FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22CE501T	Software Engineering and Project Management	3	-	-	3	30	70	100

Course Objectives	Course Outcomes
This course is intended ● To provide understanding of software engineering principles ● To enable students to understand stages involved in the development of software project ● To get acquainted with software quality, reliability and software configuration management.	Students will be able to ● distinguish and apply software development techniques to the different kinds of project. ● understand role of software engineer, analyze project requirements and author a formal specification for a software system. ● apply design process, steps for effective UI design depending on the requirement of the project. ● design test cases, apply testing strategies and demonstrate the ability to plan, estimate project. ● demonstrate the ability to work on software project by taking into consideration software quality factors.

Unit I	**[7Hrs]**
What is Software?, Role of Software Engineer, software development phases Process Models: Waterfall Model, Prototype model Incremental model, Spiral Model, Agile process: Scrum, Extreme programming.	
Unit II	**[8Hrs]**
Requirements Engineering: Initiating the process, Eliciting Requirements, Building the Requirements Model, Negotiating, Validating requirements, Requirements Analysis, Scenario-Based Analysis, Requirements Modeling strategies, Flow-Oriented Modeling, Class based modeling, SRS.	
Unit III	**[7Hrs]**
Design: What is Design? Design Principles, Effective modular design, Design models: Data, Architectural Design. User Interface Design: Rules, User Interface Analysis and Design.	
Unit IV	**[7Hrs]**
Software Testing: Testing Fundamentals, White Box Testing, Black Box Testing, Unit Testing, Integration Testing. Validation Testing, Debugging. Estimation for Software Projects: Project Planning objectives, Software Scope, Feasibility.	
Unit V	**[7Hrs]**
Software Quality Assurance: Concepts, Approaches, Software Quality Factor, Software Reviews, Software Reliability. Software Configuration Management.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Software Engineering, A practitioner's approach	Roger Pressman	7th Edition	Tata Mcgraw Hill
2	Object Oriented Software Engineering Using UML Patterns and Java	Bernd Bruegge & Allen H. Dutoit.	2nd Edition,	

Reference Books

S.N	Title	Authors	Edition	Publisher
1	OOA and Design	Grady Booch		Ad. Wesly
2	OO Modeling and design	Rambhaugh		PHI

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22CE501P	Software Engineering & Project Management Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
This course is intended • To provide understanding of principles of software engineering. • To enable students to understand stages involved in the development of software project.	**Students will be able to** • Elicit and analyze project requirements, and author a formal specification for a software system. • demonstrate the ability to plan, estimate and schedule project. • apply design process depending on the requirement of the project. • design test cases and apply testing strategies in software development.

Expt. No.	Title of the experiment
1	Identifying the Requirements from Problem Statements and author specification document Requirements | Categorization of Requirements | Functional Requirements | Non Functional Requirements | Other Requirements
2	Estimation of Project Metrics Project Estimation Technique| COCOMO Model |Project cost estimation
3	Scheduling Project Identifying Tasks | Identifying Resources | Schedule Project Use GANTT chart
4	Modeling UML Use Case Diagrams and Capturing Use Case Scenarios Identifying Identifying Actors | Identifying Use cases | Draw Use Case diagrams
5	Modeling Data Flow Diagram & Control Flow Diagram Draw Data Flow Diagram | Control Flow Diagram
6	Modeling UML Class Diagrams Structural and Behavioral aspects | Class diagram | Elements in class diagram | Class | Relationships | Draw Class Diagram
7	Modeling Sequence Diagrams Sequence diagram | Elements in sequence diagram | Object | Life-line bar | Messages | Draw Sequence Diagram
8	Designing Test Suites Software Testing | Need for Software Testing |Types of Software Testing|Design Test Suites

Text Books

S.N	Title	Authors	Edition	Publisher
1	Software Engineering, A practitioner's approach	Roger Pressman	7th edition	Tata Mcgraw Hill
2	OO Modeling and design	Michael Blah, James Rambhaugh		Prentice Hall

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22CE502T	Operating Systems	3	-	-	3	30	70	100

Course Objectives	Course Outcomes
This course is intended ● To make the students familiar with the basics of Operating system ● To introduce the notion of process,various features of process ,CPU scheduling algorithm. ● To examine several classical process – synchronization problems ● To explain concept of memory management ,paging ,virtual memory management ,and page replacement algorithm ● To explore disk managemnent and function of file systems	Students will be able to ● Understand the basics of how operating systems work. ● Explain how processes and CPU scheduling function in an operating system. ● Solve common process synchronization problems. ● Describe memory management concepts, including virtual memory. ● Comprehend disk management and the role of file systems in an operating system.

Unit I **[7Hrs]**

Introduction : Concept of operating system ,user view ,system view , Computer System organization,Bootstrap Program ,Storage Structure , Types of Operating Systems,

Operating System Structure:Monolithic, Layered, Micro kernel, Exokernel.Operating System services,User and Operating system Interfaces: Command interpreters ,Graphical User Interface. System calls ,Types of system call,System Programs

Unit II [8Hrs]

Process Concept : Processes : Process Definition , Process in memory, Process State, Process Control block(PCB), Operation on Process,context switching **Threads:** Definition, Benefits of Threads,Types of Threads,Different state of thread. **Process Scheduling:** Scheduling Objective, CPU – I/O burst Cycle,CPU Scheduler :Types of scheduler, Scheduling criteria.**Scheduling Algorithms:**Pre-emptive and Non Preemptive,FCFS,SRTF ,Priority,RR.

Unit III [7Hrs]

Synchronization : Critical Section problem,Race condition ,Peterson solution , Semaphores. Classic problem IPC Problem :Producer Consumer Problem, ReaderWriter Problem. ,The Dinning _ philosophers Problem. **Deadlocks**: System model ,Deadlock characterization,Methods of handling deadlocks ,Deadlock Prevention,Deadlock Avoidance : Banker's algorithm , Deadlock Detection and recovery

Unit IV [8Hrs]

Memory Management: Basic concepts , logical and physical address mapping **,**Swapping **Memory Allocation** -Contiguous Memeory Allocation - fixed partition and Variable partition, **Fragmentation :** Internal and External Fragmentation **Paging** : Basic method , paging model for logical and physical memory ,paging hardware with TLB, Advantage and disadvantage of paging .

Unit V [7Hrs]

Virtual Memory Management: Basic of Virtual Memory ,Demand paging ,Page Replacement Algorithm : FIFO ,LRU,Optimal

Disk Management : Disk Structure ,Disk Scheduling – FCFS,SSTF,SCAN,C-SCAN,LOOK,C-LOOK **File System :**File concepts ,File attributes,File operations,File Types .File Access Method : sequential Access ,Direct access

Text Books

S.N	Title	Authors	Edition	Publisher
1	Operating System Concepts	A.Silberschatz,Peter B. Galvin,Grag Gagne	8th edition	Willey

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Operating System	A.Godbole, Atul Kahate	3rd Edition	Tata McGrawHill
2	Operating Systems Concepts and Design	Milan Milenkovic	7th Edition	Tata McGrawHill

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22CE502P	Operating System Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
This course is intended • To provide students with practical experience in designing and implementing operating system concepts, including system calls, CPU scheduling, process management, process synchronization, memory management, and deadlock handling, utilizing the C programming language within the Linux environment	Students will be able to • Understand and implement basic services and functionalities of the operating system using system calls. • Analyze and simulate CPU Scheduling Algorithms like FCFS, Round Robin, SJF, and Priority. • Implement memory management schemes and page replacement schemes. • Implement synchronization mechanisms to address concurrent access issues. • Understand the concepts of deadlock in operating systems and implement them in multi programming system.

Expt. No.	Title of the experiment
1	A. Demonstrate the basic linux command on line Shell Script(JSlinux) B. Create Linux shell Scripts using conditional Statements and loop constructs in online shell Scripting environment
2	Demonstrate Program code based the System call operation to copy content source file to destination file
3	Implement C program FCFS Process Scheduling Algorithm
4	Implement Round Robin Process Scheduling Algorithm using Virtual lab
5	Demonstrate The Producer-Consumer classical multi-proces synchronization problem
6	Simulate Bankers algorithm for the purpose of deadlock avoidance
7	Simulate memory allocation using techniques like first-fit, best-fit, and worst-fit.
8	Implement virtual memory with page replacement using the Least Recently Used (LRU) algorithm.

Text Books

S.N	Title	Authors	Edition	Publisher
1	Operating System	A.Godbole	3rd Edition	The McGraw-Hill.
2	Operating System Concepts	A.Silberschatz,Peter B. Galvin,Grag Gagne	8th edition	

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22CE503T	Theory of Computation	3	-	-	3	30	70	100

Course Objectives	Course Outcomes
This course is intended ● To study the theoretical foundation of finite state machines and its application. ● To study formal languages and related grammar. ● To study basic computational function related to finite automaton.	Students will be able to ● Design the Finite State Machine with mathematical representation. ● Define regular expression for the given Finite State Machine and vice versa. ● Represent context free grammar in various forms along with its properties. ● Design Push Down Automaton and Turing Machine as FSM and its various representation. ● Differentiate between decidable and undecidable problems.

Unit I	**[7Hrs]**
Strings, Alphabet, Language operations, Finite state machine definitions, Finite automation model, Acceptance of strings and language, Non deterministic finite automation, Deterministic finite automation, Equivalence between NFA and DFA, Conversion of NFA into DFA, Moore and Mealy machines.	
Unit II	**[7Hrs]**
Regular sets, Regular expressions, Identity Rule, Manipulation of regular expressions, Equivalence between RE and FA, Inter conversion, Pumping lemma, Closure properties of regular sets(proofs not required), Chomsky hierarchy of languages, Regular grammars, Right linear and left linear grammars, Equivalence between regular grammar and finite automation, Inter conversion between RE and RG.	
Unit III	**[7Hrs]**
Context free grammar, Derivation trees (Syntax tree and Parse tree), Ambiguous Grammar, Context Free Language (CFL), Closure properties of CFL, Normal Form of grammar: Chomsky Normal form, Greibach normal form.	
Unit IV	**[8Hrs]**
Push Down Automaton, Turing Machine: Definition, Model of TM, Design of TM, Universal Turing Machine, Types of TM's (proofs not required), Turing Computable Functions, Linear bounded automaton.	
Unit V	**[7Hrs]**
Decidability and Undecidability of problems, Properties of recursive & recursively enumerable languages, Halting problems, Post correspondence problem, Ackerman function, Church's Hypothesis, Recursive Function: Basic functions and operations on them, Primitive recursive function, μ-recursive function, Bounded Minimization, Unbounded Minimization.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Theory of Computer Science, Automata, Languages and Computation	K. L. P. Mishra and N. Chandrasekaran	3rd Edition	PHI Learning.
2	Introduction to Automata Theory, Languages and Computation	J. E. Hopcraft,R. Motwani, J. D Ullman	2nd Edition	Pearson Education, Aisa

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Introduction to Theory of Computation	Sipser	2nd Edition	Cengage publications
2	An Introduction to Formal Languages and Automata	Peter Linz		
3	Introduction to Langauges and the theory of Automata	John Martin		TMH Publication

		July 2024	1	Applicable for 2024-25
Chairman - BoS	Dean – Academics	Date of Release	Version	

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22CE504T(i)	Computer Graphics (PE-I)	3	-	-	3	30	70	100

Course Objectives	Course Outcomes
This course is intended ● To study the fundamental concepts of Computer Graphics and its applications. ● To study and demonstrate advanced concepts of computer graphics	Students will be able to ● Demonstrate the working of line drawing and circle drawing algorithm ● Demonstrate 2D transformations and polygon clipping algorithms. ● Demonstrate 3D transformations and curves & surfaces. ● Realize different color models ● Demonstrate advanced algorithms based on hidden lines and surfaces.

Unit I	**[5Hrs]**
Overview of graphics systems – Video display devices, Raster scan systems, Random scan systems, Graphics monitors and Workstations, Input devices, Hard copy Devices, Graphics Software; Output primitives – points and lines, line drawing algorithms, circle generating algorithm.	
Unit II	**[5Hrs]**
Two dimensional geometric transformations – Matrix representations and homogeneous coordinates, composite transformations; clipping operations – point, line, polygon clipping algorithms.	
Unit III	**[5Hrs]**
Three dimensional concepts; Three dimensional object representations – Polygon surfaces- Polygon tables- Plane equations – Polygon meshes; Curved Lines and surfaces, Spline representations – Bezier curves and surfaces -B-Spline curves and surfaces, Parallel and Perspective projections.	
Unit IV	**[5Hrs]**
Light sources – basic illumination models – halftone patterns and dithering techniques; Properties of light – Standard primaries and chromaticity diagram; Intuitive colour concepts – RGB colour model – YIQ colour model – CMY colour model – HSV colour model – HLS colour model; Colour selection.	
Unit V	**[5Hrs]**
Hidden Lines and Surfaces: Back Face Detection algorithm, Depth buffer method, A- buffer method, Scan line method, basic illumination models– Ambient light, Diffuse reflection, Specular reflection and Phong model, Combined approach, Warn model, Intensity Attenuation, Color consideration, Transparency and Shadows.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Computer Graphics: Principles and Practice	John F. Hughes, Andries Van Dam, Morgan Mc uire ,David F. Sklar , James D. Foley, Steven K. Feiner and Kurt Akeley	3rd Edition.	Addison- Wesley Professional,2013
2	Computer Graphics	Donald Hearn and M. Pauline Baker		Prentice Hall, New Delhi

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Multimedia: Computing, Communication and applications	Raf Steinmetz and Klara Nahrstedt	2nd Edition	Pearson Education.
2	Multimedia Graphics	John V. Casanova and Leony Fernandez-Elias		Prentice Hall India
3	Computer Visualization-Graphics Abstraction and Interactivity	Thomas Strothotte		Springer Verlag, Berlin
4	Fundamentals of Computer graphics & Multimedia	Mukherjee		PHI Learning Private Limited

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22CE504T(ii)	PE-I Artificial Intelligence	3	-	-	3	30	70	100

Course Objectives	Course Outcomes
This course is intended ● To cover fundamentals of Artificial Intelligence ● To understand various knowledge representation techniques. ● To provide knowledge of AI systems and its variants	At the end of the Course, the Student will be able to: ● Understand the AI and AI Problem. ● Analyze the data using predicate logic knowledge ● Solve the problem using Bayes and DST Probabilistic Reasoning ● Apply Natural Language Processing kit on given sentence ● Recall and understand the concept of Expert System.

Unit I	**[9Hrs]**
INTRODUCTION: Definition of AI, History of AI, examples of AI problems. Current trends in Artificial Intelligence, Intelligent Agents - types of agents. Problem solving by search: Uninformed Search: Depth First Search (DFS), Breadth First Search (BFS), Informed Search: Best First Search, A*. Local Search: Hill Climbing, Problem Reduction Search: AO*, Population Based Search: Adversarial Search: Game Playing-Min Max Algorithm, Alpha-Beta Pruning.	
Unit II	**[7Hrs]**
KNOWLEDGE REPRESENTATION: Types of Knowledge, Knowledge Representation Techniques, Propositional Logic, syntax, inference, Predicate Logic, Semantic nets, Frames, Knowledge representation issues, Rule based systems.	
Unit III	**[7Hrs]**
REASONING UNDER UNCERTAINTY: Basics of Probability Theory, Probabilistic Reasoning: Bayes Rules, Probabilistic Reasoning: Bayesian statistic, Dempster-Shafer Theory, Planning: Spare, Block world, Planning with state space search, Representation of Planning, Partial-order Planning.	
Unit IV	**[6Hrs]**
PLANNING AND LEARNING: Learning: Introduction to Learning, Types of Learning, Rote Learning, Symbol Based Learning, Identification Trees, Explanation Based Learning, Transformational Analogy.	
Unit V	**[7Hrs]**
APPLICATIONS : Natural Language Processing, Language Models, Text classification, Information Retrieval, information extraction, Expert System: Introduction, Phases in Building Expert Systems.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Artificial Intelligence: A Modern Approach	Stuart R. &Peter Norvig	2nd Edition.	Pearson Education
2	Artificial Intelligence	Elaine Rich, Kevin Knight, Shivshankar B Nair	3rd Edition.	McGraw Hill,
3	Artificial Intelligence	Elaine Rich, Kevin Knight,	2nd Edition.	Tata McGraw Hill,

Reference Books

S.N	Title	Authors	Edition	Publisher
1	AI-Structures and Strategies for Complex Problem Solving	George Lugar,	4th Edition.	Pearson Education.
2	Principles of Artificial Intelligence	Nils J. Nilsson		Narosa Publication.
3	Artificial Intelligence	Patrick H. Winston	3rd Edition	Pearson Education.
4	A First Course in Artificial Intelligence	Deepak Khemani		McGraw Hill Publication

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22CE561O (i)	Statistical Analysis using R (OELE- I)	3	-	-	3	30	70	100

Course Objectives	Course Outcomes
This course is intended to provide the students with ● Knowledge of basics of R language ● Knowledge of performing statistical analysis on data	After studying this course, students will be able to ● Implement concepts of R language using basic constructs and loop structure. ● Retrieve the data from files and will use it for performing operations using functions ● Demonstrate advanced data structure ● Apply different group manipulaters on the data ● Apply probability distribution functions on the data

Unit I	**[7Hrs]**
Basics of R: Basic Math, variables, data types, vectors, calling functions, function documentation, missing data, pipes, Control Statements: if and else, switch, ifelse, compound tests, Loops : for loops, while loops, controlling loops	
Unit II	**[8Hrs]**
Reading Data into R: Reading CSVs, Excel data, reading from databases, data from other statistical tools, R binary files, data included with R, extract data from web sites, reading JSON data, Writing R Function: Hello World, function arguments, return values, do.call	
Unit III	**[7Hrs]**
Advanced Data Structures: data.frame, lists, matrices, arrays, Statistical Graphics: base graphics, ggplot2, Manipulating string: paste, sprintf, extracting text	
Unit IV	**[8Hrs]**
Group Manipulation: apply family, aggregate, plyr, data.table, Faster Group Manipulation with dplyr: pipes, tbl, select, filter, slice, mutate, summarize, group_by, arrange, do, dplyr with databases, Iterating with purrr: map, map with specified types, iterating over a data.frame, map with multiple inputs	
Unit V	**[7Hrs]**
Probability Distributions: Normal distribution, Binomial distribution, Poisson distribution, other distributions, Basic Statistics: summary statistics, correlation and covariance, T-tests, ANOVA Linear Models: simple linear regression, multiple regression, Clustering: K-Means, Hierarchical clustering	

Text Books

S.N	Title	Authors	Edition	Publisher
1	R for Everyone - Advanced Analytics and Graphics	Jared P. Lander	Second edition	Pearson Publication

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22CE561O(ii)	OE-I Software Testing	3	-	-	3	30	70	100

Course Objectives	Course Outcomes
This course is intended ● To provide basic concepts of software testing ● To provide the integration and system testing fundamentals	After studying this course, the students will be able to ● Describe the basic testing techniques ● Perform unit testing on software models ● Perform control testing on software models ● Perform integration and system test on the software models ● Define the system test categories and design test cases

Unit I	**[7Hrs]**
BASIC CONCEPTS: Need of testing, Errors, Faults, Defects, failures, Unit Testing, Integration Testing system, System testing, Objectives of Testing, Central issue in Testing, Testing activities, V-model, Sources Of information for Test Cases, Monitoring & measuring test execution, Test Tools & Automation, Limitation Of Testing	
Unit II	**[8Hrs]**
UNIT TESTING: Concept of unit testing, Static unit testing, Defect Prevention, Dynamic unit testing, Mutation testing, Debugging, Unit Testing in extreme programming , tools for unit Testing	
Unit III	**[7Hrs]**
CONTROL FLOW TESTING: Outline of control flow testing, control flow graph, Path in control flow graph, Path selection Criteria: All path coverage criteria, Statement coverage, Path coverage, Predicate coverage criteria, Generating Test input, example of Test data selection	
Unit IV	**[8Hrs]**
DATA FLOW TESTING & SYSTEM INTEGRATION: Introduction to Data flow testing, Data flow graph, Data flow Testing criteria, Comparison of Data flow Test selection criteria. System Integration: Introduction, Different types of interfaces & interfaces errors, System integration techniques, Software & Hardware integration, Test Plan for System integration, Off-the Shelf component integration	
Unit V	**[7Hrs]**
SYSTEM TEST CATEGORIES & TEST DESIGN: Taxonomy of system Test, Basic Test, Functionality test, Robustness Test, Performance Test, Scalability Test, Stress Test, Load & scalability Test, Reliability Test, Regression test, Documentation test TEST DESIGN: Test Cases and Necessity of Test Case Documentation, Test case Design methods, Functional specification based Test Case Design, Use Cases based Test Case Design, Application based Test cases Design, Levels of Test Execution.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Software Testing & Quality Assurance	Kshirsagar Naik & Priyadarshi Tripathi		Wiley Publication
2	Software Testing Concepts & Tools	Nageswara Rao Pusuluri		DreamTech
3	Software Testing	Ron Patton	Second Edition	Pearson Education
4	Software Testing: Principles and Practices	Gopalswamy Ramesh and Srinivasan Desikan		Pearson Education

Reference Books

S.N	Title	Authors	Edition	Publisher
1	A Practical Guide to Testing Object-Oriented Software	John D McGregor and David A Sykes		Addison-Wesley Professional

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22CE505P	Computer Lab - II	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
This course is intended • To provide understanding of advanced programming problem solving using competitive programming platform. • To enhance the ability for complex problem solving using competitive programming platform.	**Students will be able to** ● Explore and implement the competitive programming concepts of advanced programming. ● Solve Industry placement problems based on compititative programming.

Expt. No.	Title of the experiment
1	To explore the advanced competitive programming examples based on Array.
2	To explore the advanced competitive programming examples based on Maths.
3	To explore the advanced competitive programming examples based on String.
4	To explore the advanced competitive programming examples based on Bit Manipulation.
5	To explore the advanced competitive programming examples based on Sorting.
6	To explore the advanced competitive programming examples based on Brain Teaser.
7	To explore the advanced competitive programming examples based on Hash Table.
8	To explore the advanced competitive programming examples based on Randomized.
9	To solve company specific placement problems.

Text Books

S.N	Title	Authors	Edition	Publisher
1	Mastering C++	Venugopal,Ravi Shankar	Third Edition	TMH Publication
2	Python Programming: A Practical Approach	Vijay Kumar Sharma, VimalKumar,SwatiSharma,ShashwatPathak		CRC Press
3	The C Programming Language	Brian W. Kernighan, Dennis Ritchie	Second Edition	Pearson Education

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22AS501T	Economics and Management	3	-	-	3	30	70	100

Course Objectives	Course Outcomes
● The course examines how the economics, business and industrial management practices are related and how business decision is taken.	● Apply managerial economics concept in business analysis and business decision making. ● Explain relationships between production and costs and understand different forms of market structures. ● Asses impact of macroeconomics and government policies on business and economy. ● Recognize the functions of management and marketing management for business decisions. ● Explore role of financial management in business and decision making.

Unit I	**[8Hrs]**
Economics, Classification of economics, Industrial economics, Applications of Industrial economics. Types of Business structures, Consumer demand, Law of Demand, Determinants of demand, Demand forecasting, Law of supply, Utility, Law of diminishing marginal Utility, Types of Elasticity of demand	
Unit II	**[8Hrs]**
Concept of Production, Factors of Production, Laws of return, Cost concepts and types of cost, cost curves, Market Structures- Perfect competition, Monopoly, Oligopoly, and Monopolistic competition. Business cycles, optimum size of firm.	
Unit III	**[8Hrs]**
The functions of central bank, Inflation, Deflation, Recession. Measures to control Inflation, National income, GDP, GNP, Monetary and fiscal policy of government. Liberalization, Privatization and Globalization	
Unit IV	**[8Hrs]**
Definition of management, functions of management – planning, organizing, directing, Controlling, Introduction to human resources Management, Marketing Management, Concepts of Marketing, Marketing mix, Methods of pricing, Marketing mix. channels of distribution, advertising and sales promotion.	
Unit V	**[8Hrs]**
Financial Management, nature and scope of financial management, Sources of finance, Types of capital, Brief outline of profit and loss account, balance sheet, Budgets and types of budgets, Ratio analysis, Principles of costing	

Text Books

S. N	Title	Authors	Edition	Publisher
1.	Managerial Economics	D.N. Dwivedi	8th	Vikas Publishing
2.	Modern Economic Theory	K.K. Dewett	2005	S. Chand Publisher
3.	Industrial Management	Dr.I.K. Chopde, Dr.A.M. Sheikh	Revised edition	S. Chand Publisher

Reference Books

S. N	Title	Authors	Edition	Publisher
1.	Industrial Organization and Industrial economics	T.R. Banga, S.C. Sharma	2006	Khanna Publishers

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22CE506P	Technical Skill Development-II	-	-	2	1	50	--	50

Course Objectives	Course Outcomes
1. To teach the basic of JAVA and its execution 2. To make the student learn concept of package and interface 3. To make the students understand the life cycle of applet and functionality. 4. To make the student develop database connectivity with java.	At the end of the course, students will be able to: 1. Use compiler Java and eclipse or notepad to write and execute java program. 2. Understand and apply the concept of object oriented features and Java concept. 3. Apply the concept of multithreaded and implement exception handling. 4. Develop an application using JDBC.

1. Write a program based on class and object.
2. Write a program-based constructor and destructor
3. Write a java program based on inheritance and interface.
4. Write a java program based on multithread concept.
5. Write a program that creates a user interface to perform integer divisions using exception handling.
6. Write a java applet code using AWT package.
   (a) Develop an applet that displays a simple message.
   (b) Develop an Applet that receives an integer in one text field & compute its factorial value & returns it in another text filed when the button “Compute” is clicked.
7. Write a java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with “stop” or “ready” or “go” should appear above the buttons in a selected color. Initially there is no message shown.
8. Write a java program that connects to a database using JDBC and does add, deletes, modify and retrieve operations.

Reference Books

S. N.	Title	Authors	Edition	Publisher
1	Java The Complete Reference	Herbert Schildt	Special Edition	McGraw-Hill Education
2	Core and Advanced Java, Black Book	Dreamtech Press	Kindle	Dreamtech Press

		July 2024	1	Applicable for 2024-25
Chairman - BoS	Dean – Academics	Date of Release	Version	