DEPARTMENT OF INFORMATION TECHNOLOGY

M.Tech.– INFORMATION TECHNOLOGY

CURRICULUM & SYLLABI

Regulations 2020

(Applicable to candidates admitted in the academic year 2020 - 2021 onwards)

K.S.R. College of Engineering(Autonomous)

(Approved by AICTE, Accredited by NAAC with A++ grade & Affiliated to Anna University)

K.S.R.KalviNagar,Tiruchengode–637215 Namakkal (Dt), Tamilnadu, India

Email: info@ksrce.ac.in Website: www.ksrce.ac.in

K.S.R. COLLEGE OF ENGINEERING: TIRUCHENGODE - 637 215

(Autonomous)

DEPARTMENT OF INFORMATION TECHNOLOGY

(REGULATIONS 2020)

Vision of the Institution

IV	We envision to achieve status as an excellent Educational Institution in the global knowledge hub, making self-learners, experts, ethical and responsible engineers, technologists, scientists, managers, administrators and entrepreneurs who will significantly contribute to research and environment friendly sustainable growth of the nation and the world.

Mission of the Institution

IM 1	To inculcate in the students self-learning abilities that enable them to become competitive and considerate engineers, technologists, scientists, managers, administrators and entrepreneurs by diligently imparting the best of education, nurturing environmental and social needs.
IM 2	To foster and maintain mutually beneficial partnership with global industries and Institutions through knowledge sharing, collaborative research and innovation.

Vision of the Department / Programme: Information Technology

DV	To produce excellent and competent software professional, researchers and responsible engineers, who can significantly contribute to environment friendly societal industry through quality education.

Mission of the Department / Programme: Information Technology

DM1	To make the students competitive and efficient in technical field through technological transformations in Information Technology, by providing them advanced curriculum, infrastructure and nurturing human values.
DM2	To provide an excellent forum for higher studies that leads to careers as Computer and IT professionals in the widely diversified domains of industry, government and academia.

Programme Educational Objectives (PEOs) of M.Tech. - Information Technology

PEO 1	**Evaluate Solutions:** Incorporate with necessary background and significantly contribute to contemporary research in information technology to investigate complex problems.
PEO 2	**Novelty in Technology:** Apply and disseminate intellectual ideas related to IT field and advance in their profession.
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Programme Outcomes (POs) of M.Tech./Information Technology (Regulations 2020)

M.Tech. Information Technology graduates will be able to:

PO1	An ability to independently carry out research /investigation and development work to solve practical problems.
PO2	An ability to write and present a substantial technical report/document.
PO3	Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.
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Department	Department of Information Technology	
Programme	M.Tech – Information Technology	

SEMESTER – I

Sl.No.	Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
			L	T	P	C	CA	ES	Total
THEORY									
1.	IT20111	Advanced Data Structures	3	0	0	3	30	70	100
2.	IT20112	Research Methodology and IPR	2	0	0	2	30	70	100
3.		Professional Elective I	3	0	0	3	30	70	100
4.		Professional Elective II	3	0	0	3	30	70	100
PRACTICAL									
5.	IT20121	Advanced Data Structures Laboratory	0	0	4	2	50	50	100
6.	IT20122	XML and Web Services Laboratory	0	0	4	2	50	50	100
		Total	11	0	8	15	600		

SEMESTER - II

Sl.No.	Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
			L	T	P	C	CA	ES	Total
THEORY									
1.	IT20211	Advanced Algorithms	3	0	0	3	30	70	100
2.	IT20212	Soft Computing	3	0	0	3	30	70	100
3.	MA20231	Operations Research	3	0	0	3	30	70	100
4.		Professional Elective III	3	0	0	3	30	70	100
5.		Professional Elective IV	3	0	0	3	30	70	100
PRACTICAL									
6.	IT20221	Advanced Algorithms Laboratory	0	0	4	2	50	50	100
7.	IT20222	Software Development Laboratory	0	0	4	2	50	50	100
8.	IT20223	Mini Project with Seminar	2	0	0	2	50	50	100
		Total	17	0	8	21	800		

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Department	Department of Information Technology	
Programme	M.Tech – Information Technology	

SEMESTER – III

Sl.No.	Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
			L	T	P	C	CA	ES	Total
THEORY									
1.		Professional Elective V	3	0	0	3	30	70	100
2.		Professional Elective VI	3	0	0	3	30	70	100
3.		Audit Course	2	0	0	0	50	50	100
PRACTICAL									
4.	IT20321	Project Phase – I	0	0	20	10	50	50	100
		Total	8	0	20	16	400		

SEMESTER - IV

Sl.No.	Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
			L	T	P	C	CA	ES	Total
PRACTICAL									
1.	IT20421	Project Phase – II	0	0	32	16	50	50	100
		Total	0	0	32	16	100		

KSR College of Engineering	K.S.R. COLLEGE OF ENGINEERING (Autonomous) (Approved by AICTE& Affiliated to Anna University) K.S.R. Kalvi Nagar, Tiruchengode – 637 215	CURRICULUM UG R - 2020
Department	Department of Information Technology	
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List of Electives

PROFESSIONAL ELECTIVES – I and II (SEMESTER – I)

Sl.No.	Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
			L	T	P	C	CA	ES	Total
1.	IT20161	Advanced Computer Architecture	3	0	0	3	30	70	100
2.	IT20162	Ad-Hoc and Sensor Networks	3	0	0	3	30	70	100
3.	IT20163	Software Engineering Methodologies	3	0	0	3	30	70	100
4.	IT20164	Data Science	3	0	0	3	30	70	100
5.	IT20165	Scientific Computing	3	0	0	3	30	70	100
6.	IT20166	Digital Image Processing	3	0	0	3	30	70	100
7.	IT20167	XML and Web Services	3	0	0	3	30	70	100
8.	IT20168	Distributed Systems	3	0	0	3	30	70	100
9.	IT20169	Multimedia Communications	3	0	0	3	30	70	100
10.	IT20171	Information Retrieval Techniques	3	0	0	3	30	70	100

PROFESSIONAL ELECTIVES – III and IV (SEMESTER – II)									
Sl.No.	Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
			L	T	P	C	CA	ES	Total
1.	IT20261	Data Warehousing and Data Mining	3	0	0	3	30	70	100
2.	IT20262	Network Management	3	0	0	3	30	70	100
3.	IT20263	Multicore Architecture	3	0	0	3	30	70	100
4.	IT20264	Knowledge Discovery	3	0	0	3	30	70	100
5.	IT20265	Data Security and Access Control	3	0	0	3	30	70	100
6.	IT20266	Digital Forensics	3	0	0	3	30	70	100
7.	IT20267	Agent Based Intelligent Systems	3	0	0	3	30	70	100
8.	IT20268	Big Data and Analytics	3	0	0	3	30	70	100
9.	IT20269	Ontology and Semantic Web	3	0	0	3	30	70	100
10.	IT20271	Object Oriented Analysis and Design	3	0	0	3	30	70	100

PROFESSIONAL ELECTIVES – V and VI (SEMESTER – III)									
Sl.No.	Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
			L	T	P	C	CA	ES	Total
1.	IT20361	Human Resource Management	3	0	0	3	30	70	100
2.	IT20362	Distributed Databases	3	0	0	3	30	70	100
3.	IT20363	Service Oriented Architecture	3	0	0	3	30	70	100
4.	IT20364	Cloud Computing	3	0	0	3	30	70	100
5.	IT20365	Internet of Things	3	0	0	3	30	70	100
6.	IT20366	GPU Computing	3	0	0	3	30	70	100
7.	IT20367	Business Analytics	3	0	0	3	30	70	100
8.	IT20368	Cost Management of Engineering Projects	3	0	0	3	30	70	100

AUDIT COURSE (SEMESTER – III)									
Sl.No.	Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
			L	T	P	C	CA	ES	Total
1.	IT203A1	English for Research Paper Writing	2	0	0	0	50	50	100
2.	IT203A2	Disaster Management	2	0	0	0	50	50	100
3.	IT203A3	Mobile and Pervasive Computing	2	0	0	0	50	50	100
4.	IT203A4	Constitution of India	2	0	0	0	50	50	100

Total no of Credits= 68

DEPARTMENT OF INFORMATION TECHNOLOGY

M.Tech.– INFORMATION TECHNOLOGY

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SEMESTER – I

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			L	T	P	C	CA	ES	Total
THEORY									
1.	IT20111	Advanced Data Structures	3	0	0	3	40	60	100
2.	IT20112	Research Methodology and IPR	2	0	0	2	40	60	100
3.		Professional Elective I	3	0	0	3	40	60	100
4.		Professional Elective II	3	0	0	3	40	60	100
PRACTICAL									
5.	IT20121	Advanced Data Structures Laboratory	0	0	4	2	60	40	100
6.	IT20122	XML and Web Services Laboratory	0	0	4	2	60	40	100
		Total	11	0	8	15	600		

SEMESTER - II

Sl.No.	Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
			L	T	P	C	CA	ES	Total
THEORY									
1.	IT20211	Advanced Algorithms	3	0	0	3	40	60	100
2.	IT20212	Soft Computing	3	0	0	3	40	60	100
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2.		Professional Elective VI	3	0	0	3	40	60	100
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PRACTICAL									
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PRACTICAL									
1.	IT20421	Project Phase – II	0	0	32	16	60	40	100
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8.	IT20168	Distributed Systems	3	0	0	3	40	60	100
9.	IT20169	Multimedia Communications	3	0	0	3	40	60	100
10.	IT20171	Information Retrieval Techniques	3	0	0	3	40	60	100

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5.	IT20365	Internet of Things	3	0	0	3	40	60	100
6.	IT20366	GPU Computing	3	0	0	3	40	60	100
7.	IT20367	Business Analytics	3	0	0	3	40	60	100
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2.	IT203A2	Disaster Management	2	0	0	0	60	40	100
3.	IT203A3	Mobile and Pervasive Computing	2	0	0	0	60	40	100
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Total no of Credits= 68

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER - I

		L	T	P	C
IT20111	**ADVANCED DATA STRUCTURES**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Implement the symbol table using hashing techniques.*	*Analyze*
CO2:	*Summarize the concept of skip lists.*	*Understand*
CO3:	*Develop and analyze algorithms for red-black trees, B-trees and Splay trees.*	*Apply*
CO4:	*Design algorithms for text processing applications.*	*Create*
CO5:	*Identify suitable data structures and develop algorithms for computational geometry problems.*	*Apply*

UNIT – I DICTIONARIES AND HASHING [9]

Dictionaries: Definition – Dictionary Abstract Data Type – Implementation of Dictionaries. Hashing: Review of Hashing – Hash Function – Collision Resolution Techniques in Hashing – Separate Chaining – Open Addressing, Linear Probing – Quadratic Probing – Double Hashing – Rehashing – Extendible Hashing

