, computer hacking,
Unit-3	**Malicious Software:** Malware and its types, adware, spyware, browser hijacking software, virus, worms, trojan horse, scareware
Unit-4	**Security Design Principles:** Fundamental Security Design principles, Attack surfaces ad attack trees, A model for network security, Various Standards of security
Unit-5	**Cyber threats and their defense:** email and phishing defensive measures, web-based attacks, database protection, botnet defensive measures
Unit-6	**Cyber Attacks:** Creating and distributing viruses over the internet, spamming, cross-site scripting, online auction fraud, cyber-squatting, logic bombs, web jacking, internet time thefts, denial of service attack, salami attack, data diddling, email spoofing
Unit-7	**Vulnerabilities and exploitation:** techniques to gain a foothold, web exploit tools, social engineering, DNS amplification attack
Unit-8	**User Authentication:** electronic user authentication principles, password-based authentication, token-based authentication, biometric authentication, remote user authentication, authentication with hash, encryption, antivirus, steganography
Unit-9	**Digital Signatures:** Model of Digital Signature, the importance of digital signature, Encryption with Digital Signature,
Unit-10	**Safe Browsing Guidelines:** Safe browsing guidelines for social networking sites, general tips on using social networking platforms safely, posting personal details, friends, followers and contacts, status updates, sharing online content, revealing your location, sharing videos and photos, instant chats, joining and creating groups, events and communities, email security tips
Unit-11	**Securing Passwords:** Generating secure passwords, a guideline for setting secure passwords using password manager, what is a password manager? Why you should use it? How does it work? Some popular password managers. enabling two-step verification, securing computers using free antivirus
Unit-12	**Firewalls:** introduction to firewalls, stateless packet filtering vs stateful packet filtering, gateways and its applications, types of firewall, the architecture of firewall, emerging firewall technology, design principles, characteristics, configuration
Unit-13	**Fundamentals of cryptography:** introduction to cryptography and its importance, block ciphers vs stream ciphers, public-key cryptography characteristics

Unit-14	**Intrusion detection/prevention system:** introduction, types of intrusion detection, honeypots, detection of polymorphic worms, distributed intrusion detection system and standards

Text Books:

1. INTRODUCTION TO COMPUTER NETWORK SAND CYBER SECURITY by CHWAN-HWA(JOHN) WU,J.DAVIDIRWIN, CRCPRESS

References:

1. CYBER SECURITY ESSENTIALS by JAMES GRAHAM, RYANOLSON, RICKHOWARD, CRCPRESS
2. NETWORK SECURITY ESSENTIALS (APPLICATION AND STANDARDS) by WILLIAM STALLINGS, PEARSON

Course Code	ECAP919	Course Title	SERVER-SIDE DEVELOPMENT WITH NODE.JS		
			WEIGHTAGE		
			CA	ETE(Th.)	ETE (Pr.)
			30	40	30

Course Outcomes:

CO1: Write and launch Node apps
CO2: Construct Express web servers and APIs
CO3: Integrate Node apps with Mongoose and MongoDB
CO4: Demonstrate deployment of Node apps to production

Unit No.	Content
Unit-1	**Getting setup**: Installing Node, what is Node, why should I use Node, installing Atom, Hello World example.
Unit-2	**Node.js Fundamentals:** using require, requiring your own files, using 3rd party modules
Unit-3	**Introduction to no demon and its use:** restarting app with Nodemon, getting input from the user, simplified input with Yargs.
Unit-4	**Working with JSON**: introduction to JSON and reading and writing contents with JSON files
Unit-5	**Note App:** adding and saving notes, refactoring for reusability, removing a note, reading notes and reusability
Unit-6	**Debugging node.js applications**: debugging node.js applications, debugging via chrome dev tools, listing notes
Unit-7	**Concepts of advanced Yargs**: requiring arguments and advanced Yargs, arrow functions.
Unit-8	**Web Servers**: hello express, creating a web server, rendering templates with data,
Unit-9	**Concepts of GitHub**: advanced templating, express middleware, adding version control (git), setting up GitHub & SSH key.
Unit-10	**Application Deployment:** deploying your apps, adding a new feature and deploying.
Unit-11	**Concept of MongoDB**: MongoDB, Mongoose, and REST APIs: installing MongoDB and RoboMongo (windows)
Unit-12	**Building a NoSQL vocabulary:** building a NoSQL vocabulary
Unit-13	**Data writing using MongoDB**: connecting to Mongo and writing data, the ObjectId, fetching data, setting up the repo, deleting documents, updating data
Unit-14	**Mongoose setup**: the Mongoose ORM, setting up mongoose, validators, types and defaults, installing postman.

Text Books:

1. NODE.JS IN PRACTICE by ALEX YOUNG, MARC HARTER, BEN NOORDHUIS, WILEY

References:

1. WEB DEVELOPMENT WITH MONGODB AND NODE.JS by JASON KROL, PACKT PUBLISHING, PACKT PUBLISHING
2. WEB DEVELOPMENT WITH NODE AND EXPRESS by TODD BROWN, O'REILLY

Course Code	ECAP498	Course Title	DIGITAL FORENSIC

WEIGHTAGE		
CA	ETE(Th.)	ETE (Pr.)
30	40	30

Course Outcomes:

CO1: Analyze and conduct digital investigations that conform to accepted professional standards.

CO2: Identify potential security breaches of computer data that suggest violations of legal, ethical, moral, policy and/or societal standards

CO3: Review and access relevant technical and legal information and emerging industry trends

CO4: Apply a solid foundation in file systems, hardware and mobile devices for the digital investigation of information resources from unauthorized activities

Unit No.	Content
Unit-1	**Key technical concepts**: Bits, bytes, numbering system, file extensions, data types
Unit-2	**Memory concepts**: Storage and memory concepts, computing environment, file systems
Unit-3	**Introduction to Digital Forensics**: introduction, needs and uses of digital forensics, the scope of digital forensics
Unit-4	**Role of forensic examiner**: Role of the forensic examiner in the judicial system, Lockard's Exchange Principle, Documenting Crime Scene
Unit-5	**Collecting evidence**: Crime Scenes and Evidence, various digital forensic tools, Disk Cloning
Unit-6	**Crime scene investigation**: Chain of Custody, Live System Versus Dead System, Hashing
Unit-7	**Challenges and concerns of Digital Forensic:** Standards and controls, Cloud Forensics, Solid State Drives
Unit-8	**Windows System Artifacts**: Deleted Data, Hibernation File, Registry, Print Spooling, Metadata, Restore Points and Shadow Copy concept, Link Files
Unit-9	**Anti-forensics**: Hiding Data, Passwords Attacks, Steganography, Data Destruction
Unit-10	**Legal Aspects in Forensics**: Electronic Discovery, Searches with warrants, Expert Testimony, Searches without warrants
Unit-11	**Internet and Email Forensics**: Functioning of internet, Role of Web Browser in Digital Forensics, Email Forensics
Unit-12	**Social media as evidence in digital forensics:** Role of social networking sites in Digital Forensics, various criminal techniques
Unit-13	**Network Forensics**: Network Security Tools, Incident Response in Networks, Network Evidence and Investigation
Unit-14	**Mobile Device Forensics**: Cell Phone Evidence, Cell Phone Forensics Tools, Global Positioning System (GPS)

READINGS: Self-learning material

Additional readings:

1. The basics of digital forensics: the primer for getting started in digital forensics by John Sammons, Syngress (Elsevier)

2. Digital forensics and incident response by Gerard Johansen, Packt publishing

Course Code	EACC105	Course Title	FINANCIAL ACCOUNTING

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Compare the importance of Generally Accepted Accounting Principles concerning IFRS
CO2: Analyze transactions in accounting and compute the value of assets
CO3: Prepare financial statements in accordance with appropriate standards
CO4: Solve the problems related to hiring purchase and dissolution of the partnership
CO5: Describe the main elements of branch accounting
CO6: Record the business transactions in various types of vouchers using accounting software and generating accounting reports.

Unit No.	Content
Unit-1	**Introduction to accounting-** accounting as an information system, users of financial accounting information, need of financial information, qualitative characteristics, advantages and limitations of accounting, branches of accounting, cash basis and accrual basis of accounting.
Unit-2	**Accounting principles-** nature of financial accounting principles – Basic concepts and conventions: entity, money measurement, going concerned, cost, realization, accruals, periodicity, consistency, prudence (conservatism), materiality and full disclosures.
Unit-3	**Business Income-** measurement of business income-net income: the accounting period, the continuity doctrine and matching concept, objectives of measurement, revenue recognition, recognition of expenses.
Unit-4	**Financial accounting standards-** concept, benefits, the procedure for issuing accounting standards in India, salient features of First-Time Adoption of Indian Accounting Standard (Ind-AS) 101, International Financial Reporting Standards (IFRS): - Need and procedures.
Unit-5	**Accounting Process-** recording of a business transaction in journal, ledger posting, preparation of trial balance including adjustments.
Unit-6	**Depreciation accounting-** the concept of depreciation, factors in the measurement of depreciation, methods of computing depreciation: straight-line method and diminishing balance method.
Unit-7	**Inventory Valuation-** meaning, the significance of inventory valuation, inventory record systems-periodic and perpetual, methods: FIFO, LIFO and Weighted Average and salient features of IND AS2.
Unit-8	**Final Accounts-** conceptual framework of capital and revenue expenditures and receipts, preparation of financial statements of non-corporate business entities.
Unit-9	**Dissolution of Partnership Firm-** accounting of dissolution of the partnership firm including insolvency of partners, sale to a limited company and piecemeal distribution
Unit-10	**Accounting for Hire-Purchase and Installment Systems-** Journal entries and ledger accounts in the books of hire vendors and hire purchasers for large value items including default and repossession.
Unit-11	**Branch accounting 1-** concept of dependent branches, accounting aspects, debtors' system, stock and debtors' system, branch final accounts system and wholesale basis system,
Unit-12	**Branch accounting 2-** independent branches, concept and accounting treatment and preparation of consolidated profit and loss account and balance sheet.

Unit-13	**Computerized Accounting Systems 1-** computerized accounts by using any popular accounting software, creating a company, configuring and features settings
Unit-14	**Computerized Accounting Systems 2-** creating accounting ledgers and groups, creating stock items and groups, vouchers entry, generating reports, selecting and shutting a company.

