P.G. DEPARTMENT OF COMPUTER SCIENCE (SF)

Nallamuthu Gounder Mahalingam College

(Autonomous)

(An ISO 9001:2008 Certified Institution)

Re-Accredited with 'A' Grade by NAAC

Pollachi-642001

SYLLABUS

M. Sc. COMPUTER SCIENCE (SF)

BATCH 2017-2019

Scheme of Examination

Part	Subject Code	Title of the Paper	Duration in Hours per week	Examination				Credits
				Hours	CIA	ESE	Total	
I SEMESTER								
III	17PCS101	Object Oriented Software Engineering	5	3	25	75	100	5
	17PCS102	Design and Analysis of Computer Algorithms	5	3	25	75	100	4
	17PCS103	Information Security	5	3	25	75	100	4
	17PCS1E1	Elective-I Data Mining and Warehousing	5	3	25	75	100	5
	17PCS104	Programming Lab - I: Unified Modeling Language	5	3	40	60	100	4
	17PCS105	Programming Lab –II: Design and Analysis of Computer Algorithms	5	3	40	60	100	4
II SEMESTER								
III	17PCS206	Open Source and Computing Tools	4	3	25	75	100	4
	17PCS207	Advanced Networks	4	3	25	75	100	5
	17PCS208	Computing Technologies	4	3	25	75	100	4
	17PCS2E1	Elective – II : Android Programming	5	3	25	75	100	5
IV	17PCS2N1/ 17PCS2N2	Non Major Elective: Multimedia Packages Lab /Web Designing Lab	1	3	-	100	100	2
III	17PCS209	Programming Lab -III : Open Source and Computing Tools	5	3	40	60	100	4
	17PCS210	Programming Lab-IV : Networks	5	3	40	60	100	4

III SEMESTER								
Part	**Subject Code**	**Title of the paper**	**Duration in Hrs per week**	**Examination**				**Credits**
				Hours	**CIA**	**ESE**	**Total**	
III	17PCS311	J2EE Technologies	4	3	25	75	100	4
	17PCS312	Digital Image Processing	5	3	25	75	100	5
	17PCS313	Big Data Analytics	5	3	25	75	100	4
	17PCS3E1	Elective-III: Enterprise Resource planning	5	3	25	75	100	5
	17PCS314	Programming Lab-V : J2EE Technologies	5	3	40	60	100	4
	17PCS315	Programming Lab-VI: Digital Image Processing using MATLAB	5	3	40	60	100	4
	17PCS316	Pilot Project-I	2	-	50	50	100	2
IV SEMESTER								
III	17PCS417	Industrial Project Work and Viva voce (Individual)	-	-	-	-	200	8
TOTAL MARKS							**2200**	**90**

Bloom's Taxonomy Based Assessment Pattern

K1-Remember; **K2**- Understanding; **K3**- Apply; **K4**-Analyze; **K5**- Evaluate

1. Theory: 75 Marks

(i)Test- I & II and ESE:

Knowledge Level	Section	Marks	Description	Total
K1	A(Answer all)	10x01=10	MCQ/Define	75
K2	B (Either Or pattern)	05x05=25	Short Answers	
K3& K4	C (Answer 4 out of 6)	04x10=40	Descriptive/ Detailed	

2. Practical Examinations:

Knowledge Leve	Section	Marks	Total
K3	Practical & Record work	60	100
K4		40	
K5			

Note:

1. Question paper pattern for Non-Major Elective(NME) Practical Paper (Maximum Marks: 100 Marks)
   Two questions from Computer Science Practical - 80 marks
   Marks for Record - 20 marks

Components of Continuous Assessment

Components		Calculation	CIA Total
Test 1	75	$\frac{75+75+25}{7}$	25
Test 2	75		
Assignment/Seminar	25		

Programme Outcomes

PO1. Develop core competence in computer science and prepare the students to take up a career in the IT industry as well as in research and development.

PO2. Ability to inculcate various thrust areas of computer science with sound knowledge of theory and hands-on practical skills.

Programme Specific Outcomes

PSO1: Ability to design, implement and evaluate a computer based systems, process, component or program to meet desired needs.

PSO2: Ability to analyze advantages and disadvantages of different computer science methods within professionally and academically complex areas to compete with new variants of acquired methods.

PSO3: Ability to employ in industry, government or entrepreneurial endeavors to demonstrate professional advancement through significant technical achievements and expanded leadership responsibilities.

PSO4: To provide foundation for research into the theory and practice of programming and design of computer based systems.

PSO5: To present knowledge, experience, reasoning methods and design and implementation techniques that are robust and forward looking.

SEMESTER I

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS101	**Title**	**Batch :**	2017-2019
		Object Oriented Software Engineering	**Semester**	I
Hrs/Week:	5		**Credits:**	05

Course Objective

On successful completion of the course the students should understand the concept of object oriented analysis and design with new paradigm and web engineering components and models.

Course Outcomes (CO)

K1	CO1	To recollect the fundamental principles underlying Object-Oriented software design
K2	CO2	To understand design and coding methodologies, including Object-Oriented Design, Design Patterns, Refactoring, and UML
K3	CO3	To implement web engineering methodologies for Web application development
K4	CO4	To analyze different Object-oriented software methodologies

CONTENTS	**Hours**
UNIT I **Object Oriented Systems Development Life Cycle:** Introduction – The software development process – building high-quality software. **Object Oriented Methodologies:** Introduction: Toward Unification – Too many methodologies – Survey of some of the Object Oriented Methodologies – Rumbaugh Object Modeling Technique – The Booch Methodology – The Jacobson Methodologies	**13**
UNIT II **UML Diagrams:** Class diagrams – Object diagrams – Components – Use Cases – Activity Diagrams – State diagrams – Deployment – Collaborations – Deployment. **Note: Concepts with examples only.**	**13**
Unit III **The Software Process:** A generic view of process – Prescriptive models- The waterfall model-Incremental process model-Evolutionary process models-Specialized process model- Unified process-An agile view of process- Agile- Agile process- Agile process models.	**13**
UNIT IV **Analysis Model**: Requirement analysis-Analysis modeling approaches- Data modeling concepts- Object oriented analysis- Scenario based modeling- Flow oriented modeling- Class based modeling- Creating behavioral model. **Design Engineering:** *Design within the context of software engineering*- Design process and design quality- Design concepts- Design model- Pattern based software design.	**13**
UNIT V **Web Engineering Components And Models:** Web Engineering – Framework- Components-Modeling Analysis – Modeling for Web Applications: Content Model- Interaction Model-Function Model- Configuration Model-Case Studies.	**13**
Total Hours	**65**

**Italicized* texts are for self study

Power point Presentations, Seminar , Assignment, Activity, Case study

Text Books

1. Grady Booch , 2007 , "Object Oriented Analysis and Design", 3rd edition, Pearson (Unit I)
2. Grady Booch, James Raumbaugh and Ivar Jacobson, 2008, "The Unified Modeling Language User Guide" , 2nd Edition, Pearson (Unit II)
3. Roger S. Pressman , 1997, "Software Engineering", 6th Edition, McGraw-Hill (Unit III, IV)

4. Gerti Kappel, Brigit Proll, Siegfried Reich, Werner Retschitzegger, 2006, "Web Engineering", John Wiley &Sons Ltd., (Unit V)

Reference Books

1. Bernd Bruegge, Allen H. Dutoit, 2004, "Object Oriented Software Engineering using UML, Patterns and Java", 2nd Edition, Pearson
2. Craig Larman, 2002 , "Applying UML and Patterns", 2nd Edition, Pearson

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	M	H	S
CO2	S	M	H	S	H
CO3	H	S	H	H	M
CO4	M	L	H	H	S

S: Strong H: High M: Medium L: Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	Name with Signature	CDC	COE
Name:R. Nandhakumar Signature:	Name: Dr.M. Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS102	**Title**	**Batch :**	2017-2019
		Design and Analysis of Computer Algorithms	**Semester**	I
Hrs/Week:	5		**Credits:**	04

Course Objective

On successful completion of the course the students should understand the various design and analysis of various data structure algorithms.

Course Outcomes (CO)

K1	CO1	To remember worst case running times of algorithms using asymptotic analysis
K2	CO2	To understand divide-and-conquer paradigm, dynamic-programming paradigm, greedy paradigm and branch and bound strategies and apply them for the appropriate problems
K3	CO3	To deploy different data structures
K4	CO4	To analyze major graph algorithms and to employ graphs to model engineering problems

CONTENTS	**Hours**
UNIT I **Introduction:** algorithm definition and specification – performance analysis –Elementary Data structures:- *stacks and queues* – *trees* – dictionaries – priority queues – sets and disjoint set union – graphs – Basic traversal and search techniques – Techniques for Binary Tree – Techniques for Graphs: Breadth First Search and Traversal, Depth First Search and Traversal.	**13**
UNIT II **Divide – and – conquer:** - General method – binary search – merge sort – quick sort –The Greedy method: - General method – knapsack problem – minimum cost spanning tree –single source shortest path.	**13**
UNIT III **Dynamic Programming:** General method – multistage graphs – all pair shortest path –optimal binary search trees – 0/1 Knapsack – *traveling salesman problem* – flow shop scheduling.	**13**
UNIT IV **Backtracking:** General method – 8-Queens problem – sum of subsets – graph coloring – Hamiltonian cycles – knapsack problem.	**13**
UNIT V **Branch and bound:** The method – Least Cost (LC) Search – The 15 puzzle: An Example – Control abstractions for LC Search – Bounding – FIFO Branch and Bound – LC Branch and Bound – 0/1 Knapsack problem – LC Branch and Bound solution – FIFO Branch and Bound solution – Traveling salesperson.	**13**
Total Hours	**65**

**Italicized* texts are for self study

Power point Presentations, Seminar , Assignment, Brain storming

Text Books

1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, 2008, "Computer Algorithms", 2nd Edition, Galgotia Publications

Reference Books

1. Ellis Horrowitz, Sartaj Sahni, 2015, "Fundamentals of data structures", Reprinted Edition, Galgotia Publications
2. Alfred V.Aho, John E.Hopcroft & Jeffery D Ullman, 2009 , "Data structures and Algorithms", Reprinted Edition, PHI learning pvt Ltd
3. Adam Drozdek, 2012, "Data Structures and Algorithms in C++", 4th Edition, Vikas publishing house, NewDelhi

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	H	H
CO2	H	M	M	S	S
CO3	S	H	S	M	M
CO4	M	S	M	H	M

S: Strong H: High M: Medium L: Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: N. Arul Kumar Signature:	Name: Dr.M. Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS103	**Title**	**Batch :**	2017-2019
		Information Security	**Semester**	I
Hrs/Week:	5		**Credits:**	04

Course Objective

On successful completion of the course the students should understand the Technology Infrastructure, Electronic Commerce Software and Business Strategies and understand the fundamentals of security and how it attacks.

Course Outcomes (CO)

K1	CO1	To recollect the role of the major types of information systems in a business environment and their relationship to each other
K2	CO2	To deduce the impact of the Internet and Internet technology on business electronic commerce and electronic business
K3	CO3	To deploy an understanding of E-adverting, E-supply chain management and E-strategies
K4	CO4	To evaluate the understanding of security measures in network and web

CONTENTS	**Hours**
UNIT I **Introduction to Electronic Commerce:** Electronic Commerce– Business Models, Revenue Models, and Business Processes – Economic Forces and Electronic Commerce – Identifying Electronic Commerce Opportunities – International Nature of Electronic Commerce. **Technology Infrastructure**: The Internet and the World Wide Web– *Internet and World Wide Web* – Packet – Switched Networks – Internet Protocols – Markup Languages and the Web – Intranets and Extranets – Internet Connection Options - Internet2 and The Semantic Web.	**13**
UNIT II **E-Marketing:** Online Marketing – E-Advertising-E-branding-**E-Security:** information system security-security on the internet – **E-Payment Systems:** Digital token based e-payment systems- classification of new payment systems-check payment systems on the internet. **E-Customer Relationship Management:** customer relationship management-typical business touches points. **E-Supply Chain Management:** smart chains-smarter gains-E-supply chain components-e-supply chain architecture.	**13**
UNIT III **E-Strategy:** Changes in technology-definitions of knowledge-importance of knowledge management-stages-seven dimensions-value chain and e-strategy **Mobile Commerce:** Technologies for Mobile Commerce– WAP Programming Model – Wireless Technologies – Different Generations in Wireless Communication – Security issues Pertaining to Cellular Technology –M-Commerce in India	**13**
UNIT IV **Network security:** authentication applications: Kerberos –x.509 authentication service-**E-mail Security:** Pretty Good Privacy, S/MIME (Secure/Multipurpose Mail Extension). IP security.	**13**

UNIT V **System & Web Security:** Malicious Software: Viruses and Related threats, Virus counter measures, distributed Denial of service attacks. Firewalls: Firewall, Firewall Design Principles, Trusted Systems. **Web Security:** Web Security Considerations, Secure socket layers, Transport Layer Security-Secure Electronic Transaction.	**13**
Total Contact Hrs	**65**

**Italicized* texts are for self study

Power point Presentations, Seminar , Assignment

Text Books

1. Gary P. Schneider, 2012, "E-Commerce Strategy, Technology and Implementation", 9th Edition, CENGAGE Learning India Private Limited (Unit I)
2. P.T. JOSEPH, 2013, "E-Commerce an Indian Perspective", Fourth Edition, Prentice Hall of India (Unit II & Unit III)
3. William Stalling, 2006, "Cryptography and Network Security Principle and Practice", 4rd Edition, Pearson Publications (Unit IV&V)

Reference Books

1. Mike Papazologn, 2008, "E-Business, Organizational and Technical Foundations", Wiley India Pvt Ltd.,
2. Elias M. Awad, 2008, "Electronic Commerce", Prentice-Hall of India
3. Panko Stalling , 2000, "Cryptography and Network Security Principle and Practice", 3rd Edition
4. Bruce Schneir, 2000, "Applied Cryptography", CRC Press

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	M	H	S
CO2	S	M	H	S	L
CO3	H	H	S	M	M
CO4	M	S	H	H	H

S: Strong H: High M: Medium L: Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: S.S. Shanthi Signature:	Name: Dr.M.Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

ELECTIVE - I

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS1E1	**Title**	**Batch :**	2017-2019
		ELECTIVE- I Data Mining and Warehousing	**Semester**	I
Hrs/Week:	5		**Credits:**	05

Course Objective

On successful completion of the course the students should understand the concept of data mining , classification and clustering techniques, Association rules and data warehousing.

