



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622 – MCA
-------------------	---------------------------------	----------------------------------	-----------

Semester - I

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PAPT2411	Applied Probability and Statistics for Computer Science Engineers	L	T	P	C	100
		3	1	0	4	
Course Objectives	• To encourage students to develop a working knowledge of the centralized as of Linear Algebra. • To enable students to understand the concepts of Probability and Random Variables. • To understand the basic probability concepts with respect to two dimensional random variables along with the relationship between the random variables and the significance of the central limit theorem. • To apply the small/large sample tests through Tests of hypothesis. • To enable the students to use the concepts of multivariate normal distribution and principal components analysis.					

Unit-I	LINEAR ALGEBRA	(12)
Vector spaces – norms – Inner Products – Eigen values using QR transformations – QR factorization – generalized eigen vectors – Canonical forms – singular value decomposition and applications – pseudo inverse – least square approximations.		
Unit-II	PROBABILITY AND RANDOM VARIABLES	(12)
Probability – Axioms of probability – Conditional probability – Bayes theorem – Random variables – Probability function – Moments – Moment generating functions and their properties – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma and Normal distributions – Function of a random variable.		
Unit-III	TWO DIMENSIONAL RANDOM VARIABLES	(12)
Joint distributions – Marginal and conditional distributions – Functions of two dimensional random variables – Regression curve – Correlation.		
Unit-IV	TESTING OF HYPOTHESIS	(12)
Sampling distributions – Type I and Type II errors – Small and Large samples – Tests based on Normal, t, Chi square and F distributions for testing of mean , variance and proportions – Tests for independence of attributes and goodness of fit.		
Unit-V	MULTIVARIATE ANALYSIS	(12)
Random vectors and matrices – Mean vectors and covariance matrices – Multivariate normal density and its properties – Principal components – Population principal components – Principal components from standardized variables.		
Total No of Periods to be Taught		60

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



TEXT BOOK:

1	Dallas E Johnson, “Applied multivariate methods for data Analysis”, Thomson and Duxbury press, Singapore, 1998.
2	Richard A. Johnson and Dean W. Wichern, “Applied multivariate statistical Analysis”, Pearson Education, Fifth Edition, 6th Edition, New Delhi, 2013.

REFERENCES:

1	Bronson, R.,”Matrix Operation” Schaum’s outline series, Tata McGraw Hill, New York, 2011.
---	---

COURSE OUTCOMES:

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

CO1:	Apply the concepts of Linear Algebra to solve practical problems.
CO2:	Use the ideas of probability and random variables in solving engineering problems.
CO3:	Be familiar with some of the commonly encountered two dimension random variables and be equipped for a possible extension to multivariate analysis
CO4:	Use statistical tests in testing hypothesis on data.
CO5:	Develop critical thinking based on empirical evidence and the scientific approach to knowledge development.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	-	2	2	1	2	-	-	-	-	-	-	-	-
CO2	2	-	2	2	1	1	-	-	-	-	-	-	-	-
CO3	2	-	2	1	1	2	-	-	-	-	-	-	-	-
CO4	3	1	2	2	1	2	-	-	-	-	-	-	-	-
CO5	3	-	2	3	2	3	-	-	-	-	-	-	-	-
Avg.	2.5	0.2	2	2	1.2	2.4	-	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom’s Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622 – MCA
-------------------	---------------------------------	----------------------------------	-----------

Semester - I

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PRMT2411	RESEARCH METHODOLOGY AND IPR	L	T	P	C	100
		2	0	0	2	
Course Objectives	• To give an overview of the research methodology and explain the technique of defining a search problem • To explain carrying out a literature search, its review, developing theoretical and conceptual frameworks and writing a review. • To explain the art of interpretation and the art of writing research reports. • To explain various forms of the intellectual property, its relevance and business impact in the changing global business environment. • To discuss leading International Instruments concerning Intellectual Property Rights.					

Unit-I	RESEARCH METHODOLOGY AND IPR	(6)
Overview of research process and design, Use of Secondary and exploratory data to answer the research question, Qualitative research, Observation studies, Experiments and Surveys.		
Unit-II	DATA COLLECTION AND SOURCES	(6)
Measurements, Measurement Scales, Questionnaires and Instruments, Sampling and methods. Data - Preparing, Exploring, examining and displaying.		
Unit-III	DATA ANALYSIS AND REPORTING	(6)
Overview of Multivariate analysis, Hypotheses testing and Measures of Association. Presenting Insights and findings using written reports and oral presentation.		
Unit-IV	INTELLECTUAL PROPERTY RIGHTS	(6)
Intellectual Property – The concept of IPR, Evolution and development of concept of IPR, IPR development process, Trade secrets, utility Models, IPR & Biodiversity, Role of WIPO and WTO in IPR establishments, Right of Property, Common rules of IPR practices, Types and Features of IPR Agreement, Trademark, Functions of UNESCO in IPR maintenance.		
Unit-V	PATENTS	(6)
Patents – objectives and benefits of patent, Concept, features of patent, Inventive step, Specification, Types of patent application, process E-filing, Examination of patent, Grant of patent, Revocation, Equitable Assignments, Licences, Licensing of related patents, patent agents, Registration of patent agents.		
Total No of Periods to be Taught		30

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



REFERENCES:

1	Cooper Donald R, Schindler Pamela S and Sharma JK, “Business Research Methods”, Tata McGraw Hill Education, 11e (2012).
2	Catherine J. Holland, “Intellectual property: Patents, Trademarks, Copyrights, Trade Secrets”, Entrepreneur Press, 2007.
3	David Hunt, Long Nguyen, Matthew Rodgers, “Patent searching: tools & techniques”, Wiley, 2007.

COURSE OUTCOMES:

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

CO1:	Formulate and Design research problem
CO2:	Understand and Comprehend the Data Collection Methods
CO3:	Perform Data analysis and acquire Insights
CO4:	Understand IPR and follow research ethics
CO5:	Understand and Practice Drafting and filing a Patent in research and development

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	-	1	-	1	-	-	-	-	-	-	-	-
CO2	3	2	-	2	-	1	-	-	-	-	-	-	-	-
CO3	3	2	2	2	-	1	-	-	-	-	-	-	-	-
CO4	3	2	-	1	-	-	-	-	-	-	-	-	-	-
CO5	3	3	-	1	-	-	-	-	-	-	-	-	-	-
Avg.	3	2.4	0.4	1.4	-	0.6	-	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom’s Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622 – MCA
-------------------	---------------------------------	----------------------------------	-----------

Semester - I

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCT2401	ADVANCED DATA STRUCTURES AND ALGORITHMS	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To understand the usage of algorithms in computing • To learn and use hierarchical data structures and its operations • To learn the usage of graphs and its applications • To select and design data structures and algorithms that is appropriate for problems • To study about NP Completeness of problems.					

Unit-I	ROLE OF ALGORITHMS IN COMPUTING & COMPLEXITY ANALYSIS	(9)
Algorithms – Algorithms as a Technology -Time and Space complexity of algorithms- Asymptotic analysis- Average and worst-case analysis-Asymptotic notation-Importance of efficient algorithms Program performance measurement - Recurrences: The Substitution Method – The Recursion- Tree Method- Data structures and algorithms.		
Unit-II		(9)
Binary Search Trees: Basics – Querying a Binary search tree – Insertion and Deletion- Red Black trees: Properties of Red-Black Trees – Rotations – Insertion – Deletion -B-Trees: Definition of B - trees – Basic operations on B-Trees – Deleting a key from a B-Tree- Heap – Heap Implementation – Disjoint Sets - Fibonacci Heaps: structure – Mergeable heap operations Decreasing a key and deleting a node- Bounding the maximum degree.		
Unit-III	GRAPHS	(9)
Elementary Graph Algorithms: Representations of Graphs – Breadth-First Search – Depth-First Search – Topological Sort – Strongly Connected Components- Minimum Spanning Trees: Growing a Minimum Spanning Tree – Kruskal and Prim- Single-Source Shortest Paths: The Bellman-Ford algorithm – Single-Source Shortest paths in Directed Acyclic Graphs – Dijkstra's Algorithm; Dynamic Programming - All-Pairs Shortest Paths: Shortest Paths and Matrix Multiplication – The Floyd-Warshall Algorithm		
Unit-IV	ALGORITHM DESIGN TECHNIQUES	(9)
Dynamic Programming: Matrix-Chain Multiplication – Elements of Dynamic Programming – Longest Common Subsequence- Greedy Algorithms: – Elements of the Greedy Strategy- An Activity-Selection Problem – Huffman Coding.		
Unit-V	NP COMPLETE AND NP HARD	(9)
NP-Completeness: Polynomial Time – Polynomial-Time Verification – NP- Completeness and Reducibility – NP Completeness Proofs – NP-Complete Problems.		
Total No of Periods to be Taught		45

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



REFERENCES:

1	S.Sridhar,” Design and Analysis of Algorithms”, Oxford University Press, 1st Edition, 2014.
2	Adam Drozdex, “Data Structures and Algorithms in C++”, Cengage Learning, 4th Edition, 2013.
3	T.H. Cormen, C.E.Leiserson, R.L. Rivest and C.Stein, "Introduction to Algorithms", Prentice Hall of India, 3rd Edition, 2012.
4	Mark Allen Weiss, “Data Structures and Algorithms in C++”, Pearson Education, 3rd Edition, 2009.

COURSE OUTCOMES:

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

CO1:	Design data structures and algorithms to solve computing problems.
CO2:	Choose and implement efficient data structures and apply them to solve problems.
CO3:	Design algorithms using graph structure and various string-matching algorithms to solve real-life problems.
CO4:	Design one’s own algorithm for an unknown problem. use statistical tests in testing hypothesis on data.
CO5:	Apply suitable design strategy for problem solving.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	3	2	1	2	-	-	-	-	-	-	-	-
CO2	2	1	3	2	2	2	-	-	-	-	-	-	-	-
CO3	2	1	3	2	2	2	-	-	-	-	-	-	-	-
CO4	3	1	3	2	2	2	-	-	-	-	-	-	-	-
CO5	3	1	3	2	2	2	-	-	-	-	-	-	-	-
Avg.	2.5	1	3	2	1.8	2	-	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom’s Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622 – MCA
-------------------	---------------------------------	----------------------------------	-----------

Semester - I

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCT2402	OBJECT ORIENTED SOFTWARE ENGINEERING	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To understand the phases in object oriented software development • To gain fundamental concepts of requirements engineering and analysis. • To know about the different approach for object oriented design and its methods • To learn about how to perform object oriented testing and how to maintain software • To provide various quality metrics and to ensure risk management.					

Unit-I	SOFTWARE DEVELOPMENT AND PROCESS MODELS	(9)
Introduction to Software Development – Challenges – An Engineering Perspective – Object Orientation – Software Development Process – Iterative Development Process – Process Models – Life Cycle Models – Unified Process – Iterative and Incremental – Agile Processes.		
Unit-II	MODELING OO SYSTEMS	(9)
Object Oriented Analysis (OOA / Coad-Yourdon), Object Oriented Design (OOD/Booch), Hierarchical Object Oriented Design (HOOD), Object Modeling Technique (OMT) – Requirement Elicitation – Use Cases – SRS Document – OOA - Identification of Classes and Relationships, Identifying State and Behavior – OOD - Interaction Diagrams – Sequence Diagram – Collaboration Diagrams - Unified Modeling Language and Tools.		
Unit-III	DESIGN PATTERNS	(9)
Design Principles – Design Patterns – GRASP – GoF – Dynamic Object Modeling – Static Object Modeling.		
Unit-IV	SYSTEM TESTING	(9)
Software testing: Software Verification Techniques – Object Oriented Checklist :- Functional Testing – Structural Testing – Class Testing – Mutation Testing – Levels of Testing – Static and Dynamic Testing Tools – Software Maintenance – Categories – Challenges of Software Maintenance – Maintenance of Object Oriented Software – Regression Testing		
Unit-V	SOFTWARE QUALITY AND METRICS	(9)
Need of Object Oriented Software Estimation – Lorenz and Kidd Estimation – Use Case Points Method – Class Point Method – Object Oriented Function Point – Risk Management – Software Quality Models – Analyzing the Metric Data – Metrics for Measuring Size and Structure – Measuring Software Quality - Object Oriented Metrics		
Total No of Periods to be Taught		45

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



REFERENCES:

1	Yogesh Singh, Ruchika Malhotra, “ Object – Oriented Software Engineering”, PHI Learning Private Limited, First edition, 2012
2	Ivar Jacobson. Magnus Christerson, Patrik Jonsson, Gunnar Overgaard, “Object Oriented Software Engineering, A Use Case Driven Approach”, Pearson Education, Seventh Impression, 2009

COURSE OUTCOMES:

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

CO1:	Design object oriented software using appropriate process models
CO2:	Differentiate software processes under waterfall and agile methodology
CO3:	Design and Develop UML diagrams for software projects
CO4:	Apply Design Patterns for a software process.
CO5:	Categorize testing methods and compare different testing tools for software processes.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	3	3	2	2	-	-	-	-	-	-	-	-
CO2	2	1	3	2	2	2	-	-	-	-	-	-	-	-
CO3	2	1	3	3	2	2	-	-	-	-	-	-	-	-
CO4	2	1	3	3	1	2	-	-	-	-	-	-	-	-
CO5	2	1	3	3	3	2	-	-	-	-	-	-	-	-
CO6	1	1	3	2	2	2	-	-	-	-	-	-	-	-
Avg.	1.83	1	3	2.66	2	2	-	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom’s Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622 – MCA
-------------------	---------------------------------	----------------------------------	-----------

Semester - I

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCT2403	PYTHON PROGRAMMING	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To develop Python programs with conditionals, loops and functions. • To use Python data structures–lists, tuples, dictionaries. • To do input/output with files in Python. • To use modules, packages and frameworks in python. • To define a class with attributes and methods in python.					