READINGS:

1. Charles T. Horngren and Donna Philbrick, Introduction to Financial Accounting, Pearson Education.
2. Financial Accounting by P.C. Tulsian, Pearson
3. Financial Accounting by Hanif and Mukherjee, MCgraw Hill Education
4. Advanced Accountancy by S.N. Maheshwari and S.K. Maheshwari, Vikas Publishing House

Course Code	EBSL101	Course Title	BUSINESS LAW

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Apply the statutory provisions related to Contract Act in business organizations.

CO2: Apply the statutory provisions related to the Sales of Goods Act in business enterprises.

CO3: Develop an understanding of the various provisions related to the Limited Liability Partnership Act.

CO4: Analyze the legal issues related to Negotiable Instruments.

CO5: Apply statutory provisions related to IPR laws and Consumer Protection Act.

Unit No.	Content
Unit-1	The Indian Contract Act, 1872: meaning and essentials of contract, kinds of contract, offer and acceptance
Unit-2	The Indian Contract Act, 1872: free Consent, consideration
Unit-3	The Indian Contract Act, 1872: contractual capacity, the performance of a contract
Unit-4	The Indian Contract Act, 1872: discharge of contract, remedies for breach of contract
Unit-5	Special Contracts: contingent contract, quasi-contract, contract of indemnity and guarantee
Unit-6	Special Contracts: contract of bailment, contract of agency
Unit-7	The Sale of Goods Act, 1930: meaning of contract of sale, sale and agreement to sell, transfer of property in goods including sale by a non-owner
Unit-8	The Sale of Goods Act, 1930: meaning and types of conditions, meaning and types of warranties
Unit-9	The Sale of Goods Act, 1930: the doctrine of caveat emptor, unpaid seller and his rights
Unit-10	Limited Liability Partnership Act, 2008: meaning and essential features of LLP, incorporation of LLP, types of partners, the relationship of partners, the difference between partnership, Company and LLP
Unit-11	Consumer Protection Act, 1986: meaning and definitions, the procedure of lodging a complaint, redressal machinery under the act
Unit-12	Negotiable Instruments Act, 1881: meaning and characteristics of negotiable instruments, classification of negotiable instruments, comparison between promissory note, bill of exchange and cheque
Unit-13	Negotiable Instruments Act, 1881: meaning and comparison of holder and holder in due course, privileges of holder in due course, types of endorsements, crossing of cheque, bouncing of cheque
Unit-14	Intellectual property rights: patents, copyrights and trademarks, requirements and procedure for filing a patent, intellectual property infringement

READINGS:

1. A TEXTBOOK OF MERCANTILE LAW by P.P.S. GOGNA, S. CHAND & COMPANY
2. ELEMENTS OF MERCANTILE LAW by N.D. KAPOOR, S. CHAND & COMPANY
3. A MANUAL OF BUSINESS LAWS by S.N MAHESHWARI, S.K. MAHESHWARI,
4. HIMALAYA PUBLISHING HOUSE PVT. LTD
5. MERCANTILE LAW by S S GULSAN, EXCEL BOOKS
6. MERCANTILE LAW by M C KUCHCHAL, VIKAS PUBLISHING HOUSE
7. LEGAL ASPECTS OF BUSINESS by DANIEL ALBUQUERQUE, OXFORD & IBH

Course Code	EMGN101	Course Title	BUSINESS ORGANIZATION AND MANAGEMENT

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Enumerate the concept of business organization

CO2: Analyze the significance of management functions and important organizational behavior elements at different levels of the organization

CO3: Develop and sharpen understanding of how different management approaches can be used to enhance organization effectiveness

CO4: Integrate skills to align individual and organizational objectives

CO5: Assess the application of management theories in real-life decision making

CO6: Evaluate the managerial issues in different functional areas of the organization

Unit No.	Content
Unit-1	**Foundation of Indian business**: small and medium enterprises, problems and government policy, India's experience of liberalization and globalization, technological innovations and skill development, make in India movement, social responsibility and ethics, emerging opportunities in business, franchising, outsourcing, and e-commerce
Unit-2	**Business enterprises**: limited liability partnership, choice of form of organization, forms of business organization, sole proprietorship, joint Hindu family firm, partnership firm, joint-stock company, cooperative society, government - business interface, rationale and forms of public enterprises, international business, multinational corporations
Unit-3	**Management and organization**: the process of management: planning, organizing- basic considerations, departmentation, functional, project, matrix and network, delegation and decentralization of authority, groups and teams
Unit-4	**Decision-making and control system:** decision-making process and strategy formulation, control concept and process
Unit-5	**Leadership**: leadership concept and styles, trait and situational theory of leadership
Unit-6	**Motivation:** motivation concept and importance, Maslow need hierarchy theory, Herzberg two factors theory
Unit-7	**Communication**: communication process and communication barriers in an organization
Unit-8	**Functional area of marketing management**: marketing management marketing concept, marketing mix product life cycle, pricing policies and practices
Unit-9	**Functional area of financial management:** financial management concept and objectives, sources of funds equity shares debentures venture capital and lease finance, securities market role of SEBI
Unit-10	**Functional area of human resources management:** human resource management concept and functions, basic dynamics of employer-employee relations
Unit-11	**Organizational culture**: characteristics and functions of organizational culture, types and levels of organizational culture, dimensions and elements of organizational culture, creating and sustaining organizational culture
Unit-12	**Organizational change:** concepts and process of change, managing resistance to change
Unit-13	**Conflict management**: functional and dysfunctional conflict, levels and process of conflict, conflict resolution and management styles
Unit-14	**Stress management:** stress and stress symptoms, types and causes of stress, managing stress

READINGS:

1. ESSENTIALS OF MANAGEMENT by KOONTZ AND WEIHRICH, Tata McGraw Hill, India
2. BUSINESS ORGANIZATION AND MANAGEMENT, C.B GUPTA, SULTANCHAND, AND SONS
3. BUSINESS ORGANISATION AND MANAGEMENT by CR BASU, Tata McGraw Hill, India

Course Code	EMKT201	Course Title	PRINCIPLES OF MARKETING

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Enumerate the concepts of marketing and adopt the marketing concepts in different business scenarios

CO2: Describe the dynamic nature of the environment and enhance the ability to apply marketing models and theories for taking better and informed marketing decisions

CO3: Analyze various situations and decisions involving segmentation, targeting and positioning, Decisions involving price and marketing communications

CO4: Apply the knowledge, concepts, and tools necessary to understand the challenges and issues of marketing in a growing international and global context

Unit No.	Content
Unit-1	**Marketing management today:** Marketing scope and concept, the evolution of marketing, selling vs marketing, marketing process and marking mix
Unit-2	**The marketing environment:** Analyzing the marketing environment, customer lifecycleand its stages, customer acquisition and retention and competitive analysis
Unit-3	**Market planning and research:** Approaches to market planning and its process, marketing research process and marketing information system
Unit-4	**Buying behavior:** Consumer markets and consumer buyer Behaviour, business markets and business buyer behavior
Unit-5	**Segmentation and targeting:** Market segmentation, targeting and positioning, market measurement and demand forecasting
Unit-6	**Product management:** Managing product, product differentiation and positioning, new product development and product life cycle
Unit-7	**Brand management:** Managing brands and brand equity
Unit-8	**Pricing decisions:** Meaning and significance of price, factors influencing pricing, pricing methods and pricing strategies
Unit-9	**Distribution management:** Physical distribution and marketing logistics, marketing channels, creating and managing dealer network, retailing and wholesaling
Unit-10	**Integrated marketing communication:** sales promotions, advertising, public relations, sales management, personal selling, direct marketing and digital marketing
Unit-11	**Customer relationship management**: Marketing strategy, customer service and customer relationship management process
Unit-12	**Creating sustainable competitive value and growth:** Marketing organization, marketing performance and control
Unit-13	**Broadening horizons:** Services Marketing, rural marketing and retail management
Unit-14	**Contemporary issues in marketing:** Sustainable marketing, social responsibility, marketing ethics and global marketing strategies for Indian firms

READINGS:

1. MARKETING MANAGEMENT by PHILIP KOTLER AND KEVIN LANE KELLER, Pearson Education India
2. MARKETING MANAGEMENT by RAJAN SAXENA, McGraw Hill Education
3. MARKETING MANAGEMENT INDIAN CONTEXT GLOBAL PERSPECTIVE by V.S. RAMASWAMY AND S. NAMAKUMARI, SAGE PUBLICATIONS

Course Code	EENG112	Course Title	INDIAN WRITING IN ENGLISH

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Employ an insight into the oeuvre of Indian writers

CO2: Compare the historical context in which these texts were written

CO3: Illustrate the various writing dimensions of Indian writers

Unit No.	Content
Unit-1	**Nissim Ezekiel:** *Night of the Scorpion*: Ezekiel's position in Indian poetry, Ezekiel's contribution in post-colonial writings, major thematic concerns, rural versus urban India
Unit-2	**Nissim Ezekiel:** *Goodbye Party for Miss Pushpa T.S.*: poetic craftsmanship, symbolism and imagery, major thematic concerns
Unit-3	**R. K. Narayan:** *Swami and Friends*: Narayan is one of the leading figures of Indian Literature in English
Unit-4	**R. K. Narayan:** *Swami and Friends*: the friction of British Colonial India
Unit-5	**R. K. Narayan:** *Swami and Friends*: irony and humor of childhood, the evolution of self, the portraiture of adolescence
Unit-6	***Train to Pakistan*:** the trauma of partition as faced by the Indian subcontinent
Unit-7	***Train to Pakistan*:** the intermingling of history and literature, third-person narrative
Unit-8	***Train to Pakistan*:** social structure and cultural understanding, character-analysis
Unit-9	**Mulk Raj Anand:** *Untouchable*: plot, characterization, themes, narrative technique
Unit-10	**Mulk Raj Anand:** themes, narrative technique
Unit-11	**Kiran Desai:** *The Inheritance of Loss*: plot, characterization
Unit-12	**Kiran Desai:** *The Inheritance of Loss*: themes, narrative technique
Unit-13	**Meenakshi Mujkherjee:** *The Perishable Empire*: Essays on Indian Writing in English (Select Sections): the Indian imagination in English, historical, social and literary reasons for the growth of Indian Writing, emergence of novel in the sub-continent, post-colonial and post-modernist tendencies in (later) Indian Writing in English
Unit-14	**Meenakshi Mujkherjee:** *The Perishable Empire*: Essays on Indian Writing in English (Select Sections): the emergence of novel in the sub-continent, post-colonial and post-modernist tendencies in (later) Indian Writing in English

