G.VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS)

(Re-Accredited with "A" Grade by NAAC)

Department of M.Sc., Computer Science

P25CS101 - ANALYSIS AND DESIGN OF ALGORITHM

Course Code	Course Title	Category	Lecture	Tutorial	Practical	Credit
P25CS101	Analysis and Design of Algorithm	Core-1	85	5	0	5

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
1	I	25	75	100

Course Objective

- The elementary Data Structures and algorithms
- An introduction to the algorithms, their analysis and design
- Various methods like Basic Traversal and Search Techniques, divide and Conquer method, Dynamic programming, and backtracking
- The various design and analysis of the algorithms

Course Outcomes (COs)

On the completion of the course the student will be able to

CO	Course Outcome	Knowledge Level (RBT)
CO1	get knowledge about algorithms and determines their time complexity.	K1,K2,K3,K4,K5,K6
CO2	gain good understanding of Greedy method and its algorithm.	K1,K2,K3,K4,K5,K6
CO3	describe about graphs using dynamic programming technique.	K1,K2,K3,K4,K5,K6
CO4	demonstrate the concept of backtracking & branch and bound technique.	K1,K2,K3,K4,K5,K6
CO5	explore the traversal and searching technique and apply it for trees and graphs.	K1,K2,K3,K4,K5,K6

K1–Remember; K2–Understand; K3–Apply; K4–Analyze; K5–Evaluate; K6–Create

CO-PO and CO-PSO Mapping (Course Articulation Matrix)

COs	POs							PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	3	2	1	2	2	2	3	3	3
CO2	2	1	2	2	2	2	2	2	1	2
CO3	2	3	1	2	3	2	2	3	3	3
CO4	2	2	3	2	2	1	2	1	2	1
CO5	1	2	2	2	2	2	1	1	2	1
Total	**9**	**11**	**10**	**9**	**11**	**9**	**9**	**10**	**11**	**10**

(3-Strong, 2-Medium, 1-Low, -No Correlation)

Course Content

Unit - I Introduction **(L-17 Hrs)**

Algorithm Definition and Specification – Space complexity-Time Complexity Asymptotic Notations – Elementary. Data Structure: Stacks and Queues – Binary Tree - Binary Search Tree - Heap – Heap sort- Graph.

Unit - II Basic Traversal And Search Techniques **(L-17 Hrs)**

Techniques for Binary Trees-Techniques for Graphs - Divide and Conquer: General Method – Binary Search – Merge Sort – Quick Sort.

Unit - III The Greedy Method **(L-17 Hrs)**

The Greedy Method: General Method–Knapsack Problem–Minimum Cost Spanning Tree– Single Source Shortest Path.

Unit - IV Dynamic Programming **(L-17 Hrs+T-2 Hrs)**

General Method–Multistage Graphs–All Pair Shortest Path–Optimal Binary Search Trees – 0/1 Knapsacks – Traveling Salesman Problem – Flow Shop Scheduling.

Unit - V Backtracking **(L-17 Hrs+T-3 Hrs)**

General Method – 8-Queens Problem – Sum of Subsets – Graph Coloring – Hamiltonian Cycles – Branch And Bound: - The Method – Traveling Salesperson.

Text Books

1. Ellis Horowitz, “Computer Algorithms”, Galgotia Publications.
2. Alfred V. Aho, John E . Hopcroft, Jeffrey D. Ullman, \"Data Structures and Algorithms\".

Reference Books

1. Goodrich, “Data Structures& Algorithms in Java”,Wiley3rd edition
2. Skiena,”The Algorithm Design Manual”,SecondEdition,Springer,2008
3. Anany Levith,”Introduction to the Design and Analysis of algorithm”, Pearson Education Asia, 2003
4. Robert Sedgewick, Phillipe Flajolet,”An Introduction to the Analysis of Algorithms”, Addison-Wesley Publishing Company,1996.

Web Resources

1. https://nptel.ac.in/courses/106/106/106106131/
2. https://www.tutorialspoint.com/design_and_analysis_of_algorithms/index.htm
3. https://www.javatpoint.com/daa-tutorial

Course Designer

Mrs.C.Iswarya,Assistant Professor,Department of Computer Science.

G.VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS)

(Re-Accredited with "A" Grade by NAAC)

Department of M.Sc., Computer Science

P25CS102 - OBJECT ORIENTED ANALYSIS AND DESIGN & C++

Course Code	Course Title	Category	Lecture	Tutorial	Practical	Credit
P25CS102	Object Oriented Analysis and design & C++	Core-2	80	10	0	5

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
I	I	25	75	100

Course Objective

- The object model, classes and objects, object orientation, machine view and model management view
- The basic functions, principles and concepts of object oriented analysis and design
- The students to understand C++ language with respect to OOAD

Course Outcomes (COs)

On the completion of the course the student will be able to

CO	Course Outcome	Knowledge Level (RBT)
CO1	understand the concept of Object-Oriented development and modeling techniques.	K1,K2,K3,K4,K5,K6
CO2	gain knowledge about the various steps performed during object design.	K1,K2,K3,K4,K5,K6
CO3	abstract object -based views for generic software systems.	K1,K2,K3,K4,K5,K6
CO4	link OOAD with C++ language.	K1,K2,K3,K4,K5,K6
CO5	apply the basic concept of OOPs and familiarize to write C++ program.	K1,K2,K3,K4,K5,K6

K1–Remember; K2–Understand; K3–Apply; K4–Analyze; K5–Evaluate; K6–Create

CO-PO and CO-PSO Mapping (Course Articulation Matrix)

COs	POs							PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	2	3	1	2	2	3	2	3
CO2	2	2	2	1	2	2	2	1	2	2
CO3	3	2	2	3	2	3	1	3	2	3
CO4	1	2	1	2	2	2	3	2	2	1
CO5	1	1	2	2	2	2	2	2	1	1
Total	**10**	**9**	**9**	**11**	**9**	**11**	**10**	**11**	**9**	**10**

(3-Strong, 2-Medium, 1-Low, -No Correlation)

Course Content

Unit - I The Object Model (L-16 Hrs)

The Evolution of the Object Model – Elements of the Object Model – Applying the Object Model. Classes and Objects: The Nature of an Object – Relationship among Objects.

Unit - II Classes and Object (L-16 Hrs)

Nature of Class – Relationship Among classes – The Interplay of classes and Objects. Classification: The importance of Proper Classification –identifying classes and objects – Key Abstractions and Mechanism.

Unit - III Introduction to C++ **(L-16 Hrs)**

Input and output statements in C++-Declarations-control structures– Functions in C++.

Unit - IV Inheritance and Overloading **(L-16 Hrs+T-5 Hrs)**

Classes and Objects–Constructors and Destructors–operators over loading–Type ConversionInheritance – Pointers and Arrays.

Unit - V Memory Management **(L-16 HOURS+T-5 H)**

Operators-Polymorphism–Virtual functions–Files–Exception Handling – String Handling -Templates.

Text Books

1. "Object Oriented Analysis and Design with Applications", Grady Booch, Second Edition, Pearson Education.
2. Object-Oriented Programming with ANSI & Turbo C++", Ashok N.Kamthane, First Indian Print -2003, Pearson Education.