Course Outcomes (CO)

K1	CO1	To remember the basic concepts of Data Mining and Data Warehouse Techniques
K2	CO2	To get the idea of raw data to make it suitable for various data mining algorithms
K3	CO3	To execute and measure interesting patterns from different kinds of databases
K4	CO4	To analyze the techniques of clustering, classification, association finding, feature selection and visualization to real world data

CONTENTS	**Hours**
UNIT I **Introduction:** Basic data mining tasks - *Data Mining versus Knowledge discovery in databases* – data mining issues – data mining metrics – social implications of data mining – data mining from a database perspective. **Data mining techniques:** Introduction – a statistical perspective on data mining–similarity measures–decision trees–neural networks–genetic algorithms.	**13**
UNIT II **Classification:** Introduction – Statistical – based algorithms - distance – based algorithms – decision tree - based algorithms - neural network – based algorithms –rule – based algorithms – combining techniques	**13**
UNIT III **Clustering:** Introduction – Similarity and distance measures – Outliers. **Hierarchical algorithms:** Agglomerative algorithms – Divisive clustering. **Partitioned algorithms:** Minimum Spanning tree – Squared error clustering algorithm – K – means clustering – Nearest neighbor algorithm – PAM algorithm – Bond energy algorithm – Clustering with genetic algorithm – Clustering with neural networks.	**13**
UNIT IV **Association rules:** Introduction - large item sets. **Basic algorithms:** Apriori algorithm – Sampling algorithm – Partitioning. **Parallel & distributed algorithms:** Data parallelism – Task parallelism. Comparing approaches, Incremental rules. **Advanced association rules techniques:** Generalized association rules – Multiple level association rules – Quantitative association rules – Using multiple minimum supports – Correlation rules. Measuring the quality of rules.	**13**
UNIT V **Data Warehousing:** Introduction - characteristics of a data warehouse – data marts – other aspects of data mart. **Online analytical processing:** Introduction - OLTP & OLAP systems– data modeling – star schema for multidimensional view – data modeling – multifact star	**13**

schema or snow flake schema–OLAPTOOLS–State of the market – OLAP TOOLS and the internet. **Developing a Data Warehouse:** why and how to build a data warehouse –data warehouse architectural strategies and organization issues - design consideration – data content – metadata - distribution of data – tools for data warehousing – performance considerations –crucial decisions in designing a data warehouse. *Applications of data warehousing and data mining in government*	
Total Hours	**65**

**Italicized* texts are for self study

Power point Presentations, Seminar , Assignment, Case study

Text Books

1. Margaret H. Dunham, 2008, "Data mining introductory and advanced topics", 3rd Edition, Pearson Education
2. Prabhu C.S.R, 2000, "Data warehousing concepts, techniques, products and a applications", 3rd Edition, PHI

Reference Books

1. Jiawei Han & Micheline Kamber, 2006, " Data mining Concepts & Techniques", 2nd Edition, Academic Press
2. Arun K.Pujari, 2003, "Data Mining Techniques", Revised Edition, Universities Press (India) Pvt. Ltd.

1. **MAPPING**

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	H	S
CO2	H	M	H	S	H
CO3	S	H	M	M	M
CO4	M	H	H	S	S

S: Strong H: High M: Medium L: Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: M. Dhavapriya Signature:	Name: Dr.M. Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS104	**Title**	**Batch :**	2017-2019
		Programming Lab-I: Unified Modeling Language	**Semester**	I
Hrs/Week:	5		**Credits:**	04

Course Objective

On successful completion of the course the students should understand the concepts of UML Diagrams for various applications.

Course Outcomes (CO)

K3	CO1	To implement potential benefits of object-oriented programming over other approaches
K4	CO2	To interpret object-oriented approach for developing applications of varying complexities
K5	CO3	To verify how a system interacts with its environment

Create a UML diagrams for the following applications.

1. Single sign-on to Google Application
2. Banking system
3. ATM Processing System
4. Quiz system
5. Student information system
6. Gas agency
7. Tourism and travel management system
8. Online shopping Domain
9. Construction management system
10. Library domain model
11. Inventory management system
12. payroll processing system
13. Hotel management system
14. Ration shop management system
15. Real estate

Note: The applications are developed using Class, Object, Use case, Sequence, Activity, Collaboration, Deployment, Component diagrams.

MAPPING

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	H	S	S	H	S
CO2	H	M	H	S	H
CO3	S	L	M	M	M

S: Strong H: High M: Medium L: Low

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name:R.Nandhakumar Signature:	Name: Dr.M.Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS105	**Title**	**Batch :**	2017-2019
		Programming Lab-II: Design and Analysis of Computer Algorithms	**Semester**	I
Hrs/Week:	5		**Credits:**	04

Course Objective

On successful completion of the course the students should understand the concepts of various data structures.

Course Outcomes (CO)

K3	CO1	To implement appropriate data structure for given contextual problem
K4	CO2	To analyze complexities of various data structure algorithms
K5	CO3	To prove appropriate data structure is applied to specified problem definition

Program to implement the concept for

1. Permutation Generator
2. Towers of Hanoi
3. Circular Queue
4. Stack using Linked list
5. Doubly linked list
6. Tree traversal(inorder, preorder, postorder)
7. Graph traversal Using Depth first search
8. Graph traversal Using Breadth first search
9. Binary search
10. Merge sort using divide and conquer
11. Quick sort
12. Insertion of element into heap
13. Implementation of 8-Queens problem
14. Traveling sales man problem
15. Knapsack using Greedy Method
16. Minimum Cost Spanning tree
17. Optimal Binary Search
18. 0/1 Knapsack problem using dynamic programming
19. All pairs shortest path
20. Flow shop scheduling.
21. Knapsack problem using backtracking

MAPPING

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	H	S	S	H	S
CO2	S	M	H	S	H
CO3	S	H	S	M	S

S: Strong H: High M: Medium L: Low

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: N.Arulkumar Signature:	Name: Dr.M.Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

SEMESTER II

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS206	**Title**	**Batch :**	2017-2019
		Open Source and Computing Tools	**Semester**	II
Hrs/Week:	4		**Credits:**	04

Course Objective

On successful completion of the course the students should have gained knowledge in .Net framework, PHP Programming, MySql, Apache and Linux.

Course Outcomes (CO)

K1	CO1	To recollect knowledge about Version Control System along with its commands
K2	CO2	To understand and implement Client- Server validation
K3	CO3	To implement, interpret, contrast and compare open source products among themselves
K4	CO4	To review database with open source technologies like PHP, Linux, & Apache web server

CONTENTS	Hours
UNIT I **DOTNET Framework -**Introduction to DOTNET- DOT NET class framework- Common Language Runtime- Overview- Elements of .NET application - Memory Management- Garbage Collector: Faster Memory Allocation, Optimizations- Common Language Integration- Common type system Reflection API- User and Program Interface VB.NET: *Control flow* –conditional statements-Loops-methods	**10**
UNIT II **ASP.NET Controls:** Overview of dynamic web page, introduction & features of ASP.NET, understanding ASP.NET controls, applications. Web forms, web form controls, server controls, client controls, adding controls to web form, buttons, text box, labels, checkbox, radio buttons, list box. Adding controls a runtime, Running a web application, creating a multiform web project, Form validation: client side and server side validation, Validation controls: required field comparison range, Calendar control, Ad rotator control.	**11**
UNIT III **PHP:** PHP Introduction- General Syntactic Characteristics - PHP Scripting - Commenting your code - Primitives, Operations and Expressions - PHP Variables - Operations and Expressions Control Statement - Array - Functions - Basic Form Processing - File and Folder Access - Cookies - Sessions - Database Access with PHP - MySQL - MySQL Functions - Inserting Records - Selecting Records - Deleting Records - Update Records	**10**
UNIT IV **Apache:** Introduction - Apache Explained - Starting, Stopping, and Restarting Apache - Modifying the Default Configuration - Securing Apache - Set User and Group - Consider Allowing Access to Local Documentation - Don't Allow public_html Web sites - Apache control with .htaccess **MySQL:** Introduction to MY SQL - The Show Databases and Table - The USE command - Create Database and Tables - Describe Table - Select, Insert, Update, and Delete statement - Some Administrative detail - Table Joins - Loading and Dumping a Database.	**11**

UNIT V **Open source:** Introduction - Open Source – *Open Source vs. Commercial Software* – What is Linux? - Free Software – Where I can use Linux? Linux Kernel – Linux Distributions - Linux Essential Commands – File system Concept - Standard Files - The Linux Security Model - Vi Editor - Partitions creation - Shell Introduction - String Processing - Investigating and Managing Processes - Network Clients - Installing Application.	**10**
Total Hours	**52**

* *Italicized* texts are for self study

Power point Presentations, Group discussions, Seminar , Assignment

Text Books

1. Jeffrey R. Shapiro, 2006, "VB.NET Complete Reference", Tata McGraw-Hill Publication Edition
2. Dave Mercer, 2002, "ASP.NET: A Beginner's Guide", Tata McGraw-Hill Publication Company Limited
3. James Lee and Brent Ware, 2008, "Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP", Dorling Kindersley(India) Pvt. Ltd.,

Reference Book

1. Eric Rosebrock, Eric Filson, 2004, "Setting up LAMP: Getting Linux, Apache, MySQL, and PHP and working Together", Published by John Wiley and Sons

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	H	M
CO2	H	M	H	S	H
CO3	M	S	L	M	S
CO4	S	H	H	M	H

S: Strong H: High M: Medium L: Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name:P. Jayapriya Signature:	Name: Dr.M. Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS207	**Title**	**Batch :**	2017-2019
		Advanced Networks	**Semester**	II
Hrs/Week:	4		**Credits:**	05

Course Objective

On successful completion of the course the students should gain in-depth knowledge of Internet protocols and their functionalities.