READINGS:

1. THE INHERITANCE OF LOSS by KIRAN DESAI, PENGUIN BOOKS INDIA
2. UNTOUCHABLE by MULK RAJ ANAND, PENGUIN BOOKS INDIA.

Course Code	EMTH137	Course Title	CALCULUS

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Assimilate the notions of the limit of a sequence and convergence of a series of real numbers

CO2: Describe the limit and examine the continuity of a function at a point

CO3: Understand the concept of various mean value theorems

CO4: Demonstrate tracing of curves in Cartesian and polar coordinate systems

CO5: Apply derivative tests in optimization problems appearing in social sciences, physical sciences, life sciences and a host of other disciplines

Unit No.	Content
Unit-1	Real numbers, Sequences of real numbers, Convergence of sequences and series, Bounded and monotonic sequences
Unit-2	Definite integral as a limit of a sum, Integration of irrational algebraic functions and transcendental functions
Unit-3	Reduction formulae, Definite integrals
Unit-4	Epsilon-delta definition of a limit of a real-valued function, Limit at infinity and infinite limits
Unit-5	Continuity of a real-valued function, Properties of continuous functions, Intermediate value theorem, Geometrical interpretation of continuity, Types of discontinuity, uniform continuity
Unit-6	Differentiability of a real-valued function, Geometrical interpretation of differentiability, Relation between differentiability and continuity, Differentiability and monotonicity
Unit-7	Chain rule of differentiation; Darboux's theorem, Rolle's theorem
Unit-8	Lagrange's mean value theorem, Cauchy's mean value theorem and their geometrical interpretations
Unit-9	Successive differentiation and Leibnitz theorem
Unit-10	Maclaurin's and Taylor's theorems for expansion of a function, Taylor's theorem in finite form with Lagrange, Cauchy forms of remainder
Unit-11	Maxima and minima of a function
Unit-12	Curvature, Asymptotes of general algebraic curves, Parallel asymptotes, Oblique Asymptotes
Unit-13	Symmetry, Concavity and convexity, Points of inflection, Tangents at origin, Multiple points, Position and nature of double points
Unit-14	Tracing of Cartesian, polar and parametric curves

READINGS:

1. George B. Thomas Jr., Joel Hass, Christopher Heil& Maurice D. Weir (2018).
2. Thomas' Calculus (14th edition). Pearson Education.
3. Howard Anton, I. Bivens& Stephan Davis (2016). Calculus (10th edition). Wiley India.
4. Monty J. Strauss, Gerald L. Bradley & Karl J. Smith (2011). Calculus (3rd edition).

Course Code	EACC204	Course Title	COST ACCOUNTING

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Understand various cost concepts and costing techniques

CO2: Classify various techniques of inventory control and methods of pricing material issues.

CO3: Analyze cost accounting techniques to evaluate and project business performance.

CO4: Analyze various managerial issues based on cost information.

CO5: Describe and recognize the peculiarities involved in the costing of the service sector

CO6: Use the various cost accounting techniques in rational decision-making.

Unit No.	Content
Unit-1	**Introduction to cost accounting:** importance, objectives and advantages of cost accounting, limitations, the difference between cost accounting and financial accounting, cost centers and cost classification, the role of a cost accountant, elements of cost, single or output costing, preparation of cost sheet
Unit-2	**Major components of cost:** techniques of material control, concepts and objectives of material control, methods of pricing of material issues, treatment of material losses, labor cost and various wage plans, labor turnover, idle time, overtime, fringe benefits
Unit-3	**Overhead cost:** Classification, allocation, apportionment and absorption of overheads, under- and over absorption, capacity levels and costs, capacity levels and costs, treatments of special items of overheads
Unit-4	**Process costing:** Meaning and features of process costing, abnormal losses and abnormal gain, Inter-process profits, Preparation of process cost accounts, equivalent production, joint product and by-products
Unit-5	**Job and batch costing:** applicability of job and batch costing in industries, objectives of job costing, job costing procedures, batch costing procedures, economic bath quantity (EBQ)
Unit-6	**Contract costing:** features of contract costing, contract costing and job costing distinction, escalation clause, notional and estimated profits preparation of contract accounts in case of complete, incomplete and near to completion contracts
Unit-7	**Service costing:** characteristics of the service sector, units of cost in different service sectors, costing methods used in the service sector, pricing of the service sector, costing methods used in the service sector, pricing of service sector
Unit-8	**Standard costing and variance analysis:** objectives of standard cost and standard costing, advantages and limitations of standard costing, setting standards, the meaning of variance analysis, material variances, labor variances
Unit-9	**Book Keeping in Cost Accounting:** Integral and non-integral systems, reconciliation of cost and financial accounts
Unit-10	**Marginal Costing and CVP Analysis:** concept, nature and importance of Marginal Costing, CVP Analysis: P/V ratio, break-even point and Margin of Safety, applications of Marginal Costing for decision making in organizations: make or buy decisions and product mix decision
Unit-11	**Life cycle costing: the** concept of LCC, elements and categories of project life cycle costs, LCC process, analysis of alternative courses of action in life cycle costing, optimization of project life cycle costs, practical applications of LCC, benefits of LCC

Unit-12	**Product life-cycle costing:** characteristics, uses, activities and essential features of product life-cycle costing, costs in product life-cycle costing, cost control and Product life-cycle costing, costs associated with different stages of product life-cycle costing, economic value added to the customer (EVC), experience curve and product life-cycle costing
Unit-13	**Activity-Based Costing:** identification of activities, creation of cost pools, determination of activity cost drivers, calculation of the activity cost driver rate and charging the cost of activities to products
Unit-14	**Uniform cost and inter-firm comparison:** objectives, benefits and limitations of uniform costing, requisites for installation of uniform costing, objectives and advantages of inter-firm comparisons

READINGS:

1. COST AND MANAGEMENT ACCOUNTING by M N ARORA, HIMALAYA PUBLISHING HOUSE PVT. LTD
2. COST ACCOUNTING by JAWAHAR LAL, SEEMA SRIVASTAVA, M.G.Hills
3. MANAGEMENT ACCOUNTING by PARESH SHAH, OXFORD UNIVERSITY PRESS
4. PRINCIPLES AND PRACTICE OF COST ACCOUNTING by BHATTACHARYYA, ASISHK., PHI LEARNING PVT LTD

Course Code	EBSL102	Course Title	COMPANY LAW

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Apply the legal provisions involved in the formation of the company

CO2: Analyse the legal provisions applicable for raising share capital, borrowing power, charges and its management

CO3: Interpret and recognize the legal issues involved in day-to-day company management and CSR activities

CO4: Examine the validity of various meetings held in the company

CO5: Illustrate the practical aspects related to duties, appointment and removal of directors, Committee formulation, transparency and disclosure

CO6: Identify the grounds and application of provisions related to winding up of a company under Companies Act and IBC and recognize the administrative machinery of companies

Unit No.	Content
Unit-1	**Introduction to Companies Act, 2013**: Nature and types of company, Lifting the corporate veil, Difference between company, partnership and limited liability partnership
Unit-2	**Incorporation of Company**: Legal provisions related to the incorporation of the company by MCA, Legal position of promoter
Unit-3	**Company Documents:** Memorandum of Association, Articles of Association, Doctrine of constructive Notice, Doctrine of Indoor management
Unit-4	**Prospectus**: Types of prospectuses, Legal consequences of misstatement in prospectus
Unit-5	**Raising of Capital**: Share and share capital, Alteration of share capital
Unit-6	**Company management**: Types of directors, Appointment of directors, Removal of directors, Resignation by directors, Remuneration of directors, Position of directors, Powers, and duties
Unit-7	**Borrowing powers of a company:** Ultra vires the company, Ultra vires the directors
Unit-8	**Charges:** Creation of Charges; Registration, Modification, and Satisfaction of Charges; Register of Charges; Inspection of charges; Punishment for contravention; Rectification by Central Government in the register of charges.
Unit-9	**Board Committees**: Committees of Board of Directors- Audit Committee, Nomination and Remuneration Committee, Stakeholders Relationship Committee, Corporate Social Responsibility Committee, Ethics Committee, Risk Committee, Corporate compliance committee
Unit-10	**Corporate Social Responsibility**: Applicability of CSR; Types of CSR Activities; CSR Committee and Expenditure; Net Profit for CSR; Reporting requirements.
Unit-11	**Transparency and Disclosures:** Board's Report; Annual Return; Annual Report; Website disclosures; Policies
Unit-12	**Company Meetings**: Types of meetings and essentials of a valid meeting
Unit-13	**Winding up of companies**: Meaning and modes of winding up- Compulsory winding up, winding-up under IBC act-CIRP and Voluntary winding up
Unit-14	**Other Legal Aspects**: Insider-Trading, Whistle-Blowing – Insider-Trading; meaning and legal provisions; Whistle-blowing: Concept and Mechanism. Administration of Company Law [including National Company Law Tribunal (NCLT), National Company Law Appellate Tribunal (NCLAT), Special Courts]

READINGS:

1. A TEXTBOOK OF COMPANY LAW (CORPORATE LAW) by P.P.S. GOGNA, S. CHAND & COMPANY
2. ELEMENTS OF COMPANY LAW by N. D. KAPOOR, SULTAN CHAND & SONS (P) LTD.
3. LEGAL ASPECTS OF BUSINESS by DANIEL ALBUQUERQUE, OXFORD & IBH
4. A HANDBOOK ON CORPORATE AND OTHER LAWS by MANISH BHANDARI, NOT MENTIONED

Course Code	EECO113	Course Title	BUSINESS ECONOMICS

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Discuss the interplay of business and economics

CO2: Analyze the economic functionality from the micro to the macro level

CO3: Describe the role of government in augmenting business using appropriate economic policy measures

CO4: Establish an ethical understanding and perspective on business situations

CO5: Outline the operations of markets under varying competitive conditions and prices as stabilize mechanisms.