Unit-I	BASICS OF PYTHON	(9)
Introduction to Python Programming – Python Interpreter and Interactive Mode– Variables and Identifiers – Arithmetic Operators – Values and Types – Statements. Operators – Boolean Values – Operator Precedence – Expression – Conditionals: If-Else Constructs – Loop Structures/Iterative Statements – While Loop – For Loop – Break Statement Continue statement – Function Call and Returning Values – Parameter Passing – Local and Global Scope – Recursive Functions		
Unit-II	DATA TYPES IN PYTHON	(9)
Lists, Tuples, Sets, Strings, Dictionary, Modules: Module Loading and Execution – Packages – Making Your Own Module – The Python Standard Libraries.		
Unit-III	FILE HANDLING AND EXCEPTION HANDLING	(8)
Files: Introduction – File Path – Opening and Closing Files – Reading and Writing Files –File Position –Exception: Errors and Exceptions, Exception Handling, Multiple Exceptions		
Unit-IV	MODULES, PACKAGES AND FRAMEWORKS	(10)
Modules: Introduction – Module Loading and Execution – Packages – Making Your Own Module – The Python Libraries for data processing, data mining and visualization- NUMPY, Pandas, Matplotlib, Plotly- Frameworks- Django, Flask, Web2Py		
Unit-V	OBJECT ORIENTED PROGRAMMING IN PYTHON	(9)
Creating a Class, Class methods, Class Inheritance, Encapsulation, Polymorphism, class method vs. static methods, Python object persistence		
Total No of Periods to be Taught		45

REFERENCES:

1	Reema Thareja, “Python Programming using Problem Solving Approach”, Oxford University Press, First edition, 2017
2	Allen B. Downey, “Think Python: How to Think Like a Computer Scientist”, Second Edition, Shroff, O’ReillyPublishers, 2016 (http://greenteapress.com/wp/thinkpython/)

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



3	Guido van Rossum, Fred L. Drake Jr., “An Introduction to Python – Revised and Updated for Python 3.2, Network Theory Ltd., First edition, 2011
4	John V Guttag, “Introduction to Computation and Programming Using Python”, Revised and Expanded Edition, MIT Press, 2013
5	Charles Dierbach, “Introduction to Computer Science using Python”, Wiley India Edition, First Edition, 2016

COURSE OUTCOMES:

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

CO1:	Develop algorithmic solutions to simple computational problems
CO2:	Represent compound data using Python lists, tuples and dictionaries
CO3:	Read and write data from/to files in Python Programs
CO4:	Structure simple Python programs using libraries, modules etc.
CO5:	Structure a program by bundling related properties and behaviours into individual objects.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	1	3	3	2	3	-	-	-	-	-	-	-	-
CO2	1	1	3	3	1	2	-	-	-	-	-	-	-	-
CO3	2	1	3	3	2	2	-	-	-	-	-	-	-	-
CO4	3	1	3	3	3	3	-	-	-	-	-	-	-	-
CO5	2	1	3	3	3	3	-	-	-	-	-	-	-	-
Avg.	2.2	1	3	3	2.2	2.6	-	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom’s Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622 – MCA
-------------------	---------------------------------	----------------------------------	-----------

Semester I

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCT2404	FUNDAMENTALS OF ACCOUNTING	L	T	P	C	100
		3	0	2	4	
Course Objectives	• To understand the basic principles of Accounting • To understand the Double entry system and the preparation of ledger. • To understand the process and importance of the electronic accounting system. • To prepare the estimate for various business activities such as purchase, sale, production and cash budgets • To ensure the decision making process of an organization.					

Unit-I	INTRODUCTION TO ACCOUNTING	(9+6)
Introduction to Financial, Cost and Management Accounting - Objectives of Financial Accounting – Accounting Principles, Concepts and Conventions – Bookkeeping and Accounting		
Unit-II	MANAGEMENT ACCOUNTING AND BOOKKEEPING	(9+6)
Meaning-Objectives of Management Accounting-Accounting System – Preparation of Journal, Ledger, Cash Book and Trial Balance – Errors disclosed and not disclosed by Trial Balance –Final Accounts - Ratio Analysis		
Unit-III	BUDGETS AND BUDGETARY CONTROL	(9+6)
Budgets and Budgetary Control-Meaning-Types-Sales Budget-Production Budget-Cost of Production Budget-Flexible Budgeting-Cash Budget-Master Budget-Zero Base Budgeting- Computerized Accounting – with adjustments		
Unit-IV	FINANCIAL MANAGEMENT	(9+6)
Objectives of Financial Management- preparation of Suspense Account – Depreciation – Meaning and Types – Methods of Charging and Providing depreciation – Inventory		
Unit-V	BANK RECONCILIATION STATEMENT AND REPORTING	(9+6)
Preparing Bank Reconciliation Statement (simple problems) – Insurance Claim – Average Clause - Export and Import of Data, Data Security.		
Total No of Periods to be Taught		45

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



REFERENCES:

1	S.N.Maheswari, "Financial and Management Accounting", Sultan Chand & Sons, 5th edition, 2010
2	I.M.Pandey, "Financial Management", Vikas Publishing House Pvt. Ltd., 9th Edition, 2009.
3	M.Y.Khan and P.K.Jain, "Financial Management , Text, Problems and Cases", Tata McGraw Hill, 5th Edition, 2008.
4	Reddy and Murthy, Financial Accounting by Margham Publications, 2015, Chennai
5	I.M.Pandey, "Management Accounting", Vikas Publishing House Pvt. Ltd., 3rd Edition, 2009
6	Advanced Accounting, R.L.Gupta and P.K.Gupta, Advanced Accounting, Sultan Chand, New Delhi.

List of Exercises/Experiments

1. Practical exercise session using Tally: Company Creation, Creating Groups	
2. Practical exercise session using Tally: Creation of Ledgers and Vouchers	
3. Practical exercise session using Tally: Creating Contra, Journals, Credit and Debit Notes	
4. Practical exercise session using Tally: Preparing Trial Balance and Final Accounts	
5. Practical sessions using Advanced tools in MS-Excel: Preparing Revenue Management and Portfolio Selection	
6. Practical sessions using Advanced tools in MS-Excel: Preparing Final Accounts with Adjustments	
7. Practical exercise session using Tally.: Preparing Inventory Creation, Purchase order, Sales Order	
8. Practical exercise session using Tally: Preparing Sales Journal, Rejections, Delivery Note.	
9. Practical exercise session using Tally.: Preparing the Bank Reconciliation Statement	
10. Practical exercise session using Tally: Preparing the Trading, Profit And Loss Account and Trial Balance	
Total No of Periods to be Taught	30

COURSE OUTCOMES:

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

CO1:	Able to understand the basic concepts of Accounting standards.
CO2:	Able to understand the process of maintaining Accounts in an organization
CO3:	Helps to understand and calculating the financial position of an organization
CO4:	Helps to understand Financial Management concepts and its components
CO5:	It helps to understand the importance of BRS and generation of various financial reports

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS		
S.No	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	Desktop systems	35
2	Tally Software	

Mapping of COs with POs and PSOs														
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	3	1	1	2	-	-	-	-	-	-	-	-
CO2	1	1	1	1	1	1	-	-	-	-	-	-	-	-
CO3	1	1	1	1	1	1	-	-	-	-	-	-	-	-
CO4	1	1	1	1	1	1	-	-	-	-	-	-	-	-
CO5	1	1	1	1	1	1	-	-	-	-	-	-	-	-
Avg.	1.2	1	1.4	1	1	1.2								
1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom’s Taxonomy														

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622 – MCA
------------	---------------------------------	-----------------------	-----------

Semester I

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCL2401	ADVANCED DATA STRUCTURES AND ALGORITHMS LABORATORY	L	T	P	C	100
		0	0	4	2	
Course Objectives	• To acquire the knowledge of using advanced tree structures • To learn the usage of heap structures • To understand the usage of graph structures and spanning trees • To understand the problems such as matrix chain multiplication, activity selection and Huffman coding. • To understand the necessary mathematical abstraction to solve problems.					

List of Exercises/Experiments	
1. Implementation of recursive function for tree traversal and Fibonacci	
2. Implementation of iteration function for tree traversal and Fibonacci	
3. Implementation of Merge Sort and Quick Sort	
4. Implementation of a Binary Search Tree	
5. Red-Black Tree Implementation	
6. Heap Implementation	
7. Fibonacci Heap Implementation	
8. Graph Traversals	
9. Spanning Tree Implementation	
10. Shortest Path Algorithms (Dijkstra's algorithm, Bellman Ford Algorithm)	
11. Implementation of Matrix Chain Multiplication	
12. Activity Selection and Huffman Coding Implementation	
Total No of Periods to be Taught	60

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



REFERENCES:

1	Lipschutz Seymour, "Data Structures Schaum's Outlines Series", Tata McGraw Hill, 3 rd Edition, 2014.
2	Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education, Reprint 2006.
3	http://www.coursera.org/specializations/data-structures-algorithms
4	http://www.tutorialspoint.com/data_structures_algorithms
5	http://www.geeksforgeeks.org/data-structures/

COURSE OUTCOMES:

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

CO1:	Design and implement basic and advanced data structures extensively
CO2:	Design algorithms using graph structures
CO3:	Design and develop efficient algorithms with minimum complexity using design techniques
CO4:	Develop programs using various algorithms.
CO5:	Choose appropriate data structures and algorithms, understand the ADT/libraries, and use it to design algorithms for a specific problem.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.No	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	64-bit Open source Linux or its derivative	35
2	Open Source C++ Programming tool like G++/GCC	35

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	3	3	2	2	-	-	-	-	-	-	-	-
CO2	2	1	3	3	3	3	-	-	-	-	-	-	-	-
CO3	3	1	3	3	3	3	-	-	-	-	-	-	-	-
CO4	3	1	3	3	3	3	-	-	-	-	-	-	-	-
CO5	3	1	3	3	3	3	-	-	-	-	-	-	-	-
Avg.	2.6	1	3	3	2.8	2.8	-	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622 – MCA
-------------------	---------------------------------	----------------------------------	-----------

Semester I

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCL2402	PYTHON PROGRAMMING LABORATORY	L	T	P	C	100
		0	0	4	2	
Course Objectives	• Develop Python programs with conditionals, loops and functions • Represent compound data using Python lists, tuples, dictionaries • Read and write data from to files in Python • Implement NumPy, Pandas, Matplot libraries • Implement object oriented concepts					

List of Exercises/Experiments	
1. Python programming using simple statements and expressions (exchange the values of two variables, circulate the values of n variables, distance between two points).	
2. Scientific problems using Conditionals and Iterative loops	
3. Linear search and Binary search	
4. Selection sort, Insertion sort	
5. Merge sort, Quick Sort	
6. Implementing applications using Lists, Tuples	
7. Implementing applications using Sets, Dictionaries	
8. Implementing programs using Functions.	
9. Implementing programs using Strings.	
10. Implementing programs using written modules and Python Standard Libraries (pandas, numpy, Matplotlib, scipy)	
11. Implementing real-time/technical applications using File handling	
12. Implementing real-time/technical applications using Exception handling	
13. Creating and Instantiating classes	
Total No of Periods to be Taught	60

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



REFERENCES:

1	Allen B. Downey, “Think Python: How to Think Like a Computer Scientist”, Second Edition, Updated for Python 3, Shroff/O’Reilly Publishers, 2016
2	Shroff “Learning Python: Powerful Object-Oriented Programming; Fifth edition, 2013
3	David M.Beazley “Python Essential Reference”. Addison-Wesley Professional; Fourth edition, 2009.
4	David M. Baezly “Python Cookbook” O’Reilly Media; Third edition (June 1, 2013).
5	http://www.edx.org/

COURSE OUTCOMES:

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

CO1:	Apply the Python language syntax including control statements, loops and functions to solve a wide variety of problems in mathematics and science.
CO2:	Use the core data structures like lists, dictionaries, tuples and sets in Python to store, process and sort the data
CO3:	Create files and perform read and write operations
CO4:	Illustrate the application of python libraries.
CO5:	Handle exceptions and create classes and objects for any real time applications

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.No	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	Processors: Intel Atom® processor Intel®Core™i3 processor	35
2	Disk space: 1GB	35
3	Operating systems: Windows 7, macOS and Linux	35
4	Python versions: 2.7, 3.6, 3.8	35

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	3	3	2	2	-	-	-	-	-	-	-	-
CO2	2	1	3	3	2	2	-	-	-	-	-	-	-	-
CO3	1	1	3	2	2	2	-	-	-	-	-	-	-	-
CO4	2	1	3	2	2	2	-	-	-	-	-	-	-	-
CO5	2	1	3	3	2	3	-	-	-	-	-	-	-	-
Avg.	1.8	1	3	2.6	2	2.2	-	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom’s Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622 – MCA
-------------------	---------------------------------	----------------------------------	-----------

Semester I

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCL2403	COMMUNICATION SKILLS ENHANCEMENT – I	L	T	P	C	100
		0	0	2	1	
Course Objectives	• To provide opportunities to learners to practice English and thereby make them proficient users of the language. • To enable learners to fine-tune their linguistic skills (LSRW)with the help of technology. • To improve the performance of students’ listening, speaking, reading and writing skills and thereby enhance their career opportunities.					

