CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)

NATIONALLY ACCREDITED (III CYCLE) WITH "A" GRADE BY NAAC

TIRUCHIRAPPALLI – 18

PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE

AUTONOMOUS SYLLABUS

M.Sc Computer Science

2020-2021

onwards

M.Sc Computer Science

PROGRAMME OUTCOMES

- Ability to identify, formulate and develop solutions for computational challenges
- Inculcate broad knowledge in core areas of Computer Science and emerging technologies in IT
- Develop Analytical and Technical skills to enhance employment potential
- Capable of integrating knowledge and to provide a gateway for research

PROPOSED SYLLABUS

FOR THE YEAR

2020-2021 Onwards

Cauvery College for Women (Autonomous), Trichy-18

PG & Research Department of Computer Science

M.Sc Computer Science

(For the Candidates admitted from the Academic year 2020-2021 and onwards)

Semester	Course	Title	Course Code	Inst.Hrs/ week	Credits	Exam			Total
						Hrs	Mark		
							Int.	Ext.	
I	Core Course – I (CC)	Mathematical Foundation for Computer Science	19PCS1CC1	6	5	3	25	75	100
	Core Course – II (CC)	Design and Analysis of Algorithms	19PCS1CC2	6	5	3	25	75	100
	Core Course – III(CC)	Web Technologies	19PCS1CC3	6	5	3	25	75	100
	Core Practical –I (CP)	Web Technologies Lab	19PCS1CC1P	6	4	3	40	60	100
	Core Course –IV (CC)	Distributed Operating System	19PCS1CC4	6	5	3	25	75	100
	Total			**30**	**24**				**500**
II	Core Course – V (CC)	Data Mining and Warehousing	19PCS2CC5	6	5	3	25	75	100
	Core Practical–II (CP)	Data Mining Lab and MatLab	19PCS2CC2P	6	4	3	40	60	100
	Core Course - VI (CC)	Artificial Intelligence	19PCS2CC6	6	5	3	25	75	100
	Elective Course-I (EC)	Network Security / Soft Computing/ Advanced Computer Architecture	19PCS2EC1A/ 19PCS2EC1B/ 19PCS2EC1C	6	4	3	25	75	100
	Elective Course-II (EC)	Bioinformatics/ Advanced Database System / Software Project Management	19PCS2EC2A/ 19PCS2EC2B/ 19PCS2EC2C	6	4	3	25	75	100
	Extra Credit Course	SWAYAM ONLINE COURSE	To be Fixed Later	As per UGC Recommendation					
	Total			**30**	**22**				**500**
III	Core Course –VII (CC)	Computer Science for Competitive Examinations	19PCS3CC7	6	5	3	-	100	100
	Core Course –VIII (CC)	Big Data Analytics	19PCS3CC8	6	5	3	25	75	100
	Core Practical–III (CP)	Python and R Lab	19PCS3CC3P	6	4	3	40	60	100
	Elective Course-III (EC)	Blockchain / Parallel Processing/ Compiler Design	19PCS3EC3A/ 19PCS3EC3B/ 19PCS3EC3C	6	4	3	25	75	100
	Elective Course-IV (EC)	Robotic Process Automation/ Machine Learning/ IoT	19PCS3EC4A/ 19PCS3EC4B/ 19PCS3EC4C	6	4	3	25	75	100
	Extra Credit Course	SWAYAM ONLINE COURSE	To Be Fixed Later			As per UGC Recommendation			
	Total			**30**	**22**				**500**
	Core Course –IX (CC)	Cloud Computing	19PCS4CC9	6	5	3	25	75	100
	Core Course – X (CC)	Digital Image Processing	19PCS4CC10	6	5	3	25	75	100

IV	Core Practical – IV (CP)	FOSS Lab	19PCS4CC4P	6	4	3	40	60	100
	Elective Course- V(EC)	Wireless Sensor Networks/ MANET/ Mobile Computing	19PCS4EC5A/ 19PCS4EC5B/ 19PCS4EC5C	6	4	3	25	75	100
	Project	Project	19PCS4PW	6	4	-	-	-	100
	TOTAL			**30**	**22**				**500**
				120	**90**				**2000**

Note:

Total No. of Core Papers - 10
Total No. of Practicals - 4
Total No. of Elective Papers - 5
Extra Credit Course - 2
No. of Projects - 1

The internal and external marks for theory and practical papers are as follows:

Subject	Internal Marks	External Marks
Theory	25	75
Practical	40	60

Separate passing minimum is prescribed for Internal and External

For Theory:

a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)

b) The passing minimum for End Semester Examinations shall be 40% out of 75 marks (i.e. 30 marks)

c) The passing minimum not less than 50% in the aggregate.

For Practical:

a) The passing minimum for CIA shall be 40% out of 40 marks (i.e. 16 marks)

b) The passing minimum for End Semester Examinations shall be 40% out of 60marks (i.e. 24 marks)

c) The passing minimum not less than 50% in the aggregate.

For PROJECT:

Marks for Dissertation: 80 Marks
Marks for Viva Voice: 20 Marks
Total Marks : 100 Marks

Semester I	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDITS**
19PCS1CC1	**MATHEMATICAL FOUNDATION FOR COMPUTER SCIENCE**	**CORE**	**90**	**6**	**-**	**5**

Objective:

To enable the students to learn the basic concepts of Discrete Mathematics, Graph Theory, Fuzzy set Theory and combinatorics.

Syllabus:

UNIT I **(12 HOURS)**

Statements and notation- connectives- Tautologies- Equivalence of formulas- Theory of inference for the statement calculus.

UNIT II **(18 HOURS)**

Partial ordering- Partially Ordered Set: representation and Associated Terminology Lattices and Boolean Algebra-Lattices as partially ordered sets- Definition and examples- Some properties of lattices – Boolean Algebra- Definition and examples – Sub algebra, direct product and homomorphism. Fundamental principles of counting: Permutations- Combinations: The Binomial theorem- combinations with repetition- Relations and functions- The Pigeonhole principle – the principle of Inclusion and Exclusion: The principle of Inclusion and Exclusion- Recurrence relations- First order linear Recurrence Relation.

UNIT III **(20 HOURS)**

Definition of a Graph – finite & infinite graphs – incidence, degree isolated & pendent Vertices – isomorphism –sub graphs – walks, paths & circuits –Connected & disconnected graphs – components –Euler graphs - Operations on Graphs –More on Euler graphs –Hamiltonian paths &circuits.

UNIT IV **(20 HOURS)**

Trees –properties of trees –pendent vertices in a tree – distances & centers in a tree – Rooted & binary trees – Spanning trees –Fundamental circuits – Finding all spanning trees of a Graph – Spanning trees in a weighted graph.

UNIT V **(20 HOURS)**

From Classical Sets to Fuzzy Sets, Fuzzy Sets Verses Crisp Sets: Fuzzy Sets: Basic types- Fuzzy sets: Basic Concepts – Additional Properties of α – cuts – Extension Principle for fuzzy sets. Operations on Fuzzy Sets: Types of operations – Fuzzy complements – Fuzzy Intersections: t-Norms – Fuzzy Unions: t- Conorms – Combinations of Operations.

Text Books:

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	Tremblay J. P., Manohar.R.	Discrete Mathematical Structures With ApplicationsTo Computer Science	Tata McGraw- Hill Publishing Company Limited, New Delhi	1997
2	Narsingh Deo	Graph Theory With Applications To Engineering & Computer Science	Prentice Hall of India,New Delhi	1997

3	G.J.Klir , B.Yuan	Fuzzy Sets Logic And fuzzy	Prentice Hall of India, New Delhi	2001
4	Ralph, P. Grimaldi	Discrete And CombinatorialMathematics	Pearson Asia Education	Reprint 2002

Reference Books:

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	G.J. M.Ganesh	Introduction To Fuzzy Sets And Logic	Prentice-Hall of India, New Delhi	2006
2	Dr.S. Arumugam, Dr. S.Ramachandran	Invitation To Graph Theory	Scitech Publications India Pvt Limited, Chennai	2001
3	Seymour Lipschutz, Marc Laris Lipson	Schuam's Outlines Discrete Mathematics	Tata McGraw- Hill Publishing Co., Ltd., New Delhi	1999

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Explain the concepts of Permutation	K2
CO2	Apply the concepts of connectives, theory of inference for the statement calculus and fuzzy set theory	K3
CO3	Examine basic terminologies in graph to draw various kinds of graphs	K4
CO4	Differentiate the theory of Boolean Algebra and Lattices	K4
CO5	Develop the concepts of trees	K6

Mapping with Programme Outcomes

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

S– Strong; M–Medium; L – Low

Pedagogy

Chalk and Talk, Group discussion, Seminar, Assignment.

Course Designer

Dr. S. Saridha

Semester I	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDITS**
19PCS1CC2	**DESIGN AND ANALYSIS OF ALGORITHMS**	**CORE**	**90**	**6**	**-**	**5**

Objective:

- To learn the techniques for effective problem solving in computing
- Apply important algorithmic design paradigms and methods of analysis
- Analyze the asymptotic performance of algorithms to show the efficiency of the algorithm
- Write rigorous correctness proofs for algorithms
- Demonstrate a familiarity with major algorithms and data structures

Syllabus

UNIT I **(15 HOURS)**

Introduction: Algorithm Definition – Algorithm Specification – Performance Analysis. Elementary Data Structures: Stacks and Queues – Trees – Dictionaries – Priority Queues – Sets and Disjoint Set Union – Graphs-Analysis.

UNIT II **(20 HOURS)**

Divide and Conquer: The General Method – Binary search -Merge Sort – Quick Sort – Selection sort-Heap sort -Analysis. The Greedy Method: General Method - Container Loading- Knapsack Problem - Tree Vertex Splitting – Job Sequencing with Deadlines - Minimum Cost Spanning Trees - Optimal Storage on Tapes – Optimal Merge Patterns - Single Source Shortest Paths-Analysis.

UNIT III **(20 HOURS)**

Dynamic Programming: The General Method – Multistage Graphs – All-Pairs Shortest Paths – Single-Source Shortest Paths - Optimal Binary Search Trees -String Editing - 0/1 Knapsack - Reliability Design - The Traveling Sales person Problem - Flow Shop Scheduling – Analysis.

UNIT IV **(20 HOURS)**

Basic Traversal and Search Techniques: Techniques for Binary Trees – Techniques for Graphs – Connected Components and Spanning Trees – Biconnected Components and DFS- Analysis. Backtracking: The General Method – The 8-Queens Problem – Sum of Subsets – Graph Coloring – Hamiltonian Cycles – Knapsack Problem Branch and Bound: The Method - 0/1 Knapsack Problem.- Analysis.

