KARUPPANNAN MARIAPPAN COLLEGE

(Autonomous)

(Co-Educational Institution, Affiliated to Bharathiar University, Coimbatore
Recognized u/s 2(f) & 12(B) of UGC act 1956 and Accredited by NAAC with "B" Grade)
Chettiyarpalayam, Kangayam Road, Muthur -638 105.
Tirupur District, Tamilnadu.

DEPARTMENT OF COMPUTER SCIENCE

M.Sc. (COMPUTER SCIENCE)

SYLLABUS

CONTROLLER OF EXAMINATIONS
Muthur - 638105
Karuppannan Mariappan College (Autonomous)

கருப்பண்ணன் மாரியப்பன் கல்லூரி
முத்தூர் – 638 105.
ஒழுக்கம் கடமை வாய்மை

(Students admitted during the academic year 2024- 2025 and onwards)

(Under CBCS with Outcome Based Education (OBE) Pattern)

DEPARTMENT OF COMPUTER SCIENCE (PG)

Vision

To inculcate better programming skills among rural area students.

Mission

- To impart quality computer education, to develop students as outstanding computer professionals and responsible citizen.
- To provide students with the tools to become productive, participating global citizens and life-long learners.
- To impart value based technical education and educate students towards the design and development of software products for the benefit of computer industry and society.

Eligibility for Admission:

- B.Sc. Computer Science / BCA / B.Sc., Computer Science Related Courses B.E. / B.Tech Computer Science related course is eligible for M.Sc. Computer Science.

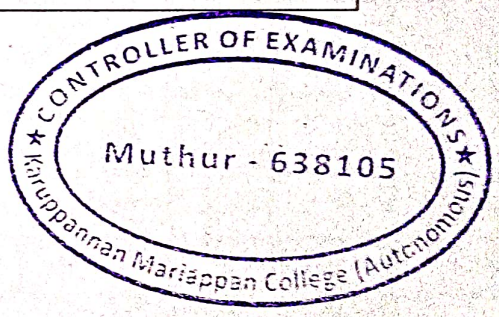
Regulation:

- Regulation 2024-25 framed for the conduct of postgraduate programme is applicable.

Programme Outcomes (POs)	
On successful completion of the **M.Sc. Computer Science** programme, the students will be able to	
PO1	Develop creativity and problem solving skills with the knowledge of computing and mathematics.
PO2	Ability to develop and carry out experiments, interpret and infer data.
PO3	Design algorithms and develop software to aid solutions to industry and governments.
PO4	Review the latest technology and tool handling mechanism.
PO5	Analyze the outcome to solve global environment related issues.
PO6	Apply the knowledge in lifelong learning journey to equip themselves.
PO7	Identify the perspective of business practices, risks and limitations.
PO8	Work with professional and ethical values.
PO9	Formulate the responsibilities of human rights and entrepreneurial spirit.
PO10	Understand the methods to communicate effectively and work collectively.

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Programme Specific Outcomes (PSOs)	
After the successful completion of **M.Sc. Computer Science** programme, the students are expected to	
PSO1	Able to analyze, design and develop problem solving skills in the discipline of computer science.
PSO2	Acquire evaluation of potential benefits of alternative solution in designing software and/or hardware systems in broad range of open source programming languages to withstand technological changes.
PSO3	Able to pursue careers in IT industry/ consultancy/ research and development, teaching and allied areas related to computer science.
PSO4	Adapt to the continuous technological change in computational science and update themselves to meet the industry requirements and standards.
PSO5	Apply the practices and strategies of computer science for software project development to deliver a quality software product and contribute to research in the chosen field and perform effectively.



DEPARTMENT OF COMPUTER SCIENCE

M.Sc., Computer Science Degree Course

(For the students admitted during the academic year 2024-2025 and onwards)

CIA- Continuous Internal Assessment Marks, ESE- End Semester Examination Marks							
S.No.	Course Code	Course	Duration Hours	Maximum Marks		Total Marks	Credits
				CIA	ESE		
SEMESTER-I							
1	24P1CSC1	Core I : Analysis & Design of Algorithms	5	25	75	100	4
2	24P1CSC2	Core II : Object Oriented Analysis and Design & C++	5	25	75	100	4
3	24P1CSC3	Core III : Python Programming	5	25	75	100	4
4	24P1CSC4	Core IV : Advanced Software Engineering	5	25	75	100	4
5	24P1CSPR1	Core II :Practical I: Algorithm and OOPS Lab	5	40	60	100	4
6	24P1CSPR2	Core III : Practical II: Python Programming Lab	5	40	60	100	4
		Total	**30**	**180**	**420**	**600**	**24**
SEMESTER-II							
1	24P2CSC5	Core V : Data Mining and Warehousing	4	25	75	100	4
2	24P2CSC6	Core VI :Advanced Operating Systems	4	25	75	100	4
3	24P2CSC7	Core VII :Advanced Java Programming	4	25	75	100	4
4	24P2CSC8	Core VIII : Artificial Intelligence & Machine Learning	4	25	75	100	4
5	24P2CSE1/1.1/ 1.2/1.3/1.4	**Elective – I**	4	25	75	100	4
6	24P2CSPR3	Core V :Practical III: Data Mining Lab using R	5	40	60	100	4
7	24P2CSPR4	Core VII :Practical IV: Advanced Java Programming Lab	5	40	60	100	4
		Total	**30**	**205**	**495**	**700**	**28**