List of Activities	
1. Listening:	
- Listening and practicing neutral accents - Listening to short talks and lectures and completing listening comprehension exercises - Listening to TED Talks	
2. Speaking:	
- Giving one minute talks - Participating in small Group Discussions - Making Presentations	
3. Reading:	
- Reading Comprehension - Reading subject specific material - Technical Vocabulary	
4. Writing:	
- Formal vs Informal Writing - Paragraph Writing - Essay Writing - Email Writing	
Total No of Periods to be Taught	30

REFERENCES:
Open Sources / websites

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	Listen and comprehend lectures in English
CO2:	Articulate well and give presentations clearly
CO3:	Participate in Group Discussions successfully
CO4:	Communicate effectively in formal and informal writing
CO5:	Write proficient essays and emails

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.No	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	Processors: Intel Atom® processor Intel®Core™i3 processor	35
2	Disk space: 1GB	35
3	Operating systems: Windows 7, macOS and Linux	35
4	Mick and Speakers	35

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	1	2	2	1	1	1	-	-	-	-	-	-	-	-
CO2	1	3	2	1	1	1	-	-	-	-	-	-	-	-
CO3	1	2	3	1	1	1	-	-	-	-	-	-	-	-
CO4	1	3	2	1	1	1	-	-	-	-	-	-	-	-
CO5	1	3	2	1	1	1	-	-	-	-	-	-	-	-
Avg.	1	2.6	2.2	1	1	1	-	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom's Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622-MCA
-------------------	---------------------------------	----------------------------------	---------

Semester II

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCT2421	FULL STACK WEB DEVELOPMENT	L	T	P	C	100
		3	0	0	3	
Course Objectives	- To understand the fundamentals of web programming and client side scripting. - To learn server side development using Node JS - To understand API development with Express Framework. - To understand and architect data bases using NoSQL and SQL databases. - To learn the advanced client side scripting and React JS framework					

Unit-I	INTRODUCTION TO CSS and JAVASCRIPT	(9)
Introduction to Web: Server - Client - Communication Protocol (HTTP) – Structure of HTML Documents – Basic Markup tags – Working with Text and Images with CSS– CSS Selectors – CSS Flexbox - JavaScript: Data Types and Variables - Functions - Events – AJAX: GET and POST		
Unit-II	SERVER SIDE PROGRAMMING WITH NODE JS	(9)
Introduction to Web Servers – Javascript in the Desktop with NodeJS – NPM – Serving files with the http module – Introduction to the Express framework – Server-side rendering with Templating Engines – Static Files - async/await - Fetching JSON from Express		
Unit-III	ADVANCED NODE JS AND DATABASE	(9)
Introduction to NoSQL databases – MongoDB system overview - Basic querying with MongoDB shell – Request body parsing in Express – NodeJS MongoDB connection – Adding and retrieving data to MongoDB from NodeJS – Handling SQL databases from NodeJS – Handling Cookies in NodeJS – Handling User Authentication with NodeJS		
Unit-IV	ADVANCED CLIENT SIDE PROGRAMMING	(9)
React JS: ReactDOM - JSX - Components - Properties – Fetch API - State and Lifecycle - -JS Localstorage - Events - Lifting State Up - Composition and Inheritance		
Unit-V	APP IMPLEMENTATION IN CLOUD	(9)
Cloud providers Overview – Virtual Private Cloud – Scaling (Horizontal and Vertical) – Virtual Machines, Ethernet and Switches – Docker Container – Kubernetes		
Total No of Periods to be Taught		45

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



REFERENCES:

1	David Flanagan, “Java Script: The Definitive Guide”, O’Reilly Media, Inc, 7th Edition, 2020
2	Matt Frisbie, "Professional JavaScript for Web Developers", Wiley Publishing, Inc, 4th Edition, ISBN: 978-1-119-36656-0, 2019
3	Alex Banks, Eve Porcello, "Learning React", O’Reilly Media, Inc, 2nd Edition, 2020
4	Marc Wandschneider, “Learning Node”, Addison-Wesley Professional, 2nd Edition, 2016
5	Joe Beda, Kelsey Hightower, Brendan Burns, “Kubernetes: Up and Running”, O’Reilly Media, 1st edition, 2017
6	Paul Zikopoulos, Christopher Bienko, Chris Backer, Chris Konarski, Sai Vennam, “Cloud Without Compromise”, O’Reilly Media, 1st edition, 2021

COURSE OUTCOMES:

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

CO1:	Write client side scripting HTML, CSS and JS.
CO2:	Implement and architect the server side of the web application
CO3:	Implement Web Application using NodeJS
CO4:	Architect NoSQL databases with MongoDB
CO5:	Implement a full-stack Single Page Application using React, NodeJS and MongoDB and deploy on Cloud

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	1	1	2	2	2	2	-	-	-	-	-	-	-	-
CO2	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO3	2	1	3	2	3	2	-	-	-	-	-	-	-	-
CO4	2	1	3	2	3	3	-	-	-	-	-	-	-	-
CO5	2	1	3	2	3	3	-	-	-	-	-	-	-	-
Avg.	1.8	1	2.6	2	2.6	2.4	-	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom’s Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622-MCA
-------------------	---------------------------------	----------------------------------	---------

Semester II

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCT2422	ADVANCED DATABASE TECHNOLOGY	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To understand the working principles and query processing of distributed databases. • To understand the basics of spatial, temporal and mobile databases and their applications. • To distinguish the different types of NoSQL databases. • To understand the basics of XML and create well formed and valid XML documents. • To gain knowledge about information retrieval and web search.					

Unit-I	DISTRIBUTED DATABASE	(9)
Distributed Systems – Introduction – Architecture – Distributed Database Concepts – Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing		
Unit-II	SPATIAL AND TEMPORAL DATABASES	(9)
Active Databases Model – Design and Implementation Issues - Temporal Databases - Temporal Querying - Spatial Databases: Spatial Data Types, Spatial Operators and Queries – Spatial Indexing and Mining – Applications – Mobile Databases: Location and Handoff Management, Mobile Transaction Models – Deductive Databases - Multimedia Databases.		
Unit-III	NOSQL DATABASES	(9)
NoSQL – CAP Theorem – Sharding - Document based – MongoDB Operation: Insert, Update, Delete, Query, Indexing, Application, Replication, Sharding–Cassandra: Data Model, Key Space, Table Operations, CRUD Operations, CQL Types – HIVE: Data types, Database Operations, Partitioning – HiveQL – OrientDB Graph database – OrientDB Features		
Unit-IV	XML DATABASES	(9)
Structured, Semi structured, and Unstructured Data – XML Hierarchical Data Model – XML Documents – Document Type Definition – XML Schema – XML Documents and Databases – XML Querying – XPath – XQuery		
Unit-V	INFORMATION RETRIEVAL AND WEB SEARCH	(9)
IR concepts – Retrieval Models – Queries in IR system – Text Preprocessing – Inverted Indexing – Evaluation Measures – Web Search and Analytics – Current trends.		
Total No of Periods to be Taught		45



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B



Mecheri, Salem Dt-636 453, Tamilnadu

REFERENCES:

1	Abraham Silberschatz, Henry F Korth, S. Sudharshan, “Database System Concepts”, Seventh Edition, McGraw Hill, 2019
2	R. Elmasri, S.B. Navathe, “Fundamentals of Database Systems”, Seventh Edition, Pearson Education/Addison Wesley, 2017.
3	Guy Harrison, “Next Generation Databases, NoSQL, NewSQL and Big Data”, First Edition, Apress publishers, 2015
4	Jiawei Han, Micheline Kamber, Jian Pei, “Data Mining: Concepts and Techniques”, Third Edition, Morgan Kaufmann, 2012.
5	Brad Dayley, “Teach Yourself NoSQL with MongoDB in 24 Hours”, Sams Publishing, First Edition, 2014.
6	C. J. Date, A. Kannan, S. Swamynathan, “An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006

COURSE OUTCOMES:

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

CO1:	Design a distributed database system and execute distributed queries
CO2:	Manage Spatial and Temporal Database systems and implement it in corresponding applications
CO3:	Use NoSQL database systems and manipulate the data associated with it.
CO4:	Design XML database systems and validate with XML schema
CO5:	Apply knowledge of information retrieval concepts on web databases

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	3	2	2	2	-	-	-	-	-	-	-	-
CO2	2	1	3	2	2	2	-	-	-	-	-	-	-	-
CO3	2	1	3	2	2	3	-	-	-	-	-	-	-	-
CO4	2	1	3	2	3	3	-	-	-	-	-	-	-	-
CO5	2	1	3	2	2	2	-	-	-	-	-	-	-	-
Avg.	2	1	3	2	2.2	2.4	-	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom’s Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622-MCA
-------------------	---------------------------------	----------------------------------	---------

Semester II

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCT2423	CLOUD COMPUTING TECHNOLOGIES	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To understand the basic concepts of Distributed systems. • To learn about the current trend and basics of Cloud computing. • To be familiar with various Cloud concepts. • To expose with the Server, Network and storage virtualization. • To be aware of Micro services and DevOps.					

Unit-I	DISTRIBUTED SYSTEMS	(9)
Introduction to Distributed Systems – Characterization of Distributed Systems – Distributed Architectural Models – Remote Invocation – Request-Reply Protocols – Remote Procedure Call – Remote Method Invocation – Group Communication – Coordination in Group Communication – Ordered Multicast – Time Ordering – Physical Clock Synchronization – Logical Time and Logical Clocks.		
Unit-II	BASICS OF CLOUD COMPUTING	(9)
Cloud Computing Basics – Desired features of Cloud Computing – Elasticity in Cloud – On demand provisioning - Applications – Benefits – Cloud Components: Clients, Datacenters & Distributed Servers – Characterization of Distributed Systems – Distributed Architectural Models - Principles of Parallel and Distributed computing - Applications of Cloud computing – Benefits – Cloud services – Open source Cloud Software: Eucalyptus, Open Nebula, Open stack, Aneka, Cloudsim.		
Unit-III	CLOUD INFRASTRUCTURE	(9)
Cloud Architecture and Design – Architectural design challenges – Technologies for Network based system - NIST Cloud computing Reference Architecture – Public, Private and Hybrid clouds – Cloud Models : IaaS, PaaS and SaaS – Cloud storage providers - Enabling Technologies for the Internet of Things – Innovative Applications of the Internet of Things		
Unit-IV	CLOUD ENABLING TECHNOLOGIES	(9)
Service Oriented Architecture – Web Services – Basics of Virtualization – Emulation – Types of Virtualization – Implementation levels of Virtualization – Virtualization structures – Tools & Mechanisms – Virtualization of CPU, Memory & I/O Devices – Desktop Virtualization – Server Virtualization – Google App Engine – Amazon AWS - Federation in the Cloud		
Unit-V	MICROSERVICES AND DEVOPS	(9)
Defining Microservices - Emergence of Microservice Architecture – Design patterns of Microservices – The Mini web service architecture – Microservice dependency tree – Challenges with Microservices - SOA vs Microservice – Microservice and API – Deploying and maintaining Microservices – Reason for having DevOps – Overview of DevOps – Core elements of DevOps – Life cycle of DevOps –Adoption of DevOps - DevOps Tools – Build, Promotion and Deployment in DevOps.		
Total No of Periods to be Taught		45

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



REFERENCES:

1	Kai Hwang, Geoffrey C. Fox & Jack J.Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, First Edition, 2012
2	Andrew S. Tanenbaum & Maarten Van Steen, "Distributed Systems - Principles and Paradigms", Third Edition, Pearson, 2017.
3	Thomas Erl, Zaigham Mahood & Ricardo Puttini, "Cloud Computing, Concept, Technology & Architecture", Prentice Hall, Second Edition, 2013.
4	Richard Rodger, "The Tao of Microservices", ISBN 9781617293146, Manning Publications, First Edition, December 2017.
5	Magnus Larsson, "Hands-On Microservices with Spring Boot and Spring Cloud: Build and deploy microservices using spring cloud, Istio and kubernetes", Packt Publishing Ltd, First Edition, September 2019.
6	Jim Lewis, "DEVOPS: A complete beginner's guide to DevOps best practices", ISBN- 13:978-1673259148, ISBN-10: 1673259146, First Edition, 2019

COURSE OUTCOMES:

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

CO1:	Use Distributed systems in Cloud Environment
CO2:	Articulate the main concepts, key technologies, strengths and limitations of Cloud computing
CO3:	Identify the Architecture, Infrastructure and delivery models of Cloud computing
CO4:	Install, choose and use the appropriate current technology for the implementation of Cloud.
CO5:	Adopt Microservices and DevOps in Cloud environments

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO2	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO3	3	1	3	2	2	2	-	-	-	-	-	-	-	-
CO4	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO5	2	1	2	2	2	2	-	-	-	-	-	-	-	-
Avg.	2.2	1	2.2	2	2	2	-	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622-MCA
-------------------	---------------------------------	----------------------------------	---------

Semester II

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCT2424	MOBILE APPLICATION DEVELOPMENT	L	T	P	C	100
		3	0	2	4	
Course Objectives	• To understand the need and characteristics of mobile applications. • To design the right user interface for mobile applications. • To understand the design issues in the development of mobile applications. • To understand the development procedure for mobile applications. • To develop mobile applications using various tools and platforms					

Unit-I	INTRODUCTION	(9+6)
Mobile Application Model – Infrastructure and Managing Resources – Mobile Device Profiles – Frameworks and Tools		
Unit-II	USER INTERFACE	(9+6)
Generic UI Development - Multimodal and Multichannel UI –Gesture Based UI – Screen Elements and Layouts – Voice XML.		
Unit-III	APPLICATION DESIGN	(9+6)
Memory Management – Design Patterns for Limited Memory – Workflow for Application development – Java API – Dynamic Linking – Plugins and rule of thumb for using DLLs – Multithreading in Java - Concurrency and Resource Management.		
Unit-IV	MOBILE OS	(9+6)
Mobile OS: Android, iOS – Android Application Architecture – Understanding the anatomy of a mobile application - Android basic components –Intents and Services – Storing and Retrieving data – Packaging and Deployment – Security and Hacking.		
Unit-V	APPLICATION DEVELOPMENT	(9+6)
Communication via the Web – Notification and Alarms – Graphics and Multimedia: Layer Animation, Event handling and Graphics services – Telephony – Location based services		
Total No of Periods to be Taught		45

REFERENCES:

1	Reto Meier, Ian Lake, “Professional Android”, 4th Edition, Wrox, 2018.
2	Zigurd Mednieks, Laird Dornin, G. Blake Meike, Masumi Nakamura, “Programming Android”, O’Reilly, 2nd Edition, 2012.
3	Alasdair Allan, “Learning iOS Programming”, O’Reilly, Third Edition, 2013

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



4	Bill Phillips, Chris Stewart, Brian Hardy, and Kristin Marsicano, Android Programming: The Big Nerd Ranch Guide, 4th edition, 2019
5	Christian Keur, Aaron Hillegass, iOS Programming: The Big Nerd Ranch Guide, 6th Edition, O'Reilly, 2016
6	Barry Burd, "Android Application Development All-In-One for Dummies", 3rd Edition, 2021

List of Exercises/Experiments	
1. Installation of necessary components and software	
2. Implement mobile applications using UI toolkits and frameworks	
3. Design an application that uses Layout Managers and event listeners.	
4. Design a mobile application that is aware of the resource constraints of mobile devices.	
5. Design an application that uses Dynamic Linking.	
6. Develop an application that makes use of mobile database	
7. Implement an android application that writes data into the SD card.	
8. Develop a web based mobile application that accesses internet and location data.	
9. Develop an android application using telephony to send SMS	
Total No of Periods to be Taught	30

COURSE OUTCOMES:	
On completion of the course, the students will be able to	
CO1:	Understand the basics of mobile application development frameworks and tools.
CO2:	Develop a UI for mobile applications
CO3:	Design mobile applications that manage memory dynamically.
CO4:	Build applications based on mobile OS like Android, iOS.
CO5:	Build location based services


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS		
S.No	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	Computer System	35
2	JDK	35
3	ECLIPSE IDE/Equivalent	35
4	Android Studio	35

Mapping of COs with POs and PSOs														
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO2	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO3	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO4	3	1	3	3	2	3	-	-	-	-	-	-	-	-
CO5	3	1	3	3	2	3	-	-	-	-	-	-	-	-
Avg.	2.4	1	2.4	2.4	2	2.4	-	-	-	-	-	-	-	-
1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom’s Taxonomy														

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622-MCA
-------------------	---------------------------------	----------------------------------	---------

Semester II

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCT2425	CYBER SECURITY	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To learn the principles of cyber security and to identify threats and risks. • To learn how to secure physical assets and develop system security controls. • To understand how to apply security for Business applications and Network Communications. • To learn the technical means to achieve security. • To learn to monitor and audit security measures					

Unit-I	PLANNING FOR CYBER SECURITY	(9)
Best Practices-Standards and a plan of Action-Security Governance Principles, components and Approach-Information Risk Management-Asset Identification-Threat Identification-Vulnerability Identification-Risk Assessment Approaches-Likelihood and Impact Assessment-Risk Determination, Evaluation and Treatment-Security Management Function-Security Policy-Acceptable Use Policy- Security Management Best Practices - Security Models: Bell La Padula model, Biba Integrity Model - Chinese Wall model		
Unit-II	SECURITY CONTROLS	(9)
People Management-Human Resource Security-Security Awareness and Education-Information Management-Information Classification and handling-Privacy-Documents and Record Management- Physical Asset Management-Office Equipment-Industrial Control Systems-Mobile Device Security- System Development-Incorporating Security into SDLC - Disaster management and Incident response planning		
Unit-III	CYBER SECURITY FOR BUSINESS APPLICATIONS AND NETWORKS	(9)
Business Application Management-Corporate Business Application Security-End user Developed Applications-System Access- Authentication Mechanisms-Access Control-System Management- Virtual Servers-Network Storage Systems-Network Management Concepts-Firewall-IP Security- Electronic Communications - Case study on OWASP vulnerabilities using OWASP ZAP tool.		
Unit-IV	TECHNICAL SECURITY	(9)
Supply Chain Management-Cloud Security-Security Architecture-Malware Protection-Intrusion Detection-Digital Rights Management-Cryptographic Techniques-Threat and Incident Management- Vulnerability Management-Security Event Management-Forensic Investigations-Local Environment Management-Business Continuity.		
Unit-V	SECURITY ASSESSMENT	(9)
Security Monitoring and Improvement-Security Audit-Security Performance-Information Risk Reporting-Information Security Compliance Monitoring-Security Monitoring and Improvement Best practices.		
Total No of Periods to be Taught		45

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



REFERENCES:

1	William Stallings, “Effective Cyber Security - A guide to using Best Practices and Standards”, Addison-Wesley Professional, First Edition, 2019.
2	Adam Shostack, “Threat Modelling - Designing for Security”, Wiley Publications, First Edition, 2014.
3	Gregory J. Touhill and C. Joseph Touhill, “Cyber Security for Executives - A Practical Guide”, Wiley Publications, First Edition, 2014
4	Raef Meeuwisse, “Cyber Security for Beginners”, Second Edition, Cyber Simplicity Ltd, 2017
5	Patrick Engebretson, “The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy”, 2nd Edition, Syngress, 2013.
6	Charles P. Pfleeger, Shari Lawrence Pfleeger, Jonathan Margulies, “Security in Computing”, Fifth Edition, Prentice Hall, 2015

COURSE OUTCOMES:

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

CO1:	Develop a set of risk and security requirements to ensure that there are no gaps in an organization’s security practices
CO2:	Achieve management, operational and technical means for effective cyber security
CO3:	Audit and monitor the performance of cyber security controls
CO4:	Spot gaps in the system and devise improvements.
CO5:	Identify and report vulnerabilities in the system

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO2	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO3	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO4	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO5	2	1	2	2	2	2	-	-	-	-	-	-	-	-
Avg.	2	1	2	2	2	2	-	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom’s Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622-MCA
-------------------	---------------------------------	----------------------------------	---------

Semester II, Elective I

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCE2401	SOFTWARE PROJECT MANAGEMENT	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To know how to do project planning for the software process. • To learn the cost estimation techniques during the analysis of the project. • To understand the quality concepts for ensuring the functionality of the software.					

Unit-I	SOFTWARE PROJECT MANAGEMENT CONCEPTS	(9)
Introduction to Software Project Management: An Overview of Project Planning: Select Project, Identifying Project scope and objectives, infrastructure, project products and Characteristics. Estimate efforts, Identify activity risks, and allocate resources- Six Sigma, Software Quality: defining software quality, ISO9126, External Standards.		
Unit-II	SOFTWARE EVALUATION AND COSTING	(9)
Project Evaluation: Strategic Assessment, Technical Assessment, cost-benefit analysis, Cash flow forecasting, cost-benefit evaluation techniques, Risk Evaluation. Selection of Appropriate Project approach: Choosing technologies, choice of process models, structured methods.		
Unit-III	SOFTWARE ESTIMATION TECHNIQUES	(9)
Software Effort Estimation: Problems with over and under estimations, Basis of software Estimation, Software estimation techniques, expert Judgment, Estimating by analogy. Activity Planning: Project schedules, projects and activities, sequencing and scheduling Activities, networks planning models, formulating a network model.		
Unit-IV	RISK MANAGEMENT	(9)
Risk Management: Nature of Risk, Managing Risk, Risk Identification and Analysis, Reducing the Risk. Resource Allocation: Scheduling resources, Critical Paths, Cost scheduling, Monitoring and Control: Creating Framework, cost monitoring, prioritizing monitoring.		
Unit-V	GLOBALIZATION ISSUES IN PROJECT MANAGEMENT	(9)
Globalization issues in project management: Evolution of globalization- challenges in building global teams-models for the execution of some effective management techniques for managing global teams. Impact of the internet on project management: Introduction – the effect of the internet on project management – managing projects for the internet – effect on project management activities. Comparison of project management software: dot Project, Launch pad, openProj. Case study: PRINCE2		
Total No of Periods to be Taught		45

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



REFERENCES:

1	Bob Hughes, Mike Cotterell & Rajib Mall “Software Project Management”, McGraw- Hill Publications, 6th Edition 2017.
2	Ian Somerville, “Software Engineering”, 10th Edition, Pearson Education, 2017.
3	Robert T. Futrell , “Quality Software Project Management”, Pearson Education India, 2008.
4	Gopalaswamy Ramesh, “Managing Global Software Projects: How to Lead Geographically Distributed Teams, Manage Processes and Use Quality Models”, McGraw Hill Education, 2017..
5	Richard H.Thayer “Software Engineering Project Management”, 2nd Edition, Wiley, 2006.
6	S. A. Kelkar,” Software Project Management” PHI, New Delhi, Third Edition ,2013

COURSE OUTCOMES:

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

CO1:	Understand the activities during the project scheduling of any software application
CO2:	Learn the risk management activities and the resource allocation for the projects.
CO3:	Apply the software estimation and recent quality standards for evaluation of the software projects.
CO4:	Acquire knowledge and skills needed for the construction of highly reliable software project
CO5:	Create reliable, replicable cost estimation that links to the requirements of project planning and managing

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO2	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO3	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO4	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO5	2	1	2	2	2	2	-	-	-	-	-	-	-	-
Avg.	2	1	2	2	2	2	-	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom’s Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622-MCA
-------------------	---------------------------------	----------------------------------	---------

Semester II

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCL2421	ADVANCED DATABASE TECHNOLOGY LABORATORY	L	T	P	C	100
		0	0	4	2	
Course Objectives	• To understand the process of distributing tables across multiple systems • To understand the process of storing, retrieving spatial and temporal data • To understand the process of storing, retrieving objects in a database • To understand the process of storing and retrieving data from a XML Database • To use the open source database for building a mobile application.					