CO6: Identify the causes and consequences of unemployment, inflation and economic growth

Unit No.	Content
Unit-1	**Business and economics**: introduction to business and economics, meaning business economics, forms of economic analysis, basic economic concepts, the basic economic questions and opportunity cost, production possibility curve
Unit-2	**Economic system**: scarcity and economic system, the market economic system, the command economic system, the mixed economy
Unit-3	**The price mechanism**: introduction to demand, supply and equilibrium, price determination about by the interaction of demand and supply
Unit-4	**Movements of curve price mechanism:** Disequilibrium and excess supply, along the curve and shifts of the curve, conditions of demand and supply, changes in equilibrium price and quantity
Unit-5	**Concept of elasticity**: introduction to elasticity concept, the elasticity of demand, measuring of price elasticity, factors affecting elasticity of demand
Unit-6	**Industry and market structure analysis**: form and structure of the market, perfect competition, monopoly, monopolistic competition, oligopoly.
Unit-7	**Production analysis**: analogy concept, precepts and techniques, technique and technology, stages of production, production strategy, production functions.
Unit-8	**Revenue and cost analysis:** Cost concept, revenue concept, average revenue, marginal revenue and total revenue, the relationship among cost, revenue and production
Unit-9	**Macroeconomics environment of business**: introduction to the business environment, economic environment of business, a non-economic environment of business, economic and non-economic environment interaction,
Unit-10	**Income determination:** Circular flow of money, national income and measurement of national income
Unit-11	**National income equilibrium**: the concept of equilibrium, consumption and savings, investment theory, government sector, foreign sector,
Unit-12	**Inflation: the** concept of inflation**,** determination of equilibrium, multiplier concept, inflationary and deflationary gap
Unit-13	**Macroeconomic problems of fluctuations and growth**: introduction, recession, inflation, demand-cost inflation, unemployment, business cycle
Unit-14	**Theories of the Business cycle**: trade theory, investment theory, monetary theory, innovation theory, causes behind fluctuations in the business cycle.

READINGS:

1. Principles of Economics by DevigaVengedasalam and Karunagaran Madhavan, Oxford University Press.
2. Business Economics by Manab Adhikary, Excel Books
3. Economics for Business by Ian Fraser, John Gionea and Simon Fraser

Course Code	EMGN251	Course Title	SPREADSHEET MODELLING (USINGEXCEL)

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Demonstrate a working knowledge of organizing and displaying large business data
CO2: Analyze complex business data with spreadsheet applications
CO3: Examine managerial problems using spreadsheet modeling
CO4: Apply macros for automating tasks in the spreadsheet

Unit No.	Content
Unit-1	**Introduction to Spreadsheets**: history and importance of spreadsheet, navigating a spreadsheet, crafting formulas, common errors in spreadsheets, differences between Sheets and Excel
Unit-2	**Basic functions and utilities**: data entry, introduction to fill handles, managing rows and columns, protecting worksheets and workbooks
Unit-3	**Spreadsheet Calculations**: Introduction to the range, absolute and relative references, formulas and functions, calculation across sheets
Unit-4	**Formatting Spreadsheets**: formatting the excel sheet, introduction to borders, alignment tools, introduction to number formats
Unit-5	**Data Analysis**: find and replace functions, text functions, filtering, sorting, conditional formatting
Unit-6	**Spreadsheet Printing**: introduction to spreadsheet printing, print preview and adjustments, orientation, margins and scale, headers and footers
Unit-7	**Charts and Graphs**: basic chart types, move and resize charts, change chart styles and types, Modification chart elements
Unit-8	**Elementary Modelling**: IF statement analysis, nested if, COUNTIF and COUNTIFS, SUMIF and SUMIFS, AVERAGEIF and AVERAGEIFS
Unit-9	**Lookup Functions**: Vlookup, Hlookup, Index and match function
Unit-10	**Pivot Table and its Applications**: introduction to pivot table, filter data using slicers in multiple pivot table, visualize aggregate data using pivot table
Unit-11	**VBA Macros programming I**: create and record a macro in a spreadsheet, Msgbox, declaring variables, writing a subroutine and function in VBA
Unit-12	**VBA Macros programming II**: IF Then statement, Case statement, For loop, While loop and Do until, worksheet and range object
Unit-13	**Sensitivity Analysis**: goal seek, data table, scenario Analysis
Unit-14	**Simulation and Optimization**: Monte Carlo simulations, introduction to solver, linear programming for optimization, Intrinsic value calculation models

READINGS:

1. MICROSOFT EXCEL 2016: DATA ANALYSIS AND BUSINESS MODELING by WINSTON, WAYNE L., PHI LEARNING PVT LTD
2. BUSINESS DATA ANALYSIS USING EXCEL by DAVID WHIGHAM, OXFORD UNIVERSITY PRESS

Course Code	DEENG114	Course Title	BRITISH POETRY AND DRAMA:14TH-18TH CENTURIES

Course Code	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Relate texts to the social, cultural and political contexts

CO2: Articulate a critical position and interpretation

CO3: Use textual or critical evidence to support an interpretation

Unit No.	Content
Unit-1	**Shakespeare's Sonnets:** When to the sessions of sweet silent thought
Unit-2	**Shakespeare's Sonnets**: Let me not to the marriage of true minds
Unit-3	**Shakespeare's Sonnet**: Since brass, nor stone, nor earth, nor boundless sea
Unit-4	**John Milton:** Paradise Lost, Lines 1 to 16: introduction, themes
Unit-5	**John Milton:** Paradise Lost, Lines 1 to 16: critical analysis, stylistic analysis
Unit-6	**Shakespeare:** Macbeth: introduction, plot construction, characterization,
Unit-7	**Shakespeare**: Macbeth: themes, critical analysis
Unit-8	**John Donne:** Go and Catch a Falling Star: introduction, theme,
Unit-9	**John Donne:** Go and Catch a Falling Star: critical analysis, stylistic features
Unit-10	**Alexander Pope:** The Rape of the Lock, Canto 1: introduction, themes
Unit-11	**Alexander Pope:** The Rape of the Lock, Canto 1: critical analysis, stylistic analysis
Unit-12	**Ben Jonson:** Volpone: Jacobean era, city comedy/beast fable
Unit-13	**Ben Jonson:** Volpone: themes and issues
Unit-14	**Ben Jonson:** Volpone: satire, parasitism, animalization

READINGS:

1. THE RAPE OF THE LOCK by ALEXANDER POPE, Unique Publisher
2. SHAKESPEARE'S SONNETS by WILLIAM SHAKESPEARE, PENGUIN CLASSICS

References:

1. PARADISE LOST by JOHN MILTON, OXFORD UNIVERSITY PRESS
2. THE COMPLETE ENGLISH POEMS by JOHN DONNE, PENGUIN CLASSICS
3. MACBETH by WILLIAM SHAKESPEARE, RUPA PUBLICATIONS
4. VOLPONE by JONSON BEN, CAMBRIDGE UNIVERSITY PRESS

Course Code	EMTH159	Course Title	MULTIVARIATE CALCULUS

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Learn conceptual variations while advancing from one variable to several variables in calculus.

CO2: Describe the limit and examine the continuity of a function at a point.

CO3: Get in-depth knowledge of techniques for the evaluation of multiple integrals.

CO4: Learn various applications of double and triple integrals.

CO5: Realize the importance of Green, Gauss and Stokes' theorems in other branches of mathematics.

Unit No.	Content
Unit-1	Functions of several variables, Limit and continuity of functions of two and three variables
Unit-2	Partial differentiation, Total differentiability and differentiability, Sufficient condition for differentiability, Chain rule for one and two independent parameters, Tangent planes
Unit-3	Jacobian, Euler's theorem for homogeneous functions, Taylor's theorem for functions of two variables and more variables
Unit-4	Extrema of functions of two and three variables, Method of Lagrange multipliers, constrained optimization problems
Unit-5	Double integration over the rectangular region, Double integration over the nonrectangular region, Double integrals in polar co-ordinates
Unit-6	Triple integrals, Triple integral over a parallelepiped and solid regions, Change of the order of integration
Unit-7	Change of variables in double integrals and triple integrals, cylindrical and spherical coordinates
Unit-8	Area and volume by using a double integral, Volume by using a triple integral
Unit-9	Limit, continuity and differentiability of vector functions
Unit-10	The gradient of a scalar field and directional derivatives, maximal and normal property of the gradient, Tangent planes
Unit-11	Definition of a vector field, divergence and curl of a vector field
Unit-12	Line integrals, Applications of line integrals: Mass and Work
Unit-13	Fundamental theorem for line integrals, Conservative vector fields, independence of path, Green's theorem
Unit-14	Surface integrals, Integrals over parametrically defined surfaces, Stoke's theorem, The Gauss divergence theorem

READINGS:

1. George B. Thomas Jr., Joel Hass, Christopher Heil& Maurice D. Weir (2018). Thomas' Calculus (14th edition). Pearson Education.
2. James Stewart (2012). Multivariable Calculus (7th edition). Brooks/Cole. Cengage.
3. Monty J. Strauss, Gerald L. Bradley & Karl J. Smith (2011). Calculus (3rd edition) Pearson Education. Dorling Kindersley (India) Pvt. Ltd

Course Code	EACC210	Course Title	CORPORATE ACCOUNTING

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Identify and illustrate issues relating to raising funds through internal and external sources
CO2: Apply the accounting provisions for redemption of preference shares and debentures
CO3: Solve the accounting problems using the provisions of amalgamation and its accounting treatment
CO4: Illustrate thorough knowledge of cash flow statements and the ability to apply them to solve problems
CO5: Appraise the conceptual framework and provisions of managerial remuneration
CO6: Apply the accounting provisions related to the preparation of final accounts of companies