Course Outcomes (CO)

K1	CO1	To recollect OSI and TCP/IP layers and their tasks. Interpret and explain physical, logical and port addresses
K2	CO2	To comprehend Standard Ethernet and Mapping techniques
K3	CO3	To deploy Logical addressing and discuss the format of Ipv4 and Ipv6 addresses
K4	CO4	To analyze the problems and solutions associated with delivery and forwarding of packets

CONTENTS	**Hours**
UNIT I **Introduction and overview:** The Motivation For Internetworking-The TCP/IP Internet-Internet Services-History and scope of the Internet-The Internet Architecture Board-The IAB Reorganization. Review of Underlying **Network Technologies:** Two Approaches To network Communication-Wide Area And Local Area Networks-Ethernet Technology-Switched Ethernet-Asynchronous Transfer Mode. Internetworking Concept and Architectural Model-Classful Internet Addresses-Mapping **Mapping Internet Addresses To Physical Addresses(ARP):** The Address Resolution Problem-Two Types Of Physical Addresses-Resolution Through Direct Mapping-Resolution Through Dynamic Binding-The Address Resolution Cache-ARP Cache Timeout-ARP Refinements-Relationship Of ARP To Other Protocols-ARP Implementation-ARP Encapsulation And Identification-ARP Protocol Format-Automatic ARP Cache Revalidation-Reverse Address Resolution(RARP).	**10**
UNIT II **Internet Protocol: Connectionless Datagram Delivery (IPv4):** A Virtual Network-Internet Architecture and Philosophy-The Conceptual Service Organization-Connectionless Delivery System-Purpose of the Internet Protocol-The IPv4 Datagram-Internet Datagram Options. **Forwarding IP Datagrams:** Forwarding In An Internet-Direct And Indirect Delivery-Table-Driven IP Forwarding-Next-Hop Forwarding- The IP Forwarding Algorithm-Forwarding With IP Addresses-Internet Protocol. **Error And Control Messages(ICMP):** The Internet Control Message Protocol-Error Reporting Vs. Error Correction-ICMP Message Delivery-ICMP Message Format-Testing Destination Reachability And Status(ping)-Echo Request And Reply Message Format-Reports Of Unreachable Destinations-Congestion And Datagram Flow Control-Source Quench Format.	**11**
UNIT III **Classless And Subnet Address Extensions (CIDR):** Review Of Relevant Facts-Minimizing Network Numbers-Proxy ARP-Subnet Addressing-Flexibility In Subnet Address Assignment -The Subnet Forwarding Algorithm-A Unified Forwarding Algorithm. **Protocol Layering:** Introduction –Needs-Conceptual Layer_ Functionality- X.25 and ISO Model-Locus of intelligence-Principle-Network substructure-TCP/IP Model-Disadvantage-Idea behind Multiplexing and Demultiplexing.	**10**

User Datagram Protocol (UDP): Identifying The Ultimate Destination-The User Datagram Protocol-Format Of UDP Messages-UDP Pseudo-Header-UDP Encapsulation And Protocol Layering-Layering And The UDP Checksum Computation-UDP Multiplexing, Demultilplexing , And Ports-Reserved And Available UDP Port Numbers.	
UNIT IV **Routing Between Peers (BGP):** BGP Characteristics-BGP Functionality And Message Types-BGP Message Header-BGP OPEN Message-BGP UPDATE Message-Compressed Mask-Address pairs-BGP path Attributes-BGP KEEPALIVE Message-The Internet Routing Architecture-BGP NOTIFICATION Message. **Mobile IP:** Mobility, Routing, and Addressing-Mobile IP Characteristics- The Two-Crossing Problem-Communication with Computers on the Home Network. **Client-Server Model of Interaction:** Model-UDP Echo Server-Time and Date Service-The Complexity of Servers. **Bootstrap and Auto-configuration (DHCP):** IP address-Retransmission-Message format-Address Acquisition States.	**10**
UNIT V **Remote Login And Desktop (TELNET, SSH):** Remote Interactive Computing-TELNET Protocol-Accommodating Heterogeneity-Passing Commands That Control The Remote Side-Forcing The Server To Read A Control Function-TELNET Options-TELNET Option Negotiation-Secure Shell (SSH)-Other Remote Access Technologies. File Transfer and Access (FTP, TFTP, NFS)-*Electronic mail* (SMTP, POP, IMAP, MIME)-*World Wide Web* (HTTP)-Network Management (SNMP)-A Next Generation IP (IPv6).	**11**
Total Hours	**52**

**Italicized* texts are for self study

Power point Presentations, Seminar ,Assignment, Experience Discussion, Brain storming

Text Book

1. Douglas E. Comer, 2010, "Internetworking with TCP/IP Volume I", Prentice Hall.

Reference Books

1. Douglas E. Comer, David L.Stevens, 2010, "Internetworking with TCP/IP Volume II", Prentice Hall.
2. Uyless Black, 2005, "TCP/IP & Related Protocols", Tata McGraw-Hill.
3. Menezes.A, Van Oorschot.P and Vanstone. S, 2011,"Hand Book of Applied Cryptography",CRC Press.

MAPPING

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	H	S	M	H	S
CO2	S	M	S	S	H
CO3	M	S	S	H	M
CO4	M	H	H	M	H

S: Strong H: High M: Medium L: Low

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: R. Nandha Kumar Signature:	Name: Dr.M. Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS208	**Title**	**Batch :**	2017-2019
		Computing Technologies	**Semester**	II
Hrs/Week:	4		**Credits:**	04

Course Objective

On successful completion of the course the students should understand the concepts of cloud computing, developing cloud services, Centralizing Email communications and cloud computing services.

Course Outcomes (CO)

K1	CO1	To understand the architecture and concept of different Cloud models-SaaS,PaaS,Web Services and On-Demand Computing
K2	CO2	To provide a strong fundamental concepts in the underlying principle of cloud virtualization , cloud storage, data management and data visualization
K3	CO3	To implement various applications by utilizing cloud platforms such as Google AppEngine and Amazan's web services(AWS)
K4	CO4	To analyze various Grid computing technologies such as OGSA and OGSI

CONTENTS	Hours
UNIT I **Fundamentals of grid and cloud computing:** Introduction to Grid computing- Merging the Grid Services Architecture with the Web Services Architecture. Introduction to Cloud computing – History of Cloud Computing –How Cloud Computing works-Companies in the Cloud Computing Today	**10**
UNIT II **Developing cloud services:** Computing in the Cloud - The Pros and Cons of Cloud Computing-Benefits of Cloud Computing. Developing Cloud Services: Web Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – Web Services – On-Demand computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2- Google App Engine – IBM Clouds.	**11**
UNIT III **Cloud computing for everyone**: *Centralizing Email communications* – collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation	**10**
UNIT IV **Using cloud services:** Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management –Collaborating on Databases – Storing and Sharing Files – Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis	**11**

UNIT V **Grid computing:** Open Grid Services Architecture (OGSA) – Sample Use Cases that drive the OGSA – The OGSA Platform Components – Open Grid Services Infrastructure (OGSI) – OGSA Basic Services	**10**
Total Hours	**52**

**Italicized* texts are for self study

Power point Presentations, Group discussions, Seminar, Assignment

Text Books

1. Joshy Joseph & Criag Fellenstein, 2009, "Grid Computing", PHI, PTR
2. Michael Miller, August 2009 , "Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online", Que Publishing

Reference Books

1. Jose C.Cunha, Omer F.Rana (Eds), 2006, "Grid Computing", Springer International Edition
2. Anthony T. Velte and others, 2011 , "Cloud Computing" TATA Mc-Graw Hill Publications, New Delhi

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	M	H	H
CO2	S	M	S	S	L
CO3	M	H	S	M	M
CO4	H	H	H	S	H

S: Strong H: High M: Medium L: Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: S. S. Shanthi Signature:	Name: Dr.M. Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

ELECTIVE – II

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS2E1	**Title**	**Batch :**	2017-2019
		ELECTIVE- II:	**Semester**	II
Hrs/Week:	5	Android Programming	**Credits:**	05

Course Objective

On successful completion of the course, the students should have a good understanding on the Mobile Environment and acquired mobile application development skills with Android

Course Outcomes (CO)

K1	CO1	To understand the operation of the application, application lifecycle, configuration files, intents, and activities
K2	CO2	To get an idea of the UI - components, layouts, event handling, and screen orientation
K3	CO3	To deploy a basic application that acts as a working example of all the topics covered in the class
K4	CO4	To analyze the functions of various sensors

CONTENTS	**Hours**
UNIT I **Android:** Introduction – Android's Fundamental Components – Exploring the Structure of an Android Application – Examining the Application Life Cycle.	**13**
UNIT II **Introduction to Android Application Architecture:** Exploring a simple Android Application – Defining UI through Layout Files – Specifying Comments in Layout Files – Adding Views and View groups in Layout Files – Specifying Control Properties in Layout Files – Indicating ViewGroup Properties – Controlling Width and Height of a Control – Introducing Resources and Backgrounds – Working with Text Controls in the Layout File – Working with Autogenerated IDs for Controls – Loading the Layout File into an Activity – Gathering Controls – Placing the Files in the Android Project – Android Activity Life Cycle – Resources.	**13**
UNIT III **User Interface Development and Controls:** UI Development in Android - Building a UI Completely in Code - Building a UI Completely in XML - *Building a UI in XML with Code*. Android's Common Controls: Text Controls – Button Controls – The ImageView Control – Date and Time Controls – The MapView Control. Adapters and List Controls: SimpleCursorAdapter – ArrayAdapter – The Basic List Control ListView – The GridView Control – The Spinner Control – The Gallery Control – Styles and Themes – Layout Managers - Menus and Action Bars	**13**
UNIT IV **Touch Screens and Sensors:** Understanding Motion Events – The Motion Event Object – Recycling Motion Events – Using Velocity Tracker – Multi-touch – Gestures. **Implementing Drag and Drop:** Exploring Drag and Drop – Basics of Drag and Drop in 3.0+ – *Drag-and-Drop* Example Application. **Sensors:** Introduction – Detecting Sensors – Getting Sensor Events – Interpreting Sensor Data.	**13**

UNIT V **Application Security and Deployment:** Security and Permissions – Understanding the Android Security Model – Performing Runtime Security Checks – Deploying the Application: Becoming a Publisher – Preparing the Application for Sale – Uploading the Application	**13**
Total Hours	**65**

**Italicized* texts are for self study

Power point Presentations, Group discussions, Seminar ,Quiz, Assignment, Experience Discussion, Brain storming, Activity

Text Books

1. Dave MacLean, Satya Komatineni, Grant Allen, 2015, "Pro Android 5", Apress Publications.
   Wei-Meng-Lee, 2012, "Beginning Android Tablet Application Development", Wiley Publications

Reference Books

1. Barry Burd, 2016, "Android Application Development – All-in-one for Dummies", 2nd Edition, Wiley India.
2. Lauren Darcey, Shane Conder, 2013, "Sams Teach Yourself Android Application Development in 24 hours", 2nd edition, Pearson Education.
3. Paul Deitel, Harvey Deitel, Alexander Wald, 2016, "Android 6 for Programmers – An App-driven Approach", 3rd edition, Pearson education.
4. Jerome (J. F) DiMarzio, 2015, "Android – A Programmer's Guide", McGraw Hill Education, 8th reprint.

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S
CO2	H	M	H	S	H
CO3	M	H	S	M	M
CO4	M	H	H	M	H

S: Strong H: High M: Medium L: Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: N. Arul kumar Signature:	Name: Dr.M. Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS2N1	**Title**	**Batch :**	2017-2019
		Non-Major Elective I:	**Semester**	II
Hrs/Week:	1	Multimedia Packages Lab	**Credits:**	02

Course Objective

On successful completion of the course the students should understand the concepts of Photoshop, Flash and JOOMLA.

Course Outcomes (CO)

K3	CO1	To implement the concepts of Image segmentation and video segmentation
K4	CO2	To analyze the concepts of Storage models and Access Techniques of Multimedia devices
K5	CO3	To access Text, Audio Text and Audio tools

PHOTOSHOP

- Use of basic tools
- Merging two images
- Cloning an image
- Changing color of an image
- Give Light effect to the image
- Icy Image
- Paint and Rainbow effect
- Design a flex for college using Photoshop
- Rain effect
- *Bubbled effect*

FLASH

- Motion Tween
- Text Bouncing
- Text Animate
- Image fading
- Butterfly Animation
- *Bouncing Ball*

JOOMLA

- To create a Corporate Web sites or portals
- To create a web site for online newspaper
- To create a web site for Online magazines
- To create a Web site for online bus ticket reservation
- To create a Government applications
- To create a Small business Web sites
- To create a organizational Web sites
- To create a web site for Community-based portals
- To create a School Web sites
- *To create a Web site for family homepages*

**Italicized* texts are for self study

Power point Presentations , Brain storming, Activity

MAPPING

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	H	S	M	H	S
CO2	H	M	H	H	H
CO3	M	S	S	M	M

S: Strong H: High M: Medium L: Low

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: R.Nandhakumar Signature:	Name: Dr.M.Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS2N2	**Title**	**Batch :**	2017-2019
		Non-Major Elective I: Web Designing Lab	**Semester**	II
Hrs/Week:	1		**Credits:**	02

Course Objective

To enable the students to develop and design various application using Web Technology.

Course Outcomes (CO)

K3	CO1	To apply critical thinking skills to design and create websites
K4	CO2	To analyze and write a well formed / valid XML document
K5	CO3	To access and analyze website performance by interpreting analytics to measure site traffic, SEO, engagement, and activity on social media

- HTML Tags
- Tables
- Forms
- Frames
- Web Creation
- CSS Rules
- CSS Grouping Style
- XML using CSS
- *Address Book*
- DTD for Book Information
- Resume Creation using DTD
- XSL Transformation
- XSL Sorting
- Event Handling
- Filters

**Italicized* texts are for self study

Power point Presentations, Experience Discussion, Brain storming, Activity

MAPPING

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	S	S	M	H	S
CO2	H	M	S	L	H
CO3	S	S	S	M	M

S: Strong H: High M: Medium L: Low

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name:R. Nandhakumar Signature:	Name: Dr.M. Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R.Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS209	**Title**	**Batch :**	2017-2019
		Programming Lab-III : Open Source and Computing Tools	**Semester**	II
Hrs/Week:	5		**Credits:**	04

Course Objective

On successful completion of the course the students should understand the concepts of Open Source Technologies.