Reference Books

1. Balagurusamy "Object Oriented Programming with C++",TMH, SecondEdition,2003.

Web Resources

1. https://onlinecourses.nptel.ac.in/noc19_cs48/preview
2. https://nptel.ac.in/noc/courses/noc16/SEM2/noc16-cs19/
3. https://www.tutorialspoint.com/object_oriented_analysis_design/ooad_object_oriented_analysis.h

Course Designer

Mrs.P.Gangalakshmi,Assistant Professor,Department of Computer Science

G.VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS)

(Re-Accredited with "A" Grade by NAAC)

Department of M.Sc., Computer Science

P25CS1P1 - ALGORITHM AND OOPS LAB

Course Code	Course Title	Category	Lecture	Tutorial	Practical	Credit
P25CS1P1	Algorithm and OOPs Lab	Core Lab -1	0	0	75	3

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
I	I	40	60	100

Course Objective

- This course covers the basic data structures like Stack, Queue, Tree, and List
- This course enables the students to learn the applications of the data structures using various techniques
- It also enables the students to understand C ++ language with respect to OOAD concepts
- Application of OOPS concepts

Course Outcomes (COs)

On the completion of the course the student will be able to

CO	Course Outcome	Knowledge Level (RBT)
CO1	Understand the concepts of object oriented with respect to C++	K1,K2,K3,K4,K5,K6
CO2	Able to understand and implement OOPS concepts	K1,K2,K3,K4,K5,K6
CO3	Implementation of data structures like Stack, Queue, Tree, and List using C++	K1,K2,K3,K4,K5,K6
CO4	Application of the data structures for Sorting, searching using different techniques.	K1,K2,K3,K4,K5,K6
CO5	Gain knowledge about the various steps performed during object design	K1,K2,K3,K4,K5,K6

K1–Remember; K2–Understand; K3–Apply; K4–Analyze; K5–Evaluate; K6–Create

CO-PO and CO-PSO Mapping (Course Articulation Matrix)

COs	POs							PSOs		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	2	2	1	2	2	3	3	2
CO2	2	1	2	2	2	2	2	1	2	2
CO3	3	3	2	1	2	3	2	3	3	2
CO4	1	2	2	3	2	2	2	2	1	1
CO5	1	2	1	2	2	2	1	2	1	2
Total	**10**	**11**	**9**	**10**	**9**	**11**	**9**	**11**	**10**	**9**

(3-Strong, 2-Medium, 1-Low, -No Correlation)

Course Content

List of Exercises **75**

1) Write a program to solve the tower of Hanoi using recursion.
2) Write a program to traverse through binary search tree using traversals.
3) Write a program to perform various operations on stack using linked list.
4) Write a program to perform various operation in circular queue.
5) Write a program to sort an array of an elements using quick sort.
6) Write a program to solve number of elements in ascending order using heap sort.
7) Write a program to solve the knap sack problem using greedy method

8) Write a program to search for an element in a tree using divide& conquer strategy.
9) Write a program to place the 8 queens on an 8X8 matrix so that no two queens Attack.
10) Write a C++ program to perform Virtual Function
11) Write a C++ program to perform Parameterized constructor
12) Write a C++ program to perform Friend Function
13) Write a C++ program to perform Function Overloading
14) Write a C++ program to perform Single Inheritance
15) Write a C++ program to perform Employee Details using files.

Text Books

1. Goodrich, “Data Structures& Algorithms in Java”, Wiley 3rd edition
2. Skiena,”The Algorithm Design Manual”, Second Edition,Springer,2008

Reference Books

1. Anany Levith, ”Introduction to the Design and Analysis of algorithm”, Pearson Education Asia, 2003.
2. Robert Sedgewick, Phillipe Flajolet, ”An Introduction to the Analysis of Algorithms”, Addison-Wesley Publishing Company,1996.

Web Resources

1. https://onlinecourses.nptel.ac.in/noc19_cs48/preview
2. https://nptel.ac.in/noc/courses/noc16/SEM2/noc16-cs19/
3. https://www.tutorialspoint.com/object_oriented_analysis_design/ooad_object_oriented_analysis.h

Course Designer

Mrs.P.Gangalakshmi,Assistant Professor,Department of Computer Science.

G.VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS)

(Re-Accredited with "A" Grade by NAAC)

Department of M.Sc., Computer Science

P25CS103 - PYTHON PROGRAMMING

Course Code	Course Title	Category	Lecture	Tutorial	Practical	Credit
P25CS103	Python Programming	Core-3	65	10	0	4

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
I	I	25	75	100

Course Objective

- Presents an introduction to Python, creation of web applications, network applications and working in the clouds
- Use functions for structuring Python programs
- Understand different Data Structures of Python
- Represent compound data using Python lists, tuples and dictionaries

Course Outcomes (COs)

On the completion of the course the student will be able to

CO	Course Outcome	Knowledge Level (RBT)
CO1	Understand the basic concepts of Python Programming	K1,K2,K3,K4,K5,K6
CO2	Understand File operations, Classes and Objects	K1,K2,K3,K4,K5,K6
CO3	Acquire Object Oriented Skills in Python	K1,K2,K3,K4,K5,K6
CO4	Develop web applications using Python	K1,K2,K3,K4,K5,K6
CO5	Develop Client Server Networking applications	K1,K2,K3,K4,K5,K6

K1–Remember; K2–Understand; K3–Apply; K4–Analyze; K5–Evaluate; K6–Create

CO-PO and CO-PSO Mapping (Course Articulation Matrix)

COs	POs							PSOs		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	2	2	1	3	2	2	3
CO2	1	2	2	2	2	2	2	2	2	1
CO3	3	2	3	1	3	2	3	2	2	3
CO4	2	1	1	3	2	2	1	2	2	2
CO5	2	2	1	2	2	2	1	1	1	2
Total	**11**	**9**	**10**	**10**	**11**	**9**	**10**	**9**	**9**	**11**

(3-Strong, 2-Medium, 1-Low, -No Correlation)

Course Content

Unit - I Python **(L-13 Hrs+T-2 Hrs)**

Introduction–Numbers–Strings–Variables–Lists–Tuples–Dictionaries–Sets– Comparison

Unit - II Code Structures **(L-13 Hrs+T-2 Hrs)**

if, else if, and else – Repeat with while – Iterate with for – Comprehensions– Functions – Generators – Decorators – Namespaces and Scope – Handle Errors with try and except – User Exceptions.

Unit - III Modules, Packages, and Programs **(L-13 Hrs+T-2 Hrs)**

Modules, Packages, and Programs: Standalone Programs – Command-Line Arguments – Modules and the import Statement – The Python Standard Library. Objects and Classes: Define a Class with class – Inheritance – Override a Method – Add a Method – Get Help from Parent with super–Inself Defense –Get and Set Attribute Values with Properties –Name Mangling for Privacy – Method Types – Duck Typing – Special Methods –Composition.

Unit - IV Data Types **(L-13 Hrs+T-3 Hrs)**

Text Strings–Binary Data. Storing and Retrieving Data: File Input/Output– Structured Text Files – Structured Binary Files - Relational Databases – NoSQL Data Stores. Web - Web Clients –Web Servers–Web Services and Automation

Unit - V Systems **(L-13 Hrs+T-1 Hrs)**

Files– Directories – Programs and Processes – Calendars and Clocks. Concurrency -Queues–Processes–Threads–Green Threads and event – twisted – Redis. Networks- Patterns – The Publish-Subscribe Model – TCP/IP – Sockets – ZeroMQ –Internet Services – Web Services and APIs.

Text Books

1. Bill Lubanovic, “Introducing Python”,O’Reilly, FirstEdition-SecondRelease,2014.
2. Mark Lutz, “Learning Python”, O’Reilly, Fifth Edition, 2013.

Reference Books

1. David M.Beazley, “Python Essential Reference”,Developer’s Library,Fourth Edition,2009.
2. Sheetal Taneja, Naveen Kumar,“Python Programming-A Modular Approach”, Pearson Publications.

Web Resources

1. https://www.programiz.com/python-programming/
2. https://www.tutorialspoint.com/python/index.htm
3. https://onlinecourses.swayam2.ac.in/aic20_sp33/preview

Course Designer

Dr.S.Suganthi,Assistant Professor,Department of Computer Science.