Unit No.	Content
Unit-1	**Accounting for share capital**: introduction to share capital, pro-rata allotment of shares, forfeiture of shares, reissue of forfeited shares
Unit-2	**Right issue**: provisions related to issue of right shares, accounting treatment **Bonus issue**: legal provisions for issue of bonus shares, accounting entries
Unit-3	**Redemption of preference shares**: concept, legal provisions for redemption, accounting entries
Unit-4	**Redemption of debentures**: the redemption of debentures through sinking fund, purchase from open Market **Buyback of shares**: the concept of buyback of shares, legal provisions for buyback of shares
Unit-5	**Underwriting of shares**: concept, the liability of underwriters **Managerial remuneration**: provisions related to managerial remuneration
Unit-6	**Final accounts of companies**: form and content of profit and loss account, form and content of balance sheet as per the sixth schedule, accounting treatment
Unit-7	**Valuation of shares**: introduction, need for valuation of shares, methods for valuation of shares
Unit-8	**Cash flow statement**: concept, preparation of cash flow statement
Unit-9	**Amalgamation I:** introduction to amalgamation, types of amalgamation, methods of purchase consideration, amalgamation in the nature of merger, accounting treatment
Unit-10	**Amalgamation II:** amalgamation in the nature of the purchase, accounting treatment in the books of the transferor company, accounting treatment in the books of the transferee company
Unit-11	**Internal reconstruction**: alteration of share capital, the procedure of reducing share capital, accounting entries
Unit-12	**Statement of changes in equity**: introduction, financial statement presentation, IFRS for SMEs, changes in accounting policies, the format of changes in equity
Unit-13	**Accounts of Holding Companies/Parent Companies:** Preparation of consolidated balance sheet with one subsidiary company, Relevant provisions of Accounting Standard: 21 (ICAI)
Unit-14	**Accounts of Banking Companies**: Difference between balance sheets of banking and non-banking companies, prudential norms, asset structure of a commercial bank, non-performing assets (NPA)

READINGS:

1. CORPORATE ACCOUNTING by JAIN S.P., NARANG K.L., KALYANI PUBLISHERS
2. CORPORATE ACCOUNTING by S.N. MAHESHWARI, S.K. MAHESHWARI, VIKAS PUBLISHING HOUSE
3. CORPORATE ACCOUNTING by P.C. TULSIAN, Tata McGraw Hill, India
4. CORPORATE ACCOUNTING by A. MUKHERJEE, H HANIF, MCGRAW HILL EDUCATION

Course Code	EBSL301	Course Title	INCOME TAX LAW AND PRACTICE

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Memorize and describe the basic principles of direct tax laws

CO2: Apply the rules associated with the calculation of income under the head salaries, house property, business or profession, capital gains and other sources

CO3: Demonstrate the various statutory deductions available to individuals

CO4: Examine the regulatory guidelines related to the computation of total income and income tax of individuals

CO5: Apply critical thinking and problem-solving skills to resolve income tax issues

CO6: Use the provisions of the Income-tax Act for e-filing of Income-tax returns

Unit No.	Content
Unit-1	**Introduction to Basic Concepts of Income-tax law:** Income, agricultural income, person, assessee, assessment year, previous year, gross total income, total income.
Unit-2	**Identification of Residential status**; Scope of total income based on residential status, residential status of a person, Incidence of Tax, Exempted incomes under section 10
Unit-3	**Concepts of revenue and capital receipts and expenditures:** Capital receipts Vs. Revenue receipts, Tests of distinction, Capital expenditure Vs. Revenue expenditure
Unit-4	**Computation of income under the head salaries**: Computation of salary income, Allowances, Perquisites.
Unit-5	**Computation of income under the head house property**: Basic terminology, Determination of annual value under different situations, Deductions u/s 24
Unit-6	**Computation of income under the head capital gains**: Meaning and types of capital gain, Basis of charge, Computation, Exemptions u/s 54
Unit-7	**Computation of income under the head business &profession**: Difference between business and profession, Allowable and disallowed expenses, Computation of Book Profits and total income under the head Business and Profession
Unit-8	**Provisions of depreciation**: Concept, Conditions and rates, Methods and computation
Unit-9	**Computation of income from other sources**: General incomes, Specific incomes **Agricultural income**: Integration of agricultural income with non-agricultural income, Tests, Definition
Unit-10	**Clubbing of income**: Assessability of income from assets transferred to spouse, sons, wife or another person for the benefit of the spouse. Assessment of Individual's income in different cases
Unit-11	**Set-off and carry forward losses**: Set-off inter head provisions, Set-off intra-head provisions, Carry forward provisions
Unit-12	**Deductions from total income**: Provisions relevant to Deductions under sections 80C to 80U; Rebates and relief
Unit-13	**Assessment of individuals**: Computation of total income after set-off of losses fewer deductions under sections 80C to 80U, Rounding off of income as well as tax, Computation of total income and tax liability
Unit-14	**Filing of return**: Meaning of PAN, Provisions of PAN, Filing Application of PAN under Income Tax Act, E-filing of ITR forms & TDS, Provision & Procedures of Compulsory On-Line filing of returns for specified assesses

READINGS:

1. Singhania, Vinod K. and Monica Singhania. Students' Guide to Income Tax, University Edition Taxmann Publications Pvt. Ltd., New Delhi.
2. Ahuja, Girish and Ravi Gupta. Systematic Approach to Income Tax. Bharat Law House, Delhi.

Course Code	EFIN302	Course Title	FUNDAMENTALS OF FINANCIAL MANAGEMENT

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Analyze the role of financial management and the key strategies and techniques used to manage cash, marketable securities, accounts receivable and inventory.

CO2: Identify the major sources of short-term and long-term financing available to the firm.

CO3: Observe concept of the time value of money and the effect of dividend policy on the value of the firm.

CO4: Interpret the capital structure decisions of the firm.

CO5: Develop the understanding of Company Capital budgeting methods and decisions.

Unit No.	Content
Unit-1	**Financial Management**: introduction to financial management, scope and applications of finance, financial goal profit maximization/wealth maximization
Unit-2	**Financial Management Functions**: Finance function, the role of finance manager, Controller and Treasury functions in respect to Financial Management
Unit-3	**Sources of finance**: short-term sources, medium-term sources, long-term sources of finance
Unit-4	**Time value of money**: concept, the meaning of TVM, the future value of cash flow, the present value of cash flow, future value of an annuity, present value of the annuity, perpetuity, difference between annuity and perpetuity
Unit-5	**Practical Applications of the Time value of Money:** Numerical aspects to understand Perpetuity, Annuity of single cash flow, Compound Interest, Simple Interest
Unit-6	**Cost of capital**: introduction, Relevance of cost of capital, components of cost of capital-cost of debt, cost of preference capital, cost of equity capital, the weighted average cost of capital, CAPM techniques
Unit-7	**Capital structure:** introduction, the concept of optimum capital structure, relevance theories of capital structure, irrelevance theories of capital structure
Unit-8	**Capital budgeting**: introduction, nature of capital budgeting, capital budgeting decisions types, non-discounting techniques, discounting techniques
Unit-9	**Leverage**: Meaning, Types of Leverage, Financial leverage, Operating Leverage, Combined Leverage
Unit-10	**Dividend theory**: introduction, objectives of dividend policy, forms of dividend, dividend relevance, dividend irrelevance
Unit-11	**Working capital management**: introduction to working capital, working capital determinants, operating cycle, liquidity and profitability trade-off
Unit-12	**Inventory management**: introduction, objectives, need, inventory management techniques, ABC Analysis.
Unit-13	**Cash management**: introduction, objectives, need, techniques for cash collection
Unit-14	**Receivables management**: introduction, nature of credit policy, credit policy variables

READINGS:

1. ESSENTIALS OF FINANCIAL MANAGEMENT by PANDEY I. M, VIKAS PUBLISHING HOUSE
2. BASIC FINANCIAL MANAGEMENT by KHAN M Y, JAIN P K, Mcgraw Hill Education
3. FINANCIAL MANAGEMENT THEORY AND PRACTICE by GUPTA SHASHI, K., SHARMA R.K, KALYANI PBLISHERS
4. FUNDAMENTALS OF FINANCIAL MANAGEMENT by SHARAN VYUPTKESH, Pearson

Course Code	EMKT309	Course Title	DIGITAL MARKETING

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Apply and analyse digital marketing activities in achieving business objectives.

CO2: To develop skills relevant to marketing campaigns for enhancing business reach.

CO3: Examine marketing metrics and collect consumer data using digital media.

CO4: Improve the brand identity and develop the customer base using real-world techniques.

Unit No.	Content
Unit-1	**Introduction to Digital Marketing-** Digital vs. Traditional Marketing, Digital Marketing Channels, ROI between Digital and traditional marketing, Creating an initial digital marketing plan and Content Management.
Unit-2	**Search Engine Basics**- Introduction to Search Engines and Websites, Difference between Blog, Portal and Website, Static and Dynamic Websites.
Unit-3	**Keyword Research** - Keyword Research, Types of Keywords, Business Analysis & Categorization, Google Keyword Planner, Market Research and Analysis, New Keyword Ideas and Finalizing the Keywords List.
Unit-4	**On-page Webmaster Tools**- Introduction to on page Webmaster Tools, Verification Process in GWMT, Selecting Target Location, On page Analysis Methodology and Fundamental On-page Factors.
Unit-5	**Optimization Techniques** - Website Speed, the Domain name in SEO, URL Optimization, Title and Meta Tag Optimization, Sitemaps Generation, Using Robot.txt in Site URL, Redirecting Techniques, Canonical Links and Rich Snippets.
Unit-6	**Off-Page Optimization-** Link Building, Types of Linking Methods, Linking Building Methodology, Links Analysis Tools, Directory Submissions, Social Bookmarking, Blogging & Commenting and Guest Blogging.
Unit-7	**Search Engine Optimization**- Local SEO, Importance of Local SEO, Local SEO Ranking Signals, Local SEO Negative Signals, Citations and Local Submissions, Website Position Analysis and Website Monthly Reports.
Unit-8	**Paid Marketing Techniques-** Google Account setup, Account Structure, Campaigns settings, Ad Group setup, Keyword Match Types, Keyword Research Tools and Understanding Ad Auction.
Unit-9	**Bidding and Quality Score-** Factors to improve Quality Score, Types of CPCs, Bidding strategies, Bidding strategies, Ad Guidelines and Ad Extensions
Unit-10	**Display Advertising-** Benefits of Display Advertising, creating a Display Campaign, Bidding Strategies, Targeting Option in Display Network, Examples of Good and Bad Ads, Display Ad Builder and Conversion Tracking.
Unit-11	**Web Analytics and reporting-** Key Performance Metrics [KPI] in Analytics, Traffic reports and Behaviour reports
Unit-12	**Social Media Marketing**- Introduction to SMM, Facebook Marketing, Facebook Advertising and Email Marketing.
Unit-13	**Budgeting and implementation**- Digital Marketing Budget, resource planning, cost estimation, cost budgeting, cost control for effective planning and implementing digital marketing techniques

Unit-14	**Visual Marketing-** Visual Perception, Choosing the Right Image, Visual marketing tools, Planning and Organizing the content and blogging to brand yourself

READINGS:

1. Ryan, D. (2014). Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation, Kogan Page Limited.
2. The Beginner's Guide to Digital Marketing (2015). Digital Marketer. Pulizzi, J. (2014) Epic Content Marketing, Mcgraw Hill Education.