Course Outcomes (CO)

K3	CO1	To implement, Interpret, Contrast and compare open source products among themselves
K4	CO2	To review and analyze database with open source technologies like PHP, Linux & Apache web server
K5	CO3	To validate how databases are integrated with components

VB.NET

1. Create a program to implement looping in vb.net
2. Create a program to implement conditional statements
3. Create a calculator using basic controls

ASP.NET

4. Create a notepad editor using Context menu strip and menu controls
5. Create an application to illustrate the use validation controls.
6. Create an application for library management system
7. Create an application for Pay roll processing system
8. Create a program to generate electricity Bill
9. Server side PHP program to display marks, total, grade of a student in tabular format by accepting user inputs for name, number and marks from a HTML form.

PHP

10. PHP program to add products that are selected from a web page to a shopping cart.
11. PHP program to access the data stored in a mysql table.
12. PHP program interface to create a database and to insert a table into it.
13. PHP program using classes to create a table.
14. PHP program to upload a file to the server.
15. PHP program to create a directory, and to read contents from the directory.
16. Shell program to find the details of an user session.
17. Shell program to change the extension of a given file.

MYSQL

18. Create a MySQL table and execute queries to read, add, remove and modify a record from that table.

Power point Presentations, Experience Discussion, Brain storming

MAPPING

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	H	S	M	H	S
CO2	H	M	M	S	H
CO3	M	S	H	M	M

S: Strong H: High M: Medium L: Low

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name:P. Jayapriya Signature:	Name: Dr.M. Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R.Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS210	**Title**	**Batch :**	2017-2019
		Programming Lab-IV: Networks	**Semester**	II
Hrs/Week:	5		**Credits:**	04

Course Objective

On successful completion of the course the students should understand the concepts of Client/Server, TCP, and UDP.

Course Outcomes (CO)

K3	CO1	To deploy and implement next generation protocols required for emerging applications
K4	CO2	To analyze different protocols used for packet communication
K5	CO3	To access Client/Server interaction

1. Program to generate IP of the machine
2. Program to implement Ping Server using raw sockets
3. Program to demonstrate the PING command
4. Program to establish Single side communication using TCP
5. Program to establish Double side communication using TCP
6. Program to establish Single side communication using UDP
7. Program to establish Double side communication using UDP
8. Program to establish Chatting
9. Program to Parse URL Address into its components
10. Program to read Source code of a Website
11. Program to find the IP address of a given Website
12. Program to generate Conversion of lowercase to uppercase
13. Program to implement UDP packets Send and Receive
14. Program to generate Asynchronous Protocol
15. Program to implement Stop and Wait Protocol
16. Program to implement the Concurrent Server
17. Program to demonstrate the ECHO command
18. Program to establish Gossip Client and Server
19. Program to implement the concept of CRC
20. Program to establish a Command line who is client
21. Program to validate a Client Password
22. Program to find Shortest Path Routing between nodes
23. Program to send a mail using SMTP
24. Program to Download a file from the internet and save a copy
25. Program to establish the concept of Sliding Window Protocol
26. Program to calculate the Area with the radius between C/S
27. Program to print DNS record of an internet address
28. Program to implement User Interface
29. Program to perform File Transfer using FTP
30. Program to send a single message to multi-client[Broadcasting]
31. Program to generate Date time Client and Server

Power point Presentations, Assignment, Experience Discussion, Brain storming

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	H	H
CO2	H	M	H	S	H
CO3	M	S	H	M	M

S: Strong H: High M: Medium L: Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name:R.Nandhakumar Signature:	Name: Dr.M.Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

SEMESTER III

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS311	**Title**	**Batch :**	2017-2019
		J2EE Technologies	**Semester**	III
Hrs/Week:	4		**Credits:**	04

Course Objective

On successful completion of the course the students should understand the features of J2EE and the Web services.

Course Outcomes (CO)

K1	CO1	To recollect different constructors and methods in JFC components, JDBC, C/S interaction
K2	CO2	To get an idea to construct an enterprise application using Java Beans
K3	CO3	To implement server side validations with session and database using JDBC
K4	CO4	To analyze web application using Servlet, Java Server Pages and RMI

CONTENTS	Hours
UNIT I **Introduction to JFC:** JPanel-JFrame-JApplet-JSplitPane-JTabbedPane-JViewport-*JMenu*-Items and Labels - JTextField - JTextArea - JButtons - JButton Classes - JCheckBoxes - JRadioButton-JComboBoxes-JList.	**10**
UNIT II **Advanced JFC Components:** JTree s- *JTables* – JInternalFrame - JDesktop Manager - JProgressbar.	**10**
UNIT III Java Beans: Introduction to Java Bean-Advantages of a Java Bean-Application Builder tools-The Bean Developer Kit(BDK)-Jar files-Introspection-Developing a Simple Bean-Using Bound Properties-Using Bean Info Interface-Constrained Properties-Persistence-Customizers-Java Bean API.	**11**
UNIT IV **Servlet Overview and Architecture:** Movement to Server Side Java-Practical Applications for Java Servlets-Java Servlet Alternatives-Reason to use Java Servlets-Java Server Architecture – Servlet Basics-The Lifecycle of Servlet-A Basic Servlet. **Servlet Chaining:** Definition for Servlet Chaining-Uses of Servlet Chains-A Practical example using Servlet Chaining-Servlets and JDBC-Two Tier and Three Tier Database access models-JDBC Servlet-Session Tracking-Using Cookies-Using Session Objects.	**11**
UNIT V **Java Server Page (JSP):**Introduction-Server-side programming-Life Cycle of JSP- To Créâte and run JSP- Architecture of JSP-Scripting tag Elements- Implicite Object- Beans - Conditions - Directives - Déclarations – Implicite Variables -Expressions. **RMI (Remote Method Invocation):** Introduction - RMI Architecture-Bootstrapping and RMI Registry - The RMI Compiler - Object Specialization and Parameter Passing - A Simple example.	**10**
Total Hours	**52**

**Italicized* texts are for self study

Power point Presentations, Seminar , Assignment, Brain storming

Text Books

1. Patric Naughton,Herbert Schildt, 2001, " The Complete Reference-Java", 5th Edition, Tata McGraw Hill
2. Sams Series,James GoodWill, 2004, "Developing Java Servlets", 1st Edition, SAMS Techmedia
3. Dr.Sathya Raj pantham, 2000, "Pure Java Swing", 1st Edition, Tech Media Publication
4. Sam Series, 2006, "Java RMI", Tata McGraw Hill

Reference Books

1. Harley Hahn, 1996, "The Internet – Complete Reference", 2nd edition, Tata McGraw-Hill International Editions
2. Patric Naughton, 1996, "The Java Hand Book", 3rd Edition, Tata McGraw Hill
3. Stephen Potts, Mike Kopack, 2004, "Web Services", Kindle Edition, Pearson Education

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	H	S
CO2	M	M	H	S	H
CO3	H	S	H	H	M
CO4	S	H	S	S	H

S: Strong H: High M: Medium L: Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name:R. Nandhakumar Signature:	Name: Dr.M. Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS312	**Title**	**Batch :**	2017-2019
		Digital Image Processing	**Semester**	III
Hrs/Week:	5		**Credits:**	05

Course Objective

On successful completion of the course the students should understand the features of Java and the Web services.

Course Outcomes (CO)

K1	CO1	Get broad exposure and understanding of various applications of image processing in industry, medicine, and defense and other applications.
K2	CO2	To be familiar with basic concepts of two-dimensional signal acquisition, sampling, and quantization
K3	CO3	To implement the fundamental image enhancement algorithms such as histogram modification, contrast manipulation, and edge detection.
K4	CO4	To analyze programming skills in image compression, segmentation and restoration techniques.

CONTENTS	Hours
UNIT I **Introduction:** What is Digital image processing – the origin of DIP – Examples of fields that use DIP – Fundamentals steps in DIP – Components of an image processing system. **Digital Image Fundamentals:** Elements of Visual perception – Light and the electromagnetic spectrum – Image sensing and acquisition – Image sampling and Quantization– Some Basic relationship between Pixels – Linear & Nonlinear operations.	**13**
UNIT II **Image Enhancement in the spatial domain:** Background – *some basic Gray level Transformations* – Histogram Processing – Enhancement using Arithmetic / Logic operations –Basics of spatial filtering – Smoothing spatial filters – Sharpening spatial filters – combining spatial enhancement methods.	**13**
UNIT III **Image Restoration:** A model of the Image Degradation / Restoration Process – Noise models – Restoration is the process of noise only – Spatial Filtering – Periodic Noise reduction by frequency domain filtering –Modeling the Degradation function –Direct Inverse Filtering-Wiener Filtering-Constrained Least Squares (Regularized) Filtering - Iterative Nonlinear Restoration using the Lucy-Richardson Algorithm-Blind Deconvolution –Image Reconstruction from projections.	**13**
UNIT IV **Image Compression:** Fundamentals – Image compression models – Elements of Information Theory – Error Free compression – Lossy compression – *Image compression standards*-coding redundancy-spatial redundancy	**13**
UNIT V **Image Segmentation:** Detection and Discontinuities – Edge Linking and Boundary deduction – Threshold – Region-Based segmentation – Segmentation by Morphological watersheds – The use of motion in segmentation.	**13**

Total Hours	**65**

**Italicized* texts are for self study

Power point Presentations, Seminar , Assignment

Text Books

1. Rafael C. Gonzalez, Richard E. Woods, 2009, "Digital Image Processing", 2nd Edition, PHI/Pearson Education
2. Rafael C. Gonzalez, Richard E. Woods, 2009, "Digital Image Processing", 3rd Edition, PHI/Pearson Education
3. Rafael C. Gonzalez, Richard E.Woods,Steven L.Eddins, 2005, "Digital Image Processing Using MATLAB" , 2nd Edition , Tata McGraw-Hill International Editions

Reference Books

1. Nick Efford, 2004, "Digital Image Processing a practical introducing using Java", Pearson Education
2. Chanda.B, Dutta Majumder.D, 2003, "Digital Image Processing and Analysis", PHI

MAPPING

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	M	S	M	H	S
CO2	H	H	H	S	M
CO3	M	S	S	M	M
CO4	S	H	H	S	H

S: Strong H: High M: Medium L: Low

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: P. Jayapriya Signature:	Name: Dr.M. Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS313	**Title**	**Batch :**	2017-2019
		Big Data Analytics	**Semester**	III
Hrs/Week:	5		**Credits:**	04

Course Objective

On successful completion of students will possess the skills necessary for utilizing tools (including deploying them on Hadoop/MapReduce) to handle a variety of big data analytics, and to be able to apply the analytics techniques on a variety of applications.