G.VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS)

(Re-Accredited with "A" Grade by NAAC)

Department of M.Sc., Computer Science

P25CS1P2 - PYTHON PROGRAMMING LAB

Course Code	Course Title	Category	Lecture	Tutorial	Practical	Credit
P25CS1P2	Python Programming Lab	Core Lab - 2	0	0	60	3

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
I	I	40	60	100

Course Objective

- An overview of elementary data items, lists, dictionaries, sets and tuples
- Understand and write simple Python programs
- The OOPS concepts of Python
- The develop web applications using Python

Course Outcomes (COs)

On the completion of the course the student will be able to

CO	Course Outcome	Knowledge Level (RBT)
CO1	write programs in Python using OOPS concepts.	K1,K2,K3,K4,K5,K6
CO2	understand the concepts of File operations and Modules in Python.	K1,K2,K3,K4,K5,K6
CO3	implementation of lists, dictionaries, sets and tuples as programs.	K1,K2,K3,K4,K5,K6
CO4	develop web applications using Python.	K1,K2,K3,K4,K5,K6
CO5	define the structure and components of a Python program.	K1,K2,K3,K4,K5,K6

K1–Remember; K2–Understand; K3–Apply; K4–Analyze; K5–Evaluate; K6–Create

CO-PO and CO-PSO Mapping (Course Articulation Matrix)

COs	POs							PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	3	2	3	2	1	2	2	3	3
CO2	2	2	2	1	2	2	2	2	2	1
CO3	2	3	2	3	1	2	3	2	3	3
CO4	1	1	2	2	3	2	2	2	1	2
CO5	2	1	1	2	2	2	2	1	1	2
Total	**9**	**10**	**9**	**11**	**10**	**9**	**11**	**9**	**10**	**11**

(3-Strong, 2-Medium, 1-Low, -No Correlation)

Course Content

List of Exercises **60**

1. Programs using elementary data items, lists, dictionaries and tuples
2. Programs using conditional branches,
3. Programs using loops.
4. Programs using functions
5. Programs using exception handling
6. Programs using inheritance
7. Programs using polymorphism
8. Programs to implement file operations.

9. Programs using modules.
10. Programs for creating dynamic and interactive Web Pages using forms.

Text Books

1. BillLubanovic,“IntroducingPython”,O’Reilly,FirstEdition-SecondRelease,2014.
2. Mark Lutz,“Learning Python”, O’Reilly, Fifth Edition, 2013.

Reference Books

1. David M.Beazley, “Python Essential Reference”, Developer’s Library,Fourth Edition,2009.
2. Sheetal Taneja, Naveen Kumar,“Python Programming-A Modular Approach”, Pearson Publications.

Web Resources

1. https://www.programiz.com/python-programming/
2. https://www.tutorialspoint.com/python/index.htm
3. https://onlinecourses.swayam2.ac.in/aic20_sp33/preview

Course Designer

Mrs.V.Jamuna Rani,Assistant Professor,Department of Computer Science.

G.VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS)

(Re-Accredited with "A" Grade by NAAC)

Department of M.Sc., Computer Science

P25CS1E1A - ADVANCED SOFTWARE ENGINEERING

Course Code	Course Title	Category	Lecture	Tutorial	Practical	Credit
P25CS1E1A	Advanced Software Engineering	Core Elective - I	55	5	0	3

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
I	I	25	75	100

Course Objective

- Software engineering, design, testing and maintenance
- The concepts of Software Engineering
- Software Project Management, Software Design & Testing

Course Outcomes (COs)

On the completion of the course the student will be able to

CO	Course Outcome	Knowledge Level (RBT)
CO1	understand about Software Engineering process.	K1,K2,K3,K4,K5,K6
CO2	understand about Software project management skills, design and quality management.	K1,K2,K3,K4,K5,K6
CO3	analyze on Software Requirements and Specification.	K1,K2,K3,K4,K5,K6
CO4	analyze on Software Testing, Maintenance and Software Re-Engineering.	K1,K2,K3,K4,K5,K6
CO5	design and conduct various types and levels of software quality for a software project.	K1,K2,K3,K4,K5,K6

K1–Remember; K2–Understand; K3–Apply; K4–Analyze; K5–Evaluate; K6–Create

CO-PO and CO-PSO Mapping (Course Articulation Matrix)

COs	POs							PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	2	2	2	3	1
CO2	1	2	2	2	2	2	2	2	1	2
CO3	3	3	3	2	2	3	1	2	3	2
CO4	2	1	1	1	2	2	2	2	2	2
CO5	2	1	1	1	2	2	2	1	2	2
Total	**11**	**10**	**10**	**8**	**10**	**11**	**9**	**9**	**11**	**9**

(3-Strong, 2-Medium, 1-Low, -No Correlation)

Course Content

Unit - I Introduction (L-11 Hrs)

The Problem Domain – Software Engineering Challenges - Software Engineering Approach – Software Processes: Software Process – Characteristics of a Software Process – Software Development Process Models – Other software processes.

Unit - II Software Requirements Analysis and Specification (L-11 Hrs)

Requirement engineering – Type of Requirements – Feasibility Studies – Requirements Elicitation – Requirement Analysis – Requirement Documentation – Requirement Validation – Requirement Management – SRS - Formal

System Specification – Axiomatic Specification – Algebraic Specification - Software Quality Management –Software Quality, Software Quality Management System, ISO 9000, SEI CMM.

Unit - III Software Project Management **(L-11 Hrs)**

Responsibilities of a software project manager – Project planning– Metrics for Project size estimation – Project Estimation Techniques – Empirical Estimation Techniques – COCOMO – Halstead's software science – Staffing level estimation – Scheduling– Organization and Team Structures – Staffing – Risk management – Software Configuration Management – Miscellaneous Plan.

Unit - IV Software Design **(L-11 Hrs T-2Hrs)**

Outcome of a Design process – Characteristics of a good software design – Cohesion and coupling - Strategy of Design – Function Oriented Design – Object Oriented Design - Detailed Design - IEEE Recommended Practice for Software Design Descriptions.

Unit - V Software Testing **(L-11 Hrs T-3 Hrs)**

A Strategic approach to software testing – Terminologies – Functional testing– Structural testing – Levels of testing – Validation testing - Regression testing – Art of Debugging–Testingtools-Metrics-ReliabilityEstimation.SoftwareMaintenance -Maintenance Process - Reverse Engineering – Software Re-engineering - Configuration Management Activities.

Text Books

1. An Integrated Approach to Software Engineering – Pankaj Jalote, Narosa Publishing House, Delhi, 3rd Edition
2. Fundamentals of Software Engineering –Rajib Mall, PHI Publication,3rdEdition.

Reference Books

1. Software Engineering– K.K. Aggarwal and Yogesh Singh, New Age International Publishers, 3 rd edition.
2. A Practitioners Approach-Software Engineering,- R.S. Pressman, McGraw Hill.
3. Fundamentals of Software Manodrioli, PHI Publication.

Web Resources

1. https://www.javatpoint.com/software-engineering-tutorial
2. https://onlinecourses.swayam2.ac.in/cec20_cs07/preview
3. https://onlinecourses.nptel.ac.in/noc19_cs69/preview

Course Designer

Mrs.S.Indira,Assistant Professor,Department of Computer Science.