UNIT – II SKIP LISTS [9]

Skip Lists: Need for Randomizing Data Structures and Algorithms – Search and Update Operations on Skip Lists – Probabilistic Analysis of Skip Lists – Deterministic Skip Lists

UNIT – III TREES [9]

Trees: Binary Search Trees – AVL Trees – Red Black Trees – 2-3 Trees – B-Trees–Splay Tree

UNIT – IV TEXT PROCESSING [9]

Text Processing: Sting Operations – Brute-Force Pattern Matching – The Boyer-Moore Algorithm – The Knuth-Morris-Pratt Algorithm – Standard Tries – Compressed Tries – Suffix Tries – The Huffman Coding Algorithm – The Longest Common Subsequence Problem (LCS) – Applying Dynamic Programming to the LCS Problem

UNIT – V COMPUTATIONAL GEOMETRY [9]

Computational Geometry: One Dimensional Range Searching – Two Dimensional Range Searching – Constructing a Priority Search Tree – Searching a Priority Search Tree – Priority Range Trees – Quad trees – k-d Trees

Total = 45 Periods

Reference Books :

1 Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, 4th Edition, Pearson, 2014

2 M T Goodrich, Roberto Tamassia, Algorithm Design, John Wiley, 2002

3 Alfred V. Aho and John E. Hopcroft, Jeffrey D. Ullman, Data Structures and Algorithms, Pearson Education, Reprint 2006

4 Robert Sedgewick and Kevin Wayne, Algorithms, Pearson Education, 4thEdition, 2010

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K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – I

		L	T	P	C
IT20112	**RESEARCH METHODOLOGY AND IPR**	2	0	0	2

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Analyze the concept of research problem*	*Analyze*
CO2:	Develop and analyze literature study	*Create*
CO3:	*Develop writing concept*	*Create*
CO4:	*Identify intellectual property rights*	*Apply*
CO5:	*Make use of Patent rights*	*Understand*

UNIT –- I RESEARCH PROBLEM [9]

Meaning of research problem – Sources of research problem – Criteria Characteristics of a good research problem – Errors in selecting a research problem – Scope and objectives of research problem – Approaches of investigation of solutions for research problem – Data collection – Analysis – Interpretation – Necessary instrumentations

UNIT – II LITERATURE STUDIES [9]

Effective literature studies approaches – Analysis Plagiarism – Research ethics

UNIT – III TECHNICAL WRITING [9]

Effective technical writing – How to write report – Paper – Developing a Research Proposal – Format of research proposal – A presentation and assessment by a review committee

UNIT – IV INTELLECTUAL PROPERTY [9]

Nature of Intellectual Property: Patents – Designs – Trade and Copyright – Process of Patenting and Development: technological research – Innovation – Patenting – Development – International Scenario: International cooperation on Intellectual Property – Procedure for grants of patents – Patenting under PCT

UNIT –- V PATENT RIGHTS [9]

Patent Rights: Scope of Patent Rights – Licensing and transfer of technology – Patent information and databases – Geographical Indications – New Developments in IPR: Administration of Patent System – New developments in IPR – IPR of Biological Systems – Computer Software etc – Traditional knowledge Case Studies – IPR and IITs

Total = 45 Periods

Reference Books :

1 Stuart Melville and Wayne Goddard, Research Methodology: An introduction for science & engineering students, 2011

2 Wayne Goddard and Stuart Melville, Research Methodology: An Introduction, 2nd edition, 2006

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SEMESTER – I

IT20121 **ADVANCED DATA STRUCTURES LABORATORY**

L	T	P	C
0	0	4	2

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Demonstrate and Implement the different queue operations by using the arrays and linked list*	*Understand*
CO2:	*Explain heap construction and implement the heap operations*	*Evaluate*
CO3:	*Construct AVL tree and perform the various rotation on AVL tree for balancing*	*Apply*
CO4:	*Design and develop various sorting algorithms*	*Create*
CO5:	*Illustrate dynamic programming and backtracking*	*Understand*

LIST OF EXPERIMENTS:

1. Circular Queue
2. Min Heap
3. Heaps
4. Leftist Heap
5. AVL Tree
6. B-Tree
7. Trees
8. Quick Sort
9. 0/1 Knapsack using Dynamic Programming
10. Graph Coloring using Backtracking

Total = 45 Periods

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K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER - I

IT20122 **XML AND WEB SERVICES LABORATORY**

L	T	P	C
0	0	4	2

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Develop web pages using markup languages and design by Cascading Style Sheets*	*Apply*
CO2:	*Build dynamic pages and perform validation using java script*	*Create*
CO3:	*Develop online applications using ASP/JSP and perform session management*	*Apply*
CO4:	*Design a XML document and parse these document using DOM/SAX parsers*	*Create*
CO5:	*Extend web applications using open source software*	*Understand*

LIST OF EXPERIMENTS:

1. Creation of HTML pages with frames, links, tables and other tags
2. Usage of internal and external CSS along with HTML pages
3. Client side Programming
   i. Java script for displaying date and comparing two dates
   ii. Form Validation including text field, radio buttons, check boxes, list box and other controls
4. Usage of ASP/JSP objects Response, Request, Application, Session, Server, ADO etc
   i. Writing online applications such as shopping, railway/air/bus ticket reservation system with set of ASP/JSP pages
   ii. Using sessions and cookies as part of the web application
5. Writing Servlet Program using HTTP Servlet
6. Any online application with database access
7. Creation of XML document for a specific domain
8. Writing DTD or XML schema for the domain specific XML document
9. Parsing an XML document using DOM and SAX Parsers
10. Sample web application development in the open source environment

Total = 45 Periods

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SEMESTER - II

		L	T	P	C
IT20211	**ADVANCED ALGORITHMS**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Analyze the complexity/performance of different algorithms*	*Analyze*
CO2:	*Determine the appropriate data structure for solving a particular set of problems.*	*Evaluate*
CO3:	*Categorize the different problems in various classes according to their complexity.*	*Analyze*
CO4:	*Develop the recent activities in the field of the advanced data structure.*	*Create*
CO5:	*Identify the concepts of Linear Programming*	*Apply*

UNIT – I SORTING AND GRAPH [9]

Review of various sorting algorithms – Topological sorting Graph: Definitions and Elementary Algorithms: Shortest path by BFS – Shortest path in edge – Weighted case (Dijkasra's) – Depth first search and computation of strongly connected components – Emphasis on correctness proof of the algorithm and time/space analysis – Example of amortized analysis

UNIT – II MATROIDS AND GRAPH MATCHING [9]

Matroids: Introduction to greedy paradigm – Algorithm to compute a maximum weight maximal independent set – Application to MST – Graph Matching: Algorithm to compute maximum matching – Characterization of maximum matching by augmenting paths – Edmond's Blossom algorithm to compute augmenting path

UNIT – III FLOW NETWORKS AND MATRIX COMPUTATIONS [9]

Flow–Networks: Maxflow mincut theorem – Ford Fulkerson Method to compute maximum flow – Edmond Karp maximum – Flow algorithm – Matrix Computations: Strassen's algorithm and introduction to divide and conquer paradigm – Inverse of a triangular matrix – Relation between the time complexities of basic matrix operations – LUP – Decomposition

UNIT – IV SHORTEST PATH IN GRAPHS [9]

Shortest Path in Graphs: Floyd – Warshall algorithm and introduction to dynamic programming paradigm – More examples of dynamic programming – Modulo Representation of integers/polynomials: Chinese Remainder Theorem – Conversion between base representation and modulo representation – Extension to polynomials – Application: Interpolation problem – Discrete Fourier Transform (DFT): In complex field – DFT in modulo ring – Fast Fourier Transform algorithm. Schonhage – Strassen Integer Multiplication Algorithm

UNIT – V LINEAR PROGRAMMING [9]

Linear Programming: Geometry of the feasibility region and Simplex algorithm – NP completeness: Examples – Proof of NP– hardness and NP– completeness – One or more of the following topics based on time and interest Approximation algorithms – Randomized Algorithms – Interior Point Method – Advanced Number Theoretic Algorithm

Total = 45 Periods

References

1 Cormen, Leiserson, Rivest, Stein, Introduction to Algorithms, 4th Edition

2 Aho, Hopcroft, Ullman ,The Design and Analysis of Computer Algorithms

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SEMESTER – II

		L	T	P	C
IT20212	**SOFT COMPUTING**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Identify and describe soft computing techniques and their roles in building intelligent machines*	*Evaluate*
CO2:	*Apply fuzzy logic and reasoning to handle uncertainty and solve various engineering problems*	*Apply*
CO3:	*Build genetic algorithms to combinatorial optimization problems*	*Create*
CO4:	*Evaluate and compare solutions by various soft computing approaches for a given problem*	*Evaluate*
CO5:	*Explain Matlab / Python Libraries*	*Understand*

UNIT – I INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS [9]

Evolution of Computing: Soft Computing Constituents – From Conventional AI to Computational Intelligence: Machine Learning Basics

UNIT – II FUZZY LOGIC [9]

Fuzzy Sets– Operations on Fuzzy Sets – Fuzzy Relations – Membership – Functions: Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems – Fuzzy Expert Systems – Fuzzy Decision Making

UNIT – III NEURAL NETWORKS [9]

Machine Learning Using Neural Network – Adaptive Networks – Feed forward Networks – Supervised Learning Neural Networks – Radial Basis Function Networks: Reinforcement Learning – Unsupervised Learning Neural – Networks – Adaptive Resonance architectures – Advances in Neural networks

UNIT – IV GENETICAL ALGORITHM [9]

Introduction to Genetic Algorithms (GA) – Applications of GA in Machine Learning : Machine Learning Approach to Knowledge acquisition

UNIT – V MATLAB/PYTHON LIB [9]

Introduction to Matlab / Python – Arrays and array operations – Functions and Files – Study of neural network toolbox and fuzzy logic toolbox – Simple implementation of Artificial Neural Network and Fuzzy Logic – Recent Trends in deep learning– various classifiers – Neural networks and genetic algorithm – Implementation of recently proposed soft computing techniques

Total = 45 Periods

References

1 Jyh Shing Roger Jang, Chuen Tsai Sun, EijiMizutani, Neuro:Fuzzy and Soft Computing, 2nd Edition ,Prentice Hall of India.