Course Code	EENG115	Course Title	BRITISH LITERATURE 18TH-20TH CENTURIES

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Identify the main images and symbols in the texts

CO2: Evaluate the scenario in the genre of 18th-century plays

CO3: Relate literary texts to significant social, cultural, political and historical issues

CO4: Analyses the literary texts to explore the themes and the main issues

Unit No.	Content
Unit-1	William Congreve -*The Way of the World*: Plot, characterization.
Unit-2	William Congreve -*The Way of the World*: Themes, narrative technique.
Unit-3	Jonathan Swift -*Gulliver's Travels (Three)*: Plot, characterization.
Unit-4	Jonathan Swift -*Gulliver's Travels (Three)*: Themes, narrative technique.
Unit-5	Jonathan Swift -*Gulliver's Travels (Four)*: Plot, characterization.
Unit-6	Jonathan Swift -*Gulliver's Travels (Four)*: Themes, narrative technique
Unit-7	Samuel Johnson- *'London'*: Introduction, critical appreciation.
Unit-8	Samuel Johnson- *'London'*: Stylistic features, themes.
Unit-9	Thomas Gray - *'Elegy Written in a Country Churchyard'*: Introduction, stylistic features.
Unit-10	Thomas Gray - *'Elegy Written in a Country Churchyard'*: Critical appreciation, themes.
Unit-11	Laurence Sterne- *The Life and Opinions of Tristram Shandy, Gentleman*: Plot, characterization.
Unit-12	Laurence Sterne- *The Life and Opinions of Tristram Shandy, Gentleman*: Themes, narrative technique.
Unit-13	Dreams-Children - *A Reverie by Charles Lamb*: Introduction, summary
Unit-14	Dreams-Children - *A Reverie by Charles Lamb*: Themes, critical analysis.

READINGS:

1. THE WAY OF THE WORLD by WILLIAM CONGREVE, DOVER PUBLICATIONS
2. GULLIVER'S TRAVELS (PENGUIN CLASSICS) by SWIFT, JONATHAN, PENGUIN BOOKS INDIA

Course Code	EMTH256	Course Title	DIFFERENTIAL EQUATIONS

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Understand the genesis of ordinary differential equations

CO2: Illustrate the solution of exact differential equations

CO3: Develop the solution of homogeneous and non-homogeneous equations

CO4: Discuss the solution of higher-order differential equations by using various methods

CO5: Analyze and compute the series solutions of a linear differential equation of an arbitrary order

CO6: Formulate mathematical models in the form of ordinary differential equations.

Unit No.	Content
Unit-1	Definition, formation and solution of differential equations, Equations in which variables are separable, Homogeneous equations, Linear differential equations and equations reducible to linear form.
Unit-2	Exact differential equations of the first order, integrating factors, and rules to find integrating factors.
Unit-3	First-order higher degree equations solvable for x, y, p, Clairaut's equation, introduction to singular solutions, Picard's method of successive approximations.
Unit-4	The basic theory of linear differential equations, Solutions of homogeneous linear ordinary differential equations with constant coefficients.
Unit-5	Wronskian and its properties, Solutions of non-homogeneous linear ordinary differential equations with constant coefficients.
Unit-6	Method of variation of parameters, method of undetermined coefficients, Solution of the Cauchy-Euler equation,
Unit-7	The genesis of Partial differential equations (PDE), the Concept of linear and non-linear PDEs, Methods of solution of Simultaneous differential equations of the form: $dx/P(x,y,z) = dy/Q(x,y,z) = dz/R(x,y,z)$,
Unit-8	Lagrange's method for PDEs of the form: $P(x,y,z)p+Q(x,y,z)q=R(x,y,z)$, where $p=\partial z/\partial x$ and $q=\partial z/\partial y$; Solutions passing through a given curve.
Unit-9	Solution of non-homogeneous reducible equations using Lagrange's method for first-order equations.
Unit-10	Reducible and irreducible homogeneous equations and their solutions in various possible cases,
Unit-11	Orthogonal trajectories of one-parameter families of curves in a plane, Minimum velocity of escape from Earth's gravitational field.
Unit-12	Newton's law of cooling, Malthusian and logistic population models.
Unit-13	Free and forced mechanical oscillations of a spring-suspended vertically carrying a mass at its lowest tip
Unit-14	Phenomena of resonance, LCR circuits, surface orthogonal to a given system of surfaces.

READINGS:

1. DIFFERENTIAL EQUATIONS by SHIPLEY L. ROSS, JOHN WILEY & SONS

2. ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS by DR. M.D. RAISINGHANIA, S Chand Publishing

3. IAN N. SNEDDON (2006). ELEMENTS OF PARTIAL DIFFERENTIAL EQUATIONS. DOVER PUBLICATIONS

4. ERWIN KREYSZIG (2011). ADVANCED ENGINEERING MATHEMATICS (10^{TH} EDITION) J. WILEY & SONS

Course Code	EACC301	Course Title	MANAGEMENT ACCOUNTING

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Analyze the financial statement of various companies
CO2: Use of ratio analysis to evaluate the performance and resolve the issues of various entities
CO3: Prepare cash, sales, flexible and production budgets
CO4: Apply the concepts of marginal costing for decision-making in organizations
CO5: Use the various techniques of profitability analysis to interpret the performance of the organization
CO6: Define the meaning of transfer pricing and various methods of calculating transfer pricing
CO7: Focus on the applicability of transfer pricing methods in the industry

Unit No.	Content
Unit-1	**Introduction to Management Accounting**: Meaning and Nature of Management Accounting, Objectives, Scope and Limitations of Management Accounting, Distinction between Management Accounting, Financial Accounting & Cost Accounting
Unit-2	**Management Discussion and Analysis Report**: Management discussion and analysis report, Director's report, Auditors report, Corporate Governance report, Concept of IFR
Unit-3	**Financial Statement Analysis**: Meaning of Financial Statement Analysis, Objectives and Importance, Comparative Statement Analysis (Horizontal Analysis), Common Size Statement Analysis (Vertical Analysis)
Unit-4	**Ratio Analysis I**: Meaning and Scope of Ratio Analysis, Advantages and Limitations, Users of Ratios, Liquidity Ratios, Efficiency Ratios
Unit-5	**Ratio Analysis II:** Solvency Ratios, Profitability Ratios, Leveraged Ratios, Du Pont Control Chart
Unit-6	**Profitability analysis**: Income measurement analysis, Revenue analysis, Cost of Sales analysis, Expense analysis, Variation analysis
Unit-7	**Risk and Return**: Calculating return, Types of risk, Relationship between risk and return
Unit-8	**Budgeting**: Concept of Budgeting, Meaning of Budgetary Control, Budgeting Process, Advantages and Limitations of Budgeting, Types of Budgets, Preparation of Cash Budget, Flexible Budget, Sales Budget and Production Budget, Zero Base Budgeting
Unit-9	**Absorption Costing and Marginal Costing**: Need for Marginal Costing, Difference Between Absorption Costing and Marginal Costing, Marginal Cost Equation, Break-Even Analysis, CVP Analysis, Effects of Certain Changes on P/V Ratio
Unit-10	**Decision Making:** Steps in Decision Making Process, Concept of Relevant Costs and Benefits, Various short-term decision-making situations – profitable product mix, Acceptance or Rejection of special / export offers, Make or buy, Addition or Elimination of a product line, sell or process further, operate or shut down. Pricing Decisions: Major factors influencing pricing decisions, various methods of pricing
Unit-11	**Artificial Intelligence and Analytics**: Finance and Accounting transformation by AI
Unit-12	**Transfer Pricing**: Concept of Transfer Pricing, Types of Transfer Pricing, Methods for Calculating Transfer Price
Unit-13	**Management Information System:** Meaning, Objectives, characteristics, nature and scope, advantages and limitations, Introduction to Reporting, Meaning and Objective of Preparing Reports, Kinds of Reports, Elements and Types of reports, Levels of Management and Reporting

Unit-14	**Responsibility Accounting**: Meaning and Prerequisites, Steps involved in Responsibility Accounting, Advantages and Limitations of Responsibility Accounting, Types of Responsibility Centers

READINGS:

1. COST AND MANAGEMENT ACCOUNTING by M.N. ARORA, VIKAS PUBLISHING HOUSE
2. MANAGEMENT ACCOUNTING by DEBARSHI BHATTACHARYYA, PEARSON
3. MANAGEMENT ACCOUNTING by MY KHAN, PK JIAN, MCGRAW HILL EDUCATION
4. COST & MANAGEMENT ACCOUNTING by MN ARORA, HIMALAYA PUBLISHING HOUSE PVT. LTD
5. COST & MANAGEMENT ACCOUNTING by MN ARORA, VIKAS PUBLISHING HOUSE

Course Code	EBSL304	Course Title	GOODS AND SERVICES TAX AND CUSTOMS LAW

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Describe provisions of goods and services tax and customs law in India
CO2: Calculate the tax payable under GST and custom duty
CO3: Analyze taxation cases using the provisions of GST and customs law in actual practice
CO4: Examine the provisions relevant to registration and filing of GST return
CO5: Determine taxable event and valuation under GST
CO6: Describe the provisions of reverse charge and composition scheme under GST