List of Exercises/Experiments

1. NOSQL Exercises	
a. MongoDB – CRUD operations, Indexing, Sharding	
b. Cassandra: Table Operations, CRUD Operations, CQL Types	
c. HIVE: Data types, Database Operations, Partitioning – HiveQL	
d. OrientDB Graph database – OrientDB Features	
2. MySQL Database Creation, Table Creation, Query	
3. MySQL Replication – Distributed Databases	
4. Spatial data storage and retrieval in MySQL	
5. Temporal data storage and retrieval in MySQL	
6. Object storage and retrieval in MySQL	
7. XML Databases , XML table creation, XQuery FLWOR expression	
Total No of Periods to be Taught	60

COURSE OUTCOMES:

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

CO1:	Design and implement advanced databases
CO2:	Use big data frameworks and tools
CO3:	Formulate complex queries using SQL
CO4:	Create an XML document and perform Xquery.
CO5:	Query processing in Mobile databases using open source tools

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS		
S.No	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	Computer System	35
2	Java/Pytho/R/Scala	
3	Oracle, MySQL, MongoDB, Casandra, Hive	

Mapping of COs with POs and PSOs														
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO2	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO3	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO4	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO5	2	1	2	2	2	2	-	-	-	-	-	-	-	-
Avg.	2	1	2	2	2	2	-	-	-	-	-	-	-	-
1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom’s Taxonomy														


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622-MCA
------------	---------------------------------	-----------------------	---------

Semester II

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCL2422	FULL STACK WEB DEVELOPMENT LABORATORY	L	T	P	C	100
		0	0	4	2	
Course Objectives	• To implement the client side of the web application using javascript. • To understand Javascript on the desktop using NodeJS. • To develop a web application using NodeJS and Express. • To implement a SPA using React. • To develop a full stack single page application using React, NodeJS, and a Database (MongoDB or SQL)					

List of Exercises/Experiments	
1. Create a form and validate the contents of the form using JavaScript.	
2. Get data using Fetch API from an open-source endpoint and display the contents in the form of a card.	
3. Create a NodeJS server that serves static HTML and CSS files to the user without using Express.	
4. Create a NodeJS server using Express that stores data from a form as a JSON file and displays it in another page. The redirect page should be prepared using Handlebars.	
5. Create a NodeJS server using Express that creates, reads, updates and deletes students' details and stores them in MongoDB database. The information about the user should be obtained from a HTML form.	
6. Create a NodeJS server that creates, reads, updates and deletes event details and stores them in a MySQL database. The information about the user should be obtained from a HTML form	
7. Create a counter using ReactJS	
8. Create a Todo application using ReactJS. Store the data to a JSON file using a simple NodeJS server and retrieve the information from the same during page reloads.	
9. Create a simple Sign up and Login mechanism and authenticate the user using cookies. The user information can be stored in either MongoDB or MySQL and the server should be built using NodeJS and Express Framework	
10. Create and deploy a virtual machine using a virtual box that can be accessed from the host computer using SSH	
11. Create a docker container that will deploy a NodeJS ping server using the NodeJS image	
Total No of Periods to be Taught	60

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	To implement and deploy the client side of the web application
CO2:	To develop and deploy server side applications using NodeJS
CO3:	To use Express framework in web development.
CO4:	To implement and architect database systems in both NoSQL and SQL environments.
CO5:	To develop a full stack single page application using React, NodeJS, and a Database and deploy using containers

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.No	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	Computer system	35
2	NodeJS/Express JS, ReactJS, Docker, any IDE like NOTEPAD++/Visual studio code/sublime text etc.	
3	MySQL, MongoDB	

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	1	3	2	3	3	-	-	-	-	-	-	-	-
CO2	2	1	2	2	3	3	-	-	-	-	-	-	-	-
CO3	2	1	2	2	3	2	-	-	-	-	-	-	-	-
CO4	2	1	3	2	2	3	-	-	-	-	-	-	-	-
CO5	2	1	2	2	2	2	-	-	-	-	-	-	-	-
Avg.	2.2	1	2.4	2	2.6	2.6								

1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom's Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622-MCA
-------------------	---------------------------------	----------------------------------	---------

Semester II

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCL2423	COMMUNICATION SKILLS ENHANCEMENT - II	L	T	P	C	100
		0	0	2	1	
Course Objectives	- To provide opportunities to learners to practice their communication skills to make them become proficient users of English. - To enable learners to fine-tune their linguistic skills (LSRW) with the help of Technology to communicate globally. - To enhance the performance of learners at placement interviews and group discussions and other recruitment procedures.					

List of Exercises/Experiments

1. SOFT SKILLS

- People skills
- Interpersonal skills
- Team building skills
- Leadership skills
- Problem solving skills

2. PRESENTATION SKILLS

- Preparing slides with animation related to the topic
- Introducing oneself to the audience
- Introducing the topic
- Presenting the visuals effectively – 5 minute presentation

3. GROUP DISCUSSION SKILLS

- Participating in group discussions
- Brainstorming the topic
- Activities to improve GD skills.

4. INTERVIEW SKILLS

- Interview etiquette – dress code – body language
- Attending job interviews
- Answering questions confidently
- Technical interview – telephone/Skype interview
- Emotional and cultural intelligence
- Stress Interview

Total No of Periods to be Taught

30

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	Students will be able to make presentations and participate in Group discussions with confidence
CO2:	Students will be able to perform well in the interviews
CO3:	Students will make effective presentations

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.No	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	Processors: Intel Atom® processor Intel®Core™i3 processor	35
2	Disk space: 1GB	35
3	Operating systems: Windows 7, macOS and Linux	35
4	Mic and Speakers	35

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	1	2	1	1	1	1	-	-	-	-	-	-	-	-
CO2	1	2	1	1	1	1	-	-	-	-	-	-	-	-
CO3	1	2	1	1	1	1	-	-	-	-	-	-	-	-
Avg.	1	2	1	1	1	1	-	-	-	-	-	-	-	-
1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy														

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622-MCA
-------------------	---------------------------------	----------------------------------	---------

Semester III

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCT2431	MACHINE LEARNING	L	T	P	C	100
		3	0	0	3	
Course Objectives	- To gain knowledge on foundations of machine learning and apply suitable dimensionality reduction techniques for an application - To select the appropriate model and use feature engineering techniques - To gain knowledge on Probability and Bayesian Learning to solve the given problem - To design and implement the machine learning techniques for real world problems - To analyze, learn and classify complex data without predefined models also					

Unit-I	INTRODUCTION	(9)
Human Learning - Types – Machine Learning - Types - Problems not to be solved - Applications - Languages/Tools– Issues. Preparing to Model: Introduction - Machine Learning Activities - Types of data - Exploring structure of data - Data quality and remediation - Data Pre-processing		
Unit-II	MODEL EVALUATION AND FEATURE ENGINEERING	(9)
Model Selection - Training Model - Model Representation and Interpretability - Evaluating Performance of a Model - Improving Performance of a Model - Feature Engineering: Feature Transformation - Feature Subset Selection.		
Unit-III	BAYESIAN LEARNING	(9)
Basic Probability Notation- Inference – Independence - Bayes' Rule. Bayesian Learning: Maximum Likelihood and Least Squared error hypothesis-Maximum Likelihood hypotheses for predicting probabilities- Minimum description Length principle -Bayes optimal classifier - Naïve Bayes classifier - Bayesian Belief networks -EM algorithm.		
Unit-IV	PARAMETRIC MACHINE LEARNING	(9)
Logistic Regression: Classification and representation – Cost function – Gradient descent – Advanced optimization – Regularization - Solving the problems on overfitting. Perceptron – Neural Networks – Multi – class Classification - Backpropagation – Non-linearity with activation functions (Tanh, Sigmoid, Relu, PRelu) - Dropout as regularization		
Unit-V	NON PARAMETRIC MACHINE LEARNING	(9)
k- Nearest Neighbors- Decision Trees – Branching – Greedy Algorithm - Multiple Branches – Continuous attributes – Pruning. Random Forests: ensemble learning. Boosting – Adaboost algorithm. Support Vector Machines – Large Margin Intuition – Loss Function - Hinge Loss – SVM Kernels		
Total No of Periods to be Taught		45

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



REFERENCES:

1	Ethem Alpaydin, "Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series)", Third Edition, MIT Press, 2014
2	Tom M. Mitchell, "Machine Learning", India Edition, 1st Edition, McGraw-Hill Education Private Limited, 2013
3	Saikat Dutt, Subramanian Chandramouli and Amit Kumar Das, "Machine Learning", 1st Edition, Pearson Education, 2019

COURSE OUTCOMES:

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

CO1:	Understand about Data Preprocessing, Dimensionality reduction
CO2:	Apply proper model for the given problem and use feature engineering techniques
CO3:	Make use of Probability Technique to solve the given problem
CO4:	Analyze the working model and features of Decision tree
CO5:	Choose and apply appropriate algorithm to learn and classify the data

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	1	1	2	2	2	2	-	-	-	-	-	-	-	-
CO2	1	1	2	2	2	2	-	-	-	-	-	-	-	-
CO3	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO4	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO5	2	1	2	2	2	2	-	-	-	-	-	-	-	-
Avg.	1.6	1	2	2	2	2	-	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622-MCA
-------------------	---------------------------------	----------------------------------	---------

Semester III

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCT2432	INTERNET OF THINGS	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To understand the concepts of IoT and its working models • To know the various IoT protocols • To understand about various IoT Physical devices and Endpoints • To know the security and privacy issues connected with IoT • To apply the concept of Internet of Things in a real world scenario.					

Unit-I	FUNDAMENTALS OF IOT	(9)
Definition and Characteristics of IoT, Sensors, Actuators, Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs, IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Embedded Systems, IoT Levels and Templates, Domain Specific IoTs – Home, City, Environment, Energy, Agriculture and Industry		
Unit-II	IOT PROTOCOLS	(9)
Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Issues with IoT Standardization – Unified Data Standards – Protocols – IEEE802.15.4–BACNet Protocol– Modbus – KNX – Zigbee– Network layer – APS layer – Security		
Unit-III	IOT PHYSICAL DEVICES AND ENDPOINTS	(9)
Introduction to Arduino and Raspberry Pi- Installation, Interfaces (serial, SPI, I2C), Programming – Python program with Raspberry PI with focus on interfacing external gadgets, controlling output, and reading input from pins		
Unit-IV	INTERNET OF THINGS PRIVACY, SECURITY AND GOVERNANCE	(9)
Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities, Security		
Unit-V	APPLICATIONS	(9)
IOT APPLICATIONS - IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications. Study of existing IoT platforms /middleware, IoT- A, Hydra etc.		
Total No of Periods to be Taught		45

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



REFERENCES:

1	Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2	Olivier Hersent, David Boswarthick, Omar Elloumi , “The Internet of Things – Key applications and Protocols”, Wiley, 2012.
3	David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton, Jerome Henry, “IoT Fundamentals, Networking Technologies, Protocols, and Use cases for the Internet of Things”, Cisco Press, First Edition, 2017.
4	Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), “Architecting the Internet of Things”, Springer, 2011
5	Raspberry Pi Cookbook, Software and Hardware Problems and solutions, Simon Monk, O'Reilly (SPD), 2016, ISBN 7989352133895
6	Peter Friess, 'Internet of Things – From Research and Innovation to Market Deployment', River Publishers, 2014

COURSE OUTCOMES:

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

CO1:	Define the infrastructure for supporting IoT deployments
CO2:	Understand the usage of IoT protocols for communication between various IoT devices
CO3:	Design portable IoT using Arduino/Raspberry Pi /equivalent boards
CO4:	Understand the basic concepts of security and governance as applied to IoT
CO5:	Analyze and illustrate applications of IoT in real time scenarios

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO2	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO3	2	1	3	2	2	3	-	-	-	-	-	-	-	-
CO4	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO5	2	1	3	2	2	3	-	-	-	-	-	-	-	-
Avg.	2	1	2.4	2	2	2.4	-	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622-MCA
-------------------	---------------------------------	----------------------------------	---------

Semester III, Elective II

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCE2415	DIGITAL MARKETING	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To understand the difference between Traditional Marketing and digital Marketing • To understand and analyze the search engine functions • To develop a deep knowledge about the Digital marketing platforms and the theoretical aspects of creating a website. • To analyze inbuilt tools for digital Marketing.					

Unit-I	INTRODUCTION TO DIGITAL MARKETING	(9)
What is Digital Marketing- Need of Digital Marketing-Digital Marketing Platforms – Understanding digital marketing process- Difference between Traditional Marketing and digital Marketing- tools of Digital marketing - Advantage of Digital Marketing-Digital Marketing Manager Role and functions - How we use both Digital & Traditional Marketing		
Unit-II	WEBSITE & SEARCH ENGINE	(9)
Website –Hosting and Domain– Different platforms for website creation- Introduction to SERP-What are search engines- How search engines work- Major functions of a search engine- What are keywords -Different types of keywords- Google keyword planner tool.		
Unit-III	MISC TOOLS- GOOGLE WEBMASTER TOOLS	(9)
Site Map Creators- Browser-based analysis tools-Page Rank tools-pinging & indexing tools- Dead links identification tools- Open site explorer Domain information/ whois tools- Quick sprout.		
Unit-IV	LEAD MANAGEMENT & DIGITAL MARKETING	(9)
Web to lead forms- Web to case forms- Lead generation techniques- Leads are everywhere- Social media and lead gen Inbuilt tools for Digital Marketing-Ip Tracker- CPC reduction (in case of paid ads) Group posting on Social Media platforms .		
Unit-V	TRENDING DIGITAL MARKETING SKILLS	(9)
Search Engine Optimization(SEO)-Search Engine Marketing(SEM).-Social Media Marketing/Optimization- Email Marketing. Website :Product Marketing- Content Writing. Marketing the created content online Copywriting- Blogging- Local Marketing. Google Ad Words - Campaign Management- PPC Advertising- Affiliate Marketing. Mobile and SMS Marketing- Marketing Automation-Web Analytics- Growth Hacking		
Total No of Periods to be Taught		45

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



REFERENCES:

1	Chaffey, D. (2019). Digital marketing strategy, Implementation and Practice. Pearson .
2	Chaffey, D., & Smith, P. R. (2017). Digital marketing excellence: planning, optimizing and integrating online marketing. Taylor & Francis. .
3	Kaufman, I., & Horton, C. (2014). Digital marketing: Integrating strategy and tactics with values, a guidebook for executives, managers, and students. Routledge.
4	Royle, J., & Laing, A. (2014). The digital marketing skills gap: Developing a Digital Marketer Model for the communication industries. International Journal of Information Management, 34(2), 65-73.
5	Dodson, I. (2016). The art of digital marketing: the definitive guide to creating strategic, targeted, and measurable online campaigns. John Wiley & Sons.