UNIT V **(15 HOURS)**

NP-HARD and NP-COMPLETE PROBLEMS: Basic concepts-NP-HARD Graph problems-NP-HARD scheduling problems-NP-HARD Code generation problems-Analysis

Text Book:

S.NO	TITLE	AUTHOR	PUBLICATION/EDITION	YEAR
1	Fundamentals of Computer Algorithms	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran	Universities Press, Second Edition	2015

Reference Books:

S.NO	TITLE	AUTHOR	PUBLICATION/EDITION	YEAR
1	Data structures and Algorithms	V.Aho, Hopcropft, Ullman	Pearson Education, 4 th Edition	2009
2	Introductionto the Design and Analysis of Algorithms	Anany Levitin	Third Edition,Pearson Education	2012
3	Design & Analysis of Algorithms	Gajendra Sharmah	Khanna Publishers;4 edition	2015

Web References

1. http://nptel.ac.in/courses/106101059/
2. http://nptel.ac.in/courses/106101060/
3. http://www.personal.kent.edu/~rmuhamma/Algorithms/algorithm.html
4. http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-006-introduction-toalgorithms-fall-2011/lecture-videos/
5. http://cs.uef.fi/pages/franti/asa/notes.html

Course Outcomes

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

CO Number	CO Statement	Knowledge level
CO1	Design algorithms for various computing problems.	K3
CO2	Analyze the time and space complexity of algorithms.	K4
CO3	Critically analyze the different algorithm design techniques for a given problem	K5
CO4	Assess/Compare the efficiency of the algorithm	K6

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1	**S**	**M**	**M**	**S**
CO2	**S**	**M**	**S**	**S**
CO3	**S**	**S**	**S**	**S**
CO4	**S**	**S**	**S**	**S**

S– Strong; M–Medium; L -Low

Pedagogy

Chalk&talk, Assignment, PPT, Seminar,E-Content.

Course designer:

Ms. K.Sangeetha

Semester I	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDITS**
19PCS1CC3	**WEB TECHNOLOGIES**	**CORE**	**90**	**6**	**-**	**5**

Objective:

- This Subject is useful for Making own Web page and how to host own web site on internet. Along with that Students will also learn about the protocols involve in internet technology
- To initiate PHP language for server side scripting, To establish XML and processing of XML Data with Java, To introduce Server side programming with Java Servlets and JSP, To commence Client side scripting with Javascript and AJAX,
- To analyse the basics involved in publishing content on the World Wide Web, To transform graduates with potential in computational into experts in information technology that the industry requires from time to time

Syllabus:

UNIT I **(16 HOURS)**

Web Essentials - Clients, Servers, and Communication. The Internet-Basic Internet Protocols - The World Wide Web-HTTP request message-response message-Web Clients - Web Servers-. Markup Languages: An Introduction to HTML History-Versions-Basic HTML Syntax and Semantics- Some Fundamental HTML Elements-Relative URLs-Lists-tables- Frames-Forms.

UNIT II **(18 HOURS)**

Style Sheets - CSS -Introduction to Cascading Style Sheets-Features-Core Syntax-Style Sheets and HTML Style Role Cascading and Inheritance-Text Properties-Box Model Normal Flow Box Layout-Beyond the Normal Flow-Other Properties.

UNIT III **(16 HOURS)**

Client- Side Programming - The JavaScript Language-History and Versions Introduction JavaScript in Perspective-Syntax Variables and Data Types-Statements- Operators- Literals-Functions-Objects-Arrays-Built-in Objects-JavaScript Debuggers.

UNIT IV **(20HOURS)**

Server-Side Programming - Java Servlets- Architecture -Overview-A Servlet- Generating Dynamic Content-Life Cycle-Parameter Data-Sessions-Cookies- URL Rewriting - Data Storage Servlets and Concurrency. RMI Architecture - Working With RMI - Application Development With RMI - Created Distributed Application Development With RMI.

UNIT V **(20 HOURS)**

Representing Web Data - XML-Documents and Vocabularies-Versions and Declaration–Namespaces JavaScript and XML: Ajax-DOM based XML processing Event-oriented Parsing: SAX-Transforming XML Documents- Selecting XML Data: XPATH-Template based Transformations: XSLT-Displaying XML Documents in Browsers.

Text Books:

S.NO	BOOK TITLE	AUTHOR	PUBLICATIONS
1.	Web Technologies-A Computer Science Perspective	Jeffrey C.Jackson	Pearson Education, 2009.

Reference Books:

S.NO	BOOK TITLE	AUTHOR	PUBLICATIONS
1.	"Programming the World Wide Web	Robert. W. Sebesta	Fourth Edition, Pearson Education, 2007
2.	Internet & World Wide Web How To Program	Deitel, Deitel, Goldberg	ThirdEdition,Pearson Education,2006
3.	Core Web Programming	Marty Hall and Larry Brown	Second Edition, VolumeI and II, Pearson Education, 2001
4.	Developing Web Applications	Bates	Wiley, 2006
5.	The Complete Reference – JAVA	Herbert Schildt	7 th Edition, TMH,2012

Web References:

1. www.w3schools.com
2. www.geeksforgeets.org/web-technology/
3. www.guide.freecodecamp.org
4. www.alphadevx.com

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the processing of XML Data with Java	K2
CO2	Apply suitable scripting languages for Client side and Server side programming	K3
CO3	Analyze the basics involved in publishing content on the World Wide web	K4
CO4	Assess oneself to get employment with this practical hands on training.	K6

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1	**S**	**S**	**S**	**M**
CO2	**S**	**S**	**S**	**S**
CO3	**S**	**S**	**S**	**S**
CO4	**S**	**S**	**S**	**S**

S– Strong; M–Medium; L -Low

Pedagogy:

Chalk and talk, PPT, Group Discussion, Quiz, Seminar

Course Designer:

Ms.S.Udhayapriya

Semester I	Internal Marks: 40			External Marks:60		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDITS**
19PCS1CC1P	**WEB TECHNOLOGIES LAB**	**CORE**	**90**	**-**	**6**	**4**

Objective:

To provide fundamental concept of Internet, JavaScript, XML, Servlet with a view to developing professional software development skills.

Syllabus:

1. Develop your college web portal using HTML.
2. To develop a Style Sheet using Link, Table, Box, List and Positioning.
3. Write a JavaScript code block, which checks the contents entered in a form's text element. If the text entered is in the lower case, convert to uppercase.
4. Write a JavaScript code block, which validates a username and password.
   a) If either the name or password field is not entered display an error message.
   b) The fields are entered do not match with default values display an error message.
   c) If the fields entered match, display the welcome message.
5. Write a program in Java to implement a Client/Server application using RMI.
6. Write a program in Java to create a Cookie and set the expiry time of the same.
7. Write a program in Java to create Servlet to count the number of visitors to a webpage.
8. Write a program in Java to create a form and validate a password using Servlet.
9. Write a XML program for job listing in HTML.

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Recognize the usage of HTML Tags	K2
CO2	Demonstrate the usage of Java Script	K3
CO3	Experiment the client/server application using RMI	K4
CO4	Develop web application using XML, Servlet	K5

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4
CO1	**S**	**S**	**S**	**M**
CO2	**S**	**S**	**S**	**M**
CO3	**S**	**S**	**S**	**S**
CO4	**S**	**S**	**S**	**S**

S– Strong; M–Medium; L –Low

Pedagogy: Demonstration

Course Designer: Ms.S.Udhayapriya

Semester I	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDITS**
19PCS1CC4	**DISTRIBUTED OPERATING SYSTEM**	**CORE**	**90**	**6**	**-**	**5**

Objective:

- To understand about the distributed computing system models, file models and the architecture of DSM.
- To know how to solve the security problems.

Syllabus:

UNIT I **(12 HOURS)**

Fundamentals: What is Distributed Operating System-Evolution of Distributed Computing system –Distributed Computing System models-Why are Distributed Computing Systems gaining popularity-What is a Distributed Computing System-Issues in Designing Distributed Computing System –Introduction to Distributed Computing Environment. Introduction to Computer Networks-Network types-LAN-WAN-Communication protocols- Internetworking-ATM Technology.

UNIT II **(18 HOURS)**

Message Passing: Introduction – Desirable features -Issues in IPC Message Passing-Synchronization-Buffering – Multi datagram Messages-Encoding and Decoding-Process Addressing – Failure Handling-Group Communication.

UNIT III **(20 HOURS)**

Distributed Shared Memory: Introduction – General Architecture of DSM system- Design and Implementation Issues of DSM – Granularity-Structure of Shared Memory- Replacement strategy-Thrashing-Heterogeneous DSM – Advantages. Synchronization: Introduction Clock Synchronization – Event Ordering –Mutual Exclusion – Deadlock-Election Algorithm.

UNIT IV **(20 HOURS)**

Distributed File System: Introduction-Desirable features- File models -File Accessing Models-File Sharing Semantics – File Caching Schemes – File Replication-Fault Tolerance- Atomic Transactions-Design Principles.

UNIT V **(20HOURS)**

Security: Introduction – Potential Attacks to Computer system –Cryptography- Authentication-Access Control- Digital Signatures – Design Principles.

Text Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS / EDITION	YEAR OF PUBLICATION
1.	Pradeep K Sinha	Distributed Operating Systems	PHI	2012

ReferenceBooks:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS / EDITION	YEAR OF PUBLICATION
1	Andrew S Tanenbaum	Distributed Operating Systems	PHI	2007

WebReferences:

1. http://www.darshan.ac.in/Upload/DIET/Documents/CE/2160710_Distributed_Operating_System_GTU_Study_Material_2017_22042017_033831AM.pdf
2. http://www.coda.cs.cmu.edu/ljpaper/lj.html
3. http://www.windowsnetworking.com/articles_tutorials/Windows2003-Distributed- File-System.html

Course Outcome

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the architecture of DSM	K2
CO2	Determine the difficulties of distributed memory management	K3
CO3	Compare centralized and distributed system	K4
CO4	Predict effective synchronization techniques to be performed to run a task in a distributed system	K6

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1	**S**	**S**	**S**	**M**
CO2	**S**	**S**	**M**	**S**
CO3	**S**	**S**	**S**	**S**
CO4	**S**	**S**	**S**	**S**

S– Strong M–Medium L –Low

Pedagogy: Chalk and talk and Seminar

Course Designer: Ms.K.Pradeepa

Semester II	Internal Marks: 25			External Marks:75		
COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDITS
19PCS2CC5	DATA MINING AND WAREHOUSING	CORE	90	6	-	5

Objective:

- Able to understand the basic concepts of data mining
- Provides an overview of various applications of data mining
- Gain knowledge about various data mining techniques like classification, clustering, association rule mining

Syllabus:

UNIT-I **(16 HOURS)**

Introduction: What is Data mining? – Data mining on what kind of data – Data mining functionalities (What kinds of Patterns can be mined) – Major Issues in Data mining –Data mining Trends and Research Frontiers: Mining Complex Data types – Other Methodologies – Data mining Applications – Data mining Trends.

UNIT-II **(16 HOURS)**

Data Pre-Processing: Data Cleaning – Data Integration - Data Reduction – Data Transformation and Data Discretization. Mining Frequent Patterns, Associations: Basic concepts – Frequent Itemset Mining Methods.

UNIT-III **(18 HOURS)**

Advanced Pattern Mining: Pattern Mining - A Road Map – Pattern Mining in Multilevel, Multidimensional Space. Data Warehousing: Basic Concepts – Data Warehouse Modeling - Data Warehouse Design and usage - Data Warehouse Implementation.

UNIT-IV **(20 HOURS)**

Classification : Basic concepts- Decision Tree Induction - Bayesian Classification – Rule Based Classification –Model Evaluation and Selection- Techniques to improve Classification Accuracy – Advanced Methods: Classification by Back Propagation – Support Vector Machines – Lazy Learners: K-Nearest-Neighbor Classifiers.

UNIT-V **(20 HOURS)**

Cluster analysis: Basic concepts and methods – Cluster analysis - Partitioning methods - Hierarchical Methods - Density Based Methods - Grid Based Methods. Advanced Cluster Analysis: Clustering High Dimensional data. Outlier Detection: Outlier and outlier analysis.