Unit No.	Content
Unit-1	**Overview of GST**: basic terminology, benefits, taxes subsumed in GST, structure, GST council, GST network
Unit-2	**The taxable event in GST**: supply of goods & services, place of supply, time of supply, mixed &composite supplies, classification of goods & services
Unit-3	**Valuation under GST**: transaction value, valuation rules
Unit-4	**Input tax credit**: requirements, eligible and ineligible input tax credit, reversal of ITC, recovery of ITC
Unit-5	**Reverse charge**: general provisions, the procedure of reverse charge, supply of goods & services liable for reverse charge
Unit-6	**Composition scheme**: eligibility, the procedure to avail the scheme, effective date, validity &withdrawal from scheme, switch over
Unit-7	**Registration under GST**: requirements & procedure for registration, persons liable for registration, voluntary registration, cancellation of registration
Unit-8	**Tax invoice**: tax invoice in respect of goods, tax invoice in respect of services, contents of tax invoice
Unit-9	**Tax payment under GST**: electronic payment of tax & other dues, sequence of discharge of tax, interest on delayed payment of tax
Unit-10	**Filing of GST Return**: Types of GST returns, Taxpayers liable to file the return, Due dates for GST returns, Procedure to file GST return online
Unit-11	**Overview of customs law**: basic concepts, a charge of duty, types of customs duty, valuation of customs duty
Unit-12	**Procedures in customs law**: import procedure, export procedure
Unit-13	**Officers of customs:** classes of officers, the appointment of officers, powers of officers, searches, seizure and arrest, offenses, penalties
Unit-14	**Baggage rules**: basic terms, general free allowance

READINGS:

1. GST LAW & PRACTICE WITH CUSTOMS & FTP by V.S. DATEY, TAXMANN PUBLISHER
2. GOODS AND SERVICES TAX by H.C. MEHROTRA & V.P. AGARWAL, SAHITYA BHAWAN PUBLICATIONS

Course Code	EMGN358	Course Title	E-COMMERCE

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Identify different kinds of e-commerce sites and the differentiation strategy behind them

CO2: Develop value in an online setting and design a suitable payment system

CO3: Develop a website, taking care of its security and reliability

Unit No.	Content
Unit-1	**Electronic business- understanding new internet economy and business**: objectives of e-business, the transition from traditional business to e-business, e-business and e-commerce, advantages of e-business
Unit-2	**E-business models**: e-business structure, the evolution of e-business and its stages, e-business models based on functionality, e-business models based on transactions
Unit-3	**E-business competitive and business strategy**: competitive advantage and competitive strategy, the role of technology in building competitive advantage, building competitive advantage through e-business
Unit-4	**E-market**: electronic market, internet advertising, e-business advertising- types, classification of e-markets
Unit-5	**Value creation and business strategies in e-age**: value drivers of e-business, e-business strategies and strategic challenges, e- business value chain
Unit-6	**E-business applications**: characteristics, classification, current trends in e-business
Unit-7	**E-procurement and e-fulfillment:** e-procurement model, e-procurement process, e-procurement infrastructure, e-SCM, e-SCM evolution
Unit-8	**Creating e-business plan**: why should a business plan be written, elements of e-business plan, phases/aspects of e-business plan, what should be avoided while writing an e-business plan
Unit-9	**Building and launching e-business**: e-business launching considerations, checklist for launching an e-business, challenges in e-business transition, types of changes in e-businesses, stages of e-business process reengineering in e-business change
Unit-10	**Online payment systems**: traditional payment methods, online payment system characteristics, online payment methods, security and risk handling in online payments, fraud detection in online payments
Unit-11	**Design and development of a business website**: prerequisites for designing in-house websites, steps involved in website development, security issues involved in websites
Unit-12	**Constructing e-business enterprise Applications**: trends, problems due to lack of integration, cross-functional integrated applications, integrated application frameworks
Unit-13	**Enterprise resource planning (ERP) for e-business**: basics of ERP, ERP decision, ERP applications, ERP implementation
Unit-14	**Security and reliability of e-business**: risk analysis- information classification, computer viruses, worms and Trojans, other threats, e-business security policy

READINGS:

1. E- BUSINESS by PARAG KULKARNI, SUNITA JAHIRABADKAR, PRADIP CHANDE, OXFORD UNIVERSITY PRESS
2. ELECTRONIC COMMERCE: A MANAGER'S GUIDE by RAVI KALAKOTA, ANDREW B.WHINSTON, PEARSON

Course Code	EMKT312	Course Title	SELLING SKILLS

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Use selling concepts and skills to critically handle sales situations

CO2: Demonstrate product information persuasively to develop an effective sales personality

CO3: Develop skills for overcoming the objections and evolving sales closing techniques

CO4: Formulate relationship marketing strategies and devise approaches to retain customers

CO5: Develop value-added selling strategies that enhance personal selling

Unit No.	Content
Unit-1	**Developing a personal selling philosophy:** relationship selling opportunities, the evolution of selling models that complement the marketing concept
Unit-2	**Developing a relationship strategy:** creating value with a relationship strategy, communication styles: a key to adaptive selling today
Unit-3	**Ethics: The foundation for relationship in selling:** making ethical decisions, factors influencing the ethics of salespeople
Unit-4	**Developing a product strategy:** creating product solutions, and product-selling strategies that add value
Unit-5	**Developing a customer strategy:** the buying process and buyer behavior, developing and qualifying a prospect base
Unit-6	**Developing a presentation strategy:** approaching the customer with adaptive selling, determining customer needs with a consultative questioning strategy
Unit-7	**Creating consultative presentation:** negotiating buyer concerns, formal integrative negotiation
Unit-8	**Adapting the close and confirming partnership:** guidelines for closing the sale, recognizing the closing clues, specific methods for closing the sale
Unit-9	**Servicing the sale:** building long-term partnerships with customer service, current development in customer service
Unit-10	**Building partnership:** customer service methods to strengthen the partnership, partnering with unhappy customers
Unit-11	**Opportunity Management:** a four-dimensional process, time management, time-consuming activities, time management methods
Unit-12	**The key to greater sales productivity:** territory management, records management, stress management
Unit-13	**Management of sales force:** applying leadership skills to sales management, recruitment and selection of salespeople
Unit-14	**Orientation and Training:** sales force motivation, compensation plan, assessing sales force productivity

READINGS:

1. SELLING TODAY: PARTNERING TO CREATE VALUE by GERALD L. MANNING, MICHAEL HEARNE & BARRY L. REECE, PEARSON
2. ABC'S OF RELATIONSHIP SELLING THROUGH SERVICE by CHARLES M. FUTRELL, Tata McGraw Hill, India
3. THE SPIN SELLING FIELDBOOK by NEIL RACKHAM, Tata McGraw Hill, India

Course Code	EENG316	Course Title	WOMEN'S WRITING

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Identify different terms related to women's writing

CO2: Develop critical thinking

CO3: Analyze different themes in the text and match them with real-life events

Unit No.	Content
Unit-1	**Introduction to Women's Writing**: The confessional mode in women's writing, sexual politics, race, caste and gender.
Unit-2	**Introduction to Women's Writing**: Difference feminism, discrimination, empowerment
Unit-3	**Emily Dickinson 'I cannot live with you'**: Introduction to the poet, the metaphor of a love relationship, a model for human existence
Unit-4	**Emily Dickinson 'I cannot live with you'**: Traditional resurrection, a critical appreciation of the poem
Unit-5	**Eunice De Souza 'Advice to Women', 'Bequest':** Introduction to the poet, analysis of the poem: a critical appreciation, themes.
Unit-6	**Eunice De Souza 'Advice to Women', Sylvia Plath 'Daddy'**: Introduction to the Sylvia Plath, analysis of the poem, a critical appreciation of the poem, themes.
Unit-7	**Alice Walker 'The Color Purple**: Introduction to Alice Walker, background, character analysis.
Unit-8	**Alice Walker's The Color Purple**: Plot construction, themes, critical analysis
Unit-9	**Terms pertaining to women's writing**: Gender identity, sexual harassment, gender harassment.
Unit-10	**Terms pertaining to women's writing**: Superwoman syndrome, womanism.
Unit-11	**Katherine Mansfield 'Bliss'**: Introduction to Katherine Mansfield, background, character analysis.
Unit-12	**Katherine Mansfield 'Bliss'**: Plot construction, themes, critical analysis
Unit-13	**Mahashweta Devi 'Draupadi'**: Introduction to Mahashweta Devi, background, character analysis.
Unit-14	**Mahashweta Devi 'Draupadi'**: Plot construction, themes, critical analysis.

READINGS:

1. A GLOSSARY OF LITERARY TERMS by M.H. ABRAMS, CENGAGE LEARNING
2. THE COLOR PURPLE by ALICE WALKER, ORION PUBLISHING
3. BREAST STORIES by MAHASWETA DEVI, SEAGULL PUBLICATION
4. THE COLLECTED SHORT STORIES OF KATHERINE MANSFIELD by KATHERINE MANSFIELD, W B SAUNDERS (ELSEVIER)

Course Code	EMTH290	Course Title	REAL ANALYSIS

WEIGHTAGE	
CA	ETE(Th.)
30	70

Course Outcomes:

CO1: Review the algebraic and order structure of the real line with examples of different sets.

CO2: Analyze the role of Cauchy's criteria for convergence of the sequences in the advanced topics of analysis.

CO3: Apply their understanding of how real numbers are constructed by the sequences of rational numbers.

CO4: Practice the concept of convergence for infinite series using various tests.

CO5: Learn some of the properties of Riemann integrable functions and the applications of the fundamental theorems of integration.

Unit No.	Content
Unit-1	**The Real Number System and its Properties-I:** Algebraic and order properties of $\mathbb{R}$, absolute value of a real number, supremum and infimum of a nonempty subset of $\mathbb{R}$.
Unit-2	**The Real Number System and its Properties-II:** The completeness property of $\mathbb{R}$, Archimedean property, density of rational numbers in $\mathbb{R}$.
Unit-3	**Basic Topology-I:** Definition and types of intervals, nested intervals property, neighborhood of a point in $\mathbb{R}$, open, closed and perfect sets in $\mathbb{R}$.
Unit-4	**Basic Topology-II:** Connected sets in $\mathbb{R}$, connected sets and continuous functions, compact subsets of $\mathbb{R}$, compact sets and continuous functions, uniform continuity.
Unit-5	**Sequences-I:** Bounded and monotonic sequences, convergent sequence and its limit, limit theorems, monotone convergence theorem.
Unit-6	**Sequences-II:** Subsequences, Bolzano-Weierstrass theorem, limit superior and limit inferior, Cauchy sequence, Cauchy's convergence criterion.
Unit-7	**Series-I:** Convergence and divergence of infinite series of positive real numbers, necessary condition for convergence, Cauchy criterion for convergence
Unit-8	**Series-II:** Tests for convergence of positive term series, basic comparison test, limit comparison test, D'Alembert's ratio test, Cauchy's n^{th} root test, Cauchy integral test
Unit-9	**Series-III:** Alternating series, Leibniz test, Absolute and conditional convergence, Rearrangement of series and Riemann's rearrangement theorem.
Unit-10	**Riemann Integration-I:** Riemann integrability of bounded functions, examples of R-integrable and non-integrable functions, necessary and sufficient condition for Riemann integrable function (Statement only), Algebra of Riemann integrable functions.
Unit-11	**Riemann Integration-II:** Integrability of continuous and monotonic functions, fundamental theorem of integral calculus, first mean value theorem.
Unit-12	**Sequence and Series of Functions:** Pointwise and uniform convergence of sequence and series of functions, Weierstrass M-test.
Unit-13	**Implications of Uniform Convergence:** Uniform convergence and continuity, uniform convergence and differentiability, uniform convergence and integration.
Unit-14	**Improper Integrals:** Improper integrals and tests for improper integrals, beta and gamma functions.