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SEMESTER-III							
1	24P3CSC9	Core IX : Digital ImageProcessing	4	25	75	100	4
2	24P3CSC10	Core X: Cloud Computing	4	25	75	100	4
3	24P3CSC11	Core XI: Network Security and Cryptography	4	25	75	100	4
4	24P3CSC12	Core XII : Data Science &Analytics	4	25	75	100	4
5	24P3CSE2/2.1 /2.2/2.3	**Elective – II**	4	25	75	100	4
6	24P3CSPR5	Core IX : Practical V: Digital Image Lab using MATLAB	4	40	60	100	4
7	24P3CSPR6	Core X: Practical VI : Cloud Computing Lab	4	40	60	100	4
8	24P3CSPR7	Practical VII : Web Application development & hosting	2	20	30	50	2
		Total	**30**	**225**	**525**	**750**	**30**
SEMESTER-IV							
1	24P4CSPV1	Project work and Viva-voce	-	50	150	200	8
		Total		**50**	**150**	**200**	**8**
		Grand Total	**90**	**660**	**1590**	**2250**	**90**

Project Evaluation – 100 marks & Viva Voce – 50 marks in ESEDuring II or III Semester

(Optional)

ELECTIVE – I

1.1. Multimedia and its Applications

1.2. Embedded Systems

1.3. Internet of Things

1.4. Critical Thinking, Design Thinking and Problem Solving

ELECTIVE – II

2.1. Mobile Computing

2.2. Block Chain Technology

2.3. Web Services Robotic Process Automation for Business

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SEMESTER –I

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	24P1CSC1	CORE –I	5	4	25	75	100
Course Title		ANALYSIS & DESIGN OF ALGORITHMS					

S.NO.	COURSE OBJECTIVES
1	To enable the students to learn the Elementary Data Structures and algorithms.
2	To presents an introduction to the algorithms, their analysis and design.
3	To discuss various methods like Basic Traversal And Search techniques, divide and conquermethod, Dynamic programming, backtracking.
4	To understood the various design and analysis of the algorithms.
5	To exposure the problem solving skills through algorithms.

COURSE OUTCOMES (COs):

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

CO Number	Course Outcomes	Knowledge Level
CO1	Get knowledge about algorithms and determines their time complexity. Demonstrate specific search and sort algorithms using divide and conquer technique.	K1,K2
CO2	Gain good understanding of Greedy method and its algorithm.	K2,K3
CO3	Able to describe about graphs using dynamic programming technique.	K3,K4
CO4	Demonstrate the concept of backtracking & branch and bound technique.	K5,K6
CO5	Explore the traversal and searching technique and apply it for trees and graphs.	K6

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

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SYLLABUS		
Unit	**Content**	**No.of Hours**
I	**Introduction:** - Algorithm Definition and Specification – Space complexity- Time Complexity- Asymptotic Notations - Elementary Data Structure: Stacks and Queues – Binary Tree - Binary Search Tree - Heap – Heapsort- Graph.	**15**
II	**Basic Traversal and Search Techniques**: Techniques for Binary Trees- Techniques for Graphs - Divide and Conquer: - General Method – Binary Search – Merge Sort – Quick Sort.	**15**
III	**The Greedy Method:** - General Method – Knapsack Problem – Minimum Cost Spanning Tree –Single Source Shortest Path.	**15**
IV	**Dynamic Programming** - General Method – Multistage Graphs – All Pair Shortest Path – Optimal Binary Search Trees – 0/1 Knapsacks – Traveling Salesman Problem – Flow Shop Scheduling	**15**
V	**Backtracking:** - General Method – 8-Queens Problem – Sum Of Subsets – Graph Coloring – Hamiltonian Cycles – Branch And Bound: - The Method – Traveling Salesperson.	**15**
	TOTAL	**75**

S.NO.	TEXT BOOKS:
1	Ellis Horowitz, "Computer Algorithms", Galgotia Publications,2019.(Unit I,II &III)
2	Narasimha Karumanchi , "Data Structures and Algorithms",2011. (Unit IV& V)

S.NO	REFERENCE BOOKS:
1	Amrinder ,"Arora, Analysis and Design of Algorithms ",2nd Edition, Cognella Academic Publishing, 2015.
2	S.Sridhar,"Design and Analysis of Algorithms",1st Edition, Oxford University Press, 2014.
3	Anany Levith,"Introduction to the Design and Analysis of algorithm", 3rd Edition, Pearson EducationAsia, 2022.
4	Robert Sedge wick, Phillipe Flajolet,"An Introduction to the Analysis of Algorithms", 2nd Edition, Wesley Publishing Company, 2013.
5	Shefali Singhal and Neha Garg, "Analysis and Design of Algorithms ",BPB Publications,2020

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S.NO.	E-REFERENCES:
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
4	https://nptel.ac.in/courses/106/106/106106131/

Mapping Course Outcomes with Programme Outcomes:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	S	L	M	L	S	M
CO2	S	S	S	S	S	M	S	M	S	M
CO3	S	S	S	S	S	M	S	M	S	M
CO4	S	S	S	S	S	M	S	M	S	M
CO5	S	S	S	S	S	M	S	M	S	M

S-Strong; M-Medium; L-Low

Verified By
Dr. P VIJAYAKUMAR

Approved By
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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	24P1CSC2	CORE –II	5	4	25	75	100
Course Title	OBJECT ORIENTED ANALYSIS AND DESIGN & C++						

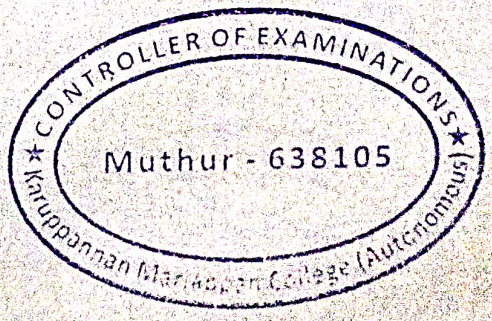
S.NO.	COURSE OBJECTIVES
1	To present the object model, classes and objects, object orientation, machine view and model management view.
2	To enables the students to learn the basic functions, principles and concepts of object oriented analysis and design
3	To understand the concepts declaration and control structures.
4	To gain knowledge about classes and objects through programming.
5	To enable the students to understand C++ language with respect to OOAD.