G.VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS)

(Re-Accredited with "A" Grade by NAAC)

Department of M.Sc., Computer Science

P25CS1E1B - ADVANCED COMPUTER NETWORKS

Course Code	Course Title	Category	Lecture	Tutorial	Practical	Credit
P25CS1E1B	Advanced Computer Networks	Core Elective -I	55	5	0	3

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
I	I	25	75	100

Course Objective

- The concept of advanced computer networks
- The idea on protocols, OSI layers and its functions
- The protocols used in different layers
- Functionality of Internet

Course Outcomes (COs)

On the completion of the course the student will be able to

CO	Course Outcome	Knowledge Level (RBT)
CO1	understand fundamental underlying principles of computer networking	K1,K2,K3,K4,K5,K6
CO2	understand details and functionality of layered network architecture.	K1,K2,K3,K4,K5,K6
CO3	apply mathematical foundations to solve computational problems in computer networking.	K1,K2,K3,K4,K5,K6
CO4	analyze and evaluate performance of various communication protocols.	K1,K2,K3,K4,K5,K6
CO5	compare and create new routing algorithms.	K1,K2,K3,K4,K5,K6

K1–Remember; K2–Understand; K3–Apply; K4–Analyze; K5–Evaluate; K6–Create

CO-PO and CO-PSO Mapping (Course Articulation Matrix)

COs	POs							PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	3	2	3	3	2	2	2	2	3
CO2	2	1	2	2	2	2	2	2	2	1
CO3	2	3	2	3	3	2	3	1	2	3
CO4	2	2	2	1	1	1	2	3	2	2
CO5	2	2	1	1	1	2	2	2	1	2
Total	**9**	**11**	**9**	**10**	**10**	**9**	**11**	**10**	**9**	**11**

(3-Strong, 2-Medium, 1-Low, -No Correlation)

Course Content

Unit - I Introduction (L-11 Hrs)

data communications – networks – The internet – Protocols and standards – OSI model– layers in OSI model – TCP/IP protocol suite – addressing – guided media – Unguided media.

Unit - II Switching (L-11 Hrs)

Circuit switched networks – datagram networks – virtual circuit networks – Framing – Flow and error control multiple access – random access – wired Lan – wireless Lan – Cellular telephony – satellite networks.

Unit - III Network layer **(L-11 Hrs)**

IP V4 addressing – IPV6 addressing – ICMP – IGMP –Network layer delivery – forwarding – unicast and multicast routing protocols.

Unit - IV Transport layer **(L-11 Hrs +T-3 Hrs)**

Process to process delivery – UDP -TCP -Congestion – congestion control – QOS– Techniques to improve QOS.

Unit - V Domain name system **(L-11 Hrs+T-2 Hrs)**

name space – domain name space – distribution of name space – DNS in the internet – remote logging - email – file transfer -Network management system – SNMP Protocol.

Text Books

1. Data communications and networking – Behrouz A Forouzan McGraw Hill 4th Edition 2015 Reprint

Reference Books

1. Computer Networks – Tanenbaum -Pearson -2022
2. Computer networking –Kurose James F, Ross Keith W -Pearson – 2017
3. Data and computer communications – William Stallings – Pearson 2017
4. Computer networks and Internet – Douglas E Comer – Pearson – 2018.

Web Resources

1. https://www.tutorialspoint.com/computer-networks
2. https://www.javatpoint.com/computer-network-tutorial

Course Designer

Mrs.S.Indira,Assistant Professor,Department of Computer Science.

G.VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS)

(Re-Accredited with "A" Grade by NAAC)

Department of M.Sc., Computer Science

P25CS1E1C - COMPILER DESIGN

Course Code	Course Title	Category	Lecture	Tutorial	Practical	Credit
P25CS1E1C	Compiler Design	Core Elective -I	55	5	0	3

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
I	I	25	75	100

Course Objective

- The student should be made to learn the design principles of a Compiler

Course Outcomes (COs)

On the completion of the course the student will be able to

CO	Course Outcome	Knowledge Level (RBT)
CO1	Identify the basics principles of compiler design	K1,K2,K3,K4,K5,K6
CO2	Apply the various parsing techniques and different levels of translation	K1,K2,K3,K4,K5,K6
CO3	Analyze the various parsing techniques.	K1,K2,K3,K4,K5,K6
CO4	Evaluate intermediate code generation and run-time environment.	K1,K2,K3,K4,K5,K6
CO5	Implement front-end of the compiler and code generator.	K1,K2,K3,K4,K5,K6

K1–Remember; K2–Understand; K3–Apply; K4–Analyze; K5–Evaluate; K6–Create

CO-PO and CO-PSO Mapping (Course Articulation Matrix)

COs	POs							PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	1	1	3	2	3
CO2	3	2	2	1	3	2	1	3	2	3
CO3	2	3	2	2	2	3	2	3	2	3
CO4	2	3	3	1	3	2	2	2	2	3
CO5	3	3	3	3	3	3	2	3	1	3
Total	**13**	**14**	**13**	**9**	**13**	**11**	**8**	**14**	**9**	**15**

(3-Strong, 2-Medium, 1-Low, -No Correlation)

Course Content

Unit - I Introduction To Compilers (L-11 Hrs)

Overview of System Software-compiler and Interpreter- Assembler-Loader-linker Translators – Introduction to Compilers – Language and Grammar- Notations and Conventions- Hierarchy of Formal Languages- Stages of Compilation

Unit - II Lexical Analysis (L-11 Hrs)

Tokens and Regular Expressions - Regular Definitions- Finite Automata - Deterministic Automata- Non Deterministic Automata- Non Deterministic Automata with E-transitions -Regular Expressions to NFA-E-NFA to DFA

Unit - III Syntax Analysis (L-11 Hrs)

Context Free Grammar- structure of Language-Parse Trees and Parser-Top-Down Parser- Recursive Descent Parser- Predictive Parser-Bottom up parser-operator Precedence Parsing LR Parser-Parser Generator Tool - YACC

Unit - IV Intermediate Code Generation And Optimization **(L-11 Hrs + T-2 Hrs)**

Introduction- Types of Intermediate Code –Semantic Analysis-Need of Optimization- Construction of Basic Blocks and Processing- Data Flow Analysis using Flow Graph

Unit - V Code Generation **(L-11 Hrs + T-3 Hrs)**

Issues in Code Generator – Directed Acyclic Graph Representation of Basic Blocks – Peephole Optimization.

Text Books

1. Alfred V Aho, Monica S. Lam, Ravi Sethi and Jeffrey D Ullman, “Compilers – Principles, Techniques and Tools”, 2nd Edition, Pearson Education, 2007.

Reference Books

1. Randy Allen, Ken Kennedy, “Optimizing Compilers for Modern Architectures: A Dependence-based Approach”, Morgan Kaufmann Publishers, 2002.
2. Steven S. Muchnick, “Advanced Compiler Design and Implementation,“Morgan Kaufmann Publishers – Elsevier Science, India, Indian Reprint 2003.
3. Keith D Cooper and Linda Torczon, “Engineering a Compiler”, Morgan Kaufmann Publishers Elsevier Science, 2004.

Web Resources

1. https://www.geeksforgeeks.org/introduction-of-compiler-design/
2. https://www.tutorialspoint.com/compiler_design/index.htm

Course Designer

Mrs.C.Iswarya,Assistant Professor, Department of Computer Science

G.VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS)

(Re-Accredited with "A" Grade by NAAC)

Department of M.Sc., Computer Science

P25CS204 - DATAMININIG AND DATAWAREHOUSING

Course Code	Course Title	Category	Lecture	Tutorial	Practical	Credit
P25CS204	DataMininig and Datawarehousing	Core-4	85	5	0	5

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
I	II	25	75	100

Course Objective

- The concepts of Mining tasks, classification, clustering and Data Warehousing
- Develop skills of using recent data mining software for solving practical problems
- Critical thinking, problem-solving, and decision-making skills

Course Outcomes (COs)

On the completion of the course the student will be able to

CO	Course Outcome	Knowledge Level (RBT)
CO1	understand the basic data mining techniques and algorithms	K1,K2,K3,K4,K5,K6
CO2	understand the Association rules, Clustering techniques and Data warehousing Contents	K1,K2,K3,K4,K5,K6
CO3	compare and evaluate different data mining techniques like classification, Prediction, Clustering and association rule mining	K1,K2,K3,K4,K5,K6
CO4	design data warehouse with dimensional modeling and apply OLAP operations	K1,K2,K3,K4,K5,K6
CO5	identify appropriate data mining algorithms to solve real world problems	K1,K2,K3,K4,K5,K6

K1–Remember; K2–Understand; K3–Apply; K4–Analyze; K5–Evaluate; K6–Create

CO-PO and CO-PSO Mapping (Course Articulation Matrix)

COs	POs							PSOs		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	3	2	2	3	1	2	2
CO2	1	2	2	2	2	2	1	2	2	2
CO3	3	2	3	3	2	2	3	2	3	1
CO4	2	2	1	1	2	1	2	2	2	3
CO5	2	1	1	1	1	2	2	2	2	2
Total	**11**	**9**	**10**	**10**	**9**	**9**	**11**	**9**	**11**	**10**

(3-Strong, 2-Medium, 1-Low, -No Correlation)

Course Content

Unit - I Basics **(L-18 Hrs)**

Basic data mining tasks – data mining versus knowledge discovery in databases – data mining issues – data mining metrics – social implications of data mining – data mining from a database perspective. Data mining techniques: Introduction – a statistical perspective on data mining – similarity measures – decision trees – neural networks – genetic algorithms.