COURSE OUTCOMES:

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

CO1:	To gain insight on the concept of digital marketing and the role of a digital manager
CO2:	To understand and administer the website and the search engines.
CO3:	To understand how to use MISC and Google Webmaster tools.
CO4:	To understand the concepts of lead management and digital marketing.
CO5:	To gain knowledge on the latest digital marketing trends.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO2	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO3	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO4	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO5	2	1	2	2	2	2	-	-	-	-	-	-	-	-
Avg.	2	1	2	2	2	2	-	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom's Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622-MCA
-------------------	---------------------------------	----------------------------------	---------

Semester III, Elective III

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCE2420	DATA MINING AND DATA WAREHOUSING TECHNIQUES	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To characterize the kinds of patterns that can be discovered by association rule mining. • To implement classification techniques on large datasets. • To analyse various clustering techniques in real world applications. • To get exposed to the concepts of data warehousing architecture and implementation					

Unit-I	DATA MINING & DATA PREPROCESSING	(9)
Data Mining– Concepts, DBMS vs Data mining, kinds of Data, Applications, Issues and Challenges–Need for Data Pre processing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.		
Unit-II	ASSOCIATION RULE MINING AND CLASSIFICATION	(9)
Introduction to Association rules – Association Rule Mining – Mining Frequent Item sets with and without Candidate Generation –Classification versus Prediction – Data Preparation for Classification and Prediction .		
Unit-III	CLASSIFICATION AND PREDICTION TECHNIQUES	(9)
Classification by Decision Tree – Bayesian Classification – Rule Based Classification – Bayesian Belief Networks – Classification by Back propagation – Support Vector Machines – K-Nearest Neighbor Algorithm – Linear Regression, Nonlinear Regression .		
Unit-IV	CLUSTERING TECHNIQUES	(9)
Cluster Analysis – Partitioning Methods: k-Means and k- Medoids – Hierarchical Methods: Agglomerative and Divisive –Model Based Clustering Methods: Fuzzy clusters and Expectation- Maximization Algorithm.		
Unit-V	DATA WAREHOUSE	(9)
Need for Data Warehouse – Database versus Data Warehouse – Multidimensional Data Model – Schemas for Multidimensional Databases – OLAP operations – OLAP versus OLTP – Data Warehouse Architecture – Extraction, Transformation and Loading (ETL)		
Total No of Periods to be Taught		45

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



REFERENCES:

1	Jiawei Han, Micheline Kamber, "Data Mining Concepts and Techniques", Third Edition, Elsevier, 2012.
2	K. P. Soman, Shyam Diwakar, V. Ajay, "Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2009.
3	Data Warehousing, Data Mining, & OLAP – Alex Berson, Stephen Smith, TMHill, 2008. 2010 .
4	David L. Olson Dursun Delen, "Advanced Data Mining Techniques," Springer-Verlag Berlin Heidelberg, 2008 Edition, Addison-Wesley, 2001.
5	G. K. Gupta, "Introduction to Data Min Data Mining with Case Studies", Eastern Economy Edition, Prentice Hall of India, Third Edition, 2014 .

COURSE OUTCOMES:

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

CO1:	Identify data mining techniques in building intelligent model.
CO2:	Illustrate association mining techniques on transactional databases.
CO3:	Apply classification and clustering techniques in real world applications.
CO4:	Evaluate various mining techniques on complex data objects.
CO5:	Design, create and maintain data ware houses.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	2	2	2	2	-	-	-	-	-	-	-	-
CO2	2	2	2	2	2	2	-	-	-	-	-	-	-	-
CO3	2	2	2	2	2	2	-	-	-	-	-	-	-	-
CO4	3	3	3	3	3	3	-	-	-	-	-	-	-	-
CO5	3	3	3	3	3	3	-	-	-	-	-	-	-	-
Avg.	2	2	2	2	2	2	-	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom's Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622 – MCA
-------------------	---------------------------------	----------------------------------	-----------

Semester III, Elective IV

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCE2426	SOFTWARE QUALITY AND TESTING	L	T	P	C	100
		3	0	2	4	
Course Objectives	- To know the behavior of the testing techniques and to design test cases to detect the errors in the software - To get insight into software testing methodologies - To understand standard emerging areas in testing - To learn about the software quality models. - To understand the models and metrics of software quality and reliability					

Unit-I	INTRODUCTION	(9+6)
Basic concepts and Preliminaries – Theory of Program Testing– Unit Testing – Control Flow Testing –Data Flow Testing– System Integration Testing		
Unit-II	SOFTWARE TESTING METHODOLOGY	(9+6)
Software Test Plan–Components of Plan - Types of Technical Reviews - Static and Dynamic Testing- – Software Testing in Spiral Manner - Information Gathering - Test Planning – Test Coverage - Test Evaluation - Acceptance Test – Summarize Testing Results.		
Unit-III	EMERGING SPECIALIZED AREAS IN TESTING	(9+6)
Test Process Assessment – Test Automation Assessment - Test Automation Framework –Agile Testing – Testing Center of Excellence – Onsite/Offshore Model - Modern Software Testing Tools – Software Testing Trends – Methodology to Develop Software Testing Tools.		
Unit-IV	SOFTWARE QUALITY MODELS	(9+6)
Software quality –Verification versus Validation– Components of Quality Assurance – SQA Plan – Quality Standards – CMM – PCMM – CMMI – Malcolm Baldrige National Quality Award		
Unit-V	QUALITY THROUGH CONTINUOUS IMPROVEMENT PROCESS	(9+6)
Role of Statistical Methods in Software Quality – Transforming Requirements into Test Cases – Deming’s Quality Principles – Continuous Improvement through Plan Do Check Act (PDCA)		
Total No of Periods to be Taught		45

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



REFERENCES:

1	William E.Lewis, “Software Testing and Continuous Quality Improvement”, 3 rd Edition, Auerbach Publications, 2011
2	KshirasagarNaik and PriyadarshiTripathy, “Software Testing and Quality Assurance Theory and Practice”, 2 nd Edition, John Wiley & Sons Publication, 2011
3	Ron Patton, “Software Testing”, 2 nd Edition, Pearson Education, 2007
4	Glenford J. Myers, Tom Badgett, Corey Sandler, “The Art of Software Testing”, 3 rd Edition, John Wiley & Sons Publication, 2012.
5	Paul C. Jorgensen, “Software Testing, A Craftman’s Approach”, CRC Press Taylor & Francis Group, Fourth Edition, 2018
6	William E.Lewis, “Software Testing and Continuous Quality Improvement”, 3 rd Edition, Auerbach Publications, 2011

List of Exercises/Experiments

1. Perform data flow testing for any C program to verify the def-use variables (Ex: largest of two numbers)	
2. Using Selenium IDE, Write a test suite containing minimum 4 test cases for any simple C program (Ex: To check Adam Number)	
3. Write and test a program to update 10 student records into tables into Excel file. (Selenium)	
4. Write and test a program to select the number of students who have scored more than 60 in any one subject (or all subjects). (Selenium)	
5. Write and test a program to login to a specific web page. (Selenium)	
6. Write and test a program to provide a total number of objects present / available on the page. (Selenium)	
7. Write and test a program to get the number of list items in a list / combo box. (Selenium)	
8. Identify system specification and design test cases to test any application using any one of a testing tool (Selenium/Bugzilla/Test Director)	
9. Automate the test cases of the above system using any test automation tool (Bugzilla /QA Complete)	
10. Design test cases for web pages to test any web sites (Web Performance Analyzer/Open STA)	
Total No of Periods to be Taught	30

COURSE OUTCOMES:

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

CO1:	Choose the software testing techniques to cater to the need of the project
CO2:	Identify the components of software quality assurance systems
CO3:	Apply various software testing strategies
CO4:	Design and develop software quality models
CO5:	Make use of statistical methods in software quality.

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



REFERENCES:

1	William E.Lewis, “Software Testing and Continuous Quality Improvement”, 3 rd Edition, Auerbach Publications, 2011
2	KshirasagarNaik and PriyadarshiTripathy, “Software Testing and Quality Assurance Theory and Practice”, 2 nd Edition, John Wiley & Sons Publication, 2011
3	Ron Patton, “Software Testing”, 2 nd Edition, Pearson Education, 2007
4	Glenford J. Myers, Tom Badgett, Corey Sandler, “The Art of Software Testing”, 3rd Edition, John Wiley & Sons Publication, 2012.
5	Paul C. Jorgensen, “Software Testing, A Craftman’s Approach”, CRC Press Taylor & Francis Group, Fourth Edition, 2018

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.No	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	Desktop systems	35
2	Compiler/IDE	35
3	Automation Tool (Selenium IDE)	35
4	IDE for Automation Eclipse IDE, Visual Studio Code	35

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO2	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO3	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO4	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO5	2	1	2	2	2	2	-	-	-	-	-	-	-	-
Avg.	2	1	2	2	2	2								

1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom’s Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622-MCA
-------------------	---------------------------------	----------------------------------	----------------

Semester III, Open Elective

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
POE2404	BIG DATA ANALYTICS	L	T	P	C	100
		3	0	0	3	
Course Objectives	- To understand the basics of big data analytics - To understand the search methods and visualization - To learn mining data streams - To learn frame works - To gain knowledge on R language					

Unit-I	INTRODUCTION TO BIG DATA	(9)
Introduction to Big Data Platform – Challenges of Conventional Systems - Intelligent data analysis –Nature of Data - Analytic Processes and Tools - Analysis Vs Reporting - Modern Data Analytic Tools- Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error.		
Unit-II	SEARCH METHODS AND VISUALIZATION	(9)
Search by simulated Annealing – Stochastic, Adaptive search by Evaluation – Evaluation Strategies –Genetic Algorithm – Genetic Programming – Visualization – Classification of Visual Data Analysis Techniques – Data Types – Visualization Techniques – Interaction techniques – Specific Visual data analysis Techniques		
Unit-III	MINING DATA STREAMS	(9)
Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions		
Unit-IV	FRAMEWORKS	(9)
MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed File Systems – Case Study- Preventing Private Information Inference Attacks on Social Networks- Grand Challenge: Applying Regulatory Science and Big Data to Improve Medical Device Innovation		
Unit-V	R LANGUAGE	(9)
Overview, Programming structures: Control statements -Operators -Functions -Environment and scope issues - Recursion -Replacement functions, R data structures: Vectors -Matrices and arrays - Lists -Data frames -Classes, Input/output, String manipulations		
Total No of Periods to be Taught		45

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



REFERENCES:

1	Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007.
2	Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Cambridge University Press, 3rd edition 2020.
3	Norman Matloff, The Art of R Programming: A Tour of Statistical Software Design, No Starch Press, USA, 2011.
4	Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics, John Wiley & sons, 2012.
5	Glenn J. Myatt, Making Sense of Data, John Wiley & Sons, 2007.

COURSE OUTCOMES:

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

CO1:	To understand the basics of big data analytics
CO2:	Ability to use Hadoop, Map Reduce Framework.
CO3:	Ability to identify the areas for applying big data analytics for increasing the business outcome.
CO4:	To gain knowledge on R language
CO5:	Contextually integrate and correlate large amounts of information to gain faster in sights.


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622-MCA
------------	---------------------------------	-----------------------	---------

Semester III

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCL2431	MACHINE LEARNING LABORATORY	L	T	P	C	100
		0	0	4	2	
Course Objectives	• To understand about data cleaning and data preprocessing • To familiarize with the Supervised Learning algorithms and implement them in practical situations. • To familiarize with unsupervised Learning algorithms and carry on the implementation part. • To involve the students to practice ML algorithms and techniques. • Learn to use algorithms for real time data sets.					

List of Exercises/Experiments	
1. Demonstrate how do you structure data in Machine Learning	
2. Implement data pre-processing techniques on real time dataset	
3. Implement Feature subset selection techniques	
4. Demonstrate how will you measure the performance of a machine learning model	
5. Write a program to implement the naïve Bayesian classifier for a sample training data set. Compute the accuracy of the classifier, considering few test data sets.	
6. Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using the standard Heart Disease Data Set.	
7. Apply EM algorithm to cluster a set of data stored in a .CSV file	
8. Write a program to implement k-Nearest Neighbour algorithm to classify the data set.	
9. Apply the technique of pruning for a noisy data monk2 data, and derive the decision tree from this data. Analyze the results by comparing the structure of pruned and unpruned tree.	
10. Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets	
11. Implement Support Vector Classification for linear kernels.	
12. Implement Logistic Regression to classify problems such as spam detection. Diabetes predictions and so on.	
Total No of Periods to be Taught	60

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



COURSE OUTCOMES:

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

CO1:	Apply data pre-processing technique and explore the structure of data to prepare for predictive modeling
CO2:	Understand how to select and train a model and measure the performance
CO3:	Apply feature selection techniques in Machine Learning
CO4:	Construct Bayesian Network for appropriate problem
CO5:	Learn about parametric and non-parametric machine Learning algorithms and implement to practical situations

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	Computer System	35
2	Python or any ML tools like R	

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO2	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO3	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO4	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO5	2	1	2	2	2	2	-	-	-	-	-	-	-	-
Avg.	2	1	2	2	2	2	-	-	-	-	-	-	-	-
1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy														

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622-MCA
-------------------	---------------------------------	----------------------------------	---------

Semester III

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCL2432	INTERNET OF THINGS LABORATORY	L	T	P	C	100
		0	0	4	2	
Course Objectives	• To design applications to interact with sensors • To design and develop IoT application Arduino/Raspberry pi for real world scenario. • To enable communication between IoT and cloud platforms • To develop applications using Django Framework					

List of Exercises/Experiments	
1. To study various IoT protocols – 6LowPAN, IPv4/IPv6, Wifi, Bluetooth, MQTT.	
2. IoT Application Development Using sensors and actuators (temperature sensor, light sensor, infrared sensor)	
3. To study Raspberry Pi development board and to implement LED blinking applications.	
4. To develop an application to send and receive data with Arduino using HTTP request	
5. To develop an application that measures the room temperature and posts the temperature value on the cloud platform.	
6. To develop an application that measures the moisture of soil and post the sensed data over Google Firebase cloud platform	
7. To develop an application for measuring the distance using ultrasonic sensor and post distance value on Google Cloud IoT platform	
8. Develop a simple application based on sensors	
9. Develop IoT applications using Django Framework and Firebase/ Bluemix platform	
10. Develop a commercial IoT application	
Total No of Periods to be Taught	60

COURSE OUTCOMES:	
On completion of the course, the students will be able to	
CO1:	To understand the various IoT protocols
CO2:	Test and experiment different sensors for application development
CO3:	To develop applications using Arduino/Raspberry Pi/ Equivalent boards
CO4:	To develop applications that would read the sensor data and post it in Cloud
CO5:	Develop IOT applications with different platforms and frameworks

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS		
S.No	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	Computer System	35
2	8051 Daughter Board, Raspberry Pi 3B+ Original	35
3	Arduino Daughter Board	35
4	Humidity + IR Sensor Interface	35
5	Ultrasonic Sensors	35
6	Open source softwares Django Framework	35

Mapping of COs with POs and PSOs														
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO ₃
CO1	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO2	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO3	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO4	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO5	2	1	2	2	2	2	-	-	-	-	-	-	-	-
Avg.	2	1	2	2	2	2	-	-	-	-	-	-	-	-
1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom's Taxonomy														

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



BRIDGE COURSES

Department	MCA	Programme Code & Name	622 – MCA
------------	-----	-----------------------	-----------

Semester I

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCV A101	DATA STRUCTURES AND ALGORITHMS	L	T	P	C	100
		3	0	2	4	
Course Objectives	• Be familiar with basic techniques of algorithm analysis. • Be exposed to the concept of ADTs. • Learn linear data structures-List, Stack and Queue. • Learn nonlinear data structures-Tree and Graphs. • Be exposed to sorting, searching and hashing algorithms					

Unit-I	INTRODUCTION	(9+6)
Introduction - Abstract Data Types (ADT) – Arrays and its representation – Structures – Fundamentals of algorithmic problem solving – Important problem types – Fundamentals of the analysis of algorithm – analysis framework – Asymptotic notations, Properties, Recurrence Relation.		
Unit-II	LINEAR DATA STRUCTURES - STACK, QUEUE	(9+6)
Stack ADT – Operations on Stack - Applications of stack – Infix to postfix conversion – evaluation of expression - Queue ADT – Operations on Queue - Circular Queue - Applications of Queue.		
Unit-III	LINEAR DATA STRUCTURES – LIST	(9+6)
List ADT - Array-based Implementation - Linked list implementation - Singly Linked Lists – Circularly linked lists – Doubly Linked Lists - Applications of linked list – Polynomial Addition.		
Unit-IV	SEARCHING, SORTING AND HASH TECHNIQUES	(9+6)
Searching: Linear search – Binary Search- comparison of linear search and binary search, Sorting algorithms: Insertion sort - Bubble sort – selection sort - Hashing: Hash Functions – Separate Chaining – Open Addressing – Rehashing.		
Unit-V	NON LINEAR DATA STRUCTURES - TREES AND GRAPHS	(9+6)
Trees and its representation – left child right sibling data structures for general trees- Binary Tree – Binary tree traversals – Binary Search Tree - Graphs and its representation - Graph Traversals - Depth-first traversal – breadth-first traversal-Application of graphs.		
Total No of Periods to be Taught		45

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



REFERENCES:

1	Anany Levitin “Introduction to the Design and Analysis of Algorithms” 3 rd Edition, Pearson Education
2	A.K. Sharma, “Data Structures using C”, 2 nd Edition, Pearson Education Asia, 2013
3	E. Horowitz, Anderson-Freed and S.Sahni, “Fundamentals of Data structures in C”, 2 nd Edition, University Press, 2007
4	E.Balagursamy,” Data Structures using C”, Tata McGraw Hill 2015 Reprint
5	Mark Allen Weiss, “Data Structures and Algorithm Analysis in C”, 2nd Edition, Pearson ducation, India, 2016
6	Jean Paul Tremblay and Paul G. Sorensen, “An Introduction to Data Structures with Applications”, 2 nd Edition, Tata McGraw Hill, New Delhi, 2017

List of Exercises/Experiments

1. Develop a program to perform various array operations	
2. Write a program to find running time complexity by considering each statement in the program for a given set of numbers.	
3. Write a program to convert infix to postfix using stack data structure	
4. Develop a program to perform circular queue operations	
5. Perform Polynomial Manipulation using Single Linked List.	
6. Implement the various operations in double linked list.	
7. Write a program to perform binary search	
8. Write a program to sort a given set of numbers and compare among Bubble Sort, Selection Sort and Insertion Sort with respect to computational complexity.	
9. Write a program to delete a node from a given Binary search tree	
10. Write a program to perform Graph Traversals	
Total No of Periods to be Taught	30

COURSE OUTCOMES:

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

CO1:	Analyze algorithms and determines their time complexity.
CO2:	Understand the concepts of data types, data structures and linear structures
CO3:	Apply data structures to solve various problems
CO4:	Apply different Sorting, Searching and Hashing algorithms.
CO5:	Understand non-linear data structures



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



REFERENCES:

1	Anany Levitin “Introduction to the Design and Analysis of Algorithms” 3 rd Edition, Pearson Education
2	A.K. Sharma, “Data Structures using C”, 2 nd Edition, Pearson Education Asia, 2013
3	E. Horowitz, Anderson-Freed and S.Sahni, “Fundamentals of Data structures in C”, 2 nd Edition, University Press, 2007
4	E.Balagursamy,” Data Structures using C”, Tata McGraw Hill 2015 Reprint
5	Mark Allen Weiss, “Data Structures and Algorithm Analysis in C”, 2nd Edition, Pearson Education, India, 2016
6	Jean Paul Tremblay and Paul G. Sorensen, “An Introduction to Data Structures with Applications”, 2 nd Edition, Tata McGraw Hill, New Delhi, 2017.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.No	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	Desktop systems	35
2	C, C++	35

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO2	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO3	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO4	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO5	2	1	2	2	2	2	-	-	-	-	-	-	-	-
Avg.	2	1	2	2	2	2								

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom’s Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	MCA	Programme Code & Name	622 – MCA
------------	-----	-----------------------	-----------

Semester I

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCVA102	PROBLEM SOLVING AND PROGRAMMING IN C	L	T	P	C	100
		3	0	2	4	
Course Objectives	• To understand the basic concepts of problem solving approaches and to develop the algorithms • Apply the techniques of structured (functional) decomposition to break a program into smaller pieces and describe the mechanics of parameter passing. • To design, implements, test, and apply the basic C programming concepts					

Unit-I	INTRODUCTION TO COMPUTER PROBLEM SOLVING	(9)
Introduction – The Problem Solving aspect – Top down design – Implementation of algorithm – Program Verification – The efficiency of algorithms – The analysis of algorithms – Fundamental Algorithms		
Unit-II	PROGRAMMING AND ALGORITHMS	(9)
Programs and Programming – building blocks for simple programs -pseudo code representation – flow charts - Programming Languages - compiler –Interpreter, Loader and Linker - Program execution – Classification of Programming Language - Structured Programming Concept – Illustrated Problems: Algorithm to check whether a given number is Armstrong number or not- Find factorial of a number		
Unit-III	BASICS OF 'C', INPUT / OUTPUT & CONTROL STATEMENTS	(9+10)
Introduction- Identifier – Keywords - Variables – Constants – I/O Statements - Operators - Initialization – Expressions – Expression Evaluation – Lvalues and Rvalues – Type Conversion in C –Formatted input and output functions - Specifying Test Condition for Selection and Iteration- Conditional Execution - and Selection – Iteration and Repetitive Execution- go to Statement – Nested Loops- Continue and break statements.		
Unit-IV	ARRAYS, STRINGS, FUNCTIONS AND POINTERS	(9+10)
Array – One dimensional Character Arrays- Multidimensional Arrays- Arrays of Strings – Two dimensional character array – functions - parameter passing mechanism scope – storage classes – recursion - comparing iteration and recursion- pointers – pointer operators - uses of pointers- arrays and pointers – pointers and strings - pointer indirection pointers to functions - Dynamic memory allocation.		
Unit-V	USER-DEFINED DATATYPES & FILES	(9+10)
Structures – initialization - nested structures – structures and arrays – structures and pointers - union– type def and enumeration types - bit fields - File Management in C – Files and Streams – File handling functions – Sequential access file- Random access file – Command line arguments.		
Total No of Periods to be Taught		45



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



List of Exercises/Experiments	
1. Write programs to get some input , perform some operation and display the output using I/O statements	
2. Write a program to execute some specific statements based on the test condition	
3. Write programs to implement nested loop	
4. Write a program in C to get the largest element of an array using the function.	
5. Display all prime numbers between two intervals using functions.	
6. Reverse a sentence using recursion.	
7. Write a C program to concatenate two strings	
8. Write a C program to Store Student Information in Structure and Display it.	
9. The annual examination is conducted for 10 students for five subjects.	
10. Write a program to read the data from a file and determine the following: Total marks obtained by each student; Topper of the class	
Total No of Periods to be Taught	30

COURSE OUTCOMES:	
On completion of the course, the students will be able to	
CO1:	Able to design a computational solution for a given problem.
CO2:	Able to break a problem into logical modules that can be solved (programmed).
CO3:	Able to transform a problem solution into programs involving programming constructs.
CO4:	To write programs using structures, strings, arrays, pointers and files for solving complex computational problems.
CO5:	Able to introduce modularity using functions and pointers which permit ad hoc runtime polymorphism.

REFERENCES:	
1	Deitel and Deitel, “C How to Program”, Pearson Education. 2013, 7 th Edition
2	Byron S Gottfried, —Programming with C, Schaums Outlines, Second Edition, Tata McGraw-Hill, 2006
3	Brian W. Kernighan and Dennis M. Ritchie, “The C programming Language”, Edition? 2 nd edition 2015, Pearson Education India
4	How to solve it by Computer, R. G. Dromey, Pearson education, Fifth Edition, 2007
5	Kamthane, A.N., “Programming with ANSI and Turbo C”, Pearson Education, Delhi, 3 rd Edition, 2015



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



6	PradipDey, ManasGhosh, —Computer Fundamentals and Programming in C, Second Edition, Oxford University Press, 2013.
---	--

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS		
S.No	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	Desktop systems	35
2	C, C++	35

Mapping of COs with POs and PSOs														
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO2	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO3	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO4	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO5	2	1	2	2	2	2	-	-	-	-	-	-	-	-
Avg.	2	1	2	2	2	2								
1 – Slight, 2 – Moderate, 3 – Substantial , BT – Bloom’s Taxonomy														

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622-MCA
-------------------	---------------------------------	----------------------------------	---------

Semester II

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCVA103	INTRODUCTION TO COMPUTER ORGANIZATION AND OPERATING SYSTEMS	L	T	P	C	100
		3	0	0	3	
Course Objectives	- To learn the basic structure and operations of a computer. - To learn the arithmetic and logic unit and implementation of fixed-point and floating point arithmetic unit. - To understand the memory hierarchies, cache memories and virtual memories and to learn the different ways of communication with I/O devices. - To understand the basic concepts and functions of Operating Systems. - To understand Process and various Scheduling Algorithms of OS					

Unit-I	BASIC STRUCTURE AND ARITHMETIC OPERATIONS	(9)
Functional Units – Basic Operational Concepts – Instructions: Language of the Computer – Operations, Operands – Instruction representation – Logical operations – Decision Making – MIPS Addressing- Arithmetic for Computers		
Unit-II	PROCESSOR AND CONTROL UNIT	(9)
A Basic MIPS implementation – Building a Datapath – Control Implementation Scheme – Pipelining – Pipelined datapath and control – Handling Data Hazards & Control Hazards – Exceptions.		
Unit-III	MEMORY & I/O SYSTEMS	(9)
Memory Hierarchy - Memory technologies – cache memory – measuring and improving cache performance – virtual memory –Accessing I/O Devices – Interrupts – Direct Memory Access – Bus structure –Interface circuits – USB		
Unit-IV	OPERATING SYSTEMS OVERVIEW	(9)
Operating system overview-objectives and functions, Evolution of Operating System- Operating System Structure - System Calls- Processes – Process Concept, Inter-process Communication		
Unit-V	PROCESS MANAGEMENT	(9)
CPU Scheduling – Scheduling criteria, Scheduling algorithms, Multiple-processor scheduling, Threads Overview– The critical-section problem, Semaphores, Classical problems of synchronization, Critical regions		
Total No of Periods to be Taught		45

REFERENCES:

1	David A. Patterson and John L. Hennessy, Computer Organization and Design: The Hardware/Software Interface, Fifth Edition, Morgan Kaufmann / Elsevier
2	Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian, Computer Organization and Embedded Systems, Sixth Edition, Tata McGraw Hill, 2012
3	Abraham Silberschatz, Peter Baer Galvin and Greg Gagne - Operating System Concepts, 9th Edition, John Wiley and Sons Inc., 2012.

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



4	John P. Hayes, Computer Architecture and Organization, Third Edition, Tata McGraw Hill, 2012
5	John L. Hennessey and David A. Patterson, Computer Architecture – A Quantitative Approach, Morgan Kaufmann / Elsevier Publishers, Fifth Edition, 2012.
6	Andrew S. Tanenbaum - Modern Operating Systems, 4th Edition, Pearson Education, 2014.

COURSE OUTCOMES:

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

CO1:	Understand the basics structure of computers, operations and instructions.
CO2:	Design arithmetic and logic unit, control unit.
CO3:	Understand the various memory systems and I/O communication.
CO4:	Understand operating system functions, types, system calls
CO5:	Analyze Process and various scheduling algorithms

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO2	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO3	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO4	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO5	2	1	2	2	2	2	-	-	-	-	-	-	-	-
Avg.	2	1	2	2	2	2	-	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom’s Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622-MCA
-------------------	---------------------------------	----------------------------------	---------

Semester II

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCV A104	DATABASE MANAGEMENT SYSTEMS	L	T	P	C	100
		3	0	2	4	
Course Objectives	• To understand the fundamentals of data models and conceptualize and depict a database system using ER diagram. • To make a study of SQL and relational data base design. • To know about data storage techniques and query processing. • To impart knowledge in transaction processing, concurrency control techniques and recovery procedures.					

Unit-I	INTRODUCTION	(9)
File systems versus Database systems – Data Models – DBMS Architecture – Data Independence – Data Modeling using Entity – Relationship Model –E-R Modeling.		
Unit-II	RELATIONAL MODEL AND QUERY EVALUATION	(9)
Relational Model Concepts – Relational Algebra – SQL – Basic Queries – Complex SQL Queries – Views – Constraints		
Unit-III	DATABASE DESIGN & APPLICATION DEVELOPMENT	(9+10)
Functional Dependencies – Non-loss Decomposition – First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form – Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form.		
Unit-IV	TRANSACTION PROCESSING	(9+10)
Query Processing-Transaction Processing – Properties of Transactions - Serializability – Transaction support in SQL - Locking Techniques –Validation Techniques — Recovery concepts – Shadow paging – Log Based Recovery.		
Unit-V	FILES AND INDEXING	(9+10)
File operations – Hashing Techniques – Indexing – Single level and Multi-level Indexes – B+ tree – Static Hashing		
Total No of Periods to be Taught		45

REFERENCES:

1	Abraham Silberschatz, Henry F.Korth and S.Sundarshan “Database System Concepts”, Seventh Edition, McGraw Hill, 2017.
2	Ramez Elmasri and Shamkant Navathe, “Fundamentals of Database Systems”, Seventh Edition, Pearson Education Delhi, 2017
3	RaghuRamakrishnan, —Database Management Systems, Fourth Edition, McGrawHill College Publications, 2015

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



4	Lee Chao, “Database Development and Management”, Auerbach Publications, 1st edition, 2010
5	Carlos Coronel, Peter Rob, and Stephen Morris, “Database Principles Fundamentals of Design, Implementation, and Management –10th Edition”, Course Technology, Cengage Learning, 2013
6	C.J. Date, “An Introduction to Database Systems”, Eighth Edition, Pearson Education Delhi, 2003

List of Exercises/Experiments	
1. Data Manipulation Commands for inserting, deleting, updating and retrieving in Tables	
2. Transaction Control Language Commands like Commit, Rollback and Save Point	
3. Illustrate the statements to create index and drop index	
4. Perform database querying using simple query, nested query, subquery and join operations	
5. Create a PL/SQL block to implement implicit and explicit cursors	
6. Create a PL/SQL block to implement procedures and functions	
7. Create a PL/SQL block to execute triggers	
8. Execute a procedure which handles exception using PL/SQL	
9. Create a embedded PL/SQL block to connect with any host language like ‘C’	
Total No of Periods to be Taught	30

COURSE OUTCOMES:	
On completion of the course, the students will be able to	
CO1:	Understand the basic concepts of the database and data models.
CO2:	Design a database using ER diagrams and map ER into Relations and normalize the relations
CO3:	Design a database using ER diagrams and map ER into Relations and normalize the relations
CO4:	Develop a simple database applications using normalization
CO5:	Acquire the knowledge about different special purpose databases and to critique how they differ from traditional database systems.

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO2	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO3	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO4	3	1	3	3	2	3	-	-	-	-	-	-	-	-
CO5	3	1	3	3	2	3	-	-	-	-	-	-	-	-
Avg.	2.4	1	2.4	2.4	2	2.4	-	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 – Substantial, BT – Bloom's Taxonomy

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.NO	DESCRIPTION OF EQUIPMENT	REQUIRED NUMBERS
1	Computer System	35
2	Oracle Database	
3	C Compiler	


CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622-MCA
-------------------	---------------------------------	----------------------------------	---------

Semester III

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMcVA105	MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To introduce Mathematical Logic and their rules for validating arguments and programmes. • To introduce counting principles for solving combinatorial problems. • To give exposure to Graph models and their utility in connectivity problems. • To introduce abstract notion of Algebraic structures for studying cryptographic and its related areas. • To introduce Boolean algebra as a special algebraic structure for understanding logical circuit problems.					

Unit-I	LOGIC AND PROOFS	(9)
Propositional Logic – Propositional Equivalences – Predicates and Quantifiers – Nested Quantifiers – Rules of Inference – Introduction to Proofs – Proof Methods and Strategy		
Unit-II	COMBINATORICS	(9)
Mathematical Induction – Strong Induction and Well Ordering – The Basics of Counting - The Pigeonhole Principle – Permutations and Combinations – Recurrence Relations Solving Linear Recurrence Relations Using Generating Functions – Inclusion – Exclusion – Principle and Its Applications		
Unit-III	GRAPHS	(9)
Graphs and Graph Models – Graph Terminology and Special Types of Graphs – Matrix Representation of Graphs and Graph Isomorphism – Connectivity – Euler and Hamilton Paths		
Unit-IV	ALGEBRAIC STRUCTURES	(9)
Groups – Subgroups – Homomorphisms – Normal Subgroup and Coset – Lagrange's Theorem – Definitions and Examples of Rings and Fields.		
Unit-V	LATTICES AND BOOLEAN ALGEBRA	(9)
Partial Ordering – Posets – Lattices as Posets – Properties of Lattices – Lattices as Algebraic Systems – Sub Lattices – Direct Product And Homomorphism – Some Special Lattices – Boolean Algebra		
Total No of Periods to be Taught		45

REFERENCES:

1	Kenneth H.Rosen, “Discrete Mathematics and its Applications”, Tata McGraw Hill Pub. Co.Ltd., Seventh Edition, Special Indian Edition, New Delhi, 2011.
2	Tremblay J.P. and Manohar R, “Discrete Mathematical Structures with Applications to Computer Science”, Tata McGraw Hill Pub. Co. Ltd, 30th Reprint, New Delhi, 2011.
3	Ralph. P. Grimaldi, “Discrete and Combinatorial Mathematics: An Applied Introduction”, Pearson Education, 3rd Edition, New Delhi, 2014.

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



4	ThomasKoshy, “Discrete Mathematics with Applications”, 2nd Edition, Elsevier Publications, Boston, 2006.
5	SeymourLipschutz and Mark Lipson,”Discrete Mathematics”, Schaum’s Outlines, Tata McGraw Hill Pub. Co. Ltd., Third Edition, New Delhi, 2013
6	Kenneth H.Rosen, “Discrete Mathematics and its Applications”, Tata McGraw Hill Pub. Co.Ltd., Seventh Edition, Special Indian Edition, New Delhi, 2011.

COURSE OUTCOMES:

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

CO1:	Apply Mathematical Logic to validate logical arguments and programmes.
CO2:	Apply combinatorial counting principles to solve application problems.
CO3:	Apply graph model and graph techniques for solving network other connectivity related
CO4:	Apply algebraic ideas in developing cryptograph techniques for solving network security problems.
CO5:	Apply Boolean laws in developing and simplifying logical circuits.

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO2	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO3	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO4	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO5	2	1	2	2	2	2	-	-	-	-	-	-	-	-
Avg.	2	1	2	2	2	2	-	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom’s Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai
Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



Department	Master of Computer Applications	Programme Code & Name	622-MCA
-------------------	---------------------------------	----------------------------------	---------

Semester III

Course Code	Course Name	Hours/Week			Credit	Maximum Marks
PMCV A106	BASICS OF COMPUTER NETWORKS	L	T	P	C	100
		3	0	0	3	
Course Objectives	• To understand networking concepts and basic communication model • To understand network architectures and components required for data communication. • To analyze the function and design strategy of physical, data link, network layer and transport layer • To acquire basic knowledge of various application protocol for internet security issues and services.					

Unit-I	NETWORK FUNDAMENTALS	(9)
Uses of Networks – Categories of Networks -Communication model –Data transmission concepts and terminology – Protocol architecture – Protocols – OSI – TCP/IP – LAN Topology - Transmission media		
Unit-II	DATA LINK LAYER	(9)
Data link control - Flow Control – Error Detection and Error Correction - MAC – Ethernet, Token ring, Wireless LAN MAC – Blue Tooth – Bridges		
Unit-III	NETWORK LAYER	(9)
Network layer – Switching concepts – Circuit switching – Packet switching –IP — Datagrams —IP addresses-IPV6– ICMP – Routing Protocols – Distance Vector – Link State- BGP		
Unit-IV	TRANSPORT LAYER	(9)
Transport layer –service –Connection establishment – Flow control – Transmission control protocol – Congestion control and avoidance – User datagram protocol		
Unit-V	APPLICATIONS AND SECURITY	(9)
Applications - DNS- SMTP – WWW –SNMP- Security –threats and services - DES- RSA		
Total No of Periods to be Taught		45

REFERENCES:

1	Larry L. Peterson & Bruce S. Davie, “Computer Networks – A systems Approach”, Fifth Edition, Morgan Kaufmann, 2012.
2	James F. Kurose, Keith W. Ross, “Computer Networking: A Top-down Approach, Pearson Education, Limited, sixth edition, 2012.
3	Andrew S. Tannenbaum, David J. Wetherall, “Computer Networks” Fifth Edition, Pearson Education 2011.
4	Forouzan, “Data Communication and Networking”, Fifth Edition, TMH 2012.

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.



THE KAVERY ENGINEERING COLLEGE

An Autonomous institution approved by AICTE, New Delhi, Affiliated to Anna university Chennai

Accredited by NAAC with A+ grade & Recognised by UGC under section 2f & 12B

Mecheri, Salem Dt-636 453, Tamilnadu



5	William Stallings, —Data and Computer Communications, Tenth Edition, Pearson Education, 2013.
6	Larry L. Peterson & Bruce S. Davie, “Computer Networks – A systems Approach”, Fifth Edition, Morgan Kaufmann, 2012.

COURSE OUTCOMES:

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

CO1:	Able to trace the flow of information from one node to another node in the network
CO2:	Able to Identify the components required to build different types of networks
CO3:	Able to understand the functionalities needed for data communication into layers
CO4:	Able to choose the required functionality at each layer for given application
CO5:	Able to understand the working principles of various application protocols and fundamentals of security issues and services available

Mapping of COs with POs and PSOs

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO2	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO3	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO4	2	1	2	2	2	2	-	-	-	-	-	-	-	-
CO5	2	1	2	2	2	2	-	-	-	-	-	-	-	-
Avg.	2	1	2	2	2	2	-	-	-	-	-	-	-	-

1 – Slight, 2 – Moderate, 3 –Substantial , BT – Bloom’s Taxonomy

CHAIRMAN - BOARD OF STUDIES
The Kavery Engineering College,
(Autonomous)
Mecheri, Salem - 636 453.