COURSE OUTCOMES (COs):

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

CO Number	Course Outcomes	Knowledge Level
CO1	Understand the concept of Object-Oriented development and modelingtechniques	K1,K2
CO2	Gain knowledge about the various steps performed during object design	K2,K3
CO3	Abstract object-based views for generic software systems	K3
CO4	Understand the concepts of Link OOAD with C++ language	K4,K5
CO5	Apply the basic concept of OOPs and familiarize to write C++ program	K5,K6

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



SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**The Object Model:** 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.	15
II	**Classes and Object**: 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.	15
III	**Introduction to C++**: Input and output statements in C++ - Declarations -control structures –Functions in C++.	15
IV	**Classes and Objects** –Constructors and Destructors –operators overloading –Type Conversion-Inheritance – Pointers and Arrays.	15
V	**Memory Management Operators:** Polymorphism – Virtual functions – Files – ExceptionHandling – String Handling -Templates.	15
	TOTAL	75

S.NO.	TEXT BOOKS:
1	Grady Booch,"Object Oriented Analysis and Design with Applications", 3rd Edition, Pearson Education, 2014. (Unit I,II&III)
2	Ashok N.Kamthane ,"Object -Oriented Programming with ANSI & Turbo C++", 2nd Edition, Indian Print -Pearson Education,2013.(Unit IV &V)

S.NO.	REFERENCE BOOKS:
1	Balagurusamy "Object Oriented Programming with C++", TMH, 5th Edition, 2011.
2	Brett D. McLaughlin , David West , Gary Pollice "Object-Oriented Analysis & Design", 1st Edition, Shroff/O'Reilly Publisher, 2011.
3	Raul Sidnei Wazlawick, "Object-Oriented Analysis and Design for Information Systems",Elsevier Science publisher,2014.
4	Mahesh Bhave, "Object oriented programming with C++", Prentice Hall publisher,2012.
5	Bjarne Stroustrup," Programming Principles and Practice Using C++",Pearson Education publisher,2014.

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S.NO.	E-REFERENCES:
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.htm

Mapping Course Outcomes with Programme Outcomes:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	M	S	S
CO2	S	S	S	M	S	M	S	M	S	S
CO3	S	S	S	M	S	M	S	M	S	S
CO4	S	S	S	M	S	M	S	M	S	S
CO5	S	S	S	M	S	M	S	M	S	S

S-Strong; M-Medium; L-Low

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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	24P1CSC3	CORE –III	4	4	25	75	100
Course Title		**PYTHON PROGRAMMING**					

S.NO.	COURSE OBJECTIVES
1	To presents an introduction to Python, network applications and working in the clouds.
2	To use functions for structuring Python programs.
3	To understand different Data Structures of Python.
4	To acquire knowledge about creation of web applications using python.
5	To represent compound data using Python lists, tuples and dictionaries

COURSE OUTCOMES (COs):

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

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

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

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Syllabus		
Unit	**Content**	**No.of Hours**
I	**Python:** Introduction – Numbers – Strings – Variables – Lists – Tuples – Dictionaries – Sets–Comparison.	**15**
II	**Code Structures:** 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	**15**
III	**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 – In self Defense – Get and Set Attribute Values with Properties – Name Mangling for Privacy – Method Types – Duck Typing – Special Methods –Composition.	**15**
IV	**Data Types:** 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	**15**
V	**Systems:** Files –Directories – Programs and Processes – Calendars and Clocks. **Concurrency:** Queues – Processes – Threads – Green Threads and gevent – twisted – Redis. **Networks:** Patterns – The Publish-Subscribe Model – TCP/IP – Sockets – Zero MQ –Internet Services – Web Services and APIs – Remote Processing – Big Fat Data and Map Reduce – Working in the Clouds.	**15**
	Total	**75**

S.NO.	TEXT BOOKS:
1	Bill Lubanovic, "Introducing Python", O'Reilly, 1st Edition,-Second Release, 2014.(Unit I,II&III)
2	Mark Lutz, "Learning Python", O'Reilly, 5th Edition, 2013.(Unit IV &V)

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S.NO.	REFERENCE BOOKS:
1	David M. Beazley, "Python Essential Reference",Developer's Library, 4th Edition,2009.
2	Sheetal Taneja, Naveen Kumar, "Python Programming-A Modular approach", Pearson Publications, 2017.
3	Gowrishankar S, Veena A, "Introduction to Python Programming",CRC Press Publisher,2018.
4	Subrat Gupta," Introduction to Python: A Comprehensive Guide to Master Python Programming", Subrat Gupta publisher, 2023.
5	Yue Zhang, "An Introduction to Python and Computer Programming",Springer publisher,2015.

S.NO.	E-REFERENCES:
1	https://www.programiz.com/python-programming/
2	https://www.tutorialspoint.com/python/index.htm
3	https://onlinecourses.swayam2.ac.in/aic20_sp33/preview

Mapping Course Outcomes with Programme Outcomes

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	M	S	M
CO2	S	S	S	S	S	S	S	M	S	M
CO3	S	S	S	S	S	S	S	M	S	M
CO4	S	S	S	S	S	S	S	M	S	M
CO5	S	S	S	S	S	S	S	M	S	M

S-Strong; M-Medium; L-Low

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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	24P1CSC4	CORE –IV	5	4	25	75	100
COURSE TITLE		ADVANCED SOFTWARE ENGINEERING					

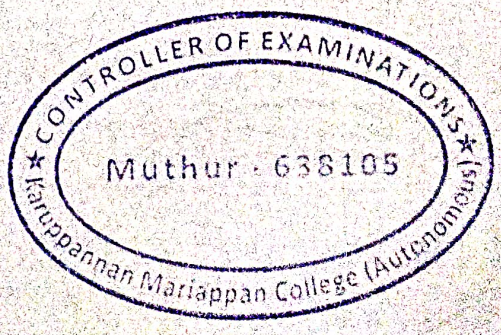
S.NO.	COURSE OBJECTIVES
1	To introduce Software Engineering, Design and Testing.
2	To enable the students to learn the concepts of Software Engineering.
3	To learn about Software Project Management, Software Design and Testing.
4	To understand the various levels of Software Quality.
5	To acquire knowledge about Software Maintenance.