Text Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER/ EDITION	YEAR OF PUBLICATION
1.	Jiawei Han, Micheline Kamber, Jian Pei	Data Mining: Concepts and Techniques	Morgan Kaufman Publishers, Third Edition	2012

Reference Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER/ EDITION	YEAR OF PUBLICATION
1.	Margaret H.Dunham	Data Mining Introductory and AdvancedTopics	Pearson Education	2006
2.	C.S.R. Prabhu	Data Warehousing: Concepts, Techniques, Products and Applications	PHI Learning Private Ltd. Second Edition	2008
3.	K.P. Soman, Shyam Diwakar, V. Ajay	Insight into Data Mining Theory and Practice	PHI	2008.

Web References:

1. www.tutorialride.com/data-mining/data-mining-tutorial.htm
2. https://hanj.cs.illinois.edu/bk3/bk3_slidesindex.htm
3. www.guru99.com/datawarehouse-architecture.htm
4. www.tutorialpoint.com/dwh/dwh_data_warehousing.htm

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Recognize basic concepts of data mining	K2
CO2	Review data mining techniques like classifications, clustering, association rule mining, prediction and related algorithm	K3
CO3	Assess the methods and techniques appropriate for the task	K5

Mapping with Programme Outcomes

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

COs	PO1	PO2	PO3	PO4
CO1	**S**	**S**	**M**	**S**
CO2	**S**	**S**	**S**	**S**
CO3	**S**	**S**	**S**	**S**

S– Strong; M–Medium; L -Low

Pedagogy: Chalk and Talk, Discussion,Lecture

Course Designer: Ms. S. Udhayapriya

Semester II	Internal Marks: 40			External Marks:60		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDITS**
19PCS2CC2P	**DATA MINING LAB AND MATLAB**	**CORE**	**90**	**-**	**6**	**4**

Objective:

- Provides rich implementation experience in data mining techniques
- Able to preprocess and Visualize data using Weka tool
- Gain knowledge to develop application using Matlab

WEKA Tool:

Preprocessing
Association rules
Classification
Clustering
Data Visualization
Experimenter
Knowledge Flow

MATLAB:

Basic Operations
Regression
Classification Ensemble
Basic graphic applications

Web References:

1. https://www.tutorialride.com/
2. https://www.slideshare.net/
3. https://in.mathworks.com/

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate the features of data mining tools	K3
CO2	Analyze the performance of various classification and clustering algorithm	K4
CO3	Interpret Regression techniques using MATLAB	K6
CO4	Apply Basic graphic applications in MATLAB	K3

Mapping with Programme Outcomes

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

S– Strong; M–Medium; L –Low

Pedagogy: Demonstration

Course Designer: Ms.S. Udhayapriya

Semester II	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDITS**
19PCS2CC6	**ARTIFICIAL INTELLIGENCE**	**CORE**	**90**	**6**	**-**	**5**

Objective:

- To foster the development and understanding of Artificial Intelligence and its applications worldwide
- To promote interdisciplinary exchanges between Artificial Intelligence and other fields of information processing
- To gain knowledge based on information through learning

Syllabus:

UNIT I **(18 HOURS)**

Introduction to Artificial Intelligence and Problem solving: Definition - AI problems- What is AI Technique- Defining the problem as state space search- Production systems. Heuristic Search techniques: Best-First Search– Constraint Satisfaction-Means-End Analysis.

UNIT II **(18 HOURS)**

Knowledge Representation Issues: Representations and mappings -Approaches to Knowledge representations. Using Predicate Logic: Representing simple facts in logic- Representing Instance and ISA relationships - Computable functions and predicates - Resolution.

UNIT III **(20 HOURS)**

Representing knowledge using rules: Procedural Vs Declarative knowledge – Logic programming- Backward vs Forward Reasoning. Statistical Reasoning: Probability and Baye's Theorem- Bayesian Networks-Dempster-Shafer Theory.

UNIT IV **(18 HOURS)**

Learning from Observations: Forms of Learning-Inductive Learning-Learning Decision tree-Ensemble Learning.

UNIT V **(16 HOURS)**

Knowledge in Learning: A Logical formulation of Learning- Knowledge in Learning- Explanation based learning-Learning using Relevance Information.

Text Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER/ EDITION	YEAR OF PUBLICATION
1	Elaine Rich, Kevin Knight, Shivashankar B Nair (Unit 1–3)	Artificial Intelligence	Tata McGraw Hill, 3rd edition	2009
2	Stuart Russel, Peter Norvig (Unit 4- Unit 5)	Artificial Intelligence- A Modern Approach	Pearson Education, 3rd edition	2010

References Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER/ EDITION	YEAR OF PUBLICATION
1	Rajendra Akerkar	Introduction to Artificial Intelligence	PHI Learning Pvt Ltd, 2nd edition	2014
2	Ben Coppin	Artificial Intelligence Illuminated	Jones and Bartlett	2004

Web References:

1. http://www.formal.stanford.edu/jmc/whatisai/
2. http://www.sciencedaily.com/news/computers_math/artificial_intelligence/

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Apply the basic knowledge representation and learning methods	K3
CO2	Examine techniques for handling incomplete and uncertain models	K4
CO3	Formulate a system for solving a particular problem	K5

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1	**S**	**S**	**M**	**S**
CO2	**S**	**S**	**S**	**S**
CO3	**S**	**S**	**S**	**S**

S– Strong; M–Medium; L -Low

Pedagogy Chalk and Talk, PPT , Discussion, Assignment, Quiz, Case study

Course designer Dr.P.Rajeswari

Semester II	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDITS**
19PCS2EC1A	**NETWORK SECURITY**	**ELECTIVE**	**90**	**6**	**-**	**4**

Objective:

- Overview the principles of cryptography and Network Security
- Inculcate the classical and advanced encryption standards and technique
- Gain knowledge in establishing IP security

Syllabus:

UNIT I **(18 HOURS)**

Introduction: Security Trends - The OSI Security Architecture - Security Attacks - Security Services - A model for network Security. Classical Encryption Techniques: Symmetric Cipher Model - Substitution Techniques -Transposition Techniques – Steganography.

UNIT II **(20 HOURS)**

Block Ciphers and the DES: Block cipher Principles - The DES - The Strength of DES - Differential and Linear Crypt Analysis. Public key cryptography and RSA: Principles of Public Key Cryptosystems – The RSA Algorithm.

UNIT III **(20 HOURS)**

Digital Signatures and Authentication Protocols: Digital Signatures - Authentication Protocols - Digital Signature Standard. Authentication Applications: Kerberos - X.509 Authentication Service, Public-Key Infrastructure. Email Security: Pretty Good Privacy - S/MIME.

UNIT IV **(20 HOURS)**

IP Security: IP Security Overview - IP Security Architecture - Authentication Header - Encapsulating Security Payload. Web Security: Security Considerations - SSL and TLS-SET.

UNIT V **(12 HOURS)**

System Security: Intruders - Intrusion Detection – Password Management. Malicious Software: Viruses and Related Threats. Firewalls: Design Principles - Trusted systems.

Text Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER / EDITION	YEAR OF PUBLICATION
1	William Stallings	Cryptography and Network Security - Principles and Practices	Prentice Hall of India, 4th edition	2007

References Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER/ EDITION	YEAR OF PUBLICATION
1	Atul Kahate	Cryptography and Network Security	Tata McGraw Hill, New Delhi	2006
2	Charles P Pfleeger, Shari Lawrence Pfleeger	Security in Computing	Pearson education, New Delhi	2006

Web References:

1. https://www.open.edu/openlearn/science-maths-technology/computing-and-ict/systems-computer/network-security/
2. scs.carleton.ca/~paulv/5900wBooks.html
3. https://en.wikipedia.org/wiki/Network_security
4. https://www.slideshare.net/HatemMahmoud/network-security-applications-4562405
5. https://www.intechopen.com/books/security-enhanced-applications-for-information-systems/cybersecurity-in-the-real-world

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand cryptography , network security concepts with its applications	K2
CO2	Apply security principle in system design	K3
CO3	Analyze network security protocols	K4
CO4	Detect network security threat	K5
CO5	Design the code to implement a cryptographic algorithm	K6

Mapping with Programme Outcomes

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

S– Strong; M–Medium; L -Low

Pedagogy: Chalk and Talk , PPT , Discussion, Assignment

Course designer: Ms.D.Radhika

Semester II	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDITS**
19PCS2EC1B	**SOFT COMPUTING**	**ELECTIVE**	**90**	**6**	**-**	**4**

Objective:

- To educate the concepts of neural networks and the role of neural networks in intelligent systems
- To provide the basic knowledge in fuzzy
- To apply fitness function using genetic algorithm

Syllabus:

UNIT I **(20 HOURS)**

Neural Networks: Fundamentals of Neural Networks – Basic Concepts of Neural Networks – Model of an Artificial Neuron – Neural Network Architecture – Characteristics of Neural Network – Learning Methods – Taxonomy of Neural Network Architecture – Back Propagation Network – Architecture of Back Propagation Network – Back Propagation Learning.

UNIT II **(20 HOURS)**

Neural Network Associative Memory: Auto Correlations – Hetero Correlations – Exponential BAM – Associative Memory for Real Coded Pattern Pairs – Adaptive Resonance Theory – Introduction – ART1 – ART 2 – Applications.

UNIT III **(20 HOURS)**

Fuzzy Set Theory: Crisp Sets – Fuzzy Sets – Crisp Relations – Fuzzy Relations – Fuzzy Systems: Crisp Logic – Predicate Logic – Fuzzy Logic – Fuzzy Rule Based System – Defuzzification Method - Applications.

UNIT IV **(20 HOURS)**

Genetic Algorithms: History – Basic Concepts – Creation of off Springs – Working Principle – Encoding – Fitness Function – Reproduction Genetic Modeling – Inheritance Operators – Cross Over – Inversion and Deletion – Mutation Operator –Applications – Advances in Genetic Algorithm .

UNIT V **(10 HOURS)**

Hybrid System: Integration of Neural Network – Fuzzy Logic – Genetic Algorithm- Hybrid System – Neural Network – Fuzzy Logic – Genetic Algorithm Weight Determination – Application – Fuzzy Back Propagation Network – Language Recognition Type Fuzzy Members – Fuzzy Neuron – Fuzzy Back Propagation Architecture – Learning in Fuzzy Back Propagation – Applications – Knowledge Base Evaluation.

Text Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	S.Rajasekaran and G.A.Vijayalakshmi Pai	Neural Networks, Fuzzy Logic and Genetic Algorithms Synthesis and Applications	Prentice Hall India Learning Private Limited	2011

Reference Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	Vinoth Kumar and R. Saravana Kumar	Neural Network and Fuzzy logic	S.K. Katria & Sons	2012
2.	Haykin Simon	Neural Networks and Learning Machines	3/e, Prentice Hall of India	2011
3.	Tang,Tan and Yi	Neural Networks: Computational Models and Application	Springer Verlag Publications	2010

Web References:

1. www.tutorialspoint.com/ neural networks
2. www.sciencedirect.com/ fuzzyset
3. https// in.geeksforgeeks.org/geneticalgorithm

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Describe the concepts of soft computing and their applications	K1
CO2	Discuss supervised and unsupervised learning in neural networks	K2
CO3	Apply soft computing techniques for small applications	K3
CO4	Analyze various soft computing techniques suitable for real time	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1	**S**	**S**	**S**	**M**
CO2	**S**	**S**	**S**	**S**
CO3	**S**	**S**	**S**	**M**
CO4	**S**	**S**	**S**	**S**

S– Strong; M–Medium; L – Low

Pedagogy: Lectures, Demonstration

Course Designer: Mrs.R.Rita Jenifer

Semester II	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDITS**
19PCS2EC1C	**ADVANCED COMPUTER ARCHITECTURE**	**ELECTIVE**	**90**	**6**	**-**	**4**

Objective:

- To understand the micro-architectural design of processors
- To learn about the various techniques used to obtain performance improvement and power savings in current processors
- To gain knowledge in distributed and Parallel Computing Architecture

Syllabus:

UNIT I **(10 HOURS)**

Review of Fundamentals of CPU, Memory and IO – Trends in Technology, Power, Energy and Cost, Dependability – Performance Evaluation.