2 George J, Klir and Bo Yuan, Fuzzy Sets and Fuzzy Logic: Theory and Applications, 4 th Edition Prentice Hall.

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SEMESTER - II

		L	T	P	C
MA20231	**OPERATIONS RESEARCH**	3	0	0	3

Course Outcomes : Upon Completion of the course, the students should be able to :		**Cognitive Level**
CO1	*Develop the Linear Programming concepts during the uncertain situations in engineering fields.*	*Apply*
CO2	*Obtain the optimal solutions in Transportation and Assignment problems.*	*Evaluate*
CO3	*Develop integer values by solving Integer Programming Problems.*	*Create*
CO4	*Obtain the optimal solutions in dynamic Programming Problems and its applications.*	*Evaluate*
CO5	*Solving the concepts of stock control by maximizing the profit.*	*Understand*

UNIT – I LINEAR PROGRAMMING [9]

Formation of LPP - Graphical method - Simplex method – Big M Method - Dual Simplex Method

UNIT – II TRANSPORTATION AND ASSIGNMENT PROBLEMS [9]

Transportation Models (Minimizing and Maximizing Problems) – Balanced and unbalanced Problems – Initial Basic feasible solution by N-W Corner Rule – Least cost and Vogel's approximation methods – Check for optimality – Solution by MODI Method – Assignment Models (Minimizing and Maximizing Problems) – Balanced and Unbalanced Problems - Travelling Salesman problem

UNIT – III INTEGER PROGRAMMING [9]

Formulation of Integer Programming problems – Gomory's cutting plane methods – Branch and Bound Techniques

UNIT - IV DYNAMIC PROGRAMMING [9]

Characteristics of Dynamic Programming– Bellman's principle of optimality – Concepts of dynamic programming – Calculus method of solution

UNIT - V INVENTORY MODEL [9]

Types of Inventory – Deterministic inventory models – EOQ and EBQ models with and without shortages – Quantity discount model – Price breaks – Probabilistic inventory model (excluding proof)

Total = 45 Periods

Reference Books :

1 P.K.Gupta & Man Mohan, Operations Research, Sultan Chand & Sons,New Delhi, Twelth edition, 2013

2 N. D. Vohra , Quantitative Techniques in Management, Tata Mcgraw Hill,New Delhi, 2014

3 Gupta P.K, Hira D.S, Problem in Operations Research, S.Chand and Co,New Delhi, 2015

4 Taha, H.A., Operations Research, Pearson Education, New Delhi, 2013

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SEMESTER - II

		L	T	P	C
IT20221	**ADVANCED ALGORITHMS LABORATORY**	0	0	4	2

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Demonstrate and Implement the bellman algorithm*	*Understand*
CO2:	*Apply linear modulo operation and design the algorithm*	*Apply*
CO3:	*Construct Dijikstra algorithm*	*Create*
CO4:	*Design and develop various sorting algorithms*	*Create*
CO5:	*Illustrate searching algorithms*	*Understand*

LIST OF EXPERIMENTS:

1. Implementation of Bellman Ford algorithm
2. Implementation of Linear Modular Equvation
3. Implementation of Mone Carlo Algorithm
4. Implementation of Searching algorithms for menu based programs
5. Implementation of Prims algorithm
6. Implementation of Dijikstra algorithm
7. Implementation of Sorting algorithms
8. Implementation of Warshall's algorithm
9. Write a menu driven program for DFS and BFS
10. Implementation of Euclidean algorithm

Total = 45 Periods

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SEMESTER - II

IT20222	**SOFTWARE DEVELOPMENT LABORATORY**	L	T	P	C
		0	0	4	2

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Discuss the various types of case tools available*	*Create*
CO2:	*Apply the modelling technique to develop the system*	*Apply*
CO3:	*Explain the code generation process*	*Understand*
CO4:	*Discuss the various CASE environments*	*Create*
CO5:	*Apply the CASE in any workbenches*	*Apply*

LIST OF EXPERIMENTS:

1. Practicing the different types of case tools such as (Rational Rose & other Open Source) used for all the phases of Software development life cycle
2. Data modeling
3. Semantic data modeling
4. Source code generators
5. Re-engineering
6. Experimenting CASE Environments
    a. Toolkits
    b. Language-centered
    c. Integrated
    d. Fourth generation
    e. Process-centered
7. Implementation of the following using CASE Workbenches:
    a. Business planning and modeling
    b. Analysis and design
    c. User-interface development
    d. Programming
    e. Verification and validation
    f. Maintenance and reverse engineering
    g. Configuration management
    h. Project management

Total = 45 Periods

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SEMESTER - II

MINI PROJECT WITH SEMINAR

L	T	P	C
2	0	0	2

IT20223

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Utilize various technical resources available from multiple fields*	*Apply*
CO2:	*Analyze the importance of intonation, word and sentence stress for improving communicative*	*Analyze*
CO3:	*Identify and overcome problem sounds*	*Apply*
CO4:	*Illustrate their technical knowledge to enhance the leadership skills*	*Understand*
CO5:	*Build report and present oral demonstrations*	*Create*

Guidelines:

1. The students have to refer the journals, conference proceedings which are published recently.
2. By mutual discussions with the faculty, the student can choose a topic in specific area.
3. The student has to give a seminar on their project related topic on every week.
4. The student has to submit a technical report having 30 - 50 pages to the corresponding faculty one week before the final presentation.

Total = 45 Periods

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SEMESTER - III

PROJECT PHASE - I

L	T	P	C
0	0	20	10

IT20321

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Formulate a real world problem, identify the requirement and develop the design solutions*	*Create*
CO2:	*Identify technical ideas, strategies and methodologies*	*Analyze*
CO3:	*Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.*	*Apply*
CO4:	*Test and validate through conformance of the developed prototype and analysis the cost effectiveness*	*Create*
CO5:	*Build report and present oral demonstrations*	*Create*

Guidelines:

- *Each student will undertake a sizeable project involving survey of literature.*
- *The student should have to develop new techniques and to implement the systems.*
- *The student should have to write the reports under the guidance of faculty members.*

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SEMESTER – IV

		L	T	P	C
IT20421	**PROJECT PHASE - II**	0	0	32	16

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Analyze the real world problems*	*Analyze*
CO2:	*Identify the requirement and develop the design solutions.*	*Analyze*
CO3:	*Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.*	*Create*
CO4:	*Test and validate through conformance of the developed prototype and analysis the cost effectiveness*	*Create*
CO5:	*Build report and present oral demonstrations*	*Create*

Guidelines:

- *Each student will undertake a sizeable project involving survey of literature.*
- *The student should have to develop new techniques and to implement the systems.*
- *The student should have to write the reports under the guidance of faculty members.*

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SEMESTER – I

		L	T	P	C
IT20161	**ADVANCED COMPUTER ARCHITECTURE (Professional Electives – I and II)**	3	0	0	3

Course Outcomes : On successful completion of the course, the student will be able to ***Cognitive Level***

CO1:	*Discuss the fundamental concepts of computer architecture*	*Create*
CO2:	*Identify the concepts and challenges of instruction level parallelism*	*Apply*
CO3:	*Discuss the data level parallelism*	*Create*
CO4:	*Outline the Memory types and Hierarchy design*	*Understand*
CO5:	*Examine about Multiprocessor and Multicore architecture*	*Analyze*

UNIT – I FUNDAMENTALS OF COMPUTER DESIGN [9]

Introduction– Classes of Computers – Defining computer architecture – Measuring and reporting performance – Quantitative principles of computer design – Instruction set principles – Classifying Instruction set architectures – Memory addressing – Addressing modes – Type and size of operands – Pipelining concepts

UNIT – II INSTRUCTION LEVEL PARALLELISM [9]

Concepts and challenges – Overcoming data hazards with dynamic scheduling using Tomasulo's approach – Dynamic scheduling examples and algorithms – Hardware based speculation – Static scheduling – High performance instruction delivery – Limitations of Instruction level parallelism

UNIT – III DATA LEVEL PARALLELISM [9]

Introduction – Vector architecture – Vector execution time – Vector length registers – Vector mask registers and memory bank – SIMD instruction set extension for multimedia – Graphics processing units – Detecting and enhancing loop level parallelism

UNIT – IV MEMORY HIERARCHY DESIGN [9]

Introduction – Review of caches – Cache performance – Reducing cache miss penalty – Reducing miss rate – Miss rate via parallelism – Reducing hit time – Main memory organization for improving performance – Memory technology – Types of storage devices – Virtual memory – Protection and examples of virtual memory

UNIT – V MULTIPROCESSORS AND MULTICORE ARCHITECTURES [9]

Introduction – Multiprocessor architecture – Issues and approach – Centralized shared memory architecture – Limitations in symmetric shared – Memory multiprocessors – Performance of symmetric shared – Memory multiprocessors – Distributed shared – Memory – Synchronization – Models of memory consistency

Total = 45 Periods

References

1. John L, Hennessey and David A, Patterson, Computer Architecture – A quantitative approach, Morgan Kaufmann Elsevier, 5th Edition, 2012
2. William Stallings, Computer Organization and Architecture – Designing for Performance, Pearson Education, 8th Edition, 2010

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SEMESTER - I

		L	T	P	C
IT20162	**AD-HOC AND SENSOR NETWORKS (Professional Electives – I and II)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Analyze the function design issues and classification of MAC protocols that have been proposed for ad hoc networks*	*Analyze*
CO2:	*Summarize the different types of routing protocols and transport layer issues in ad hoc networks*	*Understand*
CO3:	*Compile the principles ,architecture and MAC protocol of wireless sensor networks (WSNs)*	*Create*
CO4:	*Discuss the localization types and various routing issues in wireless sensor networks*	*Create*
CO5:	*Rephrase the architecture, MAC enhancement, routing and capacity models of mesh networks*	*Understand*

UNIT – I AD-HOC MAC **[9]**

Introduction – Issues in Ad-Hoc Wireless Networks – MAC Protocols – Issues – Classifications of MAC protocols – Multi channel MAC & Power control MAC protocol

UNIT – II AD-HOC NETWORK ROUTING & TCP **[9]**

Issues – Classifications of routing protocols – Hierarchical and Power aware – Multicast routing – Classifications – Tree based – Mesh based – Ad Hoc Transport Layer Issues – TCP Over Ad Hoc – Feedback based – TCP with explicit link – TCP BuS – Ad Hoc TCP and Split TCP

UNIT –– III WSN – MAC **[9]**

Introduction – Sensor Network Architecture – Data Dissemination – Gathering MAC Protocols – Self-organizing – Hybrid TDMA/FDMA and CSMA based MAC

UNIT – IV WSN ROUTING, LOCALIZATION & QOS **[9]**

Issues in WSN routing – OLSR – AODV Localization – Indoor and Sensor Network Localization – QoS in WSN

UNIT – V MESH NETWORKS **[9]**

Necessity for Mesh Networks – MAC enhancements – IEEE 802.11s Architecture – Opportunistic routing – Self configuration and Auto configuration – Capacity Models – Fairness – Heterogeneous Mesh Networks – Vehicular Mesh Networks