COURSE OUTCOMES (COs):

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

CO Number	Course Outcomes	Knowledge Level
CO1	Understand about Software Engineering process	K1,K2
CO2	Understand about Software project management skills, design and quality management	K2,K3
CO3	Analyze on Software Requirements and Specification	K3,K4
CO4	Analyze on Software Testing, Maintenance and Software Re-Engineering	K4,K5
CO5	Design and conduct various types and levels of software quality for a software project	K5,K6

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



Syllabus		
Unit	**Content**	**No.of Hours**
I	**Introduction:** 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	**15**
II	**Software Requirements Analysis and Specification** : 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 - Case study: Student Result management system. Software Quality Management – Software Quality, Software Quality Management System, ISO 9000, SEI CMM.	**15**
III	**Software Project Management**: 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.	**15**
IV	**Software Design**: 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	**15**
V	**Software Testing:** A Strategic approach to software testing – Terminologies – Functional testing – Structural testing – Levels of testing – Validation testing - Regression testing – Art of Debugging – Testing tools - Metrics-Reliability Estimation. Software Maintenance - Maintenance Process - Reverse Engineering – Software Re-engineering - Configuration Management Activities.	**15**
	TOTAL	**75**

S.NO.	TEXT BOOKS:
1	Pankaj Jalote "An Integrated Approach to Software Engineering", Narosa Publishing House, Delhi, 3rd Edition,2006. (Unit I,II &III)
2	Rajib Mall , "Fundamentals of Software Engineering ", PHI Publication, 5th Edition,2016. (Unit IV&V)

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S.NO.	REFERENCE BOOKS:
1	K.K. Aggarwal and Yogesh Singh , "Software Engineering ", New Age International Publishers, 3rd edition,2007.
2	Roger S. Pressman and Bruce Maxim , "A Practitioners Approach- Software Engineering ", 9th edition ,McGraw Hill,2020
3	Carlo Ghezzi, M. Jarayeri, D. Manodrioli, "Fundamentals of Software Engineering ", PHI Publication, 2007.
4	JASMINE BEGUM, "Advanced Software Engineering", SK Research Group of Companies publisher, 2023.
5	Ali H. Dogru, "Modern Software Engineering Concepts and Practices", Information Science Reference publisher, 2010.

S.NO.	E-REFERENCES:
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

Mapping Course Outcomes with Programme Outcomes:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	M	M	M
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	S	S	S	S	M	S	S

S- Strong; M-Medium; L-Low

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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	24P1CSPR1	CORE II - PRACTICAL I	5	4	40	60	100
COURSE TITLE		ALGORITHM AND OOPS LAB					

S.NO.	COURSE OBJECTIVES
1	To understand the basic data structures like Stack, Queue, Tree, and List.
2	To learn the applications of the data structures using various techniques.
3	To enable the students to understand C++ language with respect to OOAD concepts.
4	To acquire knowledge about applications of OPPS concepts.
5	To develop and implement program using files concepts

COURSE OUTCOMES (COs):

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

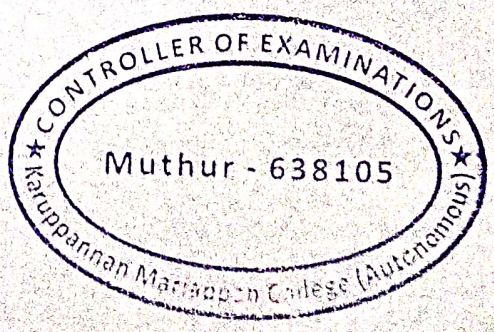
CO Number	Course Outcomes	Knowledge Level
CO1	Understand the concepts of object oriented with respect to C++	K1,K2
CO2	Able to understand and implement OOPS concepts	K3,K4
CO3	Implementation of data structures like Stack, Queue, Tree , List using C++	K4,K5
CO4	Application of the data structures for Sorting, Searching using different techniques.	K5,K6
CO4	Able to develop applications programs using files.	K6

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



S.NO	LIST OF PROGRAMS	
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 knapsack problem using greedy method	
8	Write a program to search for an element in a tree using divide & conquer strategy.	75 Hours
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.	
	Total	75

S.NO.	TEXT BOOKS:
1	Goodrich, "Data Structures & Algorithms in Java ", Wiley 4th Edition, 2001.
2	Skiena, "The Algorithm Design Manual ",2nd Edition, Springer , 2008



S.NO.	REFERENCE BOOKS:
1	Anany Levith, "Introduction to the Design and Analysis of algorithm ", Pearson EducationAsia, 2003.
2	Robert Sedgewick, Phillipe Flajolet, "An Introduction to the Analysis of Algorithms ",Addison-Wesley Publishing Company, 1996.
3	Brandle,"C++ Data Structures",Jones & Bartlett Learning Publisher,2010.
4	Frank Carrano,"Lab Manual for Data Structures and Abstractions with Java", Pearson Education, Limited Publisher, 2011.
5	Anuradha A. Puntambekar," Analysis and Design of Algorithms" ,Amazon Digital Services LLC - KDP Print US publisher,2020

S.NO.	E-REFERENCES:
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_anal ysis.htm

Mapping Course Outcomes with Programme Outcomes

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	S	S	M	M	S	L
CO2	S	M	S	S	S	S	S	S	S	M
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	L	S	S	S	S	S	S	M

S-Strong; M-Medium; L-Low

Verified By

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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	24P1CSPR2	CORE III- PRACTICAL II	5	4	40	60	100
COURSE TITLE		PYTHON PROGRAMMING LAB					

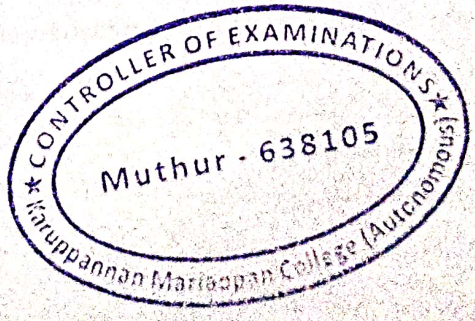
S.NO.	COURSE OBJECTIVES
1	To presents an overview of elementary data items, lists, dictionaries, sets and tuples.
2	To understand and write simple Python programs.
3	To understand the OOPS concepts of Python.
4	To design a web application and using Python.
5	To create an interactive webpages using forms.