UNIT II **(20 HOURS)**

ILP Concepts – Pipelining Overview – Compiler Techniques for Exposing ILP – Dynamic Branch Prediction – Dynamic Scheduling – Multiple Instruction Issue – Hardware Based Speculation – Static Scheduling – Multi-Threading – Limitations of ILP – Case Studies.

UNIT III **(20 HOURS)**

Vector Architecture – SIMD Extensions – Graphics Processing Units – Loop Level Parallelism.

UNIT IV **(20 HOURS)**

Symmetric and Distributed Shared Memory Architectures – Performance Issues – Synchronization – Models of Memory Consistency – Case Studies: Intel I7 Processor, SMT & CMP Processors.

UNIT V **(20 HOURS)**

Cache Performance – Reducing Cache Miss Penalty and Miss Rate – Reducing Hit Time – Main Memory and Performance – Memory Technology. Types of Storage Devices – Buses – RAID – Reliability, Availability and Dependability – I/O Performance Measures.

Text Book:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER / EDITION	YEAR OF PUBLICATION
1	John L Hennessey, David A Patterson	Computer Architecture A Quantitative Approach	Morgan Kaufmann Elsevier, Fifth Edition	2012

ReferenceBooks:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	Kai Hwang, Faye Brigg	Computer Architecture And Parallel Processing	Mc Graw-Hill International Edition	2000
2	Sima D, Fountain T, Kacsuk P	Advanced Computer Architectures: A Design Space Approach	Addison Wesley	2000

WebReferences:

1. www.cs.iiie.edu.in/
2. https://en.m.Wikipedia.org / Wiki/ instruction level parallelism
3. https://passlab.githlub.io/CSE565/note

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Review Instruction level parallelism	K2
CO2	Analyze the Performance of different level parallelism techniques	K4
CO3	Manage Cache and Memory Related Issues in Multi-Processors	K5

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1	**S**	**S**	**S**	**M**
CO2	**S**	**S**	**S**	**S**
CO3	**M**	**S**	**S**	**S**

S– Strong; M–Medium; L - Low

Pedagogy: Chalk and talk and Seminar

Course Designer: Ms.R. Rita Jenifer

Semester II	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDITS**
19PCS2EC2A	**BIOINFORMATICS**	**ELECTIVE**	**90**	**6**	**-**	**4**

Objective:

- To get the basic knowledge of bioinformatics
- To analyze and use tools and databases for text mining
- To gain deeper knowledge on FAST and BLAST

Syllabus

UNIT I **(15 HOURS)**

Introduction-Historical Overview- Bioinformatics Applications- Bio informatics Major Databases- Molecular Biology.

UNIT II **(18 HOURS)**

Sequence Visualization- Structure Visualization- Statistical Concepts- Micro Arrays- Imperfects Data- Quantitative Randomness- Data Analysis- Tool Selective and Statistics of Alignment- Clustering and Classification.

UNIT III **(20 HOURS)**

Methods & Technology Overview- Infrastructure, Pattern Recognition & Discovery- Machine Learning- Text Mining & Tools- Dot Matrix Analysis- Substitution Matrix- Dynamic Programming- Word Methods, Multiple Sequence Alignment- Tools for Pattern Matching.

UNIT IV **(20 HOURS)**

Drug Discovery- Fundamentals- Protein Structure- System Biology- Collaboration & Communications-Standards and Issues.

UNIT V **(17 HOURS)**

Introduction- Working with FASTS-Working with BLAST, FASTA & BLAST Algorithms & Comparison.

Text Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	Bioinformatics-Methods &Application	S.C.Rastogi, P.Rastogi, N.Mendiratta	PHI,4th Edition	2013
2.	Bioinformatics Computing	Bryan Bergeron	Pearson Education, 1st Edition	2002

Reference Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER / EDITION	YEAR OF PUBLICATION
1.	Elementary Bioinformatics	Imtiyaz Alam Khan	Pharma Book syndicate	2005
2.	Environmental Biotechnology	Indu Shekhar Thakur (IST)	IK International publication,2nd Edition,2002	

Web References:

1. https://en.wikipedia.org/wiki/Bioinformatics
2. https://academic.oup.com/bioinformatics/pages/instructions_for_authors
3. https://blast.ncbi.nlm.nih.gov/Blast.cgi
4. https://www.slideshare.net/RIZWANABBAS3/bioinformatics-on-internet

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Define molecular biology and bioinformatics applications	K1
CO2	Discuss the sequences using data analysis tool	K2
CO3	Sketch the data mining and pattern matching tools	K3
CO4	Summarize the molecular modeling and simulation technologies and software that are used to study a wide range of molecular phenomena in biology and medicine	K5
CO5	Interpret the BLAST and FASTA algorithms to find the similarity between protein and DNA sequences.	K6

Mapping with Programme Outcomes

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

S– Strong; M–Medium; L -Low

Pedagogy: Chalk and Talk, Lecture, Demonstration, PPT, Discussion, Quiz

Course Designer: Ms D.Radhika

Semester II	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDITS**
19PCS2EC2B	**ADVANCED DATABASE SYSTEM**	**ELECTIVE**	**90**	**6**	**-**	**4**

Objective:

- Overview the advanced concepts of Database Management System
- Information retrieval using NoSQL database
- Incorporate transaction management with ACID properties

Syllabus

Unit I **(16 HOURS)**

Parallel Database: Introduction - Architecture for Parallel Databases - Parallel Query Evaluation - Parallelizing Individual Operations - Parallel Query Optimization.

Unit II **(20 HOURS)**

Distributed Database - Distributed DBMS Architectures - Storing Data in a Distributed DBMS - Distributed Catalog Management - Distributed Query Processing - Updating Distributed Data Distributed Transaction - Distributed Concurrency Control - Distributed Recovery.

Unit III **(18 HOURS)**

Object Database System: Motivating Example - Structured Data Types - Operations on Structured Data - Encapsulation and ADTs - Inheritance - Object, OIDs and Reference Types – Database Design for ORDBMS - ORDBMS Implementation Challenges - OODBMS - Comparing RDBMS, OODBMS, and ORDBMS.

Unit IV **(18 HOURS)**

Transactions: Transaction Concepts - Transaction Recovery – ACID Properties – System Recovery –Media Recovery – Two Phase Commit - SQL Facilities for recovery – Concurrency – Need for Concurrency – Locking Protocols – Two Phase Locking – Intent Locking – Deadlock-Serializability – Recovery Isolation Levels.

Unit V **(18 HOURS)**

Advanced Databases Information retrieval: Introduction - Indexing for Text Search - Web Search Engines- Managing Text in a DBMS - Data Model for XML - XQuery. Spatial data management: Types of Spatial Data and Queries - Applications Involving Spatial Data. NoSQL databases: Introduction - Column oriented stores- Key -Value stores - Document databases - Graph databases. Introduction to Map reduce and Hadoop.

Text Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS /EDITION	YEAR OF PUBLICATION
1	Ramez Elmasri Shamkant B. Navathe	Fundamentals of Database Systems	Pearson / Addison Wesley, 4th Edition	2007
2	Thomas Connolly and Carlolyn Begg	Database Systems, A Practical Approach to Design, Implementation and Management	Pearson Education, 3rd Edition	2003

ReferenceBooks:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS/ EDITION	YEAR OF PUBLICATION
1	Abraham Silberschatz, Henry F. Korthand S. Sudharshan	Database System Concepts	Tata McGraw Hill, 5th Edition	2006
2	Raghu Ramakrishnan , Johannes Gehrke	Database Management System	McGraw Hill Higher Education, 3rdEdition	2007
3	G.K.Gupta	Database Management systems	Tata McGraw Hill Private Limited	2011
4	Shashank Tiwari	Professional NoSQL	John Wiley & Sons	2011

Web References:

1. web.cs.wp.edu
2. www.commonlounge.com

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the concepts of parallel database and query	**K2**
CO2	Apply distributed transaction and concurrency control	**K3**
CO3	Test various queries ORDBMS and OODBMS	**K4**
CO4	Combine Advanced databases like Spatial and XML databases for handling data	**K5**
CO5	Deduct applications with Map Reduce concept	**K6**

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1	**S**	**S**	**S**	**M**
CO2	**S**	**S**	**M**	**S**
CO3	**S**	**S**	**S**	**S**
CO4	**S**	**S**	**S**	**S**
C05	**S**	**S**	**S**	**S**

S– Strong; M–Medium; L – Low

Pedagogy: Chalk and talk, Lecture, Discussion, Quiz, Demonstration, PPT

Course Designer: Ms.G.Sujatha

Semester II	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDITS**
19PCS2EC2C	**SOFTWARE PROJECT MANAGEMENT**	**ELECTIVE**	**90**	**6**	**-**	**4**

Objective

- Overview the key aspects of a software project and planning
- Prepare and managing software cost
- Understand the concept of risk engineering and continuous process improvement

Syllabus

Unit I **(15 HOURS)**

Software Management Renaissance: Conventional Software Management – Evolution of Software Economics – Improving Software Economics – The Old Way and the New.

Unit II **(15 HOURS)**

A Software Management Process Framework: Live-Cycle Phases – Artifacts of the Process – Model-Based Software Architectures – Work Flows of the Process – Check Points of the Process.

Unit III **(20 HOURS)**

Software Management Disciplines – I: Iterative Process Planning – Project Organizations and Responsibilities – Process Automation.

Unit IV **(20 HOURS)**

Software Management Disciplines – II: Project Control and Process Instrumentation – Tailoring the Process.

Unit V **(20 HOURS)**

Risk Management: Introduction – Risk – Categories of risk – A framework for dealing with risk – Risk Identification – Risk assessment – Risk Planning – Risk Management – Evaluating risks to schedule – Applying the PERT Technique – Monte Carlo Simulation – Critical Chain Concepts.

Text Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS / EDITION	YEAROF PUBLICATION
1.	Walker Royce	Software Project Management	Addison-Wesley	2006

Reference Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS / EDITION	YEAR OF PUBLICATION
1.	Bob Hughes, Mike Cotterell, Rajib Mall	Software Project Management	Tata McGraw Hill, Fifth Edition	2012

Web References:

1. http://sigc.edu/department/mca/studymet/SoftwareProjectManagment.pdf
2. http://www.pvpsiddhartha.ac.in/dep_it/lecture%20notes/SPM/unit4.pdf
3. http://www.pvpsiddhartha.ac.in/dep_it/lecture%20notes/SPM/unit5.pdf
4. https://www.tutorialride.com/software-engineering/risk-management-in-software-engineering.htm

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Discuss software development project plans	K2
CO2	Apply schedule and cost techniques to determine a basis of estimate	K3
CO3	Differentiate software life cycle support and the role of the software engineering supervisor	K4
CO4	Formulate software project management practices within an organization and recommend practical improvements based upon evaluation.	K5

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1	**S**	**S**	**S**	**M**
CO2	**S**	**S**	**S**	**M**
CO3	**S**	**S**	**S**	**M**
CO4	**S**	**S**	**S**	**M**

S– Strong; M–Medium; L – Low

Pedagogy: Chalk and talk, Lecture, Discussion, Quiz, Demonstration, PPT

Course Designer: Mrs.N.Agalya

Semester III	Internal Marks: -			External Marks:100		
COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDITS
19PCS3CC7	COMPUTER SCIENCE FOR COMPETITIVE EXAMINATIONS	CORE	90	6	-	5

Objective

- To understand the need for preparing competitive exams
- To study the basic concepts of core subjects in computer science
- To inculcate the knowledge of implementation of various concepts

Syllabus

UNIT I **(18 HOURS)**

Mathematical Logic: Propositional and Predicate Logic - Normal Forms- Predicates and Quantifiers-Rules of Inference-Sets and Relations: Probability - Group Theory –Graph Theory – Optimization-**Digital Logic:** Number systems- Boolean Algebra and Minimization of functions-Combinational Circuits – Sequential Circuits.