Total = 45 Periods

References

1 Feng Zhao and Leonidas Guibas, Wireless Sensor Networks, Morgan Kaufman Publishers, 2011

2 C.Siva Ram Murthy and B.Smanoj, Ad Hoc Wireless Networks – Architectures and Protocols, Pearson Education, 2011

3 C.K.Toh, Ad Hoc Mobile Wireless Networks, 3rd Edition, Pearson Education, 2011

4 Thomas Krag and Sebastin Buettrich, Wireless Mesh Networking, O'Reilly Publishers, 2007

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SEMESTER - I

		L	T	P	C
IT20163	**SOFTWARE ENGINEERING METHODOLOGIES (Professional Electives – I and II)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Elaborate the various traditional software development life cycle models*	*Create*
CO2:	*Apply the behaviour of executable and non-executable testing with real word example*	*Apply*
CO3:	*Discuss the behaviour of object oriented and reusability*	*Create*
CO4:	*Simplify the design principles and get the outline of the object oriented analysis and design*	*Analyze*
CO5:	*Illustrate about the implementation phase and maintenance phase*	*Understand*

UNIT – I SOFTWARE LIFE CYCLE **[9]**

Scope of Software Engineering – Historical – Economic and Maintenance Aspects – Software Process – Software Life Cycle Models – Tools

UNIT – II TESTING **[9]**

Quality – Non-Execution based Testing – Execution based Testing – Testing versus Correctness Proofs – Testing Distributed and Real Time Software

UNIT – III OBJECT ORIENTATION **[9]**

Modules – Objects – Reusability – Portability and Interoperability – Planning and Estimation

UNIT – IV ANALYSIS AND DESIGN **[9]**

Requirements Phase – Specification Phase – Object Oriented Analysis Phase – Design Phase

UNIT – V IMPLEMENTATION AND INTEGRATION **[9]**

Implementation Phase – Integration Phase – Maintenance Phase

Total = 45 Periods

References

1 Roger S.Pressman, Software Engineering - A practitioner's Approach, McGraw-Hill International Edition, Seventh Edition , 2009

2 Ian Sommerville, Software Engineering, Pearson education Asia, Ninth edition, 2010

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SEMESTER - I

		L	T	P	C
IT20164	**DATA SCIENCE** **(Professional Electives – I and II)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	Discuss the key concepts in data science- including their real-world applications and the toolkit used by data scientists	*Create*
CO2:	Build data collection and management scripts using MongoDB	*Apply*
CO3:	Analyze the concept of Data Analysis	*Analyze*
CO4:	Identify Data and Visual encoding Techniques	*Apply*
CO5:	Summarize about applications of Data Science	*Understand*

UNIT – I INTRODUCTION TO CORE CONCEPTS AND TECHNOLOGIES [9]

Introduction – Terminology – Data science process – Data science toolkit – Types of data – Example applications

UNIT – II DATA COLLECTION AND MANAGEMENT [9]

Introduction – Sources of data – Data collection and APIs – Exploring and fixing data – Data storage and management – Using multiple data sources

UNIT – III DATA ANALYSIS [9]

Introduction – Terminology and concepts – Introduction to statistics – Central tendencies and distributions – Variance – Distribution properties and arithmetic – Samples/CLT– Basic machine learning algorithms – Linear regression – SVM – Naive Bayes

UNIT –– IV DATA VISUALISATION [9]

Introduction – Types of data visualization – Data for visualization – Data types – Data encodings – Retinal variables – Mapping variables to encodings – Visual encodings

UNIT – V APPLICATIONS [9]

Applications of Data Science – Technologies for visualization – Bokeh (Python) Recent trends in various data collection and analysis techniques – Various visualization techniques – Application development methods of used in data science

Total = 45 Periods

References

1 Cathy O'Neil and Rachel Schutt. "Doing Data Science", Straight Talk From The Frontline, First Edition, O'Reilly, 2013.

2 Jure Leskovek, Anand Rajaraman and Jeffrey Ullman," Mining of Massive Datasets. v2.1",Cambridge University Press

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SEMESTER – I

		L	T	P	C
IT20165	**SCIENTIFIC COMPUTING (Professional Electives – I and II)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Analyze the various modeling technique available*	*Analyze*
CO2:	*Explain the approximation in the scientific computing*	*Understand*
CO3:	*Discuss the optimization and its dimensions*	*Create*
CO4:	*Categorize the various methods to find out the roots of the equation*	*Analyze*
CO5:	*Compare the partial difference equation along with integration*	*Evaluate*

UNIT – I INTRODUCTION TO SYSTEM MODELING [9]

Modelling and general systems theory – Concepts of simulation – Types of simulation – Experimental design consideration – Comparison and selection of simulation languages – Development of simulation models using any one of the languages for some problems – stochastic simulation – Randomness and random numbers – Random number generators – software for generating random numbers

UNIT – II APPROXIMATIONS IN SCIENTIFIC COMPUTING [9]

General Strategy – Approximations in Scientific Computation – Mathematical Software – Mathematical Software Libraries – Scientific Computing Environments – Extended Arithmetic Packages

UNIT – III OPTIMIZATION [9]

Optimization Problems – Existence and Uniqueness – Convexity – Optimization in One Dimension – Multidimensional Unconstrained Optimization – Constrained Optimization – Linear Programming

UNIT – IV ROOTS OF EQUATION LINEAR ALGEBRAIC EQUATION AND INTERPOLATION [9]

Graphical Method – Iterative Methods – Newton Raphson Method – Break Even Analysis – Gauss Elimination – Solution Of Linear Systems By Gaussian – Gauss Jordan – Jacobi And Gauss Seidel Methods – Matrix Inversion – Gauss – Jordan Method – Least Square Regression – Newton's Divided – Difference Interpolating Polynomials – Lagrange's polynomials – Newton's Forward and Backward Difference Formula – Stirling's and Bessel's Central Difference Formula

UNIT – V NUMERICAL ORDINARY AND PARTIAL DIFFERENTIATION AND INTEGRATION [9]

Numerical Differentiation: Runge – Kutta Methods – Boundary – Value and Eigen value Problems – Partial Differential Equation – Elliptic Equation – Parabolic Equations – Numerical Integration: Trapezoidal and Simpson's Rules – Two and Three Point Gaussian Quadrature Formula – Double Integral Using Trapezoidal and Simpson's Rule

Total = 45 Periods

References

1 Jerry Banks and John Carson, Discrete Event System Simulation, 5th Edition, PHI, 2012

2 Steven C, Chapra Raymond P Canale, Numerical Methods for Engineering, Second Edition, McGraw-Hill

3 Sastry S S, Introductory Methods of Numerical Analysis, Fourth Edition, Prentice Hall India, 2006

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SEMESTER – I

		L	T	P	C
IT20166	**DIGITAL IMAGE PROCESSING (Professional Electives – I and II)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Explain digital image processing fundamentals- sampling and quantization concepts for 2D images*	*Understand*
CO2:	*Build image enhancement techniques*	*Apply*
CO3:	*Develop new techniques in the areas of image enhancement-restoration segmentation*	*Create*
CO4:	*Recommend various image processing techniques for real time applications*	*Evaluate*
CO5:	*Apply the concepts of Image Processing to real-world applications*	*Apply*

UNIT – I FUNDAMENTALS OF IMAGE PROCESSING [9]

Introduction – Steps in Image Processing Systems – Image Acquisition – Sampling and Quantization – Pixel Relationships – Color Fundamentals and Models – File Formats – Image operations – Arithmetic , Geometric and Morphological

UNIT – II IMAGE ENHANCEMENT [9]

Spatial Domain Gray level Transformations – Histogram Processing – Spatial Filtering – Smoothing and Sharpening – Frequency Domain: Filtering in Frequency Domain – DFT (Discrete Fourier Transform) – FFT (Fast Fourier Transform) – DCT (Discrete Cosine Transform) – Smoothing and Sharpening filters – Homomorphism Filtering

UNIT – III IMAGE SEGMENTATION AND FEATURE ANALYSIS [9]

Detection of Discontinuities – Edge Operators – Edge Linking and Boundary Detection – Thresholding – Region Based Segmentation – Morphological Watersheds – Motion Segmentation – Feature Analysis and Extraction

UNIT – IV MULTI RESOLUTION ANALYSIS AND COMPRESSIONS [9]

Multi Resolution Analysis: Image Pyramids – Multi resolution expansion – Wavelet Transforms – Image Compression: Fundamentals – Models – Elements of Information Theory – Error Free Compression – Lossy Compression – Compression Standards

UNIT – V APPLICATIONS OF IMAGE PROCESSING [9]

Image Classification – Image Recognition – Image Understanding – Video Motion Analysis – Image Fusion – Steganography – Digital Compositing – Mosaics – Color Image Processing

Total = 45 Periods

References

1. Rafael C,Gonzalez and Richard E, Woods, Digital Image Processing, 4th Edition, Pearson Education, 2011
2. Milan Sonka, Vaclav Hlavac and Roger Boyle, Image Processing, Analysis and Machine Vision, 2nd Edition, Thomson Learning, 2007
3. Anil K Jain, Fundamentals of Digital Image Processing, Pearson Education, 2011

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SEMESTER – I

		L	T	P	C
IT20167	**XML AND WEB SERVICES** **(Professional Electives – I and II)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Discuss the basics of XML Technology*	*Create*
CO2:	*Outline the basic concepts of Web Services*	*Understand*
CO3:	*Determine the web services building blocks*	*Evaluate*
CO4:	*Illustrate the use of XML in e-business*	*Understand*
CO5:	*Importance of usage of XML and content management*	*Evaluate*

UNIT – I XML TECHNOLOGY FAMILY [9]

XML – benefits – Advantages of XML over HTML – EDL (Electronic Data Interchange) – Databases – XML based standards – DTD (Document Type Declaration) – XML Schemas – XML Files – XML processing – DOM (Document Object Model) – SAX (simple API for XML) — Ppresentation technologies – XSL (XML Style sheet Language) – XFORMS – XHTML – Voice XML

UNIT – II ARCHITECTING WEB SERVICES [9]

Business motivations for web services – B2B (Business to Business) – B2C (Business to Customer) – Technical motivations – Limitations of CORBA and DCOM – Service Oriented Architecture (SOA) – Architecting web services – Implementation view – Web services technology stack – Logical view – Composition of web services – Deployment view from application server to peer to peer – Process view – Life in the runtime

UNIT – III WEB SERVICES BUILDING BLOCK [9]

Transport protocols for web services – Messaging with web services – Protocols – SOAP (Simple Object Access Protocol) – Describing web services – WSDL (Web Service Description Language) – Anatomy of WSDL – manipulating WSDL – Web service policy – Discovering web services – UDDI (Universal Description- Discovery and Integration Consortium) – Anatomy of UDDI (Universal Description – Discovery and Integration Consortium) – Web service inspection – Ad-Hoc Discovery – Securing web services