Course Outcomes (CO)

K1	CO1	To remember how to collect, manage, store, query, and analyze various forms of big data
K2	CO2	To understand the concept and challenge of big data and why existing technology is inadequate to analyze the big data
K3	CO3	To deploy use of Big Data to deliver business value
K4	CO4	To analyze un-modeled, multi-structured data using Hadoop, MapReduce

CONTENTS	**Hours**
UNIT I **Fundamentals of Big Data:** Evolution of Data Management-*Managing the data* – Big Data – Big data management architecture. **Big Data Types**: Structured data – Unstructured Data –Real Time and Non- real time requirements – Big Data together. **Distributed Computing:** History of Distributed Computing – Basics of Distributing Computing – Performance.	**13**
UNIT II **Big Data Technology Components**: Big Data Stack – Redundant Physical Infrastructure – Security Infrastructure – Operational Databases – Organizing Data Services and Tools – Analytical Data Warehouses – Big Data Analytics – Big Data Applications. **Virtualization:** Basics of Virtualization – Managing virtualization with Hypervisor – Abstraction and Virtualization – Implementing Virtualization. **Cloud and Big Data:** Cloud in the context of Big Data – Cloud Deployment and Delivery models – Cloud as an imperative for big data – Use of cloud for Big data – Providers in the Big Data Cloud Market.	**13**
UNIT III **Operational Database:** Relational, Non-relational, Key-value Pair, Document, Columnar, Graph, Spatial, Polygot Persistence. **Map Reduce Fundamentals**: Origin of Map Reduce- Map Function – Reduce Function – Putting Map and Reduce together – *Optimizing Map*-Reduce Tasks. **Exploring the world of Hadoop**: Hadoop – Hadoop Distributed File System – Hadoop map Reduce.**Hadoop Foundation and Ecosystem**: Building Big Data Foundations with Hadoop Ecosystems – Managing Resources and Applications with Hadoop YARN – Storing Big Data with HBase – Mining Big Data with Hive – Interacting with Hadoop Ecosystem	**13**
UNIT IV **Appliances and Big Data Warehouse**: Integrating Big Data with Traditional Data	**13**

Warehouse – Big Data Analysis and Data Datawarehouse – Changing the role of Data Warehouse – Changing Deployment Models to the Big Data Era – Future of Data Warehouse.**Defining Big Data Analytics:** Using Big Data to get results – Modifying BI products to handle Big Data – Big Data Analytics Examples.**Integrating Data Sources**: Identifying the data – Fundamentals of Big Data Integration – Defining Traditional ETL – Understanding ELT – Prioritizing Big Data Quality – Using Hadoop as ETL – Best practices for Data Integeration in a Big Data World.	
UNIT V **Importance of Big Data to business:** Big Data as a Business planning Tool-Adding new Dimensions to the planning cycle – Keeping data analytics in perspective – Getting Started with the right Foundation – Getting the Big data Strategy started- Planning for Big Data – Transforming Business Processes with Big Data. Ten Big Data Best Practices – Ten Big Data Resources – Ten Big data do's and don'ts.	**13**
Total Hours	**65**

**Italicized* texts are for self study

Power point Presentations, Seminar , Assignment

Text Book

1.Judith Hurwitz, Alan Nurgent, Dr. Fern Halper, Marcia Kaufman, 2013, " Big Data for Dummies", First Edition, A Wiley Publication

Reference Books

1.Michael Minelli, Michele Chambers, Ambiga Dhiraj, 2013, "Big Data, Big Analytics – Emerging Business Intelligence and Analytic Trends For Todays Businesses", First Edition, A Wiley Publication

2.Strata Conference, Making Data Work, 2013, "Big Data Now", First Edition, Shroff Publication

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MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	M	H	S
CO2	S	M	M	S	L
CO3	M	H	S	H	M
CO4	M	H	H	M	H

S: Strong H: High M: Medium L: Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name:M.Dhavapriya Signature:	Name: Dr.M.Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

ELECTIVE – III

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS3E1	**Title**	**Batch :**	2017-2019
		ELECTIVE – III :	**Semester**	III
Hrs/Week:	5	Enterprise Resource Planning	**Credits:**	05

Course Objective

On successful completion of the course the students should understand the concepts of enterprise and its applications.

Course Outcomes (CO)

K1	CO1	To recollect the concepts of reengineering and how they relate to ERP system Implementations
K2	CO2	To understand the steps and activities in the ERP life cycle
K3	CO3	To deploy business processes using process mapping techniques
K4	CO4	To obtain practical hands-on experience with one of the COTS ERP Software e.g. SAP, Oracle

CONTENTS	**Hours**
UNIT I **ERP And Technology:** Introduction – Related Technologies – Business Intelligence– E-Commerce and E-Business – *Business Process Reengineering* – Product life Cycle Management – CRM.	**13**
UNIT II **ERP Implementation:** Implementation Challenges – Strategies – Life Cycle – Methodologies – Project Teams: people involved in implementation team – Process Definitions–Data Migration–Project management: ERP project management–Post Implementation Activities: POST-GO- LIVE Activities.	**13**
UNIT III **ERP in Action & Business Modules:** Operation and Maintenance – Performance – Maximizing the ERP System – Business Modules – Finance – Human Resources – Plant maintenance – Quality management – Marketing – Sales, Distribution and service.	**13**
UNIT IV **ERP Market:** *Marketplace* – Dynamics – SAP AG – Oracle – PeopleSoft – SSA Global – Lawson Software – Intuitive.	**13**
UNIT V Enterprise Application Integration – ERP II – Total quality management – Future Directions – Trends in ERP.	**13**
Total Hours	**65**
**Italicized* texts are for self study	
Power point Presentations, Seminar , Assignment, Experience Discussion, Brain storming	
Text Books	

1. Alexis Leon, 2008, "ERP DEMYSTIFIED", 2nd Edition, Tata McGraw Hill
2. Mary Sumner, 2007, "Enterprise Resource Planning", Pearson Education

Reference Books

1. Jim Manzullo, 2007, "SAP R/3 for Everyone", Pearson
2. Jose Antonio Hernandez, Jim Koegh and Franklin Foster Martinez,2005, "The SAP R /3 Handbook", 3rd Edition, Tata McGraw Hill
3. Biao Fu, "SAP BW: A Step-by-Step Guide", 1st Edition, Pearson Education

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	M	H	S
CO2	H	M	H	S	H
CO3	L	S	S	S	M
CO4	M	H	H	M	H

S: Strong H: High M: Medium L: Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: N. Karthikeyan Signature:	Name: Dr.M.Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS314	**Title**	**Batch :**	2017-2019
		Programming Lab-V: J2EE Technologies	**Semester**	III
Hrs/Week:	5		**Credits:**	04

Course Objective

On successful completion of the course the students should understand the concepts of Web services, EJB and RMI.

Course Outcomes (CO)

K3	CO1	To implement server side validations with session and database using JDBC
K4	CO2	To analyze web application using Servlet, Java Server Pages and RMI
K5	CO3	To validate Swing components and Servlet lifecycle

JFC Components:

1. Generate a JButton using Swing components
2. Menu Creation using Swing components
3. Implement String Handling concepts
4. Demonstrate JTabbedPane
5. List the structure of JTree
6. Create a JTable using Swing Components.
7. Generate a Progress Bar Swing components
8. Generate a Scroll Pane Swing components
9. Generate a Combo Box Swing components
10. Generate a Radio Button Swing components

Servlet:

11. Demonstrate Generic Servlet.
12. Demonstrate HTTP Servlet
13. Demonstrate Servlet Chaining
14. Demonstrate JDBC Connectivity
15. Demonstrate JDBC using Servlet
16. Demonstrate Cookies.

Bean:

17. Demonstrate Juggler Bean
18. Demonstrate Molecular Bean
19. Implement Simple Property Bean
20. Create a program for Introspection

JSP:

21. Create a JSP program for Fibonacci Series

RMI:

22. Create a RMI Program for Student Mark list
23. Create a RMI Program for Greatest of Two Numbers

Power point Presentations, Brain storming

MAPPING

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	H	S	M	H	S
CO2	H	M	H	H	H
CO3	S	S	S	M	M

S: Strong H: High M: Medium L: Low

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: R.Nandhakumar Signature:	Name: Dr.M.Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS315	**Title**	**Batch :**	2017-2019
		Programming Lab-VI : Digital Image Processing using MATLAB	**Semester**	III
Hrs/Week:	5		**Credits:**	04

Course Objective

On successful completion of the course the students should understand about Image Processing, image compression and segmentation using MATLAB.

Course Outcomes (CO)

K3	CO1	To implement the fundamental image enhancement algorithms such as histogram modification, contrast manipulation, and edge detection.
K4	CO2	To analyze programming skills in image compression, segmentation and restoration techniques.
K5	CO3	To access MATLAB tools for image processing

1. Crop, Resize, Rotate an image
2. Crop an image using Simulink
3. Resize an image using Simulink
4. Rotate an image using Simulink
5. Adjusting the contrast in color image using Simulink
6. Adjusting the contrast in intensity image using Simulink
7. Finding Histogram of a RGB image
8. Finding Histogram of a gray and negative image
9. Arithmetic Operations
10. Blurring with Deconvolution Algorithm
11. Sharpening of an image using Simulink
12. Unsharp Masking and High Boost Filtering using Simulink
13. Removing Salt & Pepper noise
14. Remove Noise (Median Filter) using Simulink
15. Deblurring with Wiener Filter
16. Correct Non-Uniform Illumination using Simulink
17. Count Object in an image using Simulink
18. Image Compression using Discrete Cosine Transform.
19. Performing Morphological Operations.
20. Edge Detection using Prewitt, Sobel and Roberts.

Note: Laboratory works are to be done on MATLAB 7.0 tool.

Power point Presentations, Assignment, Experience Discussion, Brain storming

MAPPING

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	H	S	M	H	S
CO2	S	M	H	S	H
CO3	M	S	S	M	M

S: Strong H: High M: Medium L: Low

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: P.Jayapriya Signature:	Name: Dr.M.Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS316	**Title**	**Batch :**	2017-2019
		Pilot Project-I	**Semester**	III
Hrs/Week:	2		**Credits:**	02

Prerequisite Knowledge: SDLC, Models for Software Engineering, OOPs, Basic DBMS concepts, Design Techniques like DFD or UML etc., Basic Information of Business Processes according to project title.

Instructional Notes: Students are required to develop entire new software system or to enhance/modify functionalities of existing software or to provide customization based on existing technology/framework to fulfill specific requirements.

Rules for the Project:

1. The duration of the project will be 50 days. The students can develop their project individually or in a group of not more than 2 students. Group size can be increased with prior approval of head of institution.
2. The passing standard is 40% jointly in Internal and External examination.
3. The project can be developed in any language or platform but it is required to get approved by the head of the institution. For the purpose of approval, Students have to submit their project titles and proposals with the name of Internal and External Guides to the Head of Institution. In case, if the student proposal is rejected, the revised proposal in the same or other area is required to submit and get it sanctioned. Failing to do this, his/her term will not be granted.
4. The students have to report to the internal guide for at least 4 times during the project life span with the progress report duly signed by external guide. Moreover they have to bring these reports with the final report at the time of external examination.

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name:Dr.M.Sakthi Signature:	Name: Dr.M.Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

SEMESTER IV

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS417	**Title**	**Batch :**	2017-2019
		Industrial Project Work and Viva voce (Individual)	**Semester**	IV
Hrs/Week:	-		**Credits:**	08

Instructional Notes: Students are required to develop entire new software system or to enhance/modify functionalities of existing software or to provide customization based on existing technology/framework to fulfill specific requirements.

MAXIMUM MARKS : 200

PROJECT EVALUATION : 160

VIVA VOCE : 40

Contents	**Internal Mark**	**External Mark**
Project Evaluation	80	80
Viva voce	20	20
Grand Total	100	100

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: Dr.M. Sakthi Signature:	Name: Dr.M. Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

ELECTIVE I

S.No	SUBJECT CODE	TITLE
1	**17PCS1E1**	**DATA MINING AND WAREHOUSING**
2	17PCS1E2	EMBEDDED SYSTEMS
3	17PCS1E3	MACHINE INTELLIGENCE
4	17PCS1E4	DISTRIBUTED OPERATING SYSTEM

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS1E1	**Title**	**Batch :**	2017-2019
		ELECTIVE- I : Data Mining and Warehousing	**Semester**	I
Hrs/Week:	5		**Credits:**	05

Course Objective

On successful completion of the course the students should understand the concepts of data mining, classification, clustering techniques, Association Rules and data warehousing.

Course Outcomes (CO)

K1	CO1	To remember the basic concepts of Data Mining and Data Warehouse Techniques
K2	CO2	To get the idea of raw data to make it suitable for various data mining algorithms
K3	CO3	To execute and measure interesting patterns from different kinds of databases
K4	CO4	To analyze the techniques of clustering, classification, association finding, feature selection and visualization to real world data

CONTENTS	**Hours**
UNIT I **Introduction:** Basic data mining tasks - *Data Mining versus Knowledge discovery in databases* – data mining issues – data mining metrics – social implications of data mining – data mining from a database perspective. **Data mining techniques:** Introduction – a statistical perspective on data mining–similarity measures–decision trees–neural networks–genetic algorithms.	**13**
UNIT II **Classification:** Introduction – Statistical – based algorithms - distance – based algorithms – decision tree - based algorithms - neural network – based algorithms –rule – based algorithms – combining techniques	**13**
UNIT III **Clustering:** Introduction – Similarity and distance measures – Outliers. **Hierarchical algorithms:** Agglomerative algorithms – Divisive clustering. **Partitional algorithms:** Minimum Spanning tree – Squared error clustering algorithm – K – means clustering – Nearest neighbor algorithm – PAM algorithm – Bond energy algorithm – Clustering with genetic algorithm – Clustering with neural networks.	**13**
UNIT IV **Association rules:** Introduction - large item sets. **Basic algorithms:** Apriori algorithm – Sampling algorithm – Partitioning. **Parallel & distributed algorithms:** Data parallelism - Task parallelism. Comparing approaches. Incremental rules. **Advanced association rules techniques:** Generalized association rules – Multiple level association rules – Quantitative association rules – Using multiple minimum supports – Correlation rules. Measuring the quality of rules.	**13**
UNIT V **Data Warehousing:** Introduction - characteristics of a data warehouse – data marts – other aspects of data mart. **Online analytical processing:** Introduction - OLTP & OLAP	**13**

systems– data modeling – star schema for multidimensional view – data modeling – multifact star schema or snow flake schema–OLAPTOOLS–State of the market – OLAP TOOLS and the internet. **Developing a Data Warehouse:** why and how to build a data warehouse –data warehouse architectural strategies and organization issues - design consideration – data content – metadata - distribution of data – tools for data warehousing – performance considerations –crucial decisions in designing a data warehouse. *Applications of data warehousing and data mining in government.*	
Total Hours	**65**
**Italicized* texts are for self study Power point Presentations, Seminar , Assignment, Case study	

Text Books

1. Margaret H. Dunham, 2008, "Data mining introductory and advanced topics", 3rd Edition, Pearson education
2. Prabhu C.S.R, 2000, "Data warehousing concepts, techniques, products and a applications", 3rd Edition, PHI

Reference Books

1. Jiawei Han & Micheline Kamber, 2001, " Data mining Concepts & Techniques", 2nd Edition Academic Press
2. Arun K.Pujari, 2003, "Data Mining Techniques", Revised Edition, Universities Press (India) Pvt. Ltd.,

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	H	S
CO2	H	M	H	S	H
CO3	S	H	M	M	M
CO4	M	H	H	S	S

S: Strong H: High M: Medium L: Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: M. Dhavapriya Signature:	Name: Dr.M. Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS1E2	**Title**	**Batch :**	2017-2019
		ELECTIVE- I:	**Semester**	I
Hrs/Week:	5	Embedded Systems	**Credits:**	05

Course Objective

On successful completion of the course the students should understand the different types embedded systems processors and its solutions in programming concepts using C and C++.