READINGS:

1. Robert G. Bartle & Donald R. Sherbert, Introduction to Real Analysis (4th edition). Wiley India.
2. Walter Rudin, Principles of Mathematical Analysis, McGraw Hill.
3. K. A. Ross, Elementary Analysis: The Theory of Calculus (2nd edition). Springer.
4. T. M. Apostol, Mathematical Analysis: A Modern Approach to Advanced Calculus. Pearson Education.

Course Code	EPEA204	Course Title	ANALYTICAL SKILLS

WEIGHTAGE	
CA	ETE (Th.)
30	70

Course Outcomes:

CO1: Apply the basic concepts of reasoning and quantitative aptitude

CO2: Apply the learned concepts to solve the company-specific reasoning and quantitative Aptitude tests

CO3: Analyze the problem and use logic to interpret and handle different situations

Unit No.	Content
Unit-1	**Number system:** Types of numbers, rules of divisibility, multiplicity and squaring of numbers, HCF and LCM of numbers
Unit-2	**Average:** Average of numbers, Arithmetic Mean, Real-life examples of average, Application-based questions
Unit-3	**Number series:** Series Completion, Analogy, Classification
Unit-4	**Alphabet series:** Series Completion, Analogy, Classification
Unit-5	**Coding-Decoding**: Letter Coding, Direct Letter Coding, Number / Symbol Coding, deciphering message word codes, number and symbol codes for messages
Unit-6	**Percentage:** Concept of Percentage, Comparison based questions, Application-based questions
Unit-7	**Profit and Loss:** Profit or Loss, Cost price, Selling price, Calculation of profit and loss percent, Application-based questions, conceptual formulae
Unit-8	**Simple interest: the** concept of simple interest, general formulas, application-based questions
Unit-9	**Compound interest:** basic concepts and formula-based questions, the difference between simple interest and compound interest
Unit-10	**Alphabet Test:** Alphabetical order of words, Letter-word problems, Word formation by unscrambling letters
Unit-11	**Number Test:** Number Test, Position switching of numbers
Unit-12	**Ranking and Time Sequence Test:** Ranking Test, Time Sequence Test
Unit-13	**Direction Sense Test:** direction puzzle, sense the directions correctly
Unit-14	**Blood Relation:** Coded Relations, relation-based puzzle

READINGS:

1. A MODERN APPROACH TO NON-VERBAL REASONING by R S AGGARWAL, S Chand Publishing
2. QUANTITATIVE APTITUDE FOR COMPETITIVE EXAMINATIONS by R S AGGARWAL, S Chand Publishing
3. QUANTITATIVE APTITUDE by ABHIJIT GUHA, Tata McGraw Hill, India

Course Code	ECAP392	Course Title	Fundamentals of Java Programming

WEIGHTAGE		
CA	ETE(Th.)	ETE (Pr.)
30	40	30

Course Outcomes: Through this course, students should be able to

CO1: Perceive the importance of using object-oriented programming concepts in Java.

CO2: Understand the accessibility of fields and methods of an object and the use of String and StringBuilder classes

CO3: Develop user-defined exceptions to control unexpected situations.

CO4: Facilitate the input and output operations on the file.

Unit No.	Content
Unit-1	**Introduction**: introduction to object-oriented programming, features of Java Language, java classes, objects, the main method, access control
Unit-2	**Methods:** defining fields and methods, method arguments and return values, declaring, instantiating and initializing objects, variables, and its types, and control flow constructs.
Unit-3	**Encapsulation & Polymorphism:** encapsulation, polymorphism, overloading a method
Unit-4	**Constructors**: constructors & its types, overloading constructor, static methods and variables
Unit-5	**String manipulations:** working with strings: String, String Buffer and StringBuilder classes.
Unit-6	**Inheritance & Interfaces:** an overview of inheritance, working with subclasses and super classes, overriding methods in the superclass.
Unit-7	**More on Inheritance:** Creating and extending abstract classes, using Interfaces
Unit-8	**Nested classes:** nested classes, inner classes, wrapper classes
Unit-9	**Packages:** built-in packages in Java, user-defined packages,
Unit-10	**More on Packages:** creating and importing packages, adding classes to packages, introduction to Java API
Unit-11	**Exception Handling**: introduction to exceptions, built-in and user-defined exceptions, catching and throwing exceptions
Unit-12	**More on Exception handling:** propagation of exceptions handling multiple exceptions, throws vs throw.
Unit-13	**File handling:** basics of input and output in Java, stream classes, read and write data from the console
Unit-14	**More on File Handling:** file stream classes, using streams to read and write files, random access files.

Laboratory Work:

Implementation of Java Programming Concepts (Classes and objects, constructor, method overloading, string manipulations, inheritance, exception handling and working with files)

Text Books:

1. Programming with JAVA by E. Balagurusamy, Mc Graw Hill publication

Reference Books:

1. JAVA: The Complete Reference by Herbert Schildt, Mcgraw Hill Education
2. Core Java: An Integrated Approach by Dr. R. Nageswara Rao, Dreamtech press publication

Course Code	ECAP460	Course Title	FUNDAMENTALS OF PYTHON

WEIGHTAGE		
CA	ETE(Th.)	ETE (Pr.)
30	40	30

Course Outcomes: Through this course, students should be able to
CO1: Understand the properties and applications of the python programming language
CO2: Apply programming constructs of python to develop programs
CO3: Implement the input and output operations on files
CO4: Analyze real-life situation-specific problems and perceive solutions

Sr. No.	Topics
1	**Introduction to python:** installation and setting up the path, working with python, basic syntax
2	**Python basics:** understanding python variables, understanding python blocks, applications of python
3	**Data types and operators:** declaring and using numeric data types: int, float, complex, use of string data type, use of tuple data type, python basic operators
4	**Program flow control:** conditional blocks using if, else and elif, simple for loops in python
5	**Program flow control:** use of while loops in python, loop manipulation using a pass, continue, break and else
6	**Handling strings:** accessing strings, string length, string traversal, string comparison, find function, for loop using string
7	**Lists:** accessing lists, operations, slices, deletion, for loop using a list
8	**Tuples:** accessing tuples, operations, working, functions and methods
9	**Sets:** access set items, add set items, remove set items, set methods
10	**Dictionaries:** accessing values in dictionaries, working with dictionaries, properties, functions, for loop using dictionaries
11	**Functions:** defining a function, calling a function, types of functions, function arguments
12	**Text files:** printing on screen, reading data from keyboard, opening and closing files, reading and writing files
13	**Classes and objects:** creating classes, creating instance objects, accessing attributes
14	**OOP features: an** overview of OOP Terminology, constructor

Laboratory Work:

Implementation of Java Programming Concepts (Classes and objects, constructor, method overloading, string manipulations, inheritance, exception handling and working with files)

Text Books:

1. Programming with JAVA by E. Balagurusamy, Mc Graw Hill publication

Reference Books:

1. JAVA: The Complete Reference by Herbert Schildt, Mcgraw Hill Education
2. Core Java: An Integrated Approach by Dr. R. Nageswara Rao, Dreamtech press publication

Course Code	ECAP512	Course Title	OPEN-SOURCE WEB APPLICATION DEVELOPMENT

WEIGHTAGE	
CA	ETE (Th.)
30	70

Course Outcomes:

CO1: Develop dynamic web applications using PHP

CO2: Apply database concepts to effectively manage data using server site script

CO3: Summarize the different aspects of server site and client site scripts

CO4: Apply the parsing technique to read data from other sources

Unit No.	Content
Unit-1	**My SQL**: current and future versions of MySQL, installing MySQL. basic security guidelines. privilege system and working with user privileges
Unit-2	**Apache Server**: versions of apache. choosing the appropriate installation method. installing on windows, Apache configuration file structure, apache log file, starting apache for the first time
Unit-3	**PHP**: versions of PHP. installation of PHP. PHP. Ini basics. testing installation
Unit-4	**Building Blocks of PHP**: variables, data types, operators & expressions, constants, switching flow, loops, code blocks and browser output
Unit-5	**Functions**: meaning, calling, defining a function. the return value from the user-defined function, saving state with 'static' function. testing for the existence of function
Unit-6	**Arrays**: what are arrays, creating arrays, array-related functions
Unit-7	**Objects**: creating an object. object inheritance
Unit-8	**Working with String, Dates & Time**: formatting string with PHP. using date and time functions with PHP. other string, date/time functions
Unit-9	**Forms**: creating a simple input form. accessing form input with user-defined arrays, Html and PHP code on a single page. using hidden fields to save state. redirecting user. working with file upload
Unit-10	**Cookies**: introducing cookies, setting cookies, deleting cookies with Php, session function overview, starting the session, working with session variables. destroying sessions and unsetting variables
Unit-11	**Files and Directories**: include files with include (). validating files. creating files, deleting files, opening a file for reading, writing, appending
Unit-12	**Images**: understanding the image creation process, necessary modifications to PHP, drawing a new image, modifying existing images, image creation from user input
Unit-13	**Stored Procedures**: what are transactions, what are stored procedures
Unit-14	**Connecting to MySQL with PHP**: working with MySQL data

READINGS:

1. TEACH YOURSELF PHP, MYSQL & APACHE, BY: MELONI, PEARSON EDUCATION
2. OPEN-SOURCE DEVELOPMENT WITH LAMP: USING LINUX, APACHE, MYSQL, PERL & PHP BY: JAMES LEE, PEARSON EDUCATION
3. PHP: A BEGINNER'S GUIDE BY: VASWANI, VIKRAM, BY: TATA MC-GRAW HILL