COURSE OUTCOMES (COs):

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

CO Number	Course Outcomes	Knowledge Level
CO1	Able to write programs in Python using OOPS concepts.	K1,K2
CO2	Understand the concepts of File operations and Modules in Python.	K2,K3
CO3	Implementation of lists, dictionaries, sets and tuples as programs.	K3,K4
CO4	Develop web applications using Python.	K5,K6
CO5	Able to develop Webpages.	K3,K5

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



S.NO	LIST OF PROGRAMS	
1	Programs using elementary data items, lists, dictionaries and tuples	36 Hours
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.	
	Total	**36**

S.NO.	TEXT BOOKS:
1	Bill Lubanovic, "Introducing Python", O'Reilly, 1st Edition,-Second Release, 2014.
2	Mark Lutz, "Learning Python", O'Reilly, 5th Edition, 2013.

S.NO.	REFERENCE BOOKS:
1	David M. Beazley, "Python Essential Reference",Developer's Library, 4th Edition,2009.
2	Sheetal Taneja, Naveen Kumar, "Python Programming-A Modular approach", Pearson Publications, 2017.
3	Gowrishankar S, Veena A, "Introduction to Python Programming",CRC Press Publisher,2018.
4	Subrat Gupta," Introduction to Python: A Comprehensive Guide to Master Python Programming", Subrat Gupta publisher, 2023.
5	Yue Zhang,"An Introduction to Python and Computer Programming", Springer publisher, 2015.

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S.NO.	E-REFERENCES:
1	https://www.programiz.com/python-programming/
2	https://www.tutorialspoint.com/python/index.htm
3	https://onlinecourses.swayam2.ac.in/aic20_sp33/preview

Mapping Course Outcomes with Programme Outcomes

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	M	S	S
CO2	S	S	S	S	S	S	S	M	S	M
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	M	S	S	S	M	M	S	S

S-Strong; M-Medium; L-Low

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SEMESTER-II

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	24P2CSC5	CORE -V	4	4	25	75	100
COURSE TITLE		DATA MINING AND WAREHOUSING					

S.NO.	COURSE OBJECTIVES
1	To enable the students to learn the concepts of Mining tasks, classification, clustering and Data Warehousing.
2	To develop skills of using recent data mining software for solving practical problems.
3	To enable the students to learn the concepts of Mining tasks, classification, clustering and Data Warehousing.
4	To be familiar with mathematical foundations of data mining tools.
5	To develop skills in selecting the appropriate data mining algorithm for solving practical problems.

COURSE OUTCOMES (COs):

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

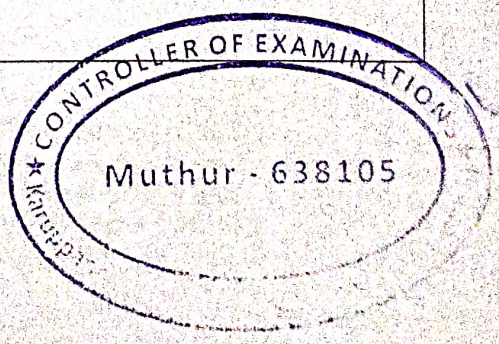
CO Number	Course Outcomes	Knowledge Level
CO1	Understand the basic data mining techniques and algorithms	K1,K2
CO2	Understand the Association rules, Clustering techniques and Data warehousing contents	K2,K3
CO3	Compare and evaluate different data mining techniques like classification, prediction, Clustering and association rule mining	K4,K5
CO4	Design data warehouse with dimensional modeling and apply OLAP operations	K5,K6
CO5	Identify appropriate data mining algorithms to solve real world problems	K6

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

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Syllabus		
Unit	Content	No.of Hours
I	**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.	15
II	**Classification:** Introduction – Statistical – based algorithms - distance – based algorithms- decision tree - based algorithms - neural network – based algorithms –rule - based algorithms – combining techniques.	15
III	**Clustering:** 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.	15
IV	**Data warehousing**: 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.	15
V	**Developing a Data Warehouse:** 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.	15
	TOTAL	75

S.NO.	TEXT BOOKS:
1	Margaret H. Dunham, "Data Mining: Introductory and Advanced Topics", Pearson education, 2006. (Unit I,II&III)
2	C.S.R. Prabhu, "Data Warehousing Concepts,Techniques, Productsand Applications", PHI, 3rd Edition,2010. (Unit IV &V)



S.NO.	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", Academic press publisher ,2011.
4	Parteek Bhatia, "Data Mining and Data Warehousing," Cambridge university press publisher ,2019.
5	G. K. Gupta," Introduction to Data Mining with case Studies",PHI Learning publisher,2014.
S.NO.	E-REFERENCES:
1	https://www.javatpoint.com/data-warehouse
2	https://nptel.ac.in/noc/courses/noc20/SEM1/noc20-cs12/
3	https://www.btechguru.com/training--it--database-management-systems--file-structures-- introduction-to-data-warehousing-and-olap-2-video-lecture--12054--26--151.html

Mapping Course Outcomes with Programme Outcomes

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	M	S	S
CO2	S	S	S	S	S	S	S	M	S	M
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	M	S	S	S	M	M	S	S

S-Strong; M-Medium; L-Low

Verified By

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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	24P2CSC6	CORE -VI	4	4	25	75	100
COURSE TITLE		ADVANCED OPERATING SYSTEMS					

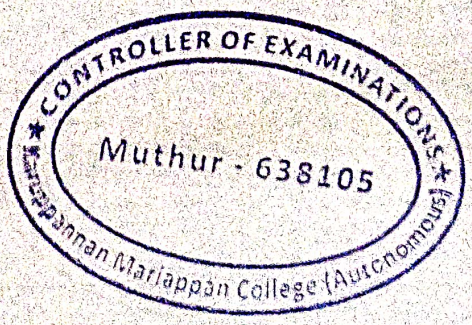
S.NO.	COURSE OBJECTIVES
1	To enable the students to learn the different types of operating systems and their functioning.
2	To gain knowledge on Distributed Operating Systems
3	To gain insight into the components and management aspects of real time and mobile operating systems.
4	To acquire knowledge about Android Architecture.
5	To learn case studies in Linux Operation Systems.

COURSE OUTCOMES (COs):

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

CO Number	Course Outcomes	Knowledge Level
CO2	Master various process management concepts including scheduling, deadlocks and distributed file systems.	K2,K3
CO3	Prepare Real Time Task Scheduling	K4,K5
CO4	Analyze Operating Systems for Handheld Systems.	K5,K6
CO5	Analyze Operating Systems like LINUX and IOS.	K6

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



Syllabus		
Unit	Content	No.of Hours
I	**Basics of Operating Systems:** 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.	15
II	**Distributed Operating Systems:** Issues – Communication Primitives – Lamport"s Logical Clocks – Deadlock handling strategies – Issues in deadlock detection and resolution-distributed file systems –design issues – Case studies – The Sun Network File System-Coda.	15
III	**Realtime Operating Systems :** Introduction – Applications of Real Time Systems – Basic Model of Real Time System – Characteristics – Safety and Reliability - Real Time Task Scheduling.	15
IV	**Operating Systems for Handheld Systems:** Requirements – Technology Overview –Handheld Operating Systems – Palm OS-Symbian Operating System- Android –Architecture of android – Securing handheld systems	15
V	**Case Studies :** Linux System: 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.	15
	TOTAL	75

S.NO.	TEXT BOOKS:
1	Abraham Silberschatz; Peter Baer Galvin; Greg Gagne, "Operating System Concepts", 7th Edition, John Wiley & Sons, 2012.(Unit I,II &III)
2	MukeshSinghal and Niranjan G. Shivaratri, "Advanced Concepts in Operating Systems – Distributed, Database, and Multiprocessor Operating Systems", Tata McGraw-Hill, 2006. (Unit IV & V)

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S.NO.	REFERENCE BOOKS:
1	Rajib Mall, "Real-Time Systems: Theory and Practice", 1st Edition,Pearson Education India, 2009.
2	Pramod Chandra P.Bhatt, "An introduction to operating systems, concept and practice", PHI, 3rd edition, 2010.
3	Daniel.P.Bovet& Marco Cesati,"Understanding the Linux kernel",3rd edition,O"Reilly, 2005.
4	Neil Smyth, "iPhone iOS 4 Development Essentials – Xcode", 4th Edition, Payload media, 2011.
5	Mukesh Singhal, Niranjan Shivaratri, "Advanced Concepts in Operating Systems ", McGraw Hill Education Publisher, 2017.

S.NO.	E-REFERENCES:
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

Mapping Course Outcomes with Programme Outcomes

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	S	S	S	M	M	M
CO2	S	M	S	S	S	S	S	M	S	S
CO3	S	M	S	S	S	S	S	M	S	S
CO4	S	M	S	S	S	S	S	M	S	S
CO5	S	M	S	S	S	S	S	M	M	M

S-Strong; M-Medium; L-Low

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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	24P2CSC7	CORE -VII	4	4	25	75	100
COURSE TITLE		ADVANCED JAVA PROGRAMMING					

S.NO.	COURSE OBJECTIVES
1	To enable the students to learn the basic functions, principles and concepts of advanced java programming.
2	To provide knowledge on concepts needed for distributed Application Architecture.
3	To understand the JDBC databases and web applications using java programming.
4	To learn Servlet packages, JQuery and Java Server Pages.
5	To create a JAR file format and swing Programming

COURSE OUTCOMES (COs):

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

CO Number	Course Outcomes	Knowledge Level
CO1	Understand the advanced concepts of Java Programming	K1,K2
CO2	Understand JDBC and RMI concepts	K3,K4
CO3	Apply and analyze Java in Database	K3,K4
CO4	Handle different event in java using the delegation event model, event listener and class	K5
CO5	Design interactive applications using Java Servlet, JSP and JDBC	K5,K6

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

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Syllabus		
Unit	Content	No.of Hours
I	**Java Basics Review:** Components and event handling – Threading concepts – Networking features – Media techniques.	15
II	**Remote Method Invocation**-Distributed Application Architecture- Creating stubs and skeletons Defining Remote objects- Remote Object Activation-Object Serialization-Java Spaces	15
III	**Java in Databases**- JDBC principles – database access- Interacting- database search – Creating multimedia databases – Database support in web applications.	15
IV	**Java Servlets:** 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 Script lets-Directives-Declarations-A complete example	15
V	**Advanced Technique** -JAR file format creation – Internationalization – Swing Programming – Advanced java Technique	15
	TOTAL	75

S.NO.	TEXT BOOKS:
1	Robert Flenner, "Java Unleashed", SAMS Tech media Publications,2006. (Unit I,II &III)
2	Raymond Gallardo, "The Java Tutorial",Pearson Education,publisher 2014. (Unit IV&V)

S.NO.	REFERENCE BOOKS:
1	Jim Keogh,"The Complete Reference J2EE", Tata McGraw Hill Publishing Company Ltd,2010.
2	David Sawyer Mc Farland, "Java Script And JQuery- The Missing Manual", Oreilly Publications, 3rd Edition, 2011.
3	Harvey Deitel and Deitel, "Java How to Program", PHI/Pearson Education Asia,2017.
4	Herbert Schildt ,"Java:The Complete Reference ", 12th Edition, McGraw Hill Publisher,2021.
5	Herbert Schildt, "Java: A Beginner's Guide," 6th Edition, McGraw Hill Publisher,2014.

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S.NO.	E-REFERENCES:
1	https://www.javatpoint.com/servlet-tutorial
2	https://www.tutorialspoint.com/java/index.htm
3	https://onlinecourses.nptel.ac.in/noc19_cs84/preview

Mapping Course Outcomes with Programme Outcomes

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	M	M	M	S
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	S	S	S	M	M	M	S

S-Strong; M-Medium; L-Low

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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	24P2CSC8	CORE -VIII	4	4	25	75	100
COURSE TITLE		ARTIFICIAL INTELLIGENCE & MACHINE LEARNING					

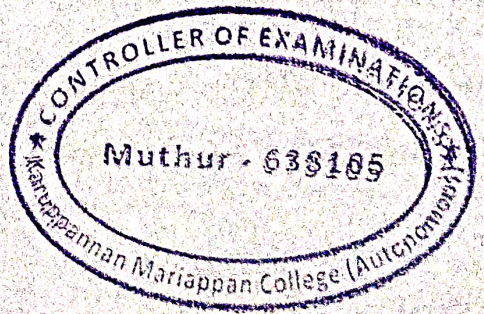
S.NO.	COURSE OBJECTIVES
1	To enable the students to learn the basic functions of AI.
2	To understand the concepts of Heuristic Search Techniques.
3	To provide knowledge on concepts of Representations and Mappings and Predicate Logic.
4	To introduce Machine Learning with respect Data Mining, Big Data and Cloud.
5	To Study on impact of Machine Learning in real world.

COURSE OUTCOMES (COs):

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

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

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



Syllabus		
Unit	Content	No.of Hours
I	**Introduction:** AI Problems - AI techniques - Criteria for success. Problems, Problem Spaces, Search: State space search - Production Systems - Problem Characteristics - Issues in design of Search.	15
II	**Heuristic Search techniques:** 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.	15
III	**Using Predicate logic**: 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.	15
IV	**Understanding Machine Learning:** 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.	15
V	**Looking Inside Machine Learning**: The Impact of Machine Learning on Applications - Data Preparation-The Machine Learning Cycle.	15
	Total	75

S.NO.	TEXT BOOKS:
1	Elaine Rich and Kevin Knight," Artificial Intelligence", Tata McGraw Hill Publishers company Pvt Ltd, 3rd Edition, 2017.(Unit I,II &III)
2	George F Luger, "Artificial Intelligence",4th Edition, Pearson Education Publ,2007.(Unit IV &V)

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S.NO.	REFERENCE BOOKS:
1	Judith Hurwitz, Daniel Kirsch ,"Machine Learning For Dummies®", IBM Limited Edition by 2008.
2	Oliver Theobald,"Machine Learning for Absolute Beginners: A Plain English Introduction ", Scatterplot Press Publisher,2017.
3	Drew Conway," Machine Learning for Hackers ", O'Reilly Media Publisher,2012.
4	Geron Aurelien,," Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems ", O'Reilly Media Publisher,2019.
5	Andrew W. Trask,"Grokking Deep Learning",Manning Publications,2019.

S.NO.	E-REFERENCES:
1	https://www.ibm.com/downloads/cas/GB8ZMQZ3
2	https://www.javatpoint.com/artificial-intelligence-tutorial
3	https://nptel.ac.in/courses/106/105/106105077/

Mapping Course Outcomes with Programme Outcomes

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	M	M	S
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	S	S	S	S	M	M	S

-Strong ; M-Medium; L-Low

Verified By

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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	24P2CSE1	ELECTIVE-I	5	4	25	75	100
COURSE TITLE	MULTIMEDIA AND ITS APPLICATIONS						

S.NO.	COURSE OBJECTIVES
1	To introduce the students the fundamental concepts of Multimedia.
2	To introduce Multimedia authoring tools.
3	To acquire knowledge about image and video animation.
4	To understand the role of Multimedia in Internet.
5	To know about High Definition Television and Desktop Computing – Knowledge based.

COURSE OUTCOMES (COs):

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

CO Number	Course Outcomes	Knowledge Level
CO1	Understand the basic concepts of Multimedia	K1,K2
CO2	Demonstrate Multimedia authoring tools	K2,K3
CO3	Analyze the concepts of Sound, Images, Video & Animation	K3,K4
CO4	Apply and Analyze the role of Multimedia in Internet and real time applications	K4,K5
CO5	Analyze multimedia applications using HDTV	K5,K6

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

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Syllabus		
Unit	Content	No.of Hours
I	**Introduction:** What is Multimedia? – Introduction to making Multimedia – Macintosh and Windows Production platforms – Basic Software tools.	12
II	**Multimedia Tools:** Making Instant Multimedia – Multimedia authoring tools – Multimedia building blocks – Text – Sound	12
III	**Animation :** Images – Animation – Video.	10
IV	**Internet: Multimedia and the Internet** ; The Internet and how it works – Tools for World Wide Web – Designing for the World Wide Web.	12
V	**Multimedia Systems**: High Definition Television and Desktop Computing – Knowledge based Multimedia systems.	12
	Total	60

S.NO.	TEXT BOOKS:
1	Tay Vaughan, "Multimedia making it work", 5th Edition, Tata McGrawHill,2013. (Unit I,II &III).
2	John F. Koegel Bufford, "Multimedia Systems", Pearson Education, 2002. (Unit IV &V).