Course Outcomes (CO)

K1	CO1	To recollect the mathematical model of the system
K2	CO2	To understand the working of real-time operating systems and real-time database
K3	CO3	To apply real-time algorithm for task scheduling
K4	CO4	To analyze work on design and development of protocols related to real-time communication

CONTENTS	**Hours**
UNIT I **Introduction:** Introduction to Embedded systems, processor in the system, Other hardware units, Software Embedded into a system, Exemplary Embedded Systems, Embedded System-On-Chip(SOC) and in VLSI Circuit. **Processor and Memory Organization:** Structural units in processor, Memory Devices, Memory selection for embedded system, Allocation of memory to program segments and blocks and memory map of a system, direct memory access.	**13**
UNIT II **Devices and Buses for Device Networks:** I/O Devices, Device drivers, Parallel port device drivers in a system, Serial port device drivers in a system, Devices drivers for internal programmable timing devices, Interrupt servicing mechanism, Context and periods for context switching, Deadline and interrupt latency.	**13**
UNIT III **Programming concepts and embedded programming in C and C++:** Software programming in assembly language and in high level language, 'C' program elements :header and source files and preprocessor directives, program elements: macros and functions, program elements : data types, data structures, modifiers, statement, loops and pointers, queues, stacks, list and ordered lists, embedded programming in C++,embedded programming in java, 'c' program compiler and cross-compiler, source code engineering tools for embedded C/C++, optimization of memory needs.	**13**
UNIT IV **Program modeling concepts in single and multiprocessor systems software-development process:** modeling processes for software analysis before software implementation, programming models for event controlled or response time constrained real time programs, modeling of multiprocessor systems. software engineering practices in the	**13**

embedded software development process: software algorithm complexity, software development process life cycle and its models, software analysis, software design, software implementation, software testing, validating and debugging, real time programming issues and during the software development process, *software project management, software maintenance*.	
UNIT V **Inter-process communication and synchronization of processes, tasks and threads:** multiple processes in an application, problem of sharing data by multiple tasks and routines, inter process communication. **Real Time Operating Systems:** operating system services, I/O subsystem, network operating systems, real-time and embedded system operating systems, interrupt routines in RTOS environment: handling of interrupt source call by the RTOS, *RTOS task scheduling models*, interrupt latency and response times of the tasks as performances matrices.	**13**
Total Hours	**65**

**Italicized* texts are for self study

Power point Presentations Seminar ,Quiz, Assignment

Text Books:

1. Raj Kamal, 2008, "Embedded Systems", "Architecture, programming and design", International Editions, Tata McGraw-Hill

Reference Books:

1. Steve Heath, Elsevier, 2003, "Embedded Systems Design", 2nd Edition, Elsevier India Pvt Ltd.,
2. Qing Li & carotene Yao, 2006, "Real Time Concepts for Embedded System", CMP books, New York

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	H	L
CO2	H	M	H	S	H
CO3	L	H	S	M	M
CO4	M	H	H	H	H

S: Strong H: High M: Medium L: Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: M. Meena Krithika Signature:	Name: Dr.M. Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS1E3	**Title**	**Batch :**	2017-2019
		ELECTIVE- I :	**Semester**	I
Hrs/Week:	5	Machine Intelligence	**Credits:**	05

Course Objective

On successful completion of the course the students should have to understand the different types of Intelligence problems and its solutions.

Course Outcomes (CO)

K1	CO1	To recollect different types of AI agents
K2	CO2	To understand AI search algorithms (uninformed, informed, heuristic, constraint satisfaction, genetic algorithms)
K3	CO3	To apply knowledge representation, reasoning, and machine learning techniques to real-world problems
K4	CO4	To analyze knowledge representation, reasoning, and machine learning techniques to real-world problems

CONTENTS	**Hours**
UNIT I **Introduction:** What is AI?-History of AI?-Intelligent Agents- Agents and Environment-Good Behavior: Concept of Rationality-The nature of Environments- the Structure of Agents. Solving problems by searching-Example problems-searching for solutions-*Uninformed search strategies*-Searching with partial Information.	**13**
UNIT II **Informed search and exploration:** Informed search strategies-Heuristic functions-Local search algorithms and optimization problems-local search in continuous spaces-Constraint satisfaction problems-backtracking search for CSPs-local search for constraint satisfaction problems-The structure of problems-Adversarial search-games-*optimal decisions in games*-Alpha beta pruning-Imperfect, real-time Decisions.	**13**
UNIT III **Knowledge Representation:** first order logic (FOL) –Syntax and semantics of FOL – Using FOL- Knowledge Engineering in FOL-Inference in FOL-Propositional Vs first order inference- Unification and Lifting-Forward chaining-backward chaining-categories and objects-actions –situations-Events.	**13**
UNIT IV **Learning:** Learning from Observations-forms of learning-Inductive learning-learning decision trees-Ensemble Learning-Knowledge in learning-Logical formulation of learning – knowledge in learning-Explanation based learning-learning using relevance information-Inductive logical programming.	**13**
UNIT V **Communication:** Communication as action –A formal grammar for fragment of English-	**13**

Syntactic Analysis-Augmented Grammars-Semantic Interpretation-Ambiguity and disambiguation –discourse understanding-Grammar Induction.	
Total Hours	**65**

**Italicized* texts are for self study

Power point Presentations, Group discussions, Seminar , Assignment

Text Books:

1. Stuart Russel, Peter Norwig, 2002, "Artificial Intelligence – A modern approach", 2nd Edition, Pearson Education

Reference Books:

1. Elaine Rich, Kevin Knight, 2003, "Artificial Intelligence", 2nd Edition, Tata McGrawHill
2. Paterson. D.W., 1990, "Introduction to Artificial Intelligence and Expert Systems", 2nd Edition, Prentice Hall Of India

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	H	S
CO2	H	M	H	L	H
CO3	M	S	S	M	M
CO4	H	H	H	S	H

S: Strong H: High M: Medium L: Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: M. Dhavapriya Signature:	Name: Dr.M. Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS1E4	**Title**	**Batch :**	2017-2019
		ELECTIVE- I:	**Semester**	I
Hrs/Week:	5	Distributed Operating System	**Credits:**	05

Course Objective

On successful completion of the course the students should understand the concepts of Operating System, Inter-process communication and distributed Operating System.

Course Outcomes (CO)

K1	CO1	To remember scheduling in distributed operating systems, fault tolerance, real-time distributed systems, and designing of distributed file systems
K2	CO2	To understand the hardware and software concepts of distributed operating systems, various design issues like transparency, flexibility etc.,
K3	CO3	To apply concept of design and implementation in the context of distributed operating systems
K4	CO4	To interpret design and development of distributed systems and distributed systems applications

CONTENTS	**Hours**
UNIT I **Distributed Computer Operating System Fundamentals:** What is a Distributed Computing System-Evolution of Distributed Computing Systems- *Distributed Commuting System Models*-Why is Distributed Computing System Gaining Popularity - What is a Distributed Operating System - Introduction to DCE-Creation-Components-Cells. **Network types:** LAN Technologies- WAN Technologies- Communication protocols-Internetworking.	**13**
UNIT II **Message Passing:** Introduction- Desirable Features of a Good Message Passing system-Issues in IPC by message passing- Synchronization- Buffering- Multidatagram Messages - Encoding and Decoding of Message Data- Process Addressing- Failure Handling- Group Communication.	**13**
UNIT III **Remote Procedure Calls:** Introduction- The RPC Model- Transparency of RPC-Implementing RPC Mechanism- Stub Generation- RPC Messages- Marshaling Arguments and Results- Server Management- Parameter-*Passing Semantics*- Call Semantics-Communication Protocols for RPCs- Complicated RPCs-Client-Server Binding. **Distributed Shared Memory:** Introduction- General Architecture of DSM System-Design and *Implementation Issues of DSM*- Granularity- Structure of Shared Memory Space- Replacement Strategy.	**13**
UNIT IV **Synchronization:** Introduction- Clock Synchronization: How computer clocks are implemented-Drifting of clocks-Mutual Exclusion-Election Algorithms: Bully algorithm-	**13**

Ring algorithm. **Process Management:** Introduction- Process Migration: Features-Mechanisms-Heterogeneous systems-Advantages- Threads: Motivations-Models-issues-implementation.	
UNIT V **Distributed File Systems:** Introduction- Desirable Features of a Good Distributed File System- File Models- File-Accessing Models- File-Sharing Semantics- File-Caching Schemes- Design Principles. **Case Studies:** Introduction-Amoeba-V-System-Mach-Chorus-A Comparison of Amoeba, V-System, Mach and Chorus.	**13**
Total Hours	**65**

**Italicized* texts are for self study

Power point Presentations, Seminar, Assignment

Text Books:

1. Pradeep k. Sinha, 2000, "Distributed Operating Systems Concepts and Design", 3rd edition, PHI publications

Reference Books:

1. James L. Peterson & Silberschatz.A, 2001, "Operating System Concepts", World Student Edition, 2nd Edition , Addison Wesley
2. Andrew S. Tenenbaum, 2015, "Modern Operating Systems", 4th edition, Prentice Hall
3. Dietel H.M., 2000, "An Introduction to Operating Systems", World Student Edition, Addison Wesley

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MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	H	S
CO2	H	H	H	S	H
CO3	M	S	S	M	M
CO4	M	H	H	M	H

S: Strong H: High M: Medium L: Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name:R. Nandhakumar Signature:	Name: Dr.M. Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

ELECTIVE II

S.No	SUBJECT CODE	TITLE
1	**17PCS2E1**	**ANDROID PROGRAMMING**
2	17PCS2E2	SATELLITE COMMUNICATION
3	17PCS2E3	ANTENNAS AND PROPAGATION
4	17PCS2E4	REMOTE SENSING AND SENSORS

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS2E1	**Title**	**Batch :**	2017-2019
		ELECTIVE- II :	**Semester**	II
Hrs/Week:	5	Android Programming	**Credits:**	05

Course Objective

On successful completion of the course, the students should have a good understand the Mobile Environment and acquired mobile application development skills with Android.

Course Outcomes (CO)

K1	CO1	To understand the operation of the application, application lifecycle, configuration files, intents, and activities
K2	CO2	To get an idea of the UI - components, layouts, event handling, and screen orientation
K3	CO3	To deploy a basic application that acts as a working example of all the topics covered in the class
K4	CO4	To analyze the functions of various sensors

CONTENTS	**Hours**
UNIT I **Android:** Introduction – Android's Fundamental Components – Exploring the Structure of an Android Application – Examining the Application Life Cycle.	**13**
UNIT II **Introduction to Android Application Architecture:** Exploring a simple Android Application – Defining UI through Layout Files – Specifying Comments in Layout Files – Adding Views and View groups in Layout Files – Specifying Control Properties in Layout Files – Indicating ViewGroup Properties – Controlling Width and Height of a Control – Introducing Resources and Backgrounds – Working with Text Controls in the Layout File – Working with Autogenerated IDs for Controls – Loading the Layout File into an Activity – Gathering Controls – Placing the Files in the Android Project – Android Activity Life Cycle – Resources.	**13**
UNIT III **User Interface Development and Controls:** UI Development in Android - Building a UI Completely in Code - Building a UI Completely in XML - *Building a UI in XML with Code*. Android's Common Controls: Text Controls – Button Controls – The ImageView Control – Date and Time Controls – The MapView Control. Adapters and List Controls: SimpleCursorAdapter – ArrayAdapter – The Basic List Control ListView – The GridView Control – The Spinner Control – The Gallery Control – Styles and Themes – Layout Managers - Menus and Action Bars.	**13**
UNIT IV **Touch Screens and Sensors:** Understanding MotionEvents – The MotionEvent Object – Recycling MotionEvents – Using VelocityTracker – Multitouch – Gestures. **Implementing Drag and Drop:** Exploring Drag and Drop – Basics of Drag and Drop in 3.0+ – *Drag-and-Drop* Example Application. **Sensors:** Introduction – Detecting Sensors – Getting Sensor	**13**

Events – Interpreting Sensor Data.	
UNIT V **Application Security and Deployment:** Security and Permissions – Understanding the Android Security Model – Performing Runtime Security Checks – Deploying the Application: Becoming a Publisher – Preparing the Application for Sale – Uploading the Application.	**13**
Total Hours	**65**

**Italicized* texts are for self study

Power point Presentations, Group discussions, Seminar , Assignment, Experience Discussion, Brain storming, Activity, Case study

Text Books

1.Dave MacLean, Satya Komatineni, Grant Allen, 2015, "Pro Android 5", Apress Publications.