UNIT – IV IMPLEMENTING XML IN E-BUSINESS [9]

B2B – B2C Applications – Different types of B2B interaction – Components of e- business XML systems – ebXML – Rosetta Net Applied XML in vertical industry – Web services for mobile devices

UNIT – V XML AND CONTENT MANAGEMENT [9]

Semantic Web – Role of Meta data in web content – Resource Description Framework – RDF schema – Architecture of semantic web – Content management workflow

Total = 45 Periods

Reference Books :

1 Ron schmelzer et al, XML and Web Services, Pearson Education, 3rd Edition, 2011

2 Sandeep Chatterjee and James Webber, Developing Enterprise Web Services: An Architect's Guide, Prentice Hall, 3rd Edition, 2009

3 Frank P, Coyle, XML, Web Services and the Data Revolution, Pearson Education, 2011

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SEMESTER – I

		L	T	P	C
IT20168	**DISTRIBUTED SYSTEMS (Professional Electives – I and II)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Analyze the distributed system architecture*	*Analyze*
CO2:	*Discuss the design trends in distributed system*	*Create*
CO3:	*Predict network virtualization*	*Create*
CO4:	*Apply remote method invocation and objects*	*Apply*
CO5:	*Demonstrate about Parallel Database Systems*	*Understand*

UNIT– I DISTRIBUTED DATABASE MANAGEMENT SYSTEM ARCHITECTURE [9]

Distributed data processing – What is a DDBS – Advantages and disadvantages of DDBS – Problem areas – Overview of database and computer network concepts Transparencies in a distributed DBMS – Distributed DBMS architecture – Global directory issues

UNIT – II DISTRIBUTED DATABASE DESIGN [9]

Alternative design strategies – Distributed design issues – Fragmentation – Data allocation View management – Data security – Semantic Integrity Control Objectives of query processing – Characterization of query processors – Layers of query processing – Query decomposition – Localization of distributed data

UNIT – III DISTRIBUTED QUERY OPTIMIZATION [9]

Factors governing query optimization – Centralized query optimization – Ordering of fragment queries – Distributed query optimization algorithms The transaction concept – Goals of transaction management – Characteristics of transactions – Taxonomy of transaction models Concurrency control in centralized database systems – Concurrency control in DDBSs – Distributed concurrency control algorithms – Deadlock management

UNIT – IV RELIABILITY [9]

Reliability issues in DDBSs – Types of failures – Reliability techniques – Commit protocols – Recovery protocols

UNIT – V PARALLEL DATABASE SYSTEMS [9]

Parallel architectures – Parallel query processing and optimization – Load balancing

Total = 45 Periods

Reference Books :

1 M T Ozsu and P Valduriez, Principles of Distributed Database Systems, Prentice Hall, 2011

2 D Bell and J Grimson, Distributed Database Systems, Addison Wesley, 1992

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SEMESTER – I

		L	T	P	C
IT20169	**MULTIMEDIA COMMUNICATIONS (Professional Electives – I and II)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Show the various standards and compression techniques used in multimedia communication*	*Understand*
CO2:	*Utilize the knowledge about multimedia operating system and file system used in multimedia communication*	*Apply*
CO3:	*Analyze various routing and communication protocols used in multimedia system*	*Analyze*
CO4:	*Propose the concepts about various synchronization models and multimedia objects in distributed environment*	*Create*
CO5:	*Outline about recent tools used for multimedia application and development*	*Understand*

UNIT – I DATA COMPRESSION VIDEO AND ANIMATIONS [9]

Basic concepts – Computer based animation – Data compression: JPEG – MPEG 2- 4- 7 – CD ROM Extended Architecture – Communications Architecture – Basic sound concepts (music, speech, images and graphics)

UNIT – II MULTIMEDIA OPERATING SYSTEM AND FILE SYSTEM [9]

Network Essentials: Terminology – Network Types And Components – TCP/IP Overview And Protocols – IP Routing – DHCP – Host Name Resolution – Access Methods – Real time – Process Scheduling – Inter process Communication – Server Architecture – Disk Management – File system: Multimedia File system – Synchronization

UNIT – III NETWORK AND COMMUNICATION SYSTEM [9]

Speech code for Multimedia Telecommunication transmitting – Control Protocol for Multimedia Communication – Multiplexing Protocol for Low bit rate – Multimedia Communication Protocol Support for QoS – Transport of Multimedia – Session Management – MBone Application

UNIT – IV HYPERTEXT- MHEG AND SYNCHRONIZATION [9]

Hypertext and Hypermedia – Multimedia and Hypermedia Information coding Expert Group – General Design Issues – Video – Audio User Interface – Reference Model for Multimedia Synchronization – Case Studies: Synchronization in MHEG – Hytime – Firefly system – Multimedia objects in distributed environment

UNIT – V APPLICATIONS AND SOFTWARE TOOLS [9]

Media: Preparation – Composition – Media Integration – Media Communication – Consumption – Entertainment – Hardware: Memory And Storage Devices – Input Devices – Output Devices – Software: Text Editing And Word Processing – Painting And Drawing Tools– 3d Modeling And Animation Tools– Image Editing Tools– Sound Editing Tools – Animation – Video And Digital Movie Tools – Case Studies: Graphics and Image Editing – Adobe Photoshop – Macromedia Fireworks – Maya – 3DS MAX

Total = 45 Periods

References

1 Ralf Steinmetz, Klara Nahrstedt, Multimedia Computing Communications and Applications, Pearson Education,2011

2 Atul Puri, Tsuhan Chen, Multimedia Systems Standards and Networks, Marcel Dekker Inc,2005

3 Frank P, Coyle, XML- Web Services and the Data Revolution, Pearson Education, 2011

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SEMESTER – I

		L	T	P	C
IT20171	**INFORMATION RETRIEVAL TECHNIQUES (Professional Electives – I and II)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Explain the basics of the information retrieval technique*	*Evaluate*
CO2:	*Discuss the retrieval process by using the query method*	*Create*
CO3:	*Examine the text operation process along with the user interface*	*Analyze*
CO4:	*Analyze the various multimedia information retrieval techniques*	*Analyze*
CO5:	*Develop the applications of the information retrieval techniques*	*Apply*

UNIT – I BASICS OF RETRIEVAL TECHNIQUES [9]

Basic Concepts – Retrieval Process – Modeling – Classic Information Retrieval – Set Theoretic- Algebraic and Probabilistic Models – Structured Text Retrieval Models – Retrieval Evaluation – Word Sense Disambiguation

UNIT – II QUERYING [9]

Languages – Key Word based Querying – Pattern Matching – Structural Queries – Query Operations – User Relevance Feedback – Local and Global Analysis – Text and Multimedia languages

UNIT – III TEXT OPERATIONS AND USER INTERFACE [9]

Document Preprocessing – Clustering – Text Compression – Indexing and Searching – Inverted files – Boolean Queries – Sequential searching – Pattern matching – User Interface and Visualization – Human Computer Interaction – Access Process – Starting Points – Query Specification – Context – User relevance Judgment – Interface for Search

UNIT – IV MULTIMEDIA INFORMATION RETRIEVAL [9]

Data Models – Query Languages – Spatial Access Models – Generic Approach – One Dimensional Time Series – Two Dimensional Color Images – Feature Extraction

UNIT – V APPLICATIONS [9]

Searching the Web – Challenges – Characterizing the Web – Search Engines – Browsing – Meta searchers – Online IR systems – Online Public Access Catalogs – Digital Libraries – Architectural Issues – Document Models – Representations and Access – Prototypes and Standards

Total = 45 Periods

References :

1. Ricardo Baeza,Yate,Berthier Ribeiro,Neto, Modern Information Retrieval, Addison Wesley, 2011
2. G G Chowdhury, Introduction to Modern Information Retrieval, Neal Schuman Publishers, Third edition, 2010
3. Daniel Iurafsky and James H Martin, Speech and Language Processing, Pearson Education, International Edition,2008
4. David A, Grossman, Ophir Frieder, Information Retrieval: Algorithms, and Heuristics, Second Edition, Springer, 2008

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SEMESTER – II

		L	T	P	C
IT20261	**DATA WAREHOUSING AND DATA MINING (Professional Electives – III and IV)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Elaborate the concepts of Data Warehousing architecture and implementation*	*Create*
CO2:	*Apply the association rules for mining applications*	*Apply*
CO3:	*Discuss on appropriate Classification techniques for various problems*	*Create*
CO4:	*Construct the suitable Clustering methods for mining applications*	*Apply*
CO5:	*Illustrate various data mining techniques on complex data objects*	*Understand*

UNIT – I DATA WAREHOUSING [9]

Introduction to Data Warehousing – Data warehousing Components – Data warehouse Architecture – Data Warehouse Schemas – Online Analytical Processing (OLAP) – OLAP and Multidimensional Data Analysis – Data Warehousing to Data Mining

UNIT – II DATA MINING [9]

Data Mining – Data Mining Functionalities – Data Pre-processing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation – Association Rule Mining – Efficient and Scalable Frequent Item Set Mining Methods – Mining Various Kinds of Association Rules – Association Mining to Correlation Analysis – Constraint Based Association Mining

UNIT – III CLASSIFICATION [9]

Classification and Prediction – Issues Regarding Classification and Prediction – Classification by Decision Tree Induction – Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section

UNIT – IV CLUSTERING [9]

Cluster Analysis – Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid Based Methods – Model Based Clustering Methods – Clustering High Dimensional Data – Constraint Based Cluster Analysis – Outlier Analysis

UNIT – V TRENDS IN DATA MINING [9]

Mining Object – Spatial, Multimedia, Text and Web Data – Multidimensional Analysis and Descriptive Mining of Complex Data Objects – Spatial Data Mining – Multimedia Data Mining – Text Mining – Mining the World Wide Web – Data mining tools – DB Miner – WEKA

Total = 45 Periods

Reference Books :

1 Jiawei Han and Micheline Kamber, Data Mining Concepts and Techniques, 3rd Edition, Elsevier, Reprinted 2011

2 Alex Berson and Stephen J Smith, Data Warehousing, Data Mining & OLAP, Tata McGraw – Hill Edition, 13th Reprint 2010

3 K P Soman, Shyam Diwakar and V Ajay, Insight into Data Mining Theory and Practice, Easter Economy Edition, Prentice Hall of India, 2006

4 G K Gupta, Introduction to Data Mining with Case Studies, Easter Economy Edition, Prentice Hall of India, 2009

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SEMESTER – II

		L	T	P	C
IT20262	**NETWORK MANAGEMENT (Professional Electives – III and IV)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Apply the knowledge in fundamental concepts and basic taxonomy and terminology used in computer networks*	*Apply*
CO2:	*Discover about IEEE 802-11 LAN system architecture and MAC management concepts*	*Analyze*
CO3:	*Identify the necessity of transport layer in IEEE 802-11 standard*	*Apply*
CO4:	*Build the skills in IP layer- sub netting and routing mechanisms in network*	*Apply*
CO5:	*Summarize about various tools and models used for measure the network performance*	*Understand*