UNIT II **(18 HOURS)**

Computer Organization and Architecture: Machine Instruction and Addressing Modes – ALU & Data Path, CPU Control Design – Memory & I/O Interface – Instruction Pipeline – Cache and Main Memory, Secondary Storage – Microprocessor-Computer Graphics: **2-D Geometrical Transforms and Viewing- 3-D Object Representation, Geometric Transformations and Viewing- Software Engineering:** Software Process Models – Software Requirements – Software Design – Software Quality – Estimation and Scheduling of software projects – Software Testing – Software Configuration Management.

UNIT III **(18 HOURS)**

Database Management Systems: Basic concepts – Data Modeling – SQL – Normalization-Data models – Data Warehousing and Data Mining-**Operating System :** Basics of operating system - Process Management – Threads – CPU Scheduling – Deadlocks – Memory Management – Storage Management – File and Input/output Systems – Security – Linux – Distributed Systems-**Data Structures and Algorithms:** Linked Lists, Stacks and Queues – Trees-Searching - Sorting – Hashing - Asymptotic Analysis – Algorithm design techniques: Greedy Approach, Dynamic Programming Divide and Conquer – Graph Search, Minimum Spanning trees, Shortest paths – Complexity Theory.

UNIT IV **(18 HOURS)**

Theory of Computation: Finite Automata and Regular Languages–Context Free Languages and Push down Automata–Recursive Enumerable sets and Turing Machines – Syntax & Semantic Analysis-**Compiler Design:** Lexical Analysis and Parsing – Syntax Directed Translation-Intermediate code generation – Code optimization-**Data Communication and Computer Networks:** Concept of Layering – Network Types & Models – Functions of OSI & TCP/IP Layers - Flow and Error Control techniques, switching – IPV4/IPV6, routers and routing algorithms – TCP/UDP and sockets, congestion controls. Application Layer Protocols (WWW, DNS, SMTP, POP, FTP, and HTTP) -Network Security: authentication, basics of public key, cryptography, digital signatures and certificates, firewalls.

UNIT V **(18 HOURS)**

Number Systems- Series Completion -Coding & Decoding- Problems on Ages - Blood Relation - Probability – Permutation & Combination - Data Interpretation - ICT (Information and Communications Technology-Logical Reasoning & Non – Verbal Reasoning.

Case Study: **Programming Languages-** Programming in C- Object Oriented Programming – Programming in C++/JAVA - Web Programming.

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAROF PUBLICATION
1.	Dr.R.S.Aggarwal,	Quantitative Aptitude for Competitive Examinations	S.Chand Publishing	2017
2.	Dr.R.S.Aggarwal,	A modern Approach to verbal & Non-verbal Reasoning	S.Chand Publishing	2020
3.	R.Gupta	UGC – NET/SET Computer Science & Applications	R.Gupta	2015
4.	Surbhi Sharma,Kailasah Chandra Gurunani	UGC NET Computer Science and Applications	Arihant Publication	2018
5.	Trishna Knowledge Systems	GATE Computer Science and Information Technology-GATE 2020	Pearson	2019

Web References

1. https://www.careerbless.com/aptitude/qa/home.php
2. https://www.sawaal.com/aptitude-reasoning/quantitative-aptitude-arithmetic- ability-questions-and-answers.html
3. https://www.indiabix.com/non-verbal-reasoning/questions-and-answers/
4. https://www.geeksforgeeks.org/ugc-net-cs-preparation/
5. http://www.netugc.com/ugc-net-solved-question-papers-in-computer-science- and-applications
6. https://gatecse.in/
7. https://gateoverflow.in/

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Explain concepts of computer science core subjects	**K2**
CO2	Apply the knowledge to solve various types of problems	**K3**
CO3	Examine various computer science concepts on real time applications	**K4**
CO4	Develop a scientific aptitude and sense of reasoning	**K5**

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1	**S**	**S**	**S**	**S**
CO2	**S**	**S**	**S**	**S**
CO3	**S**	**S**	**S**	**M**
CO4	**S**	**S**	**S**	**M**

S – Strong; M – Medium; L - Low

Pedagogy Chalk and Talk, PPT, Discussion, Group discussion, Assignments, Workshops

Course Designer Ms.R.Ramya

Semester III	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDITS**
19PCS3CC8	**BIG DATA ANALYTICS**	**CORE**	**90**	**6**	**-**	**5**

Objective

- To provide knowledge about Big data Analytics
- To study the basic concepts on Data Science &Analytical Technologies
- To understand about Hadoop &MAPREDUCE fundamentals
- To inculcate knowledge about MongoDB & Cassandra

Syllabus

Unit I **(12 HOURS)**

Types of Digital Data: Classification of Digital Data - Characteristics of Data-Evolution of Big Data-Definition of Big Data-Challenges with Big Data- Characteristics of Big Data-Other characteristics of data - Need for Big Data.

Unit II *(18 HOURS)*

Big Data Analytics: Characteristics of Big Data analytics- Need for Big Data analytics-Classification of analytics-Greatest challenges that prevent businesses from capitalizing on Big Data –Importance of Big Data analytics – Data science-Data scientist- Terminologies used in Big Data environments-Analytics tools.

Unit III *(20 HOURS)*

Big data Technology: NoSQL - Hadoop. Introduction to Hadoop: Introducing Hadoop- Need for Hadoop-Limitations of RDBMS -RDBMS versus HADOOP-History of Hadoop – Hadoop overview-Interacting with Hadoop ecosystem –HDFS - Processing Data with Hadoop MapReduce – Managing resources and applications with Hadoop YARN-Introduction to MAPREDUCE programming.

Unit IV *(20 HOURS)*

Introduction to MongoDB: Need for MongoDB -Terms used in RDBMS and MongoDB - Data types in MongoDB- MongoDB Query Language.

Unit V *(20 HOURS)*

Introduction to Cassandra: An introduction -Features of Cassandra-CQL data types-CQLSH-Keyspaces-CRUD- Collections -Using a Counter – Time to live – Alter commands – Import and Export

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER/ EDITION	YEAROF PUBLICATION
1.	Seema Acharya, Subhashini Chellappan	Bigdata and Analytics	Wiley India Pvt.Ltd	2015

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1.	V.Bhuvaneswari T.Devi	Bigdata Analytics- A Practioner's Approach	Bharathiyar University, Coimbatore	2016
2.	Michael Minelli, Michele Chambers, Ambiga Dhiraj	Big data Big Analytics	Wiley	2013
3.	Bart Baesens	Analytics in a Big data World	Wiley	2014
4.	DT Editorial Services	Big data Black Book	Dreamtech Press	2016

Web References

1. https://webopedia.com/TERM/B/big_data_analytics.html
2. https://hadoop.apache.org/
3. https://www.mongodb.com/
4. https://www.tutorialspoint.com/cassandra/index.htm
5. https://www.edureka.co/blog/mapreduce-tutorial/

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamentals of Bigdata analytics	**K2**
CO2	Describe the Hadoop architecture and File system	**K2**
CO3	Apply the MapReduce Programming model for real-world problems	**K3**
CO4	Explore the concepts of NoSQL databases	**K4**
CO5	Develop a complete business data analytics solution	**K6**

Mapping with Programme Outcomes

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

S – Strong; M – Medium; L - Low

Pedagogy Chalk and talk, PPT, Discussion, Interactive Teaching, Group discussion and Workshops

Course Designer Ms.A.Sahaya Jenitha

Semester III	Internal Marks: 40			External Marks:60		
COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	CREDITS
19PCS3CC3P	PYTHON AND R LAB	CORE	90	-	6	4

Objective

- To write, test and debug simple Python programs
- To implement Python programs with list, tuples and dictionary
- To analyze the data using R

PYTHON PROGRAMMING

1. Create a calculator program
2. Demonstrate use of Loops
3. Demonstrate use of List
4. Demonstrate use of Tuples
5. Demonstrate use of Dictionaries
6. Explore string functions
7. Demonstrate usage of basic regular expression
8. Read and write a file
9. Demonstrate Exceptional Handling Technique
10. Create Comma Separate Files (CSV), Load CSV files into internal Data Structure

R PROGRAMMING

1. Demonstrate use of Data frames
2. Explore functions
3. Exporting data into CSV, Excel, SAS & STATA
4. Correlation with Matrix Example
5. Data Visualization
6. Demonstrate machine Learning algorithm
   i. Decision Tree
   ii. K-Means

Web References

1.https://www.programiz.com
2.https:// www.statmethods.net
3. https://www.datamentor.io/

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Write and debug simple Python programs with loops and conditions	K3
CO2	Use Python lists, tuples, dictionaries for representing compound data and apply file concept in Python	K4
CO3	Construct Python programs step-wise by defining functions and calling them	K5
CO4	Create a data frame and exporting data into various fileformats in R.	K5
CO5	Apply Machine Learning algorithm in R	K3

Mapping with Programme Outcomes

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

S – Strong; M – Medium; L – Low

Pedagogy Demonstration

Course Designer Ms.K.Reka

Semester III	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDITS**
19PCS3EC3A	**BLOCKCHAIN**	**ELECTIVE**	**90**	**6**	**-**	**4**

Objective

- Allow the students to explore the driving force behind the cryptocurrency
- Inculcate knowledge about Bitcoin, along with the Decentralization and Cryptography provides alternative to Bitcoins
- Initiate Smart contracts and currencies

Syllabus

UNIT I **(13 HOURS)**

Distributed systems- History of blockchain- Introduction to blockchain- Types ofBlockchain - CAP theorem and blockchain- Benefits and limitations of blockchain.

UNIT II **(17 HOURS)**

Decentralization using blockchain- Methods of decentralization- Routes to Decentralization- Decentralized organizations -Cryptography and Technical Foundations: Cryptographic primitives- Asymmetric cryptography- Public and private keys.

UNIT III **(20 HOURS)**

Bitcoin –Transactions- Blockchain- Bitcoin payments. Alternative Coins -Theoretical foundations- Bitcoin limitations- Name coin, Litecoin, Primecoin, Zcash.

UNIT IV **(20HOURS)**

Definition-Ricardian contracts: Smart contract templates-Deploying smart contracts on a blockchain.

UNIT V **(20 HOURS)**

Internet of Things- Government- Health- Finance- Media.