2. Wei-Meng-Lee, 2012, "Beginning Android Tablet Application Development", Wiley Publications

Reference Books

1. Barry Burd, 2016, "Android Application Development – All-in-one for Dummies", 2nd Edition, Wiley India.

2.Lauren Darcey, Shane Conder, 2013, "Sams Teach Yourself Android Application Development in 24 hours", 2nd edition, Pearson Education.

3. Paul Deitel, Harvey Deitel, Alexander Wald, 2016, "Android 6 for Programmers – An App-driven Approach", 3rd edition, Pearson education.

4. Jerome (J. F) DiMarzio, 2015, "Android – A Programmer's Guide", McGraw Hill Education, 8th reprint

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S
CO2	H	M	H	S	H
CO3	M	H	S	M	M
CO4	M	H	H	M	H

S: Strong H: High M: Medium L: Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: N. Arul kumar Signature:	Name: Dr.M. Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS2E2	**Title**	**Batch :**	2017-2019
		ELECTIVE- II :	**Semester**	II
Hrs/Week:	5	Satellite Communication	**Credits:**	05

Course Objective

On successful completion of the course the students should understand the concepts of satellites and satellite services.

Course Outcomes (CO)

K1	CO1	To recollect application of techniques, tools and resources
K2	CO2	To understand applications of established communication methods to complex engineering problem solving
K3	CO3	To apply problem solving approaches to work challenges and make decisions using sound engineering methodologies
K4	CO4	To analyze High levels of technical competence in the field

CONTENTS	**Hours**
UNIT I **Satellite Orbits :** Kepler's Laws, Newton's law, orbital parameters, orbital perturbations, station keeping, geo stationary and non Geo-stationary orbits – Look Angle Determination-Limits of visibility –eclipse-Sub satellite point –Sun transit outage-Launching Procedures - launch vehicles and propulsion.	**13**
UNIT II **Space Segment And Satellite Link Design:** Spacecraft Technology- Structure, Primary power, Attitude and Orbit control, Thermal control and Propulsion, communication Payload and supporting subsystems, Telemetry, Tracking and command. Satellite uplink and downlink Analysis and Design, link budget, E/N calculation- performance impairments-system noise, inter modulation and interference, Propagation Characteristics and Frequency considerations-System reliability and design lifetime.	**13**
UNIT III **Satellite Access:** Modulation and Multiplexing: Voice, Data, Video, Analog – digital transmission system, Digital video Brocast, multiple access: FDMA, TDMA, CDMA, Assignment Methods, Spread Spectrum communication, compression – encryption.	**13**
UNIT IV **Earth Segment:** Earth Station Technology-- Terrestrial Interface, Transmitter and Receiver, Antenna Systems TVRO, MATV, CATV, Test Equipment Measurements on G/T, C/No, EIRP, Antenna Gain.	**13**
UNIT V **Satellite Applications:** INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM, GPS, INMARSAT, LEO, MEO, and Satellite Navigational System. Direct Broadcast satellites	**13**

(DBS)- Direct to home Broadcast (DTH), Digital audio broadcast (DAB)- Worldspace services, Business TV(BTV), GRAMSAT, Specialized services – *E –mail, Video conferencing, Internet.*	
Total Hours	**65**

**Italicized* texts are for self study

Power point Presentations, Seminar ,Quiz, Assignment,Case study

Text Books:

1. Dennis Roddy, 'Satellite Communication', McGraw Hill International, 4th Edition, 2006
2. Wilbur L. Pritchard, Hendri G. Suyderhoud, Robert A. Nelson, 'Satellite Communication Systems Engineering', Prentice Hall/Pearson, 2007

Reference Books:

1. N.Agarwal, 'Design of Geosynchronous Space Craft, Prentice Hall, 1986
2. Bruce R. Elbert, 'The Satellite Communication Applications' Hand Book, Artech HouseBostan London, 1997
3. Tri T. Ha, 'Digital Satellite Communication', II edition, 1990.

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MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	H	M	H	S
CO2	H	M	H	S	L
CO3	S	S	S	M	M
CO4	L	H	H	H	H

S: Strong H: High M: Medium L: Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name:S. Sharmila Signature:	Name: Dr.M. Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS2E3	**Title**	**Batch :**	2017-2019
		ELECTIVE- II :	**Semester**	II
Hrs/Week:	5	Antennas and Propagation	**Credits:**	05

Course Objective

On successful completion of the course the students should understand the concepts of Antennas and its propagation.

Course Outcomes (CO)

K1	CO1	To recollect fundamental antennas and propagation parameters and its terminology
K2	CO2	To understand the basic concepts of electromagnetic wave radiation and reception
K3	CO3	To apply the fundamentals to design different types of antennas
K4	CO4	To analyze the basic skills necessary for designing a wide variety of practical antennas and antenna arrays

CONTENTS	**Hours**
UNIT I **Antenna Basics:** Introduction, basic Antenna parameters, patterns, beam area, radiation intensity, beam efficiency, diversity and gain, antenna apertures, effective height, bandwidth, radiation, efficiency, antenna temperature and antenna filed zones.	**13**
UNIT II **Point Sources and Arrays:** Introduction, point sources, power patterns, power theorem, radiation intensity, filed patterns, phase patterns. Array of two isotropic point sources, non-isotropic but similar point sources, principles of pattern multiplication, examples of pattern synthesis by pattern multiplication, non-isotropic point sources, broad side array with non unipolar amplitude distribution, broad side versus end fire array, direction of maxima fire arrays of n isotropic point sources of equal amplitude and spacing.	**13**
UNIT III **Electric Dipoles And Thin Linear Antennas:** Introduction, short electric dipole, fields of a short dipole, radiation resistance of short dipole, radiation resistances of lambda/2 Antenna, thin linear antenna, micro strip arrays, low side lobe arrays, long wire antenna, folded dipole antennas.	**13**
UNIT IV **Loop, Slot, Patch And Horn Antenna:** Introduction, small loop, comparison of far fields of small loop and short dipole, loop antenna general case, far field patterns of circular loop, radiation resistance, directivity, slot antenna, Balinet's principle and complementary antennas, *impedance of complementary and slot antennas, patch antennas, horn antennas, rectangular horn antennas.*	**13**
UNIT V **Antenna Types:** Helical Antenna, Yagi-Uda array, corner reflectors, parabolic reflectors, log periodic antenna, lens antenna, antenna for special applications – sleeve antenna, turnstile antenna, omni directional antennas, antennas for satellite antennas for ground penetrating radars, embedded antennas, ultra wide band antennas, plasma antenna.	**13**
Total Hours	**65**

**Italicized* texts are for self study

Power point Presentations, Seminar , Brain storming

Text Books:

1. Harish and Sachidananda, 2007, "Antennas and Wave Propagation" Oxford Press

Reference Books:

1. Balanis.C.A, 1997, "Antenna Theory Analysis and Design", 2nd Edition, John Wiley
2. Sineon. R.Saunders, 2003, "Antennas and Propagation for Wireless Communication Systems", John Wiley

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	H	S
CO2	H	M	H	S	H
CO3	M	S	S	M	M
CO4	M	H	H	L	H

S: Strong H: High M: Medium L: Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: P. Jayapriya Signature:	Name: Dr.M. Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS2E4	**Title**	**Batch :**	2017-2019
		ELECTIVE- II:	**Semester**	II
Hrs/Week:	5	Remote Sensing and Sensors	**Credits:**	05

Course Objective

On successful completion of the course the students should understand the concepts of remote sensing and sensors.

Course Outcomes (CO)

K1	CO1	To remember and explain at a basic level fundamental physical principles of remote sensing, including the electromagnetic spectrum; the emission, scattering, reflection, and absorption of electromagnetic (EM) radiation
K2	CO2	To understand key applications of land, marine, aquatic, and atmospheric remote sensing and relate them to the properties of historical, current, and planned remote sensing instruments, approaches, and datasets
K3	CO3	To apply mathematical relationships (at a pre-calculus level) describing fundamental physical, geometric, and computational principles relevant to remote sensing
K4	CO4	To analyze proficiency and conceptual understanding in using software or manual techniques to carry out remote sensing image processing and analysis through a series of laboratory exercises and reports

CONTENTS	**Hours**
UNIT I **Basics of Remote Sensing:** Principles of remote sensing, History of Remote sensing, remote sensing in India, *Electromagnetic Radiation and Electromagnetic Spectrum.* **EMR quantities:** Nomenclature and Units, Thermal Emission of Radiation, Radiation Principles (Plank's Law, Stephen Boltezman law), Interaction of EMR with the Earth Surface (Wien's displacement law, Kirchoffs Law), Spectral signature, Reflectance characteristics of Earths cover types, Remote sensing systems.	**13**
UNIT II **Platforms and sensors:** Platforms, Remote sensing sensors, resolutions Across track and along the track scanning, Optical sensors, Thermal scanners, Microwave sensing radar, satellite missions, Landsat series, SPOT series, IRS satellite series, IKNOS.	**13**
UNIT III **Microwave Remote Sensing:** Airborne and Space borne radar systems basic instrumentation. System parameters - *Wave length, Polarization, Resolutions, Radar geometry, Target parameters* - Back scattering, Point target, Volume scattering, Penetration, Reflection, Bragg resonance, Cross swath variation. Speckie radiometric calibration: Radar - Grametry - Introduction, Mosaicing Stereoscope. **Application:** Geology, Forestry, Land use, Soils etc. Future trends and Research.	**13**
UNIT IV **Thermal Imaging system:** Introduction - IR region of the Electromagnetic spectrum, Atmospheric transmission, Kinetic and radiant temperature, Thermal properties of materials, Emissivity, Radiant temperature. Thermal conductivity. Thermal capacity, thermal inertia,	**13**

apparent thermal inertia, Thermal diffusivity. IR - radiometers, Airborne and Satellite TTR scanner system, Characteristics of IR imagesi) Scanner distortion, ii) image irregularities, iii) Film density and recorded iv)Temperature ranges **Effects of weather on images:** i) Clouds, ii) Surface winds, iii) Penetration of smoke plumes, Interpretation of thermal imagery, Advantages of Thermal imagery.	
UNIT V **Meteorological satellites:** Meteorological satellite characteristics and their orbits, TIROS, NIMBUS, NOAA, TIROS N, SEASAT, GOES, METEOSAT, INSAT, Measurement of Earth and Atmospheric energy and Radiation budget parameters from satellites.	**13**
Total Hours	**65**

**Italicized* texts are for self study

Power point Presentations, Seminar , Assignment

Text Books:

1. Travelt.W, "Imaging Radar for Resource Survey: Remote Sensing Applications", 3rd Edition, Chapman & Hall
2. Davis.S.M, Swain.P.H, "Remote Sensing: The quantitative approach", McGraw Hill

Reference Books:

1. Barrett. E.C, Curtis.L.F, " Introduction to Environmental Remote Sensing", Chapman and Hall, London
2. Floyd, F. Sabins, 1978 , "Remote Sensing Principles and Interpretation", Freeman and Co., San Franscisco.

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	S	H	S
CO2	S	H	H	M	L
CO3	H	M	L	H	M
CO4	H	H	S	M	H

S: Strong H: High M: Medium L: Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: Dr. A. Kanagaraj Signature:	Name: Dr.M. Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

ELECTIVE III

S.No	SUBJECT CODE	TITLE
1	**17PCS3E1**	**ENTERPRISE RESOURCE PLANNING**
2	17PCS3E2	MANAGING ORGANIZATION
3	17PCS3E3	HUMAN RESOURCE MANAGEMENT
4	17PCS3E4	MARKETING MANAGEMENT

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS3E1	**Title**	**Batch :**	2017-2019
		ELECTIVE – III: Enterprise Resource Planning	**Semester**	III
Hrs/Week:	5		**Credits:**	05

Course Objective

On successful completion of the course the students should understand the concepts of enterprise and its applications.