UNIT – I NETWORKING BASICS [9]

Networking basics – LANs and WANs – Network hardware components – Server-based networks – Peer-to-peer networks – Server based vs peer-to-peer networks – Specialized servers – Combination networks – Network packets – Addressing packets – Multiplexing – Protocols – The OSI reference model – Internet Protocol Stack

UNIT – II MAC MANAGEMENT [9]

Asynchronous and Synchronous transmission – MAC protocol – Controlled & contention-based – IEEE 802-11 LANs – System architecture – physical layer – Media Access Control – MAC management – Error Detection and Correction Techniques – CRC and Linear Block Codes – Transmission Protocols – Retransmission techniques – Token ring – FDDI

UNIT – III TCP [9]

Introduction to TCP – Packet format – Sliding window protocol – Establishing and Closing TCP connection – Response to Congestion and variance in delay – TCP performance – Reserved and available port numbers

UNIT – IV IP DATAGRAMS [9]

IP Layers and functions – Congestion control – X.25 – Internetworking concepts and X.25 architectural models – Naming addressing and routing using IP – Unreliable connectionless delivery – Datagram's – Routing IP datagram's – ICMP

UNIT – V SWITCHING AND ROUTING [9]

Traffic modeling and simulation – Self-similar and heavy tailed models – Buffering – Blocking – Fast Forwarding Internet traffic: Self-similarity – Ethernet traffic – World-Wide – Web traffic – IP Switching – IP multicast – Multicast routing

Total = 45 Periods

Reference Books :

1 Fitzgerald and Dennis, Business Data Communications and Networking, John Wiley and Sons, Delhi, 2011
2 William Stallings, Data and Computer Communications, Eighth edition, Prentice Hall, New Delhi, 2009
3 James F Kurose, et al, Computer Networking: A Top, Down Approach Featuring the Internet, Fourth edition, Addison Wesley, 2008
4 Achyut S Godbole, Data Communications and Networks, Tata Mc,Graw Hill, Seventh reprint, 2007

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SEMESTER – II

		L	T	P	C
IT20263	**MULTI CORE ARCHITECTURE**				
	(Professional Electives – III and IV)	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Explain the basics of computer architecture concepts*	*Understand*
CO2:	*Discuss the pipeline processing process and its principles*	*Create*
CO3:	*Analyze the parallel processing principles*	*Analyze*
CO4:	*Construct the vector architecture and its types*	*Apply*
CO5:	*Compile the shared memory architecture*	*Create*

UNIT – I FUNDAMENTAL CONCEPT OF COMPUTER ARCHITECTURE [9]

Fundamental Concept of Computer Architecture – Introduction to Parallel Processing – Basic concepts – Types and levels of Parallelism – Classification of Parallel architecture – Basic parallel Techniques – Relationship between languages and Parallel architecture

UNIT – II PIPELINED PROCESSOR [9]

Introduction to ILP Processors – Pipelined Processor – Basic concept – Design space of pipelines – Overview of pipelined instruction processing – Pipelined instruction processing in Pentium – Case study – VLIW architecture – basic principles – Trace 200 family case Study

UNIT – III SUPERSCALAR PROCESSOR [9]

Introduction – Parallel decoding – Instruction issue – Shelving – Register renaming – Parallel execution – Power PC 620 case study – SIMD architecture – Introduction – Design space – Coarse grained SIMD architecture

UNIT – IV INTRODUCTION TO MIMD ARCHITECTURE [9]

Introduction – Word length – Vectorization – Pipelining – Parallel computing streams – Cray family – Convex C4 / XA system – Introduction to MIMD architecture – Coarse gain multi computers – Intel paragon homogeneous architecture – Power plus hybrid architecture

UNIT – V CACHE MEMORY [9]

Introduction – Dynamic interconnection networks – Cache coherence – Uniform Memory Access (UMA) machines – Encore multi max machine case study – Non Uniform Memory Access (NUMA) machines – Vector machine case study – Cache Only Memory Architecture (COMA) machine with examples

Total = 45 Periods

Reference Books :

1 Dezso Sima, Peter Karsuk, Terence Fountain, Advanced Computer Architectures, A Design Space ApproachII, Pearson Education, 2011

2 J L Hennessy and D A Patterson, Computer Architecture: A Quantitative Approach, Morgan Kaufmann publishers, 2011

3 Richard Y, Kain, Advanced Computer Architecture: A System Design Approach, PHI Learning, 2010

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SEMESTER – II

		L	T	P	C
IT20264	**KNOWLEDGE DISCOVERY (Professional Electives – III and IV)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Justify about various knowledge representation methods*	*Evaluate*
CO2:	*Discuss on Knowledge Representation*	*Create*
CO3:	*Identify the evaluation of Decision Trees*	*Apply*
CO4:	*Analyze Classification Rules*	*Analyze*
CO5:	*Recall the concept of Clustering*	*Remember*

UNIT – I INTRODUCTION KDD AND DATA MINING **[9]**

Data Mining and Machine Learning – Machine Learning and Statistics – Generalization as Search – Data Mining and Ethics

UNIT – II KNOWLEDGE REPRESENTATION **[9]**

Decision Tables – Decision Trees – Classification Rules – Association Rules – Rules involving Relations – Trees for Numeric Predictions – Neural Networks – Clusters

UNIT – III EVALUATION OF LEARNED RESULTS **[9]**

Decision Trees – Divide and Conquer– Calculating Information – Entropy – Pruning– Estimating Error Rates – The C4–5 Algorithm – Training and Testing – Predicting Performance – Cross Validation

UNIT – IV CLASSIFICATION **[9]**

Classification Rules – Inferring Rudimentary Rules – Covering Algorithms for Rule Construction – Probability Measure for Rule Evaluation – Association Rules – Item Sets – Rule Efficiency

UNIT – V CLUSTERING **[9]**

Numeric Predictions – Linear Models for Classification and Numeric Predictions – Numeric Predictions with Regression Trees – Evaluating Numeric Predictions – Artificial Neural Networks – Perceptions – Multilayer Networks – The Back propagation Algorithm – Iterative Distance based Clustering – Incremental Clustering – The EM Algorithm

Total = 45 Periods

Reference Books :

1 Maimon and oded(et al), Data mining and knowledge discovery handbook

2 Data Cleansing: A Prelude to knowledge Discovery

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SEMESTER – II

		L	T	P	C
IT20265	**DATA SECURITY AND ACCESS CONTROL (Professional Electives – III and IV)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	Develop classical models and algorithms	*Create*
CO2:	Analyze the data and identify the problems	*Analyze*
CO3:	Choose the relevant models	*Apply*
CO4:	Apply the algorithms	*Apply*
CO5:	Predict the strengths and weaknesses of various access control models and to analyze their behaviour	*Create*

UNIT – I INTRODUCTION TO ACCESS CONTROL [9]

Introduction to Access Control – Purpose and fundamentals of access control – Brief history – Policies of Access Control – Models of Access Control and Mechanisms – Discretionary Access Control (DAC) – Non Discretionary Access Control – Mandatory Access Control (MAC) – Capabilities and Limitations of Access Control Mechanisms: Access Control List (ACL) and Limitations – Capability List and Limitations

UNIT – II ROLE-BASED ACCESS CONTROL (RBAC) [9]

Role Based Access Control (RBAC) and Limitations – Core RBAC – Hierarchical RBAC – Statically Constrained RBAC – Dynamically Constrained RBAC – Limitations of RBAC – Comparing RBAC to DAC and MAC Access control policy

UNIT – III BIBA'SINTRIGITY MODEL [9]

Biba's integrity model – Clark Wilson model – Domain type enforcement model – Mapping the enterprise view to the system view – Role hierarchies – Inheritance schemes – Hierarchy structures and inheritance forms – Using SoD in real system Temporal Constraints in RBAC – MAC AND DAC – Integrating RBAC with enterprise IT infrastructures: RBAC for WFMSs – RBAC for UNIX and JAVA environments – Case study: Multi line Insurance Company

UNIT – IV SMART CARD BASED INFORMATION SECURITY [9]

Smart Card based Information Security – Smart card operating system – Fundamentals – Design and implantation principles – Memory organization – Smart card files – File management – Atomic operation – Smart card data transmission ATR – PPS Security techniques – User identification – Smart card security – Quality assurance and testing – Smart card life cycle – 5 phases – Smart card terminals

UNIT – V RECENT TRENDS IN DATABASE SECURITY [9]

Recent trends in Database security and access control mechanisms – Case study of Role Based Access Control (RBAC) systems – Recent Trends related to data security management – Vulnerabilities in different DBMS

Total = 45 Periods

References

1 David F, Ferraiolo D Richard Kuhn , Ramaswamy Chandramouli, Role Based Access Control, 2nd Edition,2011

2 http://www-smartcard-co-uk/tutorials/sct-itsc-pdf : Smart Card Tutorial

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SEMESTER - II

		L	T	P	C
IT20266	**DIGITAL FORENSICS**				
	(Professional Electives – III and IV)	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Discuss relevant legislation and codes of ethics*	*Create*
CO2:	Analyze Computer forensics and digital detective and various processes policies and procedures	*Analyze*
CO3:	Demonstrate on E-discovery guidelines and standards E-evidence tools and environment	*Understand*
CO4:	*Recommend Email and web forensics and network forensics*	*Evaluate*
CO5:	*Relate the tools of Mobile Forensics*	*Understand*

UNIT – I DIGITAL FORENSICS SCIENCE [9]

Forensic science – Computer forensics And digital forensics – Computer Crime: Criminalistics as it relates to the investigative process – Analysis of cyber – Criminalistics area – Holistic approach to Cyber Forensics

UNIT – II CYBER CRIME SCENE ANALYSIS [9]

Discuss the various court orders etc – Methods to search and seizure electronic evidence – Retrieved and unretrieved communications – Discuss the importance of understanding what court documents would be required for a criminal investigation

UNIT – III EVIDENCE MANAGEMENT & PRESENTATION [9]

Create and manage shared folders using operating system – Importance of the forensic mindset – Define the workload of law enforcement – Explain what the normal case would look like – Define who should be notified of a crime – Parts of gathering evidence – Define and apply probable cause

UNIT – IV COMPUTER FORENSICS [9]

Prepare a case – Begin an investigation – Understand computer forensics workstations and software – Conduct an investigation – Complete a case – Critique a case – Network Forensics: open source security tools for network forensic analysis – Requirements for preservation of network data

UNIT – V MOBILE FORENSICS [9]

Mobile forensics techniques – Mobile forensics tools – Legal Aspects of Digital Forensics: IT Act 2000 – Amendment of IT Act 2008 – Recent trends in mobile forensic technique and methods to search and seizure electronic evidence

Total = 45 Periods

References

1 John Sammons, The Basics of Digital Forensics, 2nd edition, Elsevier, 2014

2 John Vacca, Computer Forensics: Computer Crime Scene Investigation, First Edition, Laxmi Publications, 2015

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SEMESTER - II

		L	T	P	C
IT20267	**AGENT BASED INTELLIGENT SYSTEMS (Professional Electives – III and IV)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Discuss the basics of intelligent agent ad searching methods*	*Create*
CO2:	*Analyze the knowledge management and agent based process event*	*Analyze*
CO3:	*Explain the various techniques used in planning agents*	*Evaluate*
CO4:	*Categorize the rules ad responsibility of Bayesian network*	*Analyze*
CO5:	*Outline the basics and applications of Knowledge in Learning*	*Understand*

UNIT – I FUNDAMENTALS [9]

Definitions – Foundations – History – Intelligent Agents – Problem Solving – Searching – Heuristics – Constraint Satisfaction Problems – Adversarial search

UNIT – II KNOWLEDGE REPRESENTATION AND REASONING [9]

Logical Agents – First Order Logic – Inference in FOL: Unification – Chaining – Resolution Strategies – Knowledge Representation: Objects – Events

UNIT – III PLANNING AGENTS [9]

Planning Problem – State Space Search – Partial Order Planning – Graphs – Planning approach and analysis – Time schedule and Resources – Hierarchical planning – Multi Agent Planning

UNIT – IV AGENTS AND UNCERTAINITY [9]

Acting under uncertainty – Probability Notation – Bayes Rule and use – Bayesian Networks – Probabilistic Reasoning - Time and Uncertainty – Models and Filters

UNIT – V LEARNING [9]

Knowledge in Learning – Explanation based Learning – Relevance Information – Inductive Logic Programming – Learning Probabilistic Model – Reinforcement Learning

Total = 45 Periods

References

1 Stuart Russell and Peter Norvig, Artificial Intelligence- A Modern Approach, 3rd Edition, Prentice Hall, 2018
2 Michael Wooldridge, An Introduction to Multi Agent System, 2nd Edition, John Wiley, 2009
3 Patrick Henry Winston, Artificial Intelligence, 3rd Edition, AW, 2009

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SEMESTER - II

		L	T	P	C
IT20268	**BIG DATA AND ANALYTICS (Professional Electives – III and IV)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Determine big data and use cases from selected business domains*	*Evaluate*
CO2:	*Explain NoSQL big data management*	*Evaluate*
CO3:	*Examine the data concepts of HDFS*	*Analyze*
CO4:	*Organize map-reduce analytics using Hadoop*	*Apply*
CO5:	*Select Hadoop related tools such as HBase, Cassandra, Pig and Hive for big data analytics*	*Apply*

UNIT – I INTRODUCTION TO BIG DATA [9]

What is big data – Why big data – Convergence of key trends – Unstructured data – Industry examples of big data – Web analytics – Big data and marketing – Fraud and big data – Risk and big data – Credit risk management – Big data and algorithmic trading – Big data and healthcare – Big data in medicine – Advertising and big data – Big data technologies – Introduction to Hadoop– Open source technologies – Cloud and big data – Mobile business intelligence – Crowd sourcing analytics – Inter and trans firewall analytics

UNIT – II INTRODUCTION TO NOSQL [9]

Introduction to NoSQL – Aggregate data models – Aggregates – Key value and document data models – Relationships – Graph databases – Schema less databases – Materialized views – Distribution models – Shading – Master slave replication – Peer peer replication – Shading and replication – Consistency – Relaxing consistency – Version stamps – Map reduce – Partitioning and combining – Composing map reduce calculations

UNIT – III DATA FORMAT ANALYZING WITH HADOOP [9]

Data format – Analyzing data with Hadoop – Scaling out – Hadoop streaming – Hadoop pipes – design of Hadoop distributed file system (HDFS) – HDFS concepts – Java interface – Data flow – Hadoop I/O – Data integrity – Compression – Serialization – Avro file based data structures

UNIT – IV MAP REDUCE WORKFLOWS [9]

Map Reduce workflows – Unit tests with MR Unit – Test data and local tests – Anatomy of Map Reduce job run – classic Map reduce – YARN – Failures in classic Map reduce and YARN – Job scheduling – Shuffle and sort– task execution – Map Reduce types – Input formats – Output formats

UNIT – V INTRODUCTION TO HBASE [9]

Hbase – Data model and implementations – Hbase clients – Hbase examples – Praxis – Cassandra – Cassandra data model – Cassandra examples – Cassandra clients – Hadoop integration – Pig Grunt – Pig data model – Pig Latin – developing and testing Pig Latin scripts – Hive – Data types and file formats – HiveQL data definition – HiveQL data manipulation – HiveQL queries

Total = 45 Periods

References

1 Michael Minelli, Michelle Chambers and Ambiga Dhiraj, Big Data- Big Analytics: Emerging Business and Analytic trends for todays Business, First Edition,Wiley,2013

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SEMESTER - II

		L	T	P	C
IT20269	**ONTOLOGY AND SEMANTIC WEB (Professional Electives – III and IV)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Explain the fundamentals of Ontology*	*Evaluate*
CO2:	*Identify the languages of the semantic web and ontologies*	*Apply*
CO3:	*Analyze ontology learning for semantic web*	*Analyze*
CO4:	*Construct ontology using different tools*	*Apply*
CO5:	*Outline about semantic web services with web applications*	*Understand*

UNIT – I INTRODUCTION [9]

Components – Types – Ontological Commitments – Ontological Categories – Philosophical Background– Sample – Knowledge Representation Ontologies – Top Level Ontologies – Linguistic Ontologies – Domain Ontologies – Semantic Web – Need – Foundation – Layers – Architecture

UNIT – II LANGUAGES FOR SEMANTIC WEB AND ONTOLOGIES [9]

Web Documents in XML – RDF - Schema – Web Resource Description using RDF– RDF Properties – Topic Maps and RDF – Overview – Syntax Structure – Semantics – Pragmatics – Traditional Ontology Languages – LOOM – OKBC – OCML – Flogic Ontology Markup Languages – SHOE – OIL – DAML + OIL– OWL

UNIT – III ONTOLOGY LEARNING FOR SEMANTIC WEB [9]

Taxonomy for Ontology Learning – Layered Approach – Phases of Ontology Learning – Importing and Processing Ontologies and Documents – Ontology Learning Algorithms – Evaluation

UNIT – IV ONTOLOGY MANAGEMENT AND TOOLS [9]

Overview – Need for management – Development process – Target ontology – Ontology mapping – Skills management system – Ontological class – Constraints – Issues- Evolution – Development of Tools and Tool Suites – Ontology Merge Tools – Ontology based Annotation Tools

UNIT – V APPLICATIONS [9]

Web Services – Semantic Web Services – Case Study for specific domain – Security issues – Current trends

Total = 45 Periods

References

1. Asuncion Gomez Perez, Oscar Corcho, Mariano Fernandez Lopez, Ontological Engineering: with examples from the areas of Knowledge Management, e,Commerce and the Semantic Web , Springer, 2010
2. Grigoris Antoniou, Frank van Harmelen, A Semantic Web Primer (Cooperative Information Systems, The MIT Press, 2014
3. Alexander Maedche, Ontology Learning for the Semantic Web, Springer, 1st edition, 2002
4. John Davies, Dieter Fensel, Frank Van Harmelen, Towards the Semantic Web: Ontology – Driven Knowledge Management, John Wiley & Sons Ltd, 2003

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SEMESTER - II

		L	T	P	C
IT20271	**OBJECT ORIENTED ANALYSIS AND DESIGN (Professional Electives – III and IV)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Explain the various system development methods available*	*Evaluate*
CO2:	*Apply the object behaviour in the system using the UML diagrams*	*Apply*
CO3:	*Discuss the system behaviour in the design phase using the axioms*	*Create*
CO4:	*Propose the design principles and get the outline of the system*	*Create*
CO5:	*Illustrate the architectural analysis of the proposed system using the tools available*	*Understand*

UNIT – I INTRODUCTION [9]

Introduction to System Concepts – Managing Complex Software- Properties – Object Oriented Systems Development – Object Basics – Systems Development Life Cycle – Rumbaugh Methodology – Brooch Methodology – Jacobson Methodology – Unified Process

UNIT – II INCEPTION [9]

Unified Approach – Unified Modelling Language – Static behaviour diagrams – Dynamic behaviour diagrams – Object Constraint Language

UNIT– III ELABORATION ITERATION 1 - BASIC [9]

Inception – Evolutionary Requirements – Domain Models – Operation Contracts – Requirements to Design – Design Axioms – Logical Architecture – Designing Objects with Responsibilities – Object Design – Designing for Visibility

UNIT – IV ELABORATION ITERATION 2 – MORE PATTERNS [9]

Patterns – Analysis and Design patterns – GoF Patterns – Mapping designs to code – Test Driven development and refactoring – UML Tools and UML as blueprint

UNIT – V ELABORATION ITERATION 3 [9]

More Patterns – Applying design patterns – Architectural Analysis – Logical Architecture Refinement – Package Design – Persistence framework with pattern

Total = 45 Periods

References

1. Craig Larman, Applying UML and Patterns – An introduction to Object Oriented Analysis and Design and Iterative Development, 3rd Edition, Pearson Education, 2012
2. Fowler Martin, UML Distilled,3rd Edition, Pearson Education, 2015
3. Michael Blaha and James Rumbaugh, Object oriented modeling and design with UML, 2nd Edition, Prentice Hall of India, 2009
4. Grady Booch, Object Oriented Analysis and Design,2nd Edition, Pearson Education, 2008

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SEMESTER - III

		L	T	P	C
IT20361	**HUMAN RESOURCE MANAGEMENT (Professional Electives – V and VI)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Discuss the roles and responsibilities of HR manager*	*Create*
CO2:	*Analyze the various processes in international level staff recruitment*	*Analyze*
CO3:	*Explain the need of training in performance management*	*Understand*
CO4:	*Discuss the benefits of compensation*	*Create*
CO5:	*Analyze the process in practicing the industrial relations and people management*	*Analyze*

UNIT – I IHRM [9]

Meaning of IHRM – Difference between domestic and International HRM – Issues and barriers to effective global HRM – Role of HR in International firms – Multi Culture in Organizations

UNIT – II INTERNATIONAL RECRUITMENT AND STAFFING [9]

International Staffing – Approaches – Recruitment and Selection – Role of expatriate and non expatriates

UNIT – III TRAINING AND PERFORMANCE MANAGEMENT [9]

Training and development – Need – Cross cultural training – Expatriate training Basis – Issues and approaches in International performance management

UNIT – IV COMPENSATION AND BENEFITS [9]

Components – Approaches to International compensation – Variables influencing compensation – Issues in International compensation

UNIT – V INDUSTRIAL RELATIONS-AND PEOPLE MANAGEMENT PRACTICES [9]

Industrial relations – Key issues in International Industrial Relations – Trade unions and International Industrial relations – Asian – Japanese – American perspectives in managing HR

Total = 45 Periods

References

1. Peter J Dowling and Denice E Welch, International Human Resource Management Managing people in a Multinational context, Cengage, 2009
2. Aswathappa Sadhna Dash ,International Human Resource Management, Text and Cases, Tata McGraw Hill, 2009

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SEMESTER - III

		L	T	P	C
IT20362	**DISTRIBUTED DATABASES (Professional Electives – V and VI)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Analyze relational database management systems*	*Analyze*
CO2:	*Apply normalization to make efficient retrieval from database and query*	*Apply*
CO3:	*Discuss about Query processors*	*Create*
CO4:	*Analyze about parallel Database Systems*	*Analyze*
CO5:	*Explain Distributed Object database Management systems*	*Evaluate*

UNIT – I INTRODUCTION [9]

Distributed Data processing – Distributed database system (DDBMS) – Promises of DDBMSs – Complicating factors and Problem areas in DDBMSs – Overview of Relational DBMS – Relational Database concepts – Normalization – Integrity rules – Relational Data Languages – Relational DBMS

UNIT – II DISTRIBUTED DBMS ARCHITECTURE [9]

DBMS Standardization – Architectural models for Distributed DBMS – Distributed DBMS Architecture – Distributed Database Design: Alternative design Strategies – Distribution Design Issues – Fragmentation Allocation – Semantic Data Control: View Management – Data security – Semantic Integrity Control

UNIT – III OVERVIEW OF QUERY PROCESSING [9]

Query Processing: Objectives of Query Processing – Complexity of Relational Algebra operations – Characterization of Query processors – Layers of Query Processing: Introduction to Transaction Management: Definition of Transaction – Properties of Transaction – Types of transaction – Distributed Concurrency Control: Serializability Theory – Taxonomy of Concurrency Control Mechanisms – Locking Based Concurrency Control Algorithms

UNIT – IV PARALLEL DATABASE SYSTEMS [9]

Database Servers – Parallel Architecture – Parallel DBMS Techniques – Parallel Execution Problems – Parallel Execution for Hierarchical Architecture – Recent Approaches and Current Trends in improving the Performance of Distributed Database

UNIT – V DISTRIBUTED OBJECT DATABASE MANAGEMENT SYSTEMS [9]

Fundamental Object Concepts and Object Models – Object Distribution Design – Architectural Issues – Object Management – Distributed Object Storage – Object Query Processing – Transaction Management. Database Interoperability: Database Integration – Query Processing

Total = 45 Periods

References

1 M. Tamer Ozsu Patrick Valduriez, Principles of Distributed Database Systems, Second Edition, 2011

2 Stefano Ceri Giuseppe Pelagatti, Distributed Databases principles and systems ,Tata McGraw Hill , 2018

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SEMESTER - III

		L	T	P	C
IT20363	**SERVICE ORIENTED ARCHITECTURE (Professional Electives – V and VI)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Discuss the fundamentals of SOA and its Architecture*	*Create*
CO2:	*Discover the knowledge of SOA technologies SOAP, WSDL and JAX etc*	*Analyze*
CO3:	*Build SOA Development and orchestration*	*Create*
CO4:	*Identify the SOA security services like XML signature,WS security*	*Apply*
CO5:	*Compile Transaction processing issues and SOA in mobile research*	*Create*

UNIT – I **ARCHITECTURE** **[9]**

Software Architecture – Types of IT Architecture – SOA – Evolution – Key components – Perspective of SOA – Enterprise wide SOA – Architecture – Enterprise Applications – Solution Architecture for Enterprise Application – Software Platforms for Enterprise Applications – Patterns for SOA – SOA Programming Models

UNIT – II **SOA TECHNOLOGIES** **[9]**

Service Oriented Analysis and Design – Design of Activity Data – Client and Business Process Services –Technologies of SOA – SOAP – WSDL – JAX – WS – XML WS for .NET – Service integration with ESB Scenario – Business case for SOA – Stakeholder objectives – Benefits of SOA – Cost Savings

UNIT – III **IMPLEMENTATION AND GOVERNANCE** **[9]**

Handoff in Wireless Mobile Networks – Reference Model – Handoff Schemes – Location Management In Cellular Networks – Mobility models – Location and Tracking Management Schemes – Time – Movement – Profile and Distance Based Update Strategies

UNIT – IV **SECURITY SERVICES** **[9]**

Meta Data Management – XML Security – XML Signature – XML Encryption – SAML – XACML – XKMS – WS Security– Security in Web Service Framework – Advanced Messaging

UNIT – V **TRANSACTIONS AND RESEARCH ISSUES** **[9]**

Transaction Processing – Paradigm – Protocols and Co-ordination – Transaction Specifications – SOA in mobile – Research Issues

References

1. Shankar Kambhampaly, Service Oriented Architecture for Enterprise Applications, Wiley India Pvt Ltd 2008
2. Eric Newcomer Greg Lomow, Understanding SOA with Web Services, Pearson Education 2009
3. Mark O' Neill Phillip Hallam Baker Sean Mac Cann Mike Shema Ed Simon Paul A.Watters and Andrew White, Web Services Security ,Tata McGraw-Hill Edition 2008

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SEMESTER - III

		L	T	P	C
IT20364	**CLOUD COMPUTING (Professional Electives – V and VI)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Identify security aspects of each cloud model*	*Apply*
CO2:	*Develop a risk-management strategy for moving to the Cloud*	*Create*
CO3:	*Construct a public cloud instance using a public cloud service provider*	*Apply*
CO4:	*Apply trust-based security model to different layer*	*Apply*
CO5:	*Create the knowledge on GRC*	*Create*

UNIT – I **INTRODUCTION TO CLOUD COMPUTING AND ITS ARCHITECTURE** **[9]**

Online Social Networks and Applications – Cloud introduction and overview – Different clouds – Risks – Novel applications of cloud computing Requirements – Introduction to Cloud computing architecture – On Demand Computing – Virtualization at the infrastructure level – Security in Cloud computing – Environments

UNIT – II **VIRTUALIZATION CLOUD COMPUTING AND DEPLOYMENT MODELS** **[9]**

CPU Virtualization – A discussion on Hypervisors Storage Virtualization – Cloud Computing Defined – The SPI Framework for Cloud Computing – The Traditional Software Model – The Cloud Services Delivery Model – Cloud Deployment Models – Key Drivers to Adopting the Cloud – The Impact of Cloud Computing on Users – Governance in the Cloud – Barriers to Cloud Computing Adoption in the Enterprise

UNIT – III **SECURITY ISSUES IN CLOUD COMPUTING AND ACCESS MANAGEMENT** **[9]**

Infrastructure Security: The Network Level – The Host Level – The Application Level – Data Security and Storage – Aspects of Data Security – Data Security Mitigation Provider Data and Its Security – Trust Boundaries and IAM – IAM Challenges – Relevant IAM Standards and Protocols for Cloud Services – IAM Practices in the Cloud – Cloud Authorization Management

UNIT – IV **SECURITY MANAGEMENT IN THE CLOUD AND ITS PRIVACY ISSUES** **[9]**

Security Management Standards – Security Management in the Cloud – Availability Management: SaaS – PaaS – IaaS – Privacy Issues – Data Life Cycle – Key Privacy Concerns in the Cloud – Protecting Privacy – Changes to Privacy Risk Management and Compliance in Relation to Cloud Computing – Legal and Regulatory Implications – U.S. Laws and Regulations – International Laws and Regulations

UNIT – V **AUDIT AND COMPLIANCE AND ADVANCED TOPICS** **[9]**

Internal Policy Compliance – Governance Risk and Compliance (GRC) – Regulatory/External Compliance – Cloud Security Alliance – Auditing the Cloud for Compliance – Security as a Cloud – Recent Developments in Hybrid Cloud and Cloud Security

References

1 John Rhoton , Cloud Computing Explained: Implementation Handbook for Enterprises ,November 2009

2 Tim Mather, Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance (Theory in Practice) ISBN-10: 0596802765 O'Reilly Media ,September 2009

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SEMESTER - III

		L	T	P	C
IT20365	**INTERNET OF THINGS (Professional Electives – V and VI)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Analyze various protocols for IoT*	*Analyze*
CO2:	*Develop web services to access/control IoT devices*	*Apply*
CO3:	*Design a portable IoT using Rasperry Pi*	*Create*
CO4:	*Formulate an IoT application and connect to the cloud*	*Create*
CO5:	*Analyze applications of IoT in real time scenario*	*Analyze*

UNIT – I **INTRODUCTION TO IoT** **[9]**

Internet of Things – Physical Design – Logical Design – IoT Enabling Technologies – IoT Levels and Deployment Templates – Domain Specific IoTs – IoT and M2M – IoT System Management with NETCONF – YANG – IoT Platforms Design Methodology

UNIT – II **IoT ARCHITECTURE** **[9]**

M2M high level ETSI architecture – IETF architecture for IoT – OGC architecture – IoT reference model – Domain model – Information Model – Functional Model – Communication Model – IoT Reference Architecture

UNIT – III **IoT PROTOCOLS** **[9]**

Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Unified Data Standards – Protocols – IEEE 802.15.4 – BAC Net Protocol – Mod bus – Zig bee Architecture – Network layer – 6LowPAN – CoAP – Security

UNIT – IV **BUILDING IoT WITH RASPBERRY PI & ARDUINO** **[9]**

Building IOT with RASPERRY PI – IoT Systems – Logical Design using Python – IoT Physical Devices & Endpoints – IoT Device – Building blocks – Raspberry Pi Board – Linux on Raspberry Pi – Raspberry Pi Interfaces – Programming Raspberry Pi with Python – Other IoT Platforms – Arduino

UNIT – V **CASE STUDIES AND REALWORLD APPLICATIONS** **[9]**

Real World Design Constraints – Applications – Asset Management – Industrial automation – Smart Grid – Commercial Building Automation – Smart Cities – Participatory Sensing – Data Analytics for IoT – Software and Management Tools for IoT – Cloud Storage Models and Communication APIs – Cloud for IoT – Amazon Web Services for IoT

Total = 45 Periods

References

1 Arshdeep Bahga Vijay Madisett, Internet of Things – A hands on approach, Universities Press ,2015

2 Dieter Uckelmann Mark Harrison Michahelles Florian (Eds), Architecting