Text Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER/EDITION	YEAR OF PUBLICATION
1.	Imran Bashir	Mastering Blockchain	Packt, Birmingham, Mumbai	2018
2.	Andreas M.Antonopoulos	Mastering Bitcoin	O'REILLY,2nd Edition	2019

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER/EDITION	YEAR OF PUBLICATION
1.	Tiana Laurence	Blockchain for dummies	Wiley	2017

Web References

1.http://nptel.ac.in/courses/106106168/27
2. https://www.edx.org/learn/blockchain-cryptography
3.https://www.class-central.com/tag/blockchain
4.https://cognitiveclass.ai/courses/blockchain-course/
5. https://www.skillshare.com/browse/blockchain

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Define blockchain, types, applications &limitations	K1
CO2	Explore blockchain, cryptography concepts	K2
CO3	Enumerate bitcoin and other alternatives	K3
CO4	Differentiate various contracts	K4
CO5	Propose IoT in various sectors	K5

Mapping with Programme Outcomes

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

S – Strong; M – Medium; L – Low

Pedagogy Chalk and Talk, Discussion, Lecture, Quiz, PPT

Course Designer Ms.D.Radhika

Semester III	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDITS**
19PCS3EC3B	**PARALLEL PROCESSING**	**ELECTIVE**	**90**	**6**	**-**	**4**

Objective

- To study how parallel computers work
- To analyze the correct designs of parallel architectures, especially within the technological constraints
- To prepare students for a career in designing the computer systems of the future

Syllabus

UNIT I **(16 HOURS)**

Fundamentals of Parallel Processing – Evolution of Computer System- Trends towards parallel processing – Parallelism in Uniprocessor Systems – Parallel Computer Structures – Architectural Classification Schemes– Parallel Processing Applications.

UNIT II **(16 HOURS)**

Memory and Input-Output Subsystems: Hierarchical Memory Structure – Virtual Memory System – Memory Allocation and Management – Cache Memories and Management – Input-Output Subsystems.

UNIT III **(20 HOURS)**

Pipelining: An Overlapped Parallelism – Principles linear pipelining – classification of pipeline processors – general pipeline and reservation tables – arithmetic pipeline design examples – data buffering and bus Structure – internal forwarding and register tagging – hazard detection and resolution – job Sequencing and collision prevention – vector processing requirements – characteristics – Pipelined vector processing methods.

UNIT IV **(20 HOURS)**

Vectorization and Optimization Method- Language Features in Vector Processing – Design of Vectorizing Compilers-SIMD array processors – Organization – Masking and Data routing – Inter PE Communications – SIMD Interconnection Networks – Static vs Dynamic network– Mesh connected Illiac network– Cube Interconnection network – Barrel Shifter and Data Manipulator - Shuffle-exchange and Omega networks- GPU Basics-Architecture of a modern GPU-Evolution of Graphics Pipelines-GPGPU-An intermediate Step-GPU computing.

UNIT V **(18 HOURS)**

Multiprocessors Architecture and Programming - Functional Structures - Interconnection Networks – Time Shared or Common Buses- Crossbar Switch and Multiport Memories- Multistage Networks for Multiprocessors- Parallel Memory Organizations - Multiprocessor Operating Systems –Multiprocessor Scheduling Strategies.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER/ EDITION	YEAR OF PUBLICATION
1.	Kai Hwang, Faye A. Briggs	Computer Architecture and Parallel Processing	McGraw Hill International Edition	2017

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER/ EDITION	YEAR OF PUBLICATION
1.	Sajjan G. Shiva	Advanced Computer Architecture	Taylor & Francis	2006
2.	Kai Hwang	Advanced Computer Architectures: Parallelism, Scalability, Programmability	Tata McGraw Hill	2003
3.	David B.Kirk, Wen-mei W.Hwu	Programming Massively Parallel Processors	MK Publications, Second Edition	2013

Web References

1. https://www.tutorialspoint.com/parallel_computer_architecture/index.htm
2. https://www.geeksforgeeks.org/introduction-to-parallel-computing/
3. https://www.studytonight.com/computer-architecture/parallel-processing-and-data-transfer
4. https://www.nlb.gov.sg/biblio/12672553
5. https://vincyjoseph.files.wordpress.com/2014/01/computer_architecture_hwang_brigg.pdf
6. http://digilib.stmikbanjarbaru.ac.id/data.bc/18.%20Programming/2013%20Programming%20Massively%20Parallel%20Processors%20A%20Hands-on%20Approach%202nd.pdf

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Discuss the concepts of parallel processing including various kinds of system architectures	K2
CO2	Illustrate the issues and techniques in improving performance of SIMD Computers	K3
CO3	Compare the pipeline and parallel concepts	K4
CO4	Categorize the Multiprocessor systems, cache coherence and Interconnection networks	K5

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1	**S**	**S**	**M**	**S**
CO2	**S**	**M**	**M**	**S**
CO3	**S**	**S**	**S**	**S**
CO4	**S**	**S**	**S**	**S**

S – Strong; M – Medium; L - Low

Pedagogy Chalk and talk, Lecture, Discussion, Quiz, Demonstration, PPT

Course Designer Mrs.R.Ramya

Semester III	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDITS**
19PCS3EC3C	**COMPILER DESIGN**	**ELECTIVE**	**90**	**6**	**-**	**4**

Objective

- To enrich the knowledge in various phases of compiler and its uses
- Learn code optimization techniques, machine code generation and use of symboltable
- To identify the similarities and differences among various parsing techniques and grammar transformation techniques

Syllabus

UNIT I **(18 HOURS)**

Introduction to Compiler– Phases of a Compiler – Cousins of Compiler- Lexical analysis: Role of a lexical analyzer – Input buffering –Specification of tokens – Finite Automata: Nondeterministic Finite Automata-Deterministic Finite Automata- Conversion of NFA to DFA-Constructing NFA from Regular Expression.

UNIT II **(18 HOURS)**

Syntax Analysis: Role of parser-Context Free Grammar-Regular Expression Vs. Context Free Grammar-Elimination of Left Recursion-Left Factoring- Top down parsing – Simple bottom up parsing – Shift reducing parsing.

UNIT III **(20 HOURS)**

LR Parsers - LR parsing algorithms-Constructing SLR parsing tables-Constructing Canonical LR parsing tables-Constructing LALR parsing table-Parser Generator-YACC.

UNIT IV **(18 HOURS)**

Run-time environment - Source language issues – Storage organizations – Storage allocation strategies –Parameter Passing- Intermediate code generation: Intermediate languages – Declarations – Assignment statements- Backpatching

UNIT V **(16 HOURS)**

Code generation - Issue in design of code generator – The target machine – Runtime storage management – Basic clocks and flow graphs – DAG representation of Basic Blocks- Code optimization: Introduction – Principle source of code optimization – Optimization of basic blocks-Peephole Optimization

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1	Alfred V.Aho, Ravi Sethi, Jeffrey D.Ullman,Monica S.Lam	Compilers Principles, Techniques and Tools	Pearson Education, 6th Edition	2007

References Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER/ EDITION	YEAR OF PUBLICATION
1	Parag H. Dave, Himanshu B. Dave	Compilers: Principles and Practice	Pearson	2012
2	Raghavan V	Principles of Compiler Design	Tata Mc-Graw Hill Education Pvt. Ltd	2017

Web References

1. https://www.slideshare.net/appasami/cs6660-compiler-design-notes?next_slideshow=1
2. https://www.slideshare.net/mir_majid_kant/lec00-outline
3. https://www.ssmengg.edu.in/weos/weos/upload/EStudyMaterial/Cse/6th%20sem/compiler%20design/compiler%20design.pdf
4. http://www.engppt.com/2009/08/compiler-design-ppt_21.html
5. https://www.slideshare.net/fellowbuddy/compiler-design-lecture-notes
6. https://www.slideshare.net/eelcovisser/lr-parsing-71059803
7. http://www.d.umn.edu/~rmaclin/cs5641/Notes/Lecture9.ppt
8. https://www.cse.iitm.ac.in/~krishna/cs3300/lecture2.pdf

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Construct grammars and automata for regular language	K3
CO2	Analyze the knowledge of patterns, tokens & regular expressions for solving a problem	K4
CO3	Develop new code optimization techniques for improving the performance of a program in terms of speed & space	K5
CO4	Predict symbol table and generate intermediate code	K6

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1	**S**	**S**	**M**	**S**
CO2	**S**	**S**	**S**	**S**
CO3	**S**	**S**	**S**	**S**
CO4	**S**	**S**	**S**	**S**

S – Strong; M – Medium; L - Low

Pedagogy Chalk and Talk , PPT , Discussion, Assignment, Demonstration, Quiz, Case study

Course Designer Dr.P.Rajeswari

Semester III	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDITS**
19PCS3EC4A	**ROBOTIC PROCESS AUTOMATION**	**ELECTIVE**	**90**	**6**	**-**	**4**

Objective

- To enrich the knowledge in Robotic Process Automation
- Learn sequence and control flow
- To know about the RPA Use cases

Syllabus

UNIT I **(15 HOURS)**

What is Robotics Process Automation: Scope and Techniques of Automation - Robotic Process Automation – The Future of Automation.

UNIT II **(20 HOURS)**

Sequence, Flow Chart and Control Flow: Sequencing the Workflow – Activities – Control Flow, Various Types of Loops and Decision Making, Step-by-step example using Sequence and Flow Chart - Step-by-step example using Sequence and Control Flow.

UNIT III **(20 HOURS)**

Data Manipulation: Variables and Scope – Collections – Arguments – Purpose and use – Data Table usage with examples – Clipboard Management – File Operation with step-by-step example – CSV/Excel to data table and vice versa.

UNIT IV **(20 HOURS)**

Taking Control of The Controls System: Finding and Attaching Windows – Finding the Control – Techniques for waiting for a control – Act on Controls – Mouse and Keyboard Activities – Working with Ui Explorer – Handling events – Revisit Recorder – Screen Scraping – When to use OCR –Types of OCR available – How to use OCR – Avoiding Typical failure points**.**

UNIT V **(15 HOURS)**

RPA Use cases: RPA in Banking – Excel Automation – PDF Data Extraction & Automation – RPAData Migration and Entry – Email Automation

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Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1.	Alok Mani Tripathi	Learning Robotic Process Automation	Packt, Birmingham	2018

Reference Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1	Steve Kaelble	Robotic Process Automation for dummies	NICE RPA team	2018

Web References

1. **https://www.edureka.co/blog/rpa-tutorial/**
2. **https://www.udemy.com/course/robotic-process-automation/**
3. **https://www.guru99.com/robotic-process-automation-tutorial.html**
4. **https://www.automationanywhere.com/in/robotic-process-automation**
5. **https://www.uipath.com/blog/learning-robotic-process-automation-through-video tutorials**

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Learn Robotic Process Automation and its Features	K1
CO2	Explore Control Flow and Decision Making	K2
CO3	Enumerate Clipboard Management	K3
CO4	Differentiate various controls	K4

Mapping with Programme Outcomes

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

S – Strong; M – Medium; L - Low

Pedagogy Chalk and Talk, Discussion, Lecture, Quiz, PPT

Course Designer Ms.R.Sangeetha

Semester III	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDIT**
19PCS3EC4B	**MACHINE LEARNING**	**ELECTIVE**	**90**	**6**	**-**	**4**

Objective

- Introduce and define the meaning of Machine Learning
- Explore various paradigms for knowledge encoding in computer systems.
- Also introduce the concept of learning patterns from data and develop a strong theoretical foundation for understanding state of the art Machine Learning algorithms.

Syllabus

UNIT I **(15 HOURS)**

Introduction to machine learning- What is machine learning – Classification, Supervised/Unsupervised Learning, Probably Approximately Correct (PAC) Learning.