S.NO.	REFERENCE BOOK:
1	Judith Jeffloate, "Multimedia in Practice (Technology and Applications)", PHI, 2003.
2	Neetu Sharma, "Multimedia System and its Applications Hardcover " , Global Vision Publishing House,2014.
3	Tay Vaughan,"Multimedia: Making it Work," 7th Edition, McGraw Hill Publisher,2008.
4	V. K. Jain," Introduction to Multimedia and Its Applications ", Khanna Book Publishing Company, 2012.
5	Tay Vaughan,"Multimedia: Making It Work," 8th Edition, McGraw Hill Publisher,2011.

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S.NO.	E-REFERENCES:
1	https://www.tutorialspoint.com/multimedia/index.htm
2	https://www.tutorialspoint.com/basics_of_computer_science/basics_of_computer_science_m
3	https://nptel.ac.in/courses/117/105/117105083/

Mapping Course Outcomes with Programme Outcomes

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	M	M	S
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	S	S	S	S	M	M	S

S-Strong; M-Medium; L-Low

Verified By

Approved By

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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	24P2CSPR3	CORE V- PRACTICAL III	5	4	40	60	100
COURSE TITLE	DATA MINING USING R						

S.NO.	COURSE OBJECTIVES
1	To enable the students to learn the concepts of Data Mining algorithms namely classification, clustering, regression.
2	To understand and write program using the DM algorithms.
3	To apply statistical interpretations for the solutions.
4	To use visualizations techniques for interpretations.
5	To implement DM algorithms for real time applications.

COURSE OUTCOMES (COs):

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

CO Number	Course Outcomes	Knowledge Level
CO1	Able to write programs using R for Association rules, Clustering techniques	K1,K2
CO2	Implement data mining techniques like classification, prediction	K2,K3
CO3	Able to use different visualizations techniques using R	K4,K5
CO4	Apply different data mining algorithms to solve real world applications	K5,K6
CO5	Able to Understand Data Visualization	K6

K1–Remember; K2 –Understanding; K3–Apply; K4–Analyze; K5-Evaluate; K6 - Create .

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S.No	LIST OF PROGRAMS	
1	Implement Apriori algorithm to extract association rule of datamining.	75 Hours
2	Implement k-means clustering technique.	
3	Implement any one Hierarchal Clustering.	
4	Implement Classification algorithm.	
5	Implement Decision Tree.	
6	Linear Regression.	
7	Data Visualization.	
	Total	**75**

S.NO.	TEXT BOOKS:
1	Margaret H. Dunham, "Data Mining: Introductory and Advanced Topics", Pearson education,2006
2	C.S.R. Prabhu,"Data Warehousing Concepts,Techniques, Productsand Applications", PHI, 2nd Edition,2008.

S.NO.	REFERENCE BOOKS:
1	ArunK.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	R. S. Kamath," Educational Data Mining with R and Rattle",River Publisher,2016.
4	Jared Lander," R for Everyone"Prentice Hall Publisher,2017.
5	Pawel Cichosz,"Data Mining Algorithms - Explained Using R Hardcover ", Wiley Publisher,2015.

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S.NO.	E-REFERENCES:
1	https://www.javatpoint.com/data-warehouse
2	https://nptel.ac.in/noc/courses/noc20/SEM1/noc20-cs12
3	https://www.btechguru.com/training--it--database-management-systems--file-structures--introduction-to-data-warehousing-and-olap-2-video-lecture--12054--26--151.html

Mapping Course Outcomes with Programme Outcomes

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	M	S	S
CO2	S	S	S	S	S	S	S	M	S	M
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	M	S	S	S	M	M	S	S

S-Strong; M-Medium; L-Low

P. Kalai

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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	24P2CSPR4	CORE VII- PRACTICAL IV	5	4	20	30	50
COURSE TITLE		ADVANCED JAVA LAB					

S.NO.	COURSE OBJECTIVES
1	To enable the students to implement the simple programs using JSP, JAR
2	To provide knowledge on using Servlets, Applets.
3	To introduce JDBC and navigation of records.
4	To understand RMI and its implementation.
5	To introduce Socket programming.

COURSE OUTCOMES (COs):

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

CO Number	Course Outcomes	Knowledge Level
CO1	Understand to the implement concepts of Java using HTML forms, JSP & JAR	K1,K2
CO2	Must be capable of implementing JDBC and RMI concepts	K3,K4
CO3	Able to write Applets with Event handling mechanism	K5,K6
CO4	Create interactive web based applications using servlets and JSP	K5,K6
CO5	Create the socket for text message for Sender and Receiver	K4,K5

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

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S.No	LIST OF PROGRAMS	
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 there cords	75 Hours
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 applet 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).	
	Total	**75**

S.NO.	TEXT BOOKS:
1	Robert Flenner, "Java Unleashed", SAMS Tech media Publications,2006. (Unit I,II &III)
2	Raymond Gallardo, "The Java Tutorial",Pearson Education,publisher 2014. (Unit IV&V)

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S.NO.	REFERENCE BOOKS:
1	Jim Keogh,"The Complete Reference J2EE", Tata McGraw Hill Publishing Company Ltd,2010.
2	David Sawyer Mc Farland, "Java Script And JQuery- The Missing Manual", Oreilly Publications, 3rd Edition, 2011.
3	Harvey Deitel and Deitel, "Java How to Program", PHI/Pearson Education Asia,2017.
4	Herbert Schildt ,"Java:The Complete Reference ", 12th Edition, McGraw Hill Publisher,2021.
5	Herbert Schildt, "Java: A Beginner's Guide," 6th Edition, McGraw Hill Publisher,2014.

S.NO.	E-REFERENCES:
1	https://www.javatpoint.com/servlet-tutorial
2	https://www.tutorialspoint.com/java/index.htm
3	https://onlinecourses.nptel.ac.in/noc19_cs84/preview

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PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	M	M	M
CO2	S	S	S	S	S	S	S	M	S	M
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	M	S	S	S	M	M	M	M

S-Strong; M-Medium ; L-Low

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