Course Outcomes (CO)

K1	CO1	To recollect the concepts of reengineering and how they relate to ERP system Implementations
K2	CO2	To understand the steps and activities in the ERP life cycle
K3	CO3	To deploy business processes using process mapping techniques
K4	CO4	To obtain practical hands-on experience with one of the COTS ERP Software e.g. SAP, Oracle

CONTENTS	**Hours**
UNIT I **ERP And Technology:** Introduction – Related Technologies – Business Intelligence–E-Commerce and E-Business – *Business Process Reengineering* – Product life Cycle Management – CRM.	**13**
UNIT II **ERP Implementation:** Implementation Challenges – Strategies – Life Cycle – Methodologies – Project Teams: people involved in implementation team – Process Definitions–Data Migration–Project management: ERP project management–Post Implementation Activities: POST-GO- LIVE Activities.	**13**
UNIT III **ERP in Action & Business Modules:** Operation and Maintenance – Performance – Maximizing the ERP System – Business Modules – Finance – Human Resources – Plant maintenance – Quality management – Marketing – Sales, Distribution and service.	**13**
UNIT IV **ERP Market:** *Marketplace* – Dynamics – SAP AG – Oracle – PeopleSoft – SSA Global – Lawson Software – Intuitive.	**13**
UNIT V Enterprise Application Integration – ERP II – Total quality management – Future Directions – Trends in ERP.	**13**
Total Hours	**65**

**Italicized* texts are for self study

Power point Presentations, Seminar , Assignment, Experience Discussion, Brain storming

Text Books

1. Alexis Leon, 2008, "ERP DEMYSTIFIED", 2nd Edition, Tata McGraw Hill

2. Mary Sumner, 2007, "Enterprise Resource Planning", Pearson Education.

Reference Books

1. Jim Manzullo, 2007, "SAP R/3 for Everyone", Pearson Education
2. Jose Antonio Hernandez, Jim Koegh and Franklin Foster Martinez, 2005, "The SAP R /3 Handbook, 3rd Edition, Tata McGraw Hill
3. Biao Fu, "SAP BW: A Step-by-Step Guide", 1st Edition, Pearson Education.

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MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	S	M	H	S
CO2	H	M	H	S	H
CO3	L	S	S	S	M
CO4	M	H	H	M	H

S: Strong H: High M: Medium L: Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: N. Karthikeyan Signature:	Name: Dr.M. Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS3E2	**Title**	**Batch :**	2017-2019
		ELECTIVE – III:	**Semester**	III
Hrs/Week:	5	Managing Organization	**Credits:**	05

Course Objective

On Successful completion of the course the students should gain knowledge of Managing organization and its processing.

Course Outcomes (CO)

K1	CO1	To remember knowledge, skills, attitudes, and values necessary for success in management and leadership positions in a variety of business, governmental education, and nonprofit settings
K2	CO2	To understand advanced professional and educational capabilities
K3	CO3	To apply leadership with the ability to be a change agent within an organization and the business community.
K4	CO4	To interpret personal and professional ethical responsibility in all managerial and organizational decision making

CONTENTS	**Hours**
UNIT I **Evolution of Management Thought:** Scientific Management, Classical Organization Theory School, Management Science School, Behavioral School, Systems Approach and Contingency Approach. Concept of Management: Definition, Need, Concept and Nature of Management, Skills & Management Levels, Managing in Present Competitive Environment.	**13**
UNIT II **Process of Management:** Planning; Organizing- departmentalization, Line and Staff relationship; Directing; Coordinating & Controlling; Decision Making; Authority and Responsibility.	**13**
UNIT III **Elements of Human Behavior at Work:** Definition, Concept, Need, Importance and Foundations of Organizational Behavior, Personality, Perceptual Processes, Management and Behavioral applications of Personality, and Perception.	**13**
UNIT IV **Psychological Variables and Communication Technology:** Learning; Values and Attitudes; Motivation; Management and Behavioral Applications of Attitude and Motivation on Performance.	**13**
UNIT V **Leadership:** Style and Functions of Leader, Transformational -Transactional, Charismatic-Visionary Leadership, *Likert's Four Systems of Leadership and Managerial Grid.* **Organizational Conflict:** Concept, classification, process and conflict resolution strategies.	**13**

Organizational Culture: Concept, Process and Implications of organizational Culture **Organizational Change:** Concept, Nature, Kurt Lewin Theory of Change, Implementing Change, Managing Resistance to Change.	
Total Hours	**65**

**Italicized* texts are for self study

Power point Presentations, , Seminar, Assignment

Text Books:

1. Rao.V.S.P, "Managing Organization", 1st Edition
2. Chaturvedi, Saxena, "Managing Organization", Himalaya Publication
3. Koontz Harold, Weihrich Heinz, 2008, "Essentials of management", 5th Edition, Tata Mc Graw Hill

Reference Books:

1. Newstrom John., "Organizational Behaviour: Human Behaviour at Work", 12th Edition, Tata Mc Graw Hill
2. Luthans Fred, "Organizational Behaviour", 10th Edition, Tata Mc Graw Hill
3. Mc Shane L. Steven, Glinow Mary Ann Von & Sharma Radha.R, "Organizational Behaviour", 4th Edition, Tata McGraw Hill

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MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	S	M
CO2	H	M	H	H	L
CO3	H	M	H	M	H
CO4	M	S	H	H	S

S: Strong H: High M: Medium L: Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: M.Dhavapriya Signature:	Name: Dr.M.Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS3E3	**Title**	**Batch :**	2017-2019
		ELECTIVE – III:	**Semester**	III
Hrs/Week:	5	Human Resource Management	**Credits:**	05

Course Objective

On successful completion of the course the students should understand the concepts of human resource management and maintenance.

Course Outcomes (CO)

K1	CO1	To remember the development, implementation, and evaluation of employee recruitment, selection, and retention plans and processes
K2	CO2	To understand how to manage own professional development and provide leadership to others in the achievement of ongoing competence in human resources professional practice
K3	CO3	To deploy, develop, implement, and evaluate employee orientation, training, and development programs
K4	CO4	To interpret collaboration with others, in the development, implementation, and evaluation of organizational and health and safety policies and practices

CONTENTS	**Hours**
UNIT I **Introduction:** Introduction to Human Resource Management and its definition, functions of Human Resource Management & its relation to other managerial functions. Nature, Scope and Importance of Human Resource Management in Industry, Role & position of Personnel function in the organization.	**13**
UNIT II **Procurement and Placement:** Need for Human Resource Planning; Process of Human Resource Planning; Methods of Recruitment; Psychological tests and interviewing; Meaning and Importance of Placement and Induction, Employment Exchanges (Compulsory Notification of vacancies) Act 1959, The Contract Labour (Regulation & Abolition) Act 1970.	**13**
UNIT III **Training & Development:** Difference between training and Development; Principles of Training; Employee Development; Promotion-Merit v/s seniority Performance Appraisal, Career Development & Planning.	**13**
UNIT IV **Job analysis & Design:** Job Analysis: Job Description & Job Description, Job Specification. **Job Satisfaction**: Job satisfaction and its importance; Motivation, Factors affecting motivation, introduction to Motivation Theory; *Workers ' Participation*, Quality of work life.	**13**

UNIT V **Integration:** *Human Relations and Industrial Relations*; Difference between Human Relations and Industrial Relations, Factors required for good Human Relation Policy in Industry; Employee Employer relationship Causes and Effects of Industrial disputes; Employees Grievances & their Redressed, Administration of Discipline, Communication in organization, Absenteeism, Labor Turnover, Changing face of the Indian work force and their environment, Importance of collective Bargaining; Role of trade unions in maintaining cordial Industrial Relations.	**13**
Total Hours	**65**

**Italicized* texts are for self study

Power point Presentations, Seminar , Assignment

Text Books:

1. T.N.Chhabra.T.N, "Human Resource Management", Dhanpat Rai & Co.
2. Dessler, 2007, "Human Resource Management", 13th Edition, Pearson Education Limited

Reference Books:

1. Mamoria C.B and Mamoria.S, 2011, "Personnel Management", 5th Edition, Himalaya Publishing Company
2. Bernadin, 2012, "Human Resource Management", 6th Edition, Tata McGraw Hill
3. Eugence Mckenna and Nic Beach, 2008, "Human Resource Management", 2nd Edition, Pearson Education Limited

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	H	S
CO2	M	H	M	S	H
CO3	M	S	S	M	H
CO4	H	H	H	S	M

S: Strong H: High M: Medium L: Low

Course Designed by	Verified by HOD	Checked by	Approved by
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: S. Sharmila Signature:	Name: Dr.M.Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature:

Programme code:	M.Sc	**Programme Title :**	Master of Computer Science	
Course Code:	17PCS3E4	**Title**	**Batch :**	2017-2019
		ELECTIVE – III : Marketing Management	**Semester**	III
Hrs/Week:	5		**Credits:**	05

Course Objective

On successful completion of the course the students should understand the concepts of marketing theory and its practical application.

Course Outcomes (CO)

K1	CO1	To recollect complex qualitative and quantitative data to support strategic and operational decisions
K2	CO2	To understand comprehensive B2B and B2C marketing plans based on sound customer and competitive research, and that reflect an organization's domestic and international strategic vision
K3	CO3	Apply problem solving and decision making frameworks that propose defensible solutions to organizational opportunities, challenges, change and risk
K4	CO4	To evaluate problem solving and decision making frameworks that propose defensible solutions to organizational opportunities, challenges, change and risk

CONTENTS	**Hours**
UNIT I **Core Concepts of Marketing:** Concept, Meaning, definition, nature, scope and importance of marketing, Goods – Services Continuum, Product, Market, Approaches to Marketing – Product – Production - Sales – Marketing – Societal – Relational. Concept of Marketing Myopia, Holistic Marketing Orientation, Customer Value, Adapting marketing to new liberalized economy - Digitalization, Customization, Changing marketing practices.	**13**
UNIT II **Market Analysis and Selection:** Nature and Contents of Marketing Plan, Marketing environment, Controllable and Uncontrollable factors effecting marketing decisions, Analyzing latest trends in Political, Economic, Socio-cultural and Technical Environment, Concept of Market Potential & Market Share, Concept, Characteristics of consumer and organizational markets, Buyer Behavior, 5 step Buyer decision process Meaning and concept of market segmentation, Bases for market segmentation, Types of market segmentation, Effective segmentation criteria, Evaluating & Selecting, Target Markets, Concept of Target Market, Positioning and differentiation strategies, Concept of positioning – Value Proposition & USP, Marketing Information System, *Strategic marketing planning and organization*.	**13**
UNIT III **Product Decision:** Concept of a product; Classification of products; Major product decisions; Product line and product mix; Branding; Packaging and labeling; Product life cycle – strategic implications; New product development and consumer adoption process.	**13**

UNIT IV **Price Decision:** Concept, and Meaning of Price and Pricing, Significance of Pricing Decision, Factors affecting price determination; Pricing Methods and Techniques, Pricing policies and strategies; Discounts and rebates.	**13**
UNIT V **Place Decision:** Nature, functions, and types of distribution channels; Distribution channel intermediaries; Channel management decisions, Marketing channel system - Functions and flows; Channel design, Channel management - Selection, Training, Motivation and evaluation of channel members; Promotion Decision Communication Process; *Promotion mix* – advertising, personal selling, sales promotion, publicity and public relations; Media selection; Advertising effectiveness; Sales promotion – tools and techniques.	**13**
Total Hours	**65**

**Italicized* texts are for self study

Power point Presentations, Seminar, Assignment

Text Books:

1. Philip Kotler, Agnihotri, "Principle of marketing", 13th Edition, Pearson Education
2. Ramaswamy V.S. and Namakumari S, "Marketing Management: Planning, Implementation and Control", 3rd Edition, Macmillian
3. Rajan Saxena, "Marketing Management", Tata McGraw Hill

Reference Books:

1. R Kumar & Goel, 2013, "Marketing Management", UDH Publishers
2. Tapan Panda, "Marketing Management", ExcelBooks
3. Stanton William.J, "Fundamentals of Marketing", TATA Mc Graw Hill
4. Etzel M.J., Walker B.J. and Stanton William J, "Marketing concept & Cases special", 13th Edition, Tata McGraw Hill

MAPPING

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	S	S	M	H	S
CO2	H	M	H	S	H
CO3	M	S	S	M	M
CO4	M	H	H	H	H

S: Strong H: High M: Medium L: Low

Course Designed by	**Verified by HOD**	**Checked by**	**Approved by**
Name and Signature	**Name with Signature**	**CDC**	**COE**
Name: P. Jayapriya Signature:	Name: Dr.M. Sakthi Signature:	Name: Dr. M. Durairaju Signature:	Name: Dr. R. Muthukumaran Signature: