

**VELLALAR COLLEGE FOR WOMEN
(AUTONOMOUS)
ERODE – 12**



Department of Computer Science (UG&PG)

**Course contents, Scheme of Examination, Credits and
Syllabus
(for students admitted during 2018-2019 and onwards)**

Question Pattern

Bloom's Taxonomy Based Assessment Pattern

Components of CIA Marks (Theory)

Tests (I & II)	Model Examination	Assignment / Seminar / Subject Viva	Total
10	10	5	25

Components of CIA Marks (Practical)

Tests (I & II) (30 Marks Each)	Model Examination (50 Marks)	Class Performance	Record	Total
10	10	15	5	40

CIA (Theory)

Bloom's Category	Section	Choice	Marks	Total
K1,K2	A	Compulsory	4 x 1 = 4	30
K2,K3,K4	B	Either / Or	2 x 5 = 10	
K2,K3,K4	C	Either/ Or	2 x 8 = 16	

Model and End Semester Examination (Theory)

Bloom's Category	Section	Choice	Marks	Total
K1,K2	A	Compulsory	10 x 1 = 10 MCQ (5x1=5) Fill ups (5x1=5)	75
K2,K3,K4	B	Either / Or	5 x 5 = 25	
K2,K3,K4	C	Either/ Or	5 x 8 = 40	

Self Study Paper (Theory)

Answer any five out of eight questions. (5 x 20 = 100)

Vellalar College for Women (Autonomous), Erode - 12									
Master of Science in Computer Science									
2018 – 2019 onwards									
Course Content and Scheme of Examinations (CBSE & OBE Pattern)									
Semester I									
Part	Study Component	Subject Code	Title of the Paper	Inst. Hrs./ Week	Exam. Dur. Hrs.	Max. Marks			Credits
						CIA	ESE	Total	
III	Core	18CSPC101	Advanced Computer Architecture	4	3	25	75	100	4
		18CSPC102	Design and Analysis of Algorithms	5	3	25	75	100	4
		18CSPC103	Advanced Software Engineering	4	3	25	75	100	4
		18CSPC104/ 18CAPC309	Advanced Operating System	5	3	25	75	100	4
		18CSPC105/ 18CAPC310	Advanced Relational Database Management System	4	3	25	75	100	4
	Practical	18CSPCP01	Design and Analysis of Algorithms Lab	5	3	40	60	100	3
IV	Skill Based Subject I	18CSPSP01	RDBMS Lab	3	3	40	60	100	3
Total								700	26
Semester II									
III	Core	18CSPC206	Advanced Java	6	3	25	75	100	5
		18CSPC207	Digital Image Processing	6	3	25	75	100	5
	Practical	18CSPCP02	Advanced Java Lab	5	3	40	60	100	3
		18CSPCP03	Digital Image Processing Lab	5	3	40	60	100	3
	Elective I	18CSPE211/ 18CAPE544	Mobile Computing	5	3	25	75	100	5
		18CSPE221	Object Oriented Analysis and Design						
		18CSPE231/ 18CAPE412	Soft Computing						
		18CSPE241	Internet of Things						
IV	Skill Based Subject II	18CSPS202/ 18CAPS403	Advanced Multiskill Paper	3	1 *	40	60	100	3
Total								600	24

* Online Examination

Semester III									
Part	Study Component	Subject Code	Title of the Paper	Inst. Hrs./ Week	Exam. Dur. Hrs.	Max. Marks			Credits
						CIA	ESE	Total	
III	Core	18CSPC308	SOA and Web Services	5	3	25	75	100	5
		18CSPC309/ 18CAPC514	ASP.NET Programming	4	3	25	75	100	4
		18CSPC310	Machine Learning Techniques	5	3	25	75	100	5
	Practical	18CSPCP04/ 18CAPCP09	ASP.NET Programming Lab	5	3	40	60	100	3
	Elective II	18CSPE312/ 18CAPE513	Information Security	5	3	25	75	100	5
		18CSPE322	Cloud Computing and Big Data Analytics						
		18CSPE332	Principles of Compiler Design						
18CSPE342/ 18CAPE431		TCP/IP							
IV	Skill Based Subject III	18CSPSP03	Web Designing lab	3	3	40	60	100	3
	Skill Based Subject IV	18CSPSP04	Software Testing Lab	3	3	40	60	100	3
Total								700	28
Semester IV									
III	Project	18CSPC4PV	Major Project *	-	-	-	200	200	12
Total (I - IV Semesters)								2200	90

*Project – 80% Viva-Voce – 20%((Both Internal and External)

CIA – Continuous Internal Assessment Marks

EOS – End of Semester Examinations

SKILL BASED SUBJECTS					
S. No.	Subject Code	Title of the Paper	Exam. Dur. Hrs.	Max. Marks	Credits
1	18CSPSP01	RDBMS Lab	3	100	5
2	18CSPS202/ 18CAPS403	Advanced Multi Skill Paper	3	100	5
3	18CSPSP03	Web Designing lab	3	100	5
4	18CSPSP04	Software Testing Lab	3	100	5

SELF-LEARNING PAPERS (Optional)					
S.No.	Subject Code	Title of the Paper	Exam. Dur. Hrs.	Max. Marks	Credits
1	18CSPSL01	Open Source Technology	3	100	5
2	18CSPSL15	PERL	1*	100	5
3	18CSPSL25	SCILAB	1*	100	5

* Online Examination by Spoken Tutorial,IIT Bombay

MOOCs Non-ranking Compulsory Credit Course will be introduced from the Academic Year 2019-20 and Onwards.