Unit - II Algorithms Classification **(L-18 Hrs)**

Introduction –Statistical –based algorithms -distance–based algorithms-decision tree-based algorithms-neural network–based algorithms–rule-based algorithms–combining techniques.

UNIT - III Clustering **(L-18 Hrs)**

Introduction–Similarity and Distance Measures–Outliers–Hierarchical Algorithms -Partitional Algorithms. Association rules -Introduction - large item sets - basic algorithms – parallel & distributed algorithms – comparing approaches- incremental rules – advanced association rules techniques – measuring the quality of rules.

UNIT - IV Data warehousing **(L-13 Hrs+T-5 Hrs)**

introduction - characteristics of a data warehouse – data marts – other aspects of data mart. Online analytical processing: introduction - OLTP & OLAP systems. Data modeling: star schema for multidimensional view –data modeling – multi fact star schema or snow flake schema – OLAP TOOLS – State of the market – OLAP TOOLS and the internet.

Unit - V Developing a data Warehouse **(L-18 Hrs)**

why and how to build a data warehouse –data warehouse architectural strategies and organization issues - design consideration – data content – metadata distribution of data – tools for data warehousing – performance considerations – crucial decisions in designing a data warehouse. Applications of data warehousing and data mining in government: Introduction - national data warehouses – other areas for data warehousing and data mining.

Text Books

1. MargaretH.Dunham,“DataMining:IntroductoryandAdvancedTopics”,Pearson education,2003.
2. C.S.R. Prabhu, “Data Warehousing Concepts, Techniques, Products and Applications”, PHI, Second Edition.

Reference Books

1. Arun K. Pujari,“ Data Mining Techniques”, Universities Press (India) Pvt. Ltd.,2003.
2. Alex Berson, Stephen J. Smith, “Data Warehousing, Data Mining and OLAP”, TMCH, 2001.
3. Jiawei Han & Micheline Kamber,“Data Mining Concepts&Techniques”, 2001, Academicpress.

Web Resources

1. https://www.javatpoint.com/data-warehouse
2. https://nptel.ac.in/noc/courses/noc20/SEM1/noc20-cs12/

Course Designer

Dr.A.Gopikannan ,Head and Assistant Professor,Department of Computer Science.

G.VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS)

(Re-Accredited with "A" Grade by NAAC)

Department of M.Sc., Computer Science

P25CS2P3 - DATA MINING LAB USING R

Course Code	Course Title	Category	Lecture	Tutorial	Practical	Credit
P25CS2P3	Data Mining lab using R	Core Lab -3	0	0	60	2

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
I	II	40	60	100

Course Objective

- The concepts of Data Mining algorithms namely classification, clustering, regression
- To understand & write programs using the DM algorithms
- To apply statistical interpretations for the solutions
- able to use visualizations techniques for interpretations

Course Outcomes (COs)

On the completion of the course the student will be able to

CO	Course Outcome	Knowledge Level (RBT)
CO1	write programs using R for Association rules, Clustering techniques	K1,K2,K3,K4,K5,K6
CO2	implement data mining techniques like classification, prediction.	K1,K2,K3,K4,K5,K6
CO3	use different visualization techniques using R.	K1,K2,K3,K4,K5,K6
CO4	apply different data mining algorithm s to solve real world applications	K1,K2,K3,K4,K5,K6
CO5	describe and conduct appropriate statistical modelling techniques.	K1,K2,K3,K4,K5,K6

K1–Remember; K2–Understand; K3–Apply; K4–Analyze; K5–Evaluate; K6–Create

CO-PO and CO-PSO Mapping (Course Articulation Matrix)

COs	POs							PSOs		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	2	3	1	2	3	2	2
CO2	1	2	1	2	2	2	2	3	2	2
CO3	3	1	3	2	3	2	3	2	2	2
CO4	2	3	2	2	1	2	2	2	2	2
CO5	2	2	2	1	1	2	2	3	2	2
Total	**11**	**10**	**11**	**9**	**10**	**9**	**11**	**13**	**10**	**10**

(3-Strong, 2-Medium, 1-Low, -No Correlation)

Course Content

List of Excercises: **60 hrs**

1. Implement Apriori algorithm to extract association rule of data mining.
2. Implement k-means clustering technique.
3. Implement anyone Hierarchal Clustering.
4. Implement KNN algorithm.
5. Implement SVM algorithm.
6. Implement Decision Tree algorithm.
7. Implement Genetic algorithm
8. Implement Linear Regression.

9. Data Visualization.

Text Books

1. Margaret H. Dunham, “Data Mining: Introductory and Advanced Topics”, Pearson education,2003.
2. C.S.R. Prabhu, “Data Warehousing Concepts, Techniques, Products and Applications”, PHI,Second Edition.

Reference Books

1. Arun K. Pujari, “Data Mining Techniques”, Universities Press (India) Pvt. Ltd.,2003.

Web Resources

1. https://www.javatpoint.com/data-warehouse
2. https://www.javatpoint.com/data-warehouse

Course Designer

Dr.A.Gopikannan,Head and Assistant Professor,Department of Computer Science

G.VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS)

(Re-Accredited with "A" Grade by NAAC)

Department of M.Sc., Computer Science

P25CS205 - ADVANCED OPERATING SYSTEMS

Course Code	Course Title	Category	Lecture	Tutorial	Practical	Credit
P25CS205	Advanced Operating Systems	Core-5	85	5	0	5

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
I	II	25	75	100

Course Objective

- The different types of operating systems and their functioning
- The distributed operating systems
- The components and management aspects of real time and mobile operating systems
- The Linux Operating Systems

Course Outcomes (COs)

On the completion of the course the student will be able to

CO	Course Outcome	Knowledge Level (RBT)
CO1	understand the design issues associated with operating systems	K1,K2,K3,K4,K5,K6
CO2	process management concepts including scheduling, deadlocks and distributed file systems.	K1,K2,K3,K4,K5,K6
CO3	prepare Real Time Task Scheduling	K1,K2,K3,K4,K5,K6
CO4	analyze Operating Systems for Handheld Systems	K1,K2,K3,K4,K5,K6
CO5	analyze Operating Systems like LINUX and IOS	K1,K2,K3,K4,K5,K6

K1–Remember; K2–Understand; K3–Apply; K4–Analyze; K5–Evaluate; K6–Create

CO-PO and CO-PSO Mapping (Course Articulation Matrix)

COs	POs							PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	3	2	3	3	1	2	3	2	2
CO2	2	1	2	2	1	2	2	2	2	2
CO3	1	3	2	3	3	2	3	3	2	2
CO4	3	2	2	1	2	2	2	1	2	1
CO5	2	2	1	1	2	2	2	1	1	2
Total	**10**	**11**	**9**	**10**	**11**	**9**	**11**	**10**	**9**	**9**

(3-Strong, 2-Medium, 1-Low, -No Correlation)

Course Content

Unit - I Basics of Operating Systems (L-18 Hrs)

What is an Operating System? – Main frame Systems –Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems –Real-Time Systems – Handheld Systems – Feature Migration – Computing Environments -Process Scheduling – Cooperating Processes – Inter Process Communication- Deadlocks –Prevention – Avoidance – Detection – Recovery.

Unit - II Distributed Operating Systems (L-18 Hrs)

Issues – Communication Primitives – Lamports Logical Clocks – Deadlock handling strategies – Issues in deadlock detection and resolution-distributed file systems –design issues – Case studies – The Sun Network File System-Coda.

Unit - III Real-time Operating Systems **(L-18 Hrs)**

Introduction – Applications of Real Time Systems – Basic Model of Real Time System – Characteristics – Safety and Reliability - Real Time Task Scheduling.

Unit - IV Operating Systems for Handheld Systems **(L-13 Hrs+T-5 Hrs)**

Requirements–Technology Overview–Handheld Operating Systems–Palm OS-Symbian Operating System-Android–Architecture of android– Securing handheld systems.

Unit - V Linux System **(L-18 Hrs)**

Introduction – Memory Management – Process Scheduling – Scheduling Policy - Managing I/O devices – Accessing Files- iOS : Architecture and SDK Framework - Media Layer - Services Layer - Core OS Layer - File System.

Text Books

1. Abraham Silberschatz; Peter Baer Galvin; Greg Gagne, “Operating System Concepts”, Seventh Edition, John Wiley & Sons, 2004.
2. Mukesh Singhal and Niranjan G. Shivaratri, “Advanced Concepts in Operating Systems – Distributed, Database, and Multiprocessor Operating Systems”, Tata McGraw-Hill, 2001.

Reference Books

1. Rajib Mall, “Real-Time Systems: Theory and Practice ”,Pearson Education India,2006.
2. Pramod Chandra P. Bhatt, An introduction to operating systems, concept and practice, PHI, Third edition, 2010.
3. Daniel.P.Bovet&MarcoCesati,“UnderstandingtheLinuxkernel”,3rded,O?Reilly,2005.
4. Neil Smyth, “iPhone iOS 4Development Essentials–Xcode”, Fourth Edition, Payload media, 2011.

Web Resources

1. https://onlinecourses.nptel.ac.in/noc20_cs04/preview
2. https://www.udacity.com/course/advanced-operating-systems--ud189
3. https://minnie.tuhs.org/CompArch/Resources/os-notes.pdf

Course Designer

Mrs.P.Gangalakshmi,Assistant Professor, Department of Computer Science.

G.VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS)

(Re-Accredited with "A" Grade by NAAC)

Department of M.Sc., Computer Science

P25CS206 - ADVANCED JAVA PROGRAMMING

Course Code	Course Title	Category	Lecture	Tutorial	Practical	Credit
P25CS206	Advanced Java Programming	Core-6	80	10	0	4

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
I	II	25	75	100

Course Objective

- The basic functions, principles and concepts of advanced java programming
- Concepts of distributed Application Architecture
- JDBC, Servlet packages, JQuery, Java Server Pages and JAR file format

Course Outcomes (COs)

On the completion of the course the student will be able to

CO	Course Outcome	Knowledge Level (RBT)
CO1	understand the advanced concepts of Java Programming	K1,K2,K3,K4,K5,K6
CO2	understand JDBC and RMI concepts	K1,K2,K3,K4,K5,K6
CO3	apply and analyze Java in Database	K1,K2,K3,K4,K5,K6
CO4	handle different event in java using the delegation event model, event listener and class	K1,K2,K3,K4,K5,K6
CO5	design interactive applications using Java Servlet, JSP and JDBC	K1,K2,K3,K4,K5,K6

K1–Remember; K2–Understand; K3–Apply; K4–Analyze; K5–Evaluate; K6–Create

CO-PO and CO-PSO Mapping (Course Articulation Matrix)

COs	POs							PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	2	2	3	2	3	3	2	2	3
CO2	2	2	2	1	2	2	2	2	2	1
CO3	2	3	1	3	2	3	3	2	2	3
CO4	2	2	3	2	2	1	1	2	1	2
CO5	2	2	2	2	1	1	1	1	2	2
Total	**9**	**11**	**10**	**11**	**9**	**10**	**10**	**9**	**9**	**11**

(3-Strong, 2-Medium, 1-Low, -No Correlation)

Course Content

Unit - I Java Basics Review **(L-16 Hrs)**

Components and event handling–Threading concepts–Networking features – Media techniques.

Unit - II Remote Method Invocation **(L-16 Hrs)**

Distributed Application Architecture- Creating stubs and skeletons- Defining Remote objects- Remote Object Activation-Object Serialization-Java Spaces.

Unit - III Java in Databases **(L-16 Hrs)**

JDBC principles – database access-Interacting- database search – Creating multimedia databases – Database support in web applications.

Unit - IV Java Servlets **(L-16 Hrs +T- 5 Hrs)**

Java Servlet and CGI programming- A simple java Servlet-Anatomy of a java Servlet-Reading data from a client-Reading http request header-sending data to a client and writing the http response header-working with cookies Java Server Pages: JSP Overview-Installation-JSP tags-Components of a JSP page-Expressions- Scriptlets-Directives-Declarations-A complete example.

Unit - V JAR file format creation **(L-16 Hrs +T- 5 Hrs)**

Internationalization–Swing Programming–Advanced java Techniques

Text Books

1. Jamie Jaworski, “Java Unleashed”, SAMS Tech media Publications,1999.
2. Campione, Walrath and Huml, “The Java Tutorial”, Addison Wesley,1999.

Reference Books

1. JimKeogh,”TheCompleteReferenceJ2EE”,TataMcGrawHillPublishing CompanyLtd,2010.
2. DavidSawyerMcFarland,“JavaScriptAndJQuery-TheMissingManual”,Oreilly Publications, 3rd Edition,2011.
3. Deitel and Deitel, “Java How to Program”, Third Edition, PHI/Pearson Education Asia.

Web Resources

1. https://www.javatpoint.com/servlet-tutorial
2. https://www.tutorialspoint.com/java/index.htm

Course Designer

Dr.S.Suganthi,Assistant Professor,Department of Computer Science.

G.VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS)

(Re-Accredited with "A" Grade by NAAC)

Department of M.Sc., Computer Science

P25CS2P4 - ADVANCED JAVA PROGRAMMING LAB

Course Code	Course Title	Category	Lecture	Tutorial	Practical	Credit
P25CS2P4	Advanced Java Programming Lab	Core Lab 4	0	0	60	3

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
I	II	40	60	100

Course Objective

- The course aims at giving an overall view of :
- simple programs using JSP, JAR
- basics about Applet, Servlets, JDBC
- basics of RMI and its implementation
- the socket programming

Course Outcomes (COs)

On the completion of the course the student will be able to

CO	Course Outcome	Knowledge Level (RBT)
CO1	Understand to the implement concepts of Java using HTML forms, JSP & JAR.	K1,K2,K3,K4,K5,K6
CO2	Must be capable of implementing JDBC and RMI concepts.	K1,K2,K3,K4,K5,K6
CO3	Able to write Applets with Event handling mechanism.	K1,K2,K3,K4,K5,K6
CO4	To create interactive web based applications using servlets and jsp.	K1,K2,K3,K4,K5,K6
CO5	To learn the Internet Programming, using Java Applets.	K1,K2,K3,K4,K5,K6

K1–Remember; K2–Understand; K3–Apply; K4–Analyze; K5–Evaluate; K6–Create

CO-PO and CO-PSO Mapping (Course Articulation Matrix)

COs	POs							PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	2	2	3	1	3	2	3	3	2	2
CO2	2	2	2	2	1	2	1	2	2	2
CO3	2	3	3	2	3	1	3	3	2	2
CO4	2	2	1	2	2	3	2	1	2	1
CO5	1	2	1	2	2	2	2	1	1	2
Total	**9**	**11**	**10**	**9**	**11**	**10**	**11**	**10**	**9**	**9**

(3-Strong, 2-Medium, 1-Low, -No Correlation)

Course Content

List of Exercises: **60**

1. Display a welcome message using Servlet.
2. Design a Purchase Order form using Html form and Servlet.
3. Develop a program for calculating the percentage of marks of a student using JSP.
4. Design a Purchase Order form using Html form and JSP.