UNIT II **(15 HOURS)**

Bayesian Decision Theory: Classification, Losses and Risks, Discriminant Functions, Utility Theory- Evaluating an Estimator: Bias and Variance- The Bayes' Estimator Parametric Classification-Model Selection Procedures.

UNIT III **(20 HOURS)**

Multivariable Methods: Multivariate Data – Parameter Estimation – Estimation of Missing Value – Multivariate Normal Distribution – Multivariate Regression – Dimensionality Reduction – Factor Analysis – Multidimensional Scaling – Locally Linear Embedding.

UNIT IV **(20 HOURS)**

Clustering: K-Means Clustering – Mixtures of Latent Variable Models – Hierarchical Clustering – Nonparametric Methods Nonparametric Density Estimation – K-Nearest Neighbor Estimator – Nonparametric Classification – Smoothing Models.

UNIT V **(20 HOURS)**

Decision Trees: Univariate Trees – Pruning – Rule Extraction from Trees – Multivariate Trees – Linear Discrimination: Generalizing the Linear Model – Logistic Discrimination – Discrimination by Regression.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1.	Ethem Alpaydin	Introduction to Machine Learning	MIT Press, Third Edition	2014

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1.	Tom M. Mitchell	Machine Learning	McGraw Hill Education (India) PrivateLimited	2013
2.	Peter Norvig Stuart Russell	Artificial Intelligence A Modern Approach	Pearson, Third Edition	2015

Web References

1.https://expertsystem.com/machine-learning-definition/

2.https://www.geeksforgeeks.org/machine-learning/

3.https://www.edureka.co/blog/what-is-machine-learning/

4.https://towardsdatascience.com/the-5-clustering-algorithms-data-scientists-need-to-know-a36d136ef68

Course Outcomes

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

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL
CO1	Describe the theory underlying machine learning	K1
CO2	Classify knowledge about Modeling and prediction and basic feature engineering	K2
CO3	Use linear models and non-linear models	K3
CO4	Make inferences on algorithm using tree, rule based models and analyze reinforcement learning techniques	K4
CO5	Construct algorithms using Python and R	K5

Mapping with Programme Outcomes

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

S – Strong; M – Medium; L – Low

Pedagogy Chalk and Talk , PPT , Discussion, Assignment, Demo, Quiz, Case study

Course Designer Ms.V.Kavitha

Semester III	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDITS**
19PCS3EC4C	**IoT**	**ELECTIVE**	**90**	**6**	**-**	**4**

Objective

- To understand the technology behind Internet of Things
- To get familiar with the design principles of connected devices
- To know about IoT platforms and design methodologies

Syllabus

UNIT I **(15 HOURS)**

Introduction to IoT: Physical Design of IoT – Logical Design of IoT – IoT Enabling Technologies – IoT Levels & Deployment Templates – Domain Specific IoTs: Home Automation – Cities – Environment –Energy – Logistics – Retail – Agriculture.

UNIT II **(20 HOURS)**

IoT and M2M: Introduction – M2M – Different between IoT and M2M – SDN and NFV for IoT– IoT System Management with NETCONF- YANG: Simple Network Management Protocol (SNMP)- Network operator Requirement – NETCONF – YANG- NETOPEER – Developing IoT: IoT platforms design methodology – IoT Design Methodology – Motivation for using Python.

UNIT III **(20 HOURS)**

IoT Systems – Logical Design using python: Introduction – Installing Python – python Data Types & Data Structures – Control Flow – Functions – Modules – Packages-File handling-date/Time Operations-classes-Python Packages of interest for IoT – IoT physical Devices and End points : What is an IoT Device – Exemplary Devices - Raspberry pi Interfaces – Programming Raspberry pi with Python – other IoT Devices.

UNIT IV **(15 HOURS)**

Data Analytics for IOT: Apache Hadoop – Using Hadoop MapReduce for Batch Data Analysis – Apache Spark – Apache Storm- Using Apache Storm for Real–time Data Analysis.

UNIT V **(20 HOURS)**

IoT Physical Servers and Cloud Offerings: Introduction to Cloud Storage Models & Communication APIs – WAMP – Auto Bahn for IoT – Amazon Web Services for IoT - Tools forIoT: Puppet – Case Study on IoT System for Weather Monitoring.

Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1	Arshdeep Bahga, Vijay Madisetti	Internet of Things A Hands on Approach	University press	2014

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER/EDITION	YEAR OF PUBLICATION
1.	David Hanes, Gonzalo Salgueiro, Patrick Grossette, Robert Barton, Jerome Henry	IoT Fundamentals, Networking Technologies, Protocols and Use cases for Internet of Things	Cisco Press	2017
2.	Olivier Hersent, David Boswarthick, Omar Elloumi	The Internet of Things – Key applications and Protocols	Wiley	2012
3.	Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stamatis Karnouskos, Stefan Avesand, David Boyle	From Machine to Machine to the Internet of Things – Introduction to a new age of Intelligence	Elsevier	2014

Web References

1. https://github.com/connectiot/iottoolkit
2. https://www.arduino.cc/
3. https://www.tutorialspoint.com/
4. https://www.guru99.com/
5. https://www.pythonforbeginners.com/

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Illustrate IoT enabling Technologies	K3
CO2	Analyze applications of IoT in real time scenario	K4
CO3	Design a portable IoT using Raspberry pi / equivalent boards and relevant protocols	K5

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1	**S**	**S**	**S**	**S**
CO2	**S**	**S**	**S**	**S**
CO3	**S**	**S**	**S**	**S**

S – Strong; M – Medium; L – Low

Pedagogy Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz, Case study

Course Designer Ms P.Muthulakshmi

Semester IV	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDIT**
19PCS4CC9	**CLOUD COMPUTING**	**CORE**	**90**	**6**	**-**	**5**

Objective:

- To provide an in-depth and comprehensive knowledge of the Cloud Computing fundamental issues, technologies, applications and implementations.
    - To motivate students to do programming and experiment with the various cloud computing environments
- To introduce about the Cloud Standards

Syllabus:

UNIT I: (15 HOURS)

Defining Cloud Computing- Cloud Types: The NIST model - The Cloud Cube Model - Deployment models - Service models - Examining the Characteristics of Cloud Computing: Paradigm shift - Benefits of cloud computing - Disadvantages of cloud computing - Assessing the Role of Open Standards. Assessing the Value Proposition: Early adopters and new applications - The laws of cloud eonomics - Cloud computing obstacles - Behavioral factors relating to cloud adoption.

UNIT II: (20 HOURS)

Understanding Cloud Architecture: Exploring the Cloud Computing Stack– Composability- Infrastructure – Platforms - Virtual Appliances - Communication Protocols – Applications. Understanding Services and Applications by Type: Defining Infrastructure as a Service (IaaS) - Defining Platform as a Service (PaaS) - Defining Software as a Service (SaaS) - SaaS characteristics - Open SaaS and SOA.

UNIT III: (20 HOURS)

Understanding Abstraction and Virtualization: Using Virtualization Technologies - Load Balancing and Virtualization: Advanced load balancing - The Google cloud - Understanding Hypervisors: Virtual machine types - VMware vSphere - Understanding Machine Imaging: Porting Applications - The Simple Cloud API - AppZero Virtual Application Appliance. Capacity Planning - Load testing - Resource ceilings - Server and instance types.

UNIT IV: (20 HOURS)

Understanding Cloud Security: Securing the Cloud – Securing Data – Establishing Identity and Presence. Using the Mobile Cloud: Working with Mobile Devices – Defining the Mobile Market – Using Smartphones with the Cloud. Working with Mobile Web Services: Understanding Service Types – Performing Service Discovery – Using SMS – Defining WAP and other Protocols – Performing Synchronization.

UNIT V: (15 HOURS)

Cloud Programming and Software Environments: Parallel and distributed programming paradigms – Programming support of Google App Engine – Programming on Amazon AWS and Microsoft Azure – Emerging Cloud software environments.

Text Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1	Barrie Sosinsky	Cloud Computing Bible	Wiley Publishing Inc	2011
2	Kai Hwang, Geoffrey C. Fox and Jack J. Dongarra	Distributed and Cloud computing: From parallel processing to the Internet of Things	Morgan Kaufmann	2013

Reference Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1	Michael Miller	Cloud Computing	Pearson Education Inc., 7th Edition	2012
2	Rajkumar Buyya & Co.	Cloud Computing Principles and Paradigms	John Wiley & Sons Publications	2011

Web References:

1. https://www.tutorialspoint.com/cloud_computing/index.htm
2. https://data-flair.training/blogs/cloud-computing-tutorial/

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Explain the cloud paradigm and its various forms of services	K3
CO2	Illustrate the architecture, infrastructure and delivery models	K3
CO3	Apply suitable virtualization concepts	K4
CO4	Solve problems using cloud toolkit	K4
CO5	Create interactive mobile services	K5

Mapping with Programme Outcomes

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

S- Strong; M- Medium; L- Low

Pedagogy: Chalk and talk, Discussion, Quiz, Assignments & PPT

Course Designer: Ms.P.Muthulakshmi

Semester IV	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDIT**
19PCS4CC10	**DIGITAL IMAGE PROCESSING**	**CORE**	**90**	**6**	**-**	**5**

Objective:

- To impart the knowledge of image fundamentals and mathematical transforms necessary for image processing
- To understand the image enhancement techniques
- To study image compression procedures
- To study the image segmentation and representation techniques

Syllabus:

UNIT-I (14 HOURS)

Introduction to Image Processing: Overview of Image Processing-Nature of Image Processing-Image Processing and Related Fields-Digital Image Representation-Types of Images-Digital Image Processing Operations-Fundamental Steps in Image Processing- Image Processing Applications-Digital Imaging System- Colour Image Processing: Colour Models- Colour Quantization.

UNIT-II (18 HOURS)

Image Acquisition: Physical and biological aspects-Sampling and Quantization-Image quality-Image Transforms: Need for Image Transforms-Properties of Fourier Transform-Discrete Cosine Transform- Discrete Sine Transform- Walsh Transform-Hadamard Transform-Haar Transform-Slant Transform-SVD and KL Transforms.

UNIT-III (19 HOURS)

Image Enhancement and Restoration: Image Quality and Need for Image Enhancement-Point Operations-Spatial Filtering Concepts-Frequency Domain Filtering-Image Degradation Model-Categories of Image Degradations-Image Restoration Techniques.

UNIT-IV (19 HOURS)

Image Segmentation: Introduction-Classification of Image Segmentation Algorithms-Detection of Discontinuities-Edge Detection-Hough Transforms and Shape Detection-Corner Detection-Principles of Thresholding

UNIT-V (20 HOURS)

Image Compression: Image Compression Models – Compress Algorithms and its types – Types of Redundancy – Lossless Compression Algorithms – Lossy Compression Algorithms – Image and Video Compression Standards.