SEMESTER I

CODE	COURSE TITLE
18CSPC101	ADVANCED COMPUTER ARCHITECTURE

Category	CIA	ESE	L	T	P	Credit
Core	25	75	56	4	-	4

Preamble

Introduce the students, the recent trends in the field of computer architecture, parallel processing and gain knowledge in problem solving skills using parallel algorithms.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Recall the basic concepts of computer architecture	K1
CO2	Identify the performance of different computer structures	K3
CO3	Define the fundamental knowledge in architecture design, pipelined processor design and their impacts on performance	K1
CO4	Analyze the communication and the computing possibilities of parallel system architecture	K4
CO5	Analyze the parallel algorithms	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	M	S	S	L
CO3	S	S	L	M	S
CO4	S	S	M	S	M
CO5	S	S	M	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

12 Hrs.

Introduction to parallel processing: Evolution of Computer Systems– Parallelism in uniprocessor Systems – Parallel Computer structures – Architectural Classification schemes – Flynn’ Classification – Feng’s Classification – Handler’s Classification – Parallel Processing Applications.

UNIT II

12 Hrs.

Principles of Pipelining and Vector Processing: Pipelining: An Overlapped Parallelism – Principles of Designing Pipelined Processors - Instruction Prefetch and Branch Handling - Data Buffering and Busing structure - Internal forwarding and Register Tagging – Hazard

Detection and Resolution – Job Sequencing and Collision Prevention – Vector processing requirements - Characteristics – Pipelined Vector Processing methods.

UNIT III

12 Hrs.

Solving Problems in Parallel: Utilizing Temporal Parallelism – Utilizing Data Parallelism – Comparison of Temporal and Data Parallel Processing – Data parallel Processing with Specialized Processor – Inter-task Dependency. **Instructional Level Parallel Processing:** Pipelining of Processing Elements – Delays in Pipeline Execution – Difficulties in Pipelining.

UNIT IV

12 Hrs.

Structure of Parallel Computers: A Generalized Structure of Parallel Computers- Classification of parallel Computers- Vector Computers- A Typical Vector Supercomputers- Vector Computer on a CHIP-IRAM- Array Processors- Shared memory Parallel Computers.

UNIT V

12 Hrs.

Parallel Algorithms: Models of computation – Analysis of Parallel Algorithms Prefix Computation – Sorting – Searching – Matrix Operations – Practical Models of Parallel Computation.

Text Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Kai Hwang, Faye A. Briggs	Computer Architecture and Parallel Processing	Mc Graw – Hill	1985, 1 st Edition
2.	V. Rajaraman, C. Siva Ram Murthy	Parallel Computers Architectures and Programming	PHI	2012, 2 nd Edition

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Michael J. Quinn	Parallel Computing Theory and Practice	TMCH	2002, 2 nd Edition
2.	Barry Wilkinson, Micheal Allen	Parallel Programming : Techniques and Applications	Prentice Hall	1999, 2 nd Edition

Web Resources

1. <http://nptel.ac.in/courses/106103068/pdf/coa.pdf>
2. https://www.tutorialspoint.com/computer_organization/index.asp

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER I

CODE	COURSE TITLE
18CSPC102	DESIGN AND ANALYSIS OF ALGORITHMS

Category	CIA	ESE	L	T	P	Credit
Core	25	75	70	5	-	4

Preamble

This course aims at facilitating the students to understand the various data structures, their organization and operations and helps the students to solve a given problem using an algorithm. It enables to mathematically analyze the algorithms for its efficiency and effectiveness.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Recall the organization and operations of data structures	K1
CO2	Compare different algorithmic approaches, techniques and methods	K2
CO3	Apply Greedy method to solve the problems	K3
CO4	Analyze a given algorithm for its efficiency based on time and space it occupies and implement Dynamic Programming	K4
CO5	Estimate the given problem with mathematical rigor to provide an algorithmic based solution	K5

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	M
CO2	S	S	M	L	S
CO3	S	M	L	M	S
CO4	S	S	M	S	M
CO5	S	S	M	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

15 Hrs.

Introduction: Algorithm Definition and Specification – Performance Analysis.
Elementary Data structures: Trees – Dictionaries – Priority Queues – Sets and Disjoint Set Union – Graphs. **Divide – And – Conquer:** - General method – Binary Search – Finding the Maximum and Minimum – Merge Sort – Quick Sort.

UNIT II

15 Hrs.

The Greedy Method: General Method – Knapsack Problem – Minimum Cost

Spanning Tree : Prim's Algorithm and Kruskal's Algorithm – Single Source Shortest Path.

UNIT III

15 Hrs.

Dynamic Programming : General Method – Multistage Graphs – All Pair Shortest Path – 0/1 Knapsack – Traveling Salesman Problem .

UNIT IV

15 Hrs.

Backtracking: General Method – 8-Queens Problem – Sum of Subsets – Graph Coloring – Hamiltonian Cycles – Knapsack Problem.

UNIT V

15 Hrs.

Basic Traversal and Search Techniques – Branch and Bound Method – 0/1 Knapsack Problem – Traveling Salesperson.

Text Book

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Ellis Horowitz, Sartaj Sahni, Rajasekaran	Fundamentals of Computer Algorithms	Galgotia Publications	2006, 1 st Edition

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Vinod K. Rajput	Analysis and Design of Algorithms	S.K. Katari And Sons	2012, 1 st Edition
2.	Michael T. Goodrich, Roberto Tamassia	Data Structures & Algorithms in Java	Wiley	2004, 3 rd Edition.

Web Resources

1. https://www.tutorialspoint.com/design_and_analysis_of_algorithms/index.htm
2. www.spoken-tutorial.org

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER I

CODE	COURSE TITLE
18CSPC103	ADVANCED SOFTWARE ENGINEERING

Category	CIA	ESE	L	T	P	Credit
Core	25	75	57	3	-	4

Preamble

The main objective of the course is to provide the concepts of software engineering. Analyzing, designing, testing and assuring the quality of the developed software. To enable the students to overcome the various risk factors while developing the software in an efficient manner.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Recall the process model for software project development	K1
CO2	Develop use cases and data models	K3
CO3	Build various design concepts and models for a given software system	K3
CO4	Apply various testing strategies for validating the complexity of software system	K5
CO5	Analyze the quality of system using various metrics	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	S	S	M	S	L
CO3	S	S	L	M	S
CO4	S	M	S	S	M
CO5	S	S	M	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

12 Hrs.

Introduction to Software Engineering : The evolving role of software – The changing nature of software . A Generic View of Process – Process Models – Agile Process Models – Software Engineering practice- planning and modeling practice.

UNIT II

12 Hrs.

Requirement Engineering: Requirement Engineering tasks - Initiating the Process -Eliciting Requirements- Developing Use Cases - Negotiating Requirements -Validating Requirements – Building the Analysis Models:Data Modeling Concepts-Flow-Oriented Modeling-Class-Based Modeling.

UNIT III

12 Hrs.

Design Engineering: Design Process-Design Concepts – Design Models – Pattern Based Design – Software Architectural – Data Design – Component – Designing class based components.

UNIT IV**12 Hrs.**

Testing Strategies: Software Testing Strategies -Strategic Issues -Test Strategies for conventional software -Strategies for object oriented software - Validation testing -System testing.

Testing Tactics: Testing Fundamentals – Black Box – White Box –Basis Path-Control Structure.

UNIT V**12 Hrs.**

SCM and Quality Assurance: Product Metrics. Estimation: Empirical Estimation models – Risk Management – Quality Management: Concepts-SQA-Software Reviews-Formal Technical Reviews-Statistical Software Quality Assurance – Change Management -Software Configuration Management-The SCM Process.

Text Book

Sl.No	Author Name	Title of the Book	Publisher	Year and Edition
1.	Roger S. Pressman	Software Engineering – A practitioner’s Approach	McGraw-Hill	2007, 6 th Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Carlo Ghezzi, Mehdi Jazayari & Dio Mandrioli	Fundamentals of Software Engineering	PHI	1991, 2 nd Edition
2.	Fleeger.P	Software Engineering	PHI	1999, 4 th Edition
3.	Sommerville	Software Engineering	Addison Wesley	1996, 5 th Edition

Web Resources

1. https://www.tutorialspoint.com/software_engineering/index.htm
2. https://onlinecourses.nptel.ac.in/noc18_cs43/preview

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER I

CODE	COURSE TITLE
18CSPC104/ 18CAPC309	ADVANCED OPERATING SYSTEM

Category	CIA	ESE	L	T	P	Credit
Core	25	75	71	4	-	4

Preamble

The purpose of this course is to study, learn and understand the advanced concepts of Advanced Operating System. To learn the mechanism of operating system to handle processes and threads and their communication.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Recall various OS architectures	K2
CO2	Ability to utilize various type of architecture for Resource management.	K4
CO3	Classify the implementation process management and file system	K4
CO4	Outline the principles of various OS	K1
CO5	Construct the process according to the complexity of a problem	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	S	M	S	S	L
CO3	S	S	M	L	S
CO4	S	M	S	S	S
CO5	S	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

15 Hrs.

Fundamentals: What is a Distributed Computing System? Distributed Computing System Models – What is Distributed Operating system – Issues in Designing a Distributed Operating System – Introduction to Distributed Computing Environment. Remote Procedure Calls: Introduction – The RPC Model – Transparency of RPC – Implementing RPC Mechanism – Stub Generation – RPC Messages – Server Management – Parameter Passing Semantics – Call Semantics – Communication Protocols for RPCs.

UNIT II**15 Hrs.**

Distributed Shared Memory: Introduction – General Architecture of DSM Systems – Design and Implementation Issues of DSM – Granularity – Structure of Shared Memory Space – Consistency Models – Replacement Strategy – Thrashing – Advantages of DSM. Synchronization: Introduction – Clock Synchronization – Event Ordering – Mutual Exclusion – Deadlock.

UNIT III**15 Hrs.**

Resource Management: Introduction – Desirable Features of a Good Global Scheduling Algorithm – Task Assignment Approach – Load Balancing Approach – Load Sharing Approach. **Process Management:** Introduction – Process Migration – Threads – **Distributed File System :** Introduction – Desirable Features of a Good Distributed File System – File Models – File Accessing Models – File Sharing Semantics – File Caching Schemes – File Replication.

UNIT IV**15 Hrs.**

Introduction to the Kernel : Architecture of the Unix operating system – introduction to system concepts – kernel data structures. **Internal Representation of Files :** Inodes – structure of a regular file – directories – conversion of a path name to an inode – superblock – inode assignment to a new file – allocation of disk blocks. **The structure of processes:** process states and transitions – layout of system memory – the context of a process.

UNIT V**15 Hrs.**

Process Control: Process creation – process termination – awaiting process termination – invoking other programs – system boot and the init process. **Process scheduling and time:** Process scheduling – system calls for time.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Maurice J.Bach	The Design of the Unix Operating System	PHI Private Limited	2006, 1 st Edition.
2.	Pradeep K, Sinha	Distributed Operating System – Concepts and Design	Prentice Hall of India Private Limited	2006, 1 st Edition.

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Andrew S.Tanenbaum, Maarten Van Steen	Distributed Systems: Principles and Paradigms	Prentice Hall of India	2006, 1 st Edition.
2.	Colulouris, G.Dollimore Timkindberg	Distributed System: Concepts and Design	Addition Wesley	2006, 4 th Edition
3.	Sumitabha Das	Unix Concepts and Application	TMH	2008, 4 th Edition

Web Resources

1. <http://www.ee.surrey.ac.uk/Teaching/Unix/unixintro.html>
2. <https://link.springer.com/article/10.1007/s00607-016-0508-7>

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER I

CODE	COURSE TITLE
18CSPC105/ 18CAPC310	ADVANCED RELATIONAL DATABASE MANAGEMENT SYSTEM

Category	CIA	ESE	L	T	P	Credit
Core	25	75	57	3	-	4

Preamble

This course aims at facilitating the student to understand the various functionalities of DBMS software and perform many operations related to creating, manipulating and maintaining databases for Real-world applications and to understand the various designing concepts, storage methods, querying and managing databases. Able to develop, design and construct a typical enterprise database.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Summarize the basics and fundamentals of RDBMS and concept of Entity Relationship Model in Database Applications	K2
CO2	Make use of SQL for Database Definition and Manipulation	K3
CO3	Demonstration of various normalization techniques and data modeling	K2
CO4	Create a RDBMS package using PL/SQL	K4
CO5	Classify different types of databases	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	M	S	L	S
CO3	S	S	L	M	S
CO4	S	M	S	S	M
CO5	S	S	M	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

12 Hrs.

Databases and Database Users: Introduction **Database System Concepts:** Data Models, Schemas and instances – Three schema Architecture and Data Independence – Database Languages and Interfaces – Database System Environment .

Data Modeling Using ER Model: Entity Types, Entity Sets, Attributes and Keys –Relationships, Relationship Types, Roles and Structural Constraints – Weak Entity Types – ER Diagrams, Naming Conventions and Design issues - Enhanced Entity-Relationship (EER) Modeling.

UNIT II

12 Hrs.

SQL: Data Definition Language(DDL) – Data Management and Retrieval - Working with Tables Functions and Grouping - Join and Set Operators **Advanced Features: Objects, Transactions and Data Control:** Views.

UNIT III**12 Hrs.**

Functional Dependencies and Normalization for Relational Databases: Informal Design Guidelines – Functional Dependencies - Normal Forms Based on Primary Keys – Definitions for Second and Third Normal Forms – Boyce – Codd Normal Form. **Relational Database Design Algorithms and Further Dependencies :** Multivalued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form. **Introduction to Transaction Processing Concepts and Theory:** Introduction to Transaction Processing – Transaction and System Concepts – Desirable Properties of Transaction – Transaction Support in SQL.

UNIT IV**12 Hrs.**

PL/SQL Cursors and Exceptions: Cursors – Implicit Cursors – Explicit Cursors – Explicit Cursors Attributes - Implicit Cursors Attributes – Cursor FOR Loops – SELECT ...FOR UPDATE Cursor – WHERE CURRENT OF Clause – Cursor with Parameters – Cursor Variables: An Introduction – Exceptions – Types of Exceptions. **PL/SQL Named Blocks:** Procedures- Functions – Packages – Triggers.

UNIT V**12 Hrs.**

Enhanced Data Models for Advanced Applications : Multimedia Databases- **Introduction to Deductive Databases:** Overview of deductive Databases – Prolog/Datalog Notation-Clausal form and Horn Clauses –Interpretation of Rules –Datalog Programs and their Safety. **Distributed Databases:** Distributed Database Concepts – Types of distributed Database Systems

Text Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Ramez Elmasri, Shamkant B. Navathe	Fundamentals of Database Systems	Pearson Education	2005,4 th Edition
2.	Nilesh Shah	Database Systems Using Oracle	Pearson Education	2013,2 nd Edition.

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Abraham Silberschatz, Henry F Korth, Sudarshan .S	Database System Concepts	MCGraw – Hill International	2014, 6 th Edition
2.	Kandare S.S	Database Management and Oracle Programming	S.Chand & Company Ltd	2004,1 st Edition
3.	Rajesh Narang	Database Management Systems	Prentice Hall of India	2004, 3 rd Edition
4.	C.J.DATE	An Introduction To Database System	Addition Wesley Publications	2001,7 th Edition

Web Resources

- [1. https://www.webucator.com/tutorial/learn-sql/relational-database-basics](https://www.webucator.com/tutorial/learn-sql/relational-database-basics)
- [2. https://docs.oracle.com/javase/tutorial/jdbc/overview/database.html](https://docs.oracle.com/javase/tutorial/jdbc/overview/database.html)

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER I

CODE	COURSE TITLE
18CSPCP01	DESIGN AND ANALYSIS OF ALGORITHMS LAB

Category	CIA	ESE	L	T	P	Credit
Core	40	60			75	3

Preamble

Objective of this course is to design and develop algorithms to solve problems by using different methods, find the efficiency of algorithm in terms of time and space complexity.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate the concepts for elementary data structures	K2
CO2	Develop a program using Divide and Conquer Method	K3
CO3	Construct a program for tree concepts	K3
CO4	Solve problems using Greedy method and Dynamic Programming Method	K3
CO5	Compare Backtracking and Branch and Bound Method to solve problems	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	M	S	S	L
CO3	S	S	M	L	S
CO4	S	M	S	S	M
CO5	S	S	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

Program using following Concepts:

Data Elementary Structures

1. Perform Stack Operations for the finite number of elements.
2. Perform the Queue Operations for the finite number of elements.

Divide and Conquer Method

3. Search an element in the array of elements using Binary Search Method.
4. Sort the array of elements using Quick Sort Method.

Basic Search Tree Traversal

5. Search the Path for a given nodes using Breadth First Search and Depth First search Method.

Greedy Method

6. Solve the Knapsack problem and find the optimal solution using Greedy Method
7. Compute Minimum Cost Spanning Tree - Prim's Algorithm for any given graph using Greedy Method.

Dynamic Programming Method

8. Construct the shortest path using Multistage graph in dynamic programming
9. Determine the shortest path from source to destination for any given Matrix using All Pair Shortest Path method.

Backtracking Method

10. Solve the N-Queens Problem using Backtracking Method.
11. Color any given number of nodes (no two edges carries same color) using Graph Coloring Method.

Branch and Bound Method

12. Solve the Traveling Sales Person problem using Branch and Bound Method.

Pedagogy

Lecture, PPT.

SEMESTER II

CODE	COURSE TITLE
18CSPC206	ADVANCED JAVA

Category	CIA	ESE	L	T	P	Credit
Core	25	75	86	4	-	5

Preamble

The main objective of the course is to provide advanced Java programming concepts, Applet programming, Database connectivity and implement java programming concepts to develop solutions for real world problems.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Recall the basics of OOPS and relationships among them for a specific problem	K1
CO2	Make use of the concepts of polymorphism ,inheritance and packages	K3
CO3	Make use of interfaces, Multithreading and synchronization in complex applications	K3
CO4	Analyze the various activities of Applets and Swing	K4
CO5	Apply the concept of database connectivity using Servlet and JDBC	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	S
CO2	S	M	S	S	L
CO3	S	S	L	M	S
CO4	S	M	M	S	S
CO5	S	S	S	M	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

18 Hrs.

A Closer Look at Methods and Classes : Overloading Methods - Overloading Constructors - Using Objects as Parameters - Argument Passing- Returning Objects - Recursion - Introducing Access Control. Inheritance : Inheritance Basics - Using super - Creating a Multilevel Hierarchy - Method Overriding - Dynamic Method Dispatch - Using Abstract Classes - Using final with Inheritance. Packages.

UNIT II

18 Hrs.

Interfaces : Defining an Interface - Implementing Interfaces - Nested Interfaces - Applying Interfaces- Variables in Interfaces - Interfaces Can Be Extended. Multithreaded Programming : The Java Thread Model - The Main Thread - Creating a Thread - Creating Multiple Threads - Thread Priorities. Synchronization : Using Synchronized Methods - The synchronized Statement - Interthread Communication - Suspending, Resuming, and Stopping Threads - Using Multithreading. I/O Basics.

UNIT III

18 Hrs.

The Applet Class : Two Types of Applets - Applet Basics - Applet Architecture - An Applet Skeleton - Simple Applet Display Methods - Requesting Repainting - Using the Status Window. Event Handling. Introducing the AWT: Working with Windows, Graphics, and Text : AWT Classes - Window Fundamentals - Working with Frame Windows - Creating a

Frame Window in an Applet. Working with Graphics - Working with Color - Setting the Paint Mode - Working with Fonts - Managing Text Output Using Font Metrics.

UNIT IV

18 Hrs.

Using AWT Controls, Layout Managers, and Menus : Control Fundamentals - Labels - Using Buttons - Applying Check Boxes – Checkbox Group - Choice Controls - Using Lists - Managing Scroll Bars - Using a TextField - Using a TextArea. Understanding Layout Managers. Menu Bars and Menus, Dialog Boxes. Introducing Swing : The Origins of Swing - Swing Is Built on the AWT - Two Key Swing Features - The MVC Connection - Components and Containers - The Swing Packages. Java Beans.

UNIT V

18 Hrs.

Servlets: The lifecycle of a Servlet – Using Tomcat for servlet development– A Simple Servlet – The Servlet API – The javax.Servlet Package – Reading servlets Parameters.The javax.servlet.http package – Handling HTTP requests and responses – Using cookies. Database Access with JDBC: JDBC Architecture – Accessing a DataBase – Sample JDBC Servlet.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Herbert Schildt	The complete Reference Java	TMH	2010, 7 th Edition.
2.	Dustin R.Gallaway	Inside Servlets server side programming for the Java Platform	Pearson Education	2009, 1 st Edition

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Herbert Schildt	Swing a Beginners Guide	TMH	2009, 2 nd Edition.
2.	R.Krishnamoorthy, S.Prabhu	Internet and Java Programming	New Age International Private Ltd., NewDelhi	2009, 1 st Edition
3.	M.P.Bhave & S.A.Patekar	Programming with Java	Pearson Education	2009, 1 st Edition.

Web Resources

1. https://www.tutorialspoint.com/java/java_pdf_version.htm
2. www.spoken-tutorial.org

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER II

CODE	COURSE TITLE
18CSPC207	DIGITAL IMAGE PROCESSING

Category	CIA	ESE	L	T	P	Credit
Core	25	75	85	5		5

Preamble

The objective of the course is to expose students to the fundamental concepts of image processing, mathematical operations, image analysis algorithms and current applications in the field of digital image processing.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	Understand the general terminology of digital image processing	K2
CO2.	Examine various types of intensity transformations and spatial filtering	K4,K5
CO3.	Identify various degradation and restoration Process	K3
CO4.	Categorize various compression techniques and interpret image compression standards	K4
CO5.	Develop various image segmentation methods and morphological image processing	K3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1.	S	M	S	M	S
CO2.	S	M	S	S	S
CO3.	S	S	M	M	L
CO4.	S	S	M	S	M
CO5.	S	L	S	M	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I (18 Hrs.)

Introduction: What is Digital Image Processing – the origin of DIP – Examples of fields that use DIP – Fundamentals Steps in DIP – Components of an Image Processing System. **Digital Image Fundamentals:** Elements of Visual Perception – Light and the Electromagnetic Spectrum – Image Sensing and Acquisition – Image Sampling and Quantization – *Some Basic Relationship Between Pixels* – Linear & Nonlinear Operations.

UNIT II (18 Hrs.)

Intensity Transformations and Spatial Filtering: Background – Some Basic Intensity Transformations Functions – Histogram Processing – Fundamentals of Spatial Filtering – Smoothing Spatial Filters – Sharpening Spatial Filters – Combining Spatial Enhancement Methods.

UNIT III (18 Hrs.)

Image Restoration: A Model of the Image Degradation / Restoration Process – Noise Models – Restoration is the Process of Noise only – Spatial Filtering – Periodic Noise Reduction by Frequency Domain Filtering – Linear, Portion – Invariant Degradations – Estimating the Degradation Function – Inverse Filtering– Geometric Mean Filter.

UNIT IV (18 Hrs.)

Image Compression: Fundamentals. **Some Basic Compression Methods:** Huffman Coding – Arithmetic Coding – LZW Coding. **Patterns and Pattern Classes-** Recognition Based on Decision-Theoretic Methods- Structural Methods

UNIT V (18 Hrs.)

Image Segmentation: Fundamentals – Point, Line, Edge Detection – Thresholding – Region – Based Segmentation – Segmentation by Morphological Watersheds.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Rafael C. Gonzalez, Richard E. Woods	Digital Image Processing	PHI / Pearson Education	Third Edition, 2012.

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Chanda B, Dutta Majumder D	Digital Image Processing and Analysis	PHI	2003
2.	Nick Efford	Digital Image Processing a practical introducing using Java	Pearson Education	2004

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER II

CODE	COURSE TITLE
18CSPCP02	ADVANCED JAVA LAB

Category	CIA	ESE	L	T	P	Credit
Practical	40	60			75	3

Preamble

Objective of this course is to design console based , GUI based and web based application. Students should be able to design, code, test and debug java language programs.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	Demonstrate the concepts for object oriented programming Java	K2
CO2.	Develop a program for Packages in java.	K3
CO3.	Construct a program for Multithreading	K3
CO4.	Solve problems using java Applet programming and Swing	K3
CO5.	Utilize Database connectivity to develop applications	K3

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1.	S	S	S	M	S
CO2.	S	M	S	S	L
CO3.	S	S	S	S	L
CO4.	S	M	M	S	S
CO5.	S	M	S	S	M

S- Strong; M-Medium; L-Low

Syllabus

Program using following Concepts:

1. Classes and objects
2. Inheritance
3. Packages
4. Interfaces
5. Multithreading
6. Applets
7. AWT controls
8. Event Handling
9. Menu
10. Layout Managers
11. Swing Controls and Trees
12. JDBC

Pedagogy

Lecture, PPT, Assignment, Group Discussion

SEMESTER II

CODE	COURSE TITLE
18CSPCP03	DIGITAL IMAGE PROCESSING LAB

Category	CIA	ESE	L	T	P	Credit
Practical	40	60			75	3

Preamble

Students should be able to evaluate and manipulate various image processing techniques independently using MATLAB

Course Outcomes

By the end of this course students will be able to design code and test digital image processing applications using MATLAB tool.

CO Number	CO Statement	Knowledge Level
CO1.	Apply the mathematical operations of image enhancement	K2
CO2.	Design and implement filtering techniques and descriptor computations.	K5
CO3.	Implement the concepts of feature detection and contour finding algorithms.	K4,K5
CO4.	Analyze the constraints in image processing when dealing with larger data sets.	K3
CO5.	Evaluate concepts of pseudo code and classification in real time applications.	K5

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1.	S	S	M	M	M
CO2.	S	M	S	S	L
CO3.	S	S	S	M	L
CO4.	S	S	M	S	M
CO5	S	M	M	S	S

S- Strong; M-Medium; L-Low

Syllabus

1. Image Enhancement (Contrast manipulation, Histogram Equalization, Gray-level Slices, Threshold operation).
2. Filtering Techniques-Spatial Technique
3. Edge Detection.
4. Binary Image Processing (Morphological Operations)
5. Color Image Processing
6. Segmentation
7. Classification
8. Image Descriptor Computation

Pedagogy

- Lecture, PPT, Assignment, Group Discussion

SEMESTER III

CODE	COURSE TITLE
18CSPC308	SOA AND WEB SERVICES

Category	CIA	ESE	L	T	P	Credit
Core	25	75	70	5	-	4

Preamble

Students will be able to understand the basic concepts of XML and web services.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1.	understand the role of XML and the web	K1
CO2.	Gain knowledge on DTD and XSLT	K1
CO3.	Understand the concepts of using Schema and DOM in XML documents	K2
CO4.	Design a simple applications using XML document	K3
CO5.	Know the basic concepts of .NET And J2EE.	K2

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1.	S	S		M	
CO2.				L	
CO3.		S	S	M	
CO4.		S	S	M	M
CO5.		S	M		M

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

(15 Hrs)

INTRODUCTION: Role of XML - XML and The Web - XML Language Basics - SOAP - Web Services - Revolutions of XML - Service Oriented Architecture (SOA) – Creating Markup with XML : Introduction to XML Markup – Parsers and Well Formed XML documents – parsing an XML document with MS XML – characters – Markup - Cdata Sections – XML Namespaces.

UNIT II

(15 Hrs)

DTD : Parsers, Well-Formed and Valid XML Documents – Document Type Declaration – Element Type Declarations – Attribute Declarations – Attribute Types – Conditional Sections. Schemas : Introduction – Schema vs DTDs – Microsoft XML Schema : Describing Elements - Describing Attributes – Data types.

UNIT III**(15 Hrs)**

DOM : Introduction – DOM Implementation – DOM with Java Script - DOM Components. XSLT: Introduction – Templates – Creating Elements and Attributes – Iteration and Sorting – Conditional Processing – Copying Notes – Combining Style Sheets – Variables.

UNIT IV**(15 Hrs)**

SOAP: Overview Of SOAP - *HTTP* - XML-RPC - SOAP: Protocol - Message Structure - Intermediaries - Actors - Design Patterns And Faults - SOAP With Attachments.

UNIT V**(15 Hrs)**

WEB SERVICES: Overview - Architecture - Key Technologies - UDDI - WSDL - ebXML - SOAP And Web Services in E-Com - Overview Of .NET And J2EE.

Text Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Deitel, Deitel, Nieto, Lin, Sadhu	XML How to Program	Pearson Education	2009
2	Frank P. Coyle	XML, Web Services And The Data Revolution	Pearson Education	2008

Reference Books

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	McGovern, et al.	Web Services Architecture	Morgan Kaufmann Publishers, San Francisco	2005
2.	Mike Mcgraph	XML in easy Steps	Dream Tech	2006
3	Ramesh Nagappan, Robert koczylas and Rima Patel Sriganesh	Developing Java Web Services	Wiley Publishing Inc., New Delhi	2004
4	Sandeep Chatterjee, James Webber	Developing Enterprise Web Services	Pearson Education, New Delhi	2004

Pedagogy

- Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER III

CODE	COURSE TITLE
18CSPC309/ 18CAPC514	ASP.NET PROGRAMMING

Category	CIA	ESE	L	T	P	Credit
Core	25	75	55	5	-	4

Preamble

Students will be able to understand the development and deployment of web applications.

Course Outcomes

On the successful of the course the students able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the framework of web programming and .NET	K1-K2
CO2	Gain knowledge of web forms and controls to create a user interface	K1-K2
CO3	Explore the knowledge on C#.NET with its applications	K1-K3
CO4	Access and manipulate data in a Microsoft SQL Server database by using Microsoft ADO.NET	K1-K3
CO5	Apply advanced controls in web applications	K2-K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	M
CO2	S	M	M	S	M
CO3	S	M	S	S	M
CO4	S	S	M	M	S
CO5	S	M	M	S	M

S- Strong; M-Medium; L-Low

UNIT I

12 Hrs.

ASP.NET 4.0 Essentials: Exploring the .NET Framework - Exploring the Visual Studio 2010 IDE - Exploring the ASP.NET 4.0.

UNIT II **12 Hrs.**

Application Structure and State - Web Forms: Standard Controls

UNIT III **12 Hrs.**

Introducing C# 2010 – Flow Control

UNIT IV **12Hrs.**

.NET and SQL Server – Data Access with ADO.NET

UNIT V **12Hrs.**

Validation Controls – Working with Database Controls : The SqlDataSource Control – The AccessDataSource Control – The XmlDataSource Control – The GridView Control – The DataList Control – The FormView Control - The Chart Control.

TEXT BOOKS

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Kogent Learning Solutions Inc	ASP.NET 4.0 Projects Black Book	DreamTech Press	Edition 2010.
2.	Kogent Learning Solutions Inc	.NET 4.0 Programming (6-in-1) Black Book	DreamTech Press	Edition 2011.

REFERENCE BOOKS

Sl.No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Mattnew MacDonald	Beginning ASP.NET 2.0 in VB 2005	APress	First Indian Reprint 2006
2.	Adam Freeman	Applied ASP.NET 4 in Context	APress	First Indian Reprint 2012.

Web Resources

1. <https://www.tutorialspoint.com/csharp/>
2. <https://www.guru99.com/asp-net-tutorial.html>

Pedagogy

Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER III

CODE	COURSE TITLE
18CSPC310	MACHINE LEARNING TECHNIQUES

Category	CIA	ESE	L	T	P	Credit
Core	25	75	70	5	-	5

Preamble

To enable the students to learn the basic concepts, principles, methods of data mining and machine learning.

Course Outcomes

CO Number	CO Statement	Knowledge Level
CO1.	Understand the basic concepts, fundamentals and various methods of preprocessing in data mining	K2
CO2.	Demonstrate the knowledge of various classification algorithms and explain how to evaluate the accuracy of predictive modeling techniques.	K2
CO3.	Explain about the types of data in cluster analysis and the methods involved in association and correlation analysis.	K2
CO4.	Understand the concepts and applications of machine learning techniques and associated computing methods	K2
CO5.	Improve and develop methods and algorithms as applicable to machine learning and data mining.	K2

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

Mapping with Programme Outcome

COs	PO1	PO2	PO3	PO4	PO5
CO1.	S	M	S	S	S
CO2.	S	M	S	S	S
CO3.	S	M	S	S	S
CO4.	S	M	S	S	S
CO5.	S	M	S	S	S

S- Strong; M-Medium; L-Low

Syllabus

UNIT I

15 Hrs.

Introduction: Fundamentals of data mining – Data Mining functionalities – Classification of Data Mining – Task Primitives. Data Preprocessing: Need for Preprocessing – Descriptive Data Summarization - Data Cleaning – Data Integration and Transformation – Data Reduction

UNIT II

15 Hrs.

Classification and Prediction: Issues – Decision tree Induction – Bayesian classification – Back propagation – Support Vector machine. Prediction – Other classification methods. Prediction: Accuracy and error measure – Evaluating the accuracy of a classifier or predictor.

UNIT III

15 Hrs.

Clustering Analysis: Cluster analysis Introduction - Types of data in cluster analysis- Hierarchical methods – Density-Based Method - Outlier Analysis – Mining Frequency Patterns, Associations, Mining Various Kind of Association Rules - Constraint-Based Association Mining.

UNIT IV

15 Hrs.

Introduction: What Is Machine Learning? - Examples of Machine Learning Applications. **Supervised Learning:** Learning a Class from Examples – Vapnik - Chervonenkis (VC) Dimension - Probably Approximately Correct (PAC) Learning – Noise - Learning Multiple Classes – Regression - Model Selection and Generalization - Dimensions of a Supervised Machine Learning Algorithm.

UNIT V

15 Hrs.

Bayesian Decision Theory: Introduction – Classification - Losses and Risks - Discriminant Functions - Utility Theory - Association Rules. **Parametric Methods:** Introduction - Maximum Likelihood Estimation - **Evaluating an Estimator:** Bias and Variance 65 - The Bayes' Estimator - Parametric Classification – Regression - **Tuning Model Complexity:** Bias/Variance Dilemma - Model Selection Procedures.

Text Book

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Jaiwai Han, Micheline Kamber	Data Mining Concept and Techniques	Morgan Kaufmann Publishers	2008, 2 nd Edition
2.	Alpaydin Ethem	Introduction to Machine Learning	Massachusetts Institute of Technology.	Second Edition, 2010

Reference Books

Sl. No.	Author Name	Title of the Book	Publisher	Year and Edition
1.	Arun K. Pujari	Data Mining Techniques	Universities Press (India) Pvt. Ltd	2013, 3 rd edition
2.	Margaret H. Dunhan	Data Mining : Introductory and Advanced Topics	Pearson Education	2013, 3 rd edition
3.	<u>Mitchell</u>	Machine Learning	McCraw Hill Education private Limited	First edition 2011.
4.	<u>Christopher Bishop</u>	Pattern Recognition and Machine Learning (Information Science and Statistics) Hardcover – Import		Second Edition, Springer 2011.

Pedagogy

- Lecture, PPT, Quiz, Assignment, Group Discussion, Seminar

SEMESTER III

CODE	COURSE TITLE
18CSPCP04/ 18CAPCP09	ASP.NET PROGRAMMING LAB

Category	CIA	ESE	L	T	P	Credit
Practical – IX	40	60	-	-	75	3

Preamble

To make the students to develop web applications using C#.NET in .NET environment.

Course Outcomes

On the successful completion of the course, Students should able to

CO Number	CO Statement	Knowledge Level
CO1	Implement web application using basic controls.	K3
CO2	Skills to develop application using advanced controls.	K3
CO3	Demonstrate the concept of flow control in C#.NET.	K4
CO4	Illustrate the concept of Data grid and Grid View Controls.	K3
CO5	Develop applications using XML Data Source Control.	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	L
CO2	S	M	M	S	M
CO3	M	S	S	M	L
CO4	M	S	M	M	S
CO5	M	S	S	M	S

S- Strong; M-Medium; L-Low

Syllabus

1. Develop a web application using controls.
2. Develop a web application using CSS and Hyper link control.
3. Develop a web application using Bulleted List Control and Drop down list.
4. Develop an ASP.NET web page to demonstrate the use of image control and File upload control.
5. Develop an ASP.NET web application using Custom Control (User Control).
6. Develop a web application to demonstrate Flow Control using C#.NET.
7. Develop a web application using Data List, DataGrid View Controls.
8. Develop a web application using Chart Control.
9. Develop a web application using validation controls.
10. Develop a web application using XmlDataSource Control.