5. Prepare a Employee pay slip using JSP.
6. Write a program using JDBC for creating a table, Inserting, Deleting records and list out the records.
7. Write a program using Java servlet to handle form data.
8. Write a simple Servlet program to create a table of all the headers it receives along with their associated values.
9. Write a program in JSP by using session object.
10. Write a program to build a simple Client Server application using RMI.
11. Create an apple for a calculator application.
12. Program to send a text message to another system and receive the text message from the system (use socket programming).

Text Books

1. JamieJaworski,“JavaUnleashed”,SAMSTechmediaPublications,1999.
2. Campione, Walrath and Huml,“TheJavaTutorial”,AddisonWesley,1999.

Reference Books

1. JimKeogh,”TheCompleteReferenceJ2EE”,Tata Mc Graw Hill Publishing Company Ltd,2010.
2. DavidSawyerMcFarland,“JavaScriptAndJQuery-TheMissingManual”,Oreilly Publications,3rd Edition,2011.

Web Resources

1. https://www.javatpoint.com/servlet-tutorial
2. https://www.tutorialspoint.com/java/index.htm
3. https://onlinecourses.nptel.ac.in/noc19_cs84/preview

Course Designer

Dr.S.Suganthi,Assistant Professor,

G.VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS)

(Re-Accredited with "A" Grade by NAAC)

Department of M.Sc., Computer Science

P25CS2E2A - ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

Course Code	Course Title	Category	Lecture	Tutorial	Practical	Credit
P25CS2E2A	Artificial Intelligence and Machine Learning	Core Elective - II	55	5	0	3

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
I	II	25	75	100

Course Objective

- Enable the students to learn the basic functions of AI, Heuristic Search Techniques
- Provide knowledge on concepts of Representations and Mappings and Predicate Logic
- Introduce Machine Learning with respect Data Mining, Big Data and Cloud
- Study about Applications & Impact of ML

Course Outcomes (COs)

On the completion of the course the student will be able to

CO	Course Outcome	Knowledge Level (RBT)
CO1	Demonstrate AI problems and techniques	K1,K2,K3,K4,K5,K6
CO2	Understand machine learning concepts	K1,K2,K3,K4,K5,K6
CO3	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning	K1,K2,K3,K4,K5,K6
CO4	Analyze the impact of machine learning on applications	K1,K2,K3,K4,K5,K6
CO5	Analyze and design are all world problem for implementation and understand the dynamic behavior of a system	K1,K2,K3,K4,K5,K6

K1–Remember; K2–Understand; K3–Apply; K4–Analyze; K5–Evaluate; K6–Create

CO-PO and CO-PSO Mapping (Course Articulation Matrix)

COs	POs							PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	1	2	3	3	3	2	2	2	2	3
CO2	2	2	2	1	2	2	2	2	2	1
CO3	2	2	3	3	3	2	2	3	1	3
CO4	2	2	1	2	1	1	2	2	3	2
CO5	2	1	1	2	1	1	2	2	2	2
Total	**9**	**9**	**10**	**11**	**10**	**8**	**10**	**11**	**10**	**11**

(3-Strong, 2-Medium, 1-Low, -No Correlation)

Course Content

Unit - I Introduction **(L-11 Hrs)**

AI Problems - Al techniques - Criteria for success. Problems, Problem Spaces, Search: State space search - Production Systems - Problem Characteristics - Issues in design of Search.

Unit - II Heuristic Search techniques **(L-11 Hrs)**

Generate and Test - Hill Climbing- Best-First, Problem Reduction, Constraint Satisfaction, Means-end analysis. Knowledge representation issues: Representations and mappings -Approaches to Knowledge representations - Issues in Knowledge representations - Frame Problem.

Unit - III Using Predicate logic **(L-11 Hrs)**

Representing simple facts in logic - Representing Instance and Isa relationships - Computable functions and predicates - Resolution - Natural deduction. Representing knowledge using rules: Procedural Vs Declarative knowledge- Logic programming-Forward Vs Backward reasoning -Matching-Control knowledge.

Unit - IV Understanding Machine Learning **(L-11 Hrs+T-3 Hrs)**

What Is Machine Learning? - Defining Big Data - Big Data in Context with Machine Learning - The Importance of the Hybrid Cloud - Leveraging the Power of Machine Learning - The Roles of Statistics and Data Mining with Machine Learning-Putting Machine Learning in Context-Approaches to Machine Learning.

Unit - V Looking Inside Machine Learning **(L-11 Hrs+T-2 Hrs)**

Looking Inside Machine Learning: The Impact of Machine Learning on Applications - Data Preparation -The Machine Learning Cycle.

Text Books

1. Elaine Rich and Kevin Knight, \"Artificial Intelligence\", Tata McGraw Hill Publishers company Pvt Ltd, Second Edition, 1991.
2. George F Luger, \"Artificial Intelligence\", 4thEdition, Pearson Education Publ,2002.

Reference Books

1. Machine Learning For Dummies ®, IBM Limited Edition by Judith Hurwitz,Daniel Kirsch.

Web Resources

1. https://www.ibm.com/downloads/cas/GB8ZMQZ3
2. https://www.javatpoint.com/artificial-intelligence-tutorial

Course Designer

Mrs.V.Jamuna Rani,Assistant Professor,Department of Computer Science.

G.VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS)

(Re-Accredited with "A" Grade by NAAC)

Department of M.Sc., Computer Science

P25CS2E2B - INTERNET OF THINGS

Course Code	Course Title	Category	Lecture	Tutorial	Practical	Credit
P25CS2E2B	Internet of Things	Core Elective - II	55	5	0	3

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
I	II	25	75	100

Course Objective

- To get familiar with the evolution of IOT with its design principles
- To outline the functionalities and protocols of internet communication
- To analyze the hardware and software components needed to construct IOT applications
- To identify the appropriate protocol for API construction and writing embedded code
- To realize various business models and ethics in Internet of Things

Course Outcomes (COs)

On the completion of the course the student will be able to

CO	Course Outcome	Knowledge Level (RBT)
CO1	Understand about IoT, its Architecture and its Applications	K1,K2,K3,K4,K5,K6
CO2	Comprehend the IoT evolution with its architecture and sensors	K1,K2,K3,K4,K5,K6
CO3	Assess the embedded technologies and develop prototypes for the IoT products	K1,K2,K3,K4,K5,K6
CO4	Evaluate the use of Application Programming Interface and design an API for IoT in realtime	K1,K2,K3,K4,K5,K6
CO5	Design IoT in real time applications using today's internet & wireless Technologies	K1,K2,K3,K4,K5,K6

K1–Remember; K2–Understand; K3–Apply; K4–Analyze; K5–Evaluate; K6–Create

CO-PO and CO-PSO Mapping (Course Articulation Matrix)

COs	POs							PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	2	2	1	2	3	3	2	3
CO2	2	2	2	2	2	2	2	1	2	1
CO3	3	2	2	3	2	2	3	3	1	3
CO4	1	2	1	2	2	2	1	2	3	2
CO5	1	1	2	2	2	1	1	2	2	2
Total	**10**	**9**	**9**	**11**	**9**	**9**	**10**	**11**	**10**	**11**

(3-Strong, 2-Medium, 1-Low, -No Correlation)

Course Content

Unit - I Internet of Things **(L-11 Hrs)**

An Overview : IoT Conceptual Framework - IoT Architectural View - Technology Behind IoT - Sources of IoT - M2M Communication - Examples of IoT - Design Principles for Connected Devices : IoT/M2M Systems Layers and Designs Standardization - Communication Technologies - Data Enrichment, Data Consolidation and Device Management at Gateway.

Unit - II Communication Protocols for Connected Devices **(L-11 Hrs)**

Message Communication Protocols for Connected Devices – Web Connectivity for Connected Devices – Network Using Gateway , SOAP, REST, HTTP, RESTful and WebSockets -Internet Connectivity Principles : Internet Connectivity - Internet Based Communication – IP Addressing in the IoT – Media Access Control – Application Layer Protocols: HTTP, HTTPS, FTP, Telnet and Others.

Unit - III Data Acquiring and Storage **(L-11 Hrs)**

Organising the Data – Transactions, Business Processes, Integration and Enterprise Systems – Analytics – Knowledge Acquiring, Managing and Storing Processes - Data Collection, Storage and Computing Using a Cloud Platform: Cloud Computing Paradigm for Data Collection, Storage and Computing – Everything as a Service and Cloud Service Models.

UNIT - IV Sensors **(L-11 Hrs + T-2 Hrs)**

Participatory Sensing, RFIDs, and Wireless Sensor Networks: Sensor Technology – Wireless Sensor Networks Technology - Prototyping the Embedded Devices for loT and M2M: Embedded Computing Basics – Embedded Platforms for Prototyping.

Unit - V Prototyping Embedded Device Software **(L-11 Hrs + T-3 Hrs)**

Devices, Gateways, Internet and Web/Cloud Services Software Development – Prototyping online Component APIs and Web APIs – Security for IoT : Vulnerabilities, Security Requirements and Threat Analysis – IoT Security Tomography and Layered Attacker Model – Security Models, Profiles and Protocols for IoT – IoT Application Case Study : Design Layers, Design Complexity and Designing using Cloud PaaS – IoT / IIoT Applications in the premises, Supply – Chain and Customer Monitoring – Connected Car and its Applications and Services.

Text Books

1. Raj Kamal , “ Internet of Things Architecture and Design Principles”, McGraw Hill, 2017.

Reference Books

1. Ovidiu Vermesan and Peter Friess, “Internet of Things – From Research and Innovation to Mark Deployement” , River Publishers, 2014.
2. Peter Waher, “Learning Internet of Things” ,Packt Publishing, 2015.
3. Donald Norris, “The Internet of Things: Do-It-Yourself at Home Projects for Arduino, Raspberry Pi and Beagle Bone Black”, Mc Graw Hill, 2015

Web Resources

1. https://onlinecourses.nptel.ac.in/noc20_cs66/preview
2. https://www.javatpoint.com/iot-internet-of-things

Course Designer

Mrs.B.Monisha,Assistant Professor,Department of Computer Science.

G.VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS)

(Re-Accredited with "A" Grade by NAAC)

Department of M.Sc., Computer Science

P25CS2E2C - SOFT COMPUTING

Course Code	Course Title	Category	Lecture	Tutorial	Practical	Credit
P25CS2E2C	Soft Computing	Core Elective - II	55	5	0	3

Year	Semester	Internal Marks (CIA)	External Marks (ESE)	Total Marks
I	II	25	75	100

Course Objective

- Implement machine learning through neural networks,
- to explore the benefits computing methodologies like neural networks,
- fuzzy logic and genetic algorithms
- to develop the students in hybrid systems for the industrial problems

Course Outcomes (COs)

On the completion of the course the student will be able to

CO	Course Outcome	Knowledge Level (RBT)
CO1	understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic	K1,K2,K3,K4,K5,K6
CO2	apply the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations.	K1,K2,K3,K4,K5,K6
CO3	analyze appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications	K1,K2,K3,K4,K5,K6
CO4	evaluate the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory	K1,K2,K3,K4,K5,K6
CO5	create different applications of these models to solve Complex problems.	K1,K2,K3,K4,K5,K6

K1–Remember; K2–Understand; K3–Apply; K4–Analyze; K5–Evaluate; K6–Create

CO-PO and CO-PSO Mapping (Course Articulation Matrix)

COs	POs							PSOs		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
CO1	2	2	2	2	1	1	2	2	2	3
CO2	2	2	2	2	1	2	2	2	2	2
CO3	2	2	2	1	2	2	2	3	1	3
CO4	2	2	2	2	1	2	2	2	2	1
CO5	2	2	2	2	2	2	2	2	3	2
Total	**10**	**10**	**10**	**9**	**7**	**9**	**10**	**11**	**10**	**11**

(3-Strong, 2-Medium, 1-Low, -No Correlation)

Course Content

Unit – I NEURAL NETWORKS FUNDAMENTALS (L-11 Hrs)

Basic Concepts of Neural networks - Evolution of Neural networks - Basic Models of Artificial neural network - Terminologies of ANN- McCulloch - Pitts Neuron - Linear separability - Hebb Network - Applications of Neural networks. Supervised learning Network: Introduction – Perceptron Networks – Adaptive Linear Neuron –

Multiple Adaptive Linear Neurons – Back propagation Network.

Unit – II CATEGORIES OF NEURAL NETWORKS **(L-11 Hrs)**

Introduction – Training algorithms for pattern association – Auto associative Memory Network – Bidirectional Associative Memory – Hopfield Networks. Unsupervised Learning networks: Introduction – Fixed Weight Competitive Nets - Kohonen Self-Organizing Maps – Learning Vector Quantization – Adaptive Resonance Theory Network.

Unit – III BASIC CONCEPTS OF FUZZY SET **(L-11 Hrs)**

Introduction - Classical sets - Fuzzy Sets. Classical Relation and Fuzzy Relations: - Introduction - Cartesian product of a relation - Classical Relation - Fuzzy Relations. Membership Functions: Introduction - Features of Membership Functions – Fuzzification - Methods of Membership Value Assignments. Defuzzification: Introduction - Lambda-Cuts for Fuzzy Sets - Lambda-Cuts for Fuzzy Relations - Defuzzification Methods.

Unit – IV FUZZY ARITHMETIC AND DECISION MAKING **(L-11 Hrs+T-2 Hrs)**

Introduction - Fuzzy Arithmetic - Extension principles – Fuzzy measures. Fuzzy Rule Base and Approximate Reasoning: Introduction Truth values and Tables in fuzzy logic - Fuzzy properties - Formation of rules Decomposition of rules - Aggregation of Fuzzy rules - Fuzzy reasoning - Fuzzy Inference Systems. Fuzzy Decision Making: Individual Decision Making – Multi person Decision Making – Multi objective Decision Making – Multi attribute Decision Making. Fuzzy Logic..

Unit – V GENETIC ALGORITHMS **(L-11 Hrs+T-3 Hrs)**

Introduction - Basic Operators and Terminologies in GAs - Traditional Algorithm vs. Genetic Algorithm - Simple GA - General Genetic algorithm - The Schema Theorem - Classification of Genetic Algorithm - Applications of Genetic Algorithm. Applications of Soft Computing: Introduction

Text Books

1. S.N Sivanandam and S.N Deepa, “Principles of Soft Computing”, Wiley –India.
2. S.Rajasekaran and G.A.V.Pai, “Neural Networks, Fuzzy Logic and Genetic Algorithms”, PHI.

Reference Books

1. J.S.R.Jang, C.T.Sun and E.Mizutani, “Neuro-Fuzzy and Soft Computing”, PHI, Pearson Education.
2. S.N.Sivanandam, S.N.Deepa, “Introduction to Genetic Algorithms”, Springer.

Web Resources

1. www.myreaders.info/html/soft_computing.html

Course Designer

C.Iswarya ,Assistant Professor of Computer Science.