Case study: Face Recognition-Iris Recognition-Fingerprint Recognition-Signature Verification

Text Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1	Dr.S.Sridhar	Digital Image Processing	Oxford University Press	2012

Reference Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1	Anil Jain K.	Fundamentals Of Digital Image Processing	PHI Learning Pvt. Ltd	2011
2	Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins	Digital Image Processing Using MATLAB	Third Edition Tata Mc Graw Hill Pvt. Ltd	2011
3	Malay K. Pakhira	Digital Image Processing And Pattern Recognition	PHI Learning Pvt. Ltd, 1st Edition	2011

Web References:

1. ***http://www.cs.nmt.edu/~ip/lectures.html***
2. ***http://cvc.yale.edu/projects/yalefaces/yalefaces.html***
3. ***https://bestlearning.gnomio.com/***

Course Outcomes

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamentals concepts of digital image processing and image transforms	K2
CO2	Analyze images in the frequency domain using various transforms	K4
CO3	Evaluate the techniques for image enhancement and image restoration	K5
CO4	Interpret image segmentation techniques	K3
CO5	Compare various compression techniques	K4
CO6	Apply image processing algorithms in practical applications	K3

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1	S	S	S	S
CO2	S	S	S	S
CO3	S	S	M	S
CO4	S	M	S	S
CO5	S	S	S	S
CO6	S	S	S	S

S – Strong; M – Medium; L – Low

Pedagogy: Power point Presentation, e-content.

Course Designer : Ms.K.Reka

Semester IV	Internal Marks: 40			External Marks: 60		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDIT**
19PCS4CC4P	**FOSS LAB**	**CORE**	**90**	**-**	**6**	**4**

Objective:

- To expose students to FOSS environment
- To use and modify existing programs using open source packages/Technologies
- To inculcate knowledge in developing new software

Syllabus:

1. Linux
2. GIMP: GNU Image Manipulation Program
3. Apache Struts
4. Perl
5. Ruby
6. Apache Cassandra database
7. Mongo DB
8. Hadoop

Web References:

1. https://www.vmware.com/
2. https://www.cyberciti.biz/tips/linux-unix-bsd-documentations.html
3. https://developer.gimp.org/api/2.0/
4. https://struts.apache.org/
5. https://www.tutorialspoint.com/perl/perl_references.html
6. https://www.ruby-lang.org/en/documentation/
7. https://cassandra.apache.org/doc/latest/
8. https://docs.mongodb.com/manual/reference/database-references/
9. https://hadoop.apache.org/

Course Outcomes:

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

CO Number	CO Statement	Knowledge Level
CO1	Ability to install and run open-source operating systems	K1
CO2	Explain open source project structure and how to successfully setup a project	K2
CO3	Ability to contribute software to and interact with Free and Open Source Software development projects	K3
CO4	Exploring the Hadoop Distributed File System (HDFS)	K3

Mapping with Programme Outcomes:

Cos	PO1	PO2	PO3	PO4
CO1	S	S	S	S
CO2	S	S	S	S
CO3	S	S	S	S
CO4	S	S	S	S

S – Strong; M – Medium; L – Low

Pedagogy **:** Demonstration

Course Designers: Ms.S.Udhayapriya & Ms.V.Kavitha

Semester IV	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDIT**
19PCS4EC5A	**WIRELESS SENSOR NETWORKS**	**ELECTIVE**	**90**	**6**	**-**	**4**

Objective:

- To get a thorough knowledge of sensors and its architecture
- To learn about the characteristics of wireless transmission
- To gain the exposure of sensor platform and its tools

Syllabus:

UNIT I **(13 HOURS)**

OVERVIEW OF WIRELESS SENSOR NETWORKS: Application Examples-Types of Applications -Challenges for Wireless Sensor Networks- Enabling Technologies for Wireless Sensor Networks.

UNIT II **(17 HOURS)**

ARCHITECTURES: Single-Node Architecture - Hardware Components-Energy Consumption of Sensor Nodes - Operating Systems and Execution Environments- Network Architecture - Sensor Network Scenarios- Optimization Goals and Figures of Merit- Gateway Concepts.

UNIT III **(20 HOURS)**

NETWORKING SENSORS: Physical Layer and Transceiver Design Considerations- MAC Protocols for Wireless Sensor Networks- Low Duty Cycle Protocols and Wakeup Concepts - S-MAC-The Mediation Device Protocol-Wakeup Radio Concepts-Address and Name Management- Assignment of MAC Addresses- Routing Protocols Energy-Efficient Routing-Geographic Routing.

UNIT IV **(20 HOURS)**

INFRASTRUCTURE ESTABLISHMENT: Topology Control-Clustering-Time synchronization- Localization and Positioning- Sensor Tasking and Control.

UNIT V **(20 HOURS)**

SENSOR NETWORK PLATFORMS AND TOOLS: Sensor Node Hardware – Berkeley Motes-Programming Challenges- Node level software platforms- Node-level Simulators- State-centric programming.

Text Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1.	Holger Karl, AndreasWillig	Protocols and Architectures for Wireless Sensor Networks	John Wiley	2011
2.	Feng Zhao, LeonidasJ. Guibas	Wireless Sensor Networks- An Information Processing Approach	Elsevier	2007

Reference Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1.	Kazem Sohraby, Daniel Minoli, and Taieb Znati	Wireless Sensor Networks-Technology, Protocols and Applications	John Wiley	2007
2.	Anna Hac	Wireless Sensor Network Designs	John Wiley	2003

Web References:

1. www.cs.wpi.edu
2. sensors-and-networks.blogspot.com
3. www.tfb.edu.mk

Course Outcomes:

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

CO Number	CO Statement	Knowledge Level
CO1	Define the wireless sensor, various platforms and its issues	K1
CO2	Review the various deployment mechanisms	K2
CO3	Construct the MAC layer and its issues	K3
CO4	Differentiate architectures, functions and performance of wireless sensor networks systems and its platforms	K4
CO5	Propose various routing protocols	K5

Mapping with Programme Outcomes:

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

S – Strong; M – Medium; L – Low

Pedagogy : Chalk and Talk, Discussion, Lecture, Quiz, PPT

Course Designer : Ms.D.Radhika

Semester IV	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDIT**
19PCS4EC5B	**MANET**	**ELECTIVE**	**90**	**6**	**-**	**4**

Objective:

- Able to understand the principles of adhoc networks
- To get a knowledge of routing protocols and their performance
- Gain battery management schemes
- Identify issues and solutions of transport layer

Syllabus:

UNIT I **(12 HOURS)**

Adhoc Networking-Model of Operation-Commercial Applications-Technical factors affecting Adhoc networks.

UNIT II **(18 HOURS)**

Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks – Classifications of Routing Protocols – Table–Driven Routing Protocols – On Demand Routing Protocols-Hybrid Routing Protocols.

UNIT III **(20 HOURS)**

Issues in Designing a Multicast Routing Protocol –Classifications of Multicast Routing Protocols – Tree–Based Multicast Routing Protocols– Mesh–Based Multicast Routing Protocols– Energy–Efficient Multicasting – Multicasting with Quality of Service Guarantees – Application – Dependent Multicast Routing.

UNIT IV **(20 HOURS)**

Transport layer: Issues in designing- Classification of Transport Layer Solutions-Security in Adhoc Wireless Networks-Secure Routing in Adhoc Wireless Networks-Network Layer Solutions-QoS Frameworks for Adhoc Wireless Networks.

UNIT V **(20 HOURS)**

Battery Management Schemes-Transmission Power Management Schemes-Recent advances in Wireless Networks-Ultra Wide Band Radio Communication-Wireless Fidelity Systems.

Text Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1.	C.Siva Ram Murthy, B.S.Manoj	Ad hoc Wireless Networks Architectures and protocols	Pearson Education	2007
2.	Charles E. Perkins	Adhoc Networking	Addison-Wesley Professional	2008

Reference Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1.	Stefano Basagni, MarcoConti, Silvia Giordano and Ivan Stojmenovic	Mobile ad hoc Networking	Wiley-IEEE press	2004
2.	Mohammad Ilyas	The handbook of adhoc wireless networks	CRC press	2002

3.	C. K. Toh	Ad Hoc Mobile Wireless Networks Protocols and Systems	Prentice Hall	2001

Web References:

1. en.wikipedia.com
2. tools.ietf.com
3. folk.uio.no
4. www.ietf.org
5. Tandfonline.com
6. books.google.co.in

Course Outcomes:

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

O Number	CO Statement	Knowledge Level
CO1	State the adhoc networks, characteristics and its features	K1
CO2	Review the protocol design issues of adhoc networks	K2
CO3	Examine the transport layer issues	K3
CO4	Compare QoS related performance measurements of ad hoc and sensor networks	K4

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4
CO1	**S**	**S**	**S**	**S**
CO2	**S**	**S**	**S**	**S**
CO3	**S**	**S**	**S**	**S**
CO4	**S**	**S**	**S**	**S**

S – Strong; M – Medium; L - Low

Pedagogy : Lecture, Quiz, and PPT

Course Designer : Ms.D.Radhika

Semester IV	Internal Marks: 25			External Marks:75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**L**	**T**	**P**	**CREDIT**
19PCS4EC5C	**MOBILE COMPUTING**	**ELECTIVE**	**90**	**6**	**-**	**4**

Objective:

- To understood Wireless networks GSM, UMTS and WAP Architecture
- To gain basic knowledge about Android application development
- To create real time app using content providers and Threads

Syllabus:

UNIT I (15 HOURS)

Applications – Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing – Wireless Transmission – Multiplexing. Telecommunication system: Telecommunication system– GSM – Architecture- Handover-Security.

UNIT II (15 HOURS)

Wireless LAN: IEEE 802.11 – System Architecture-MAC Frame – MAC Management – Bluetooth - Architecture. Mobile IP: Goals – Packet Delivery –Strategies – Registration – Ad hoc Networks – Routing Strategies.

UNIT III (21 HOURS)

Getting started with Android programming: What Is Android? - Obtaining the Required Tools - Creating Your First Android Application - Anatomy of an Android Application - Activities, Fragments, and Intents**:** Understanding Activities- Linking Activities Using Intents –Fragments - Calling Built-In Applications Using Intents.

UNIT IV (21 HOURS)

Getting to know the Android user interface: Understanding the Components of a Screen-Adapting to Display Orientation - Managing Changes to Screen Orientation - Utilizing the Action Bar - Designing your user interface with views: Using Basic Views - Using Picker Views - Using List Views to Display Long Lists- Understanding Specialized Fragments- Displaying pictures and menus with views.

UNIT V (18 HOURS)

Content providers: Sharing Data in Android - Using a Content Provider– Messaging: SMS Messaging-Sending E-mail –Location based services: Displaying Maps - Getting Location Data - Monitoring a Location - Developing Android services: Creating Your Own Services- Establishing Communication between a Service and an Activity -Binding Activities to Services- Understanding Threading.

Text Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1.	Jochen H.Schiller	Mobile Communications	Addison Wesley Pearson Education	2014
2.	Wei Meng Lee	Beginning Android 4 Application Development	Wiley India Pvt. Ltd	2012

Reference Books:

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHER /EDITION	YEAR OF PUBLICATION
1.	Raj Kamal	Mobile Computing	Oxford University Press	2012
2.	Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal	Mobile Computing	Tata Mcgraw Hill Publishing company limited	2010

Web References:

1. http://developer.android.com/guide/index.html.
2. http://developer.android.com/reference/packages.html
3. http://developer.android.com/guide/components/fundamentals.html
4. http://www.gsm-files.com/

Course Outcomes:

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

Co Number	CO Statement	Knowledge Level
CO1	Illustrate the concepts of Multiplexing, GSM Architecture and its Protocols	K3
CO2	Analyze Messaging and Location based services	K4
CO3	Categorize Activities, Fragments, Intents & Views	K5

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4
CO1	**S**	**S**	**S**	**S**
CO2	**S**	**S**	**S**	**S**
CO3	**S**	**S**	**S**	**S**

S – Strong; M – Medium; L – Low

Pedagogy : Chalk and Talk, Lecture, Discussion, PPT, Demonstration

Course Designer: Mrs. K.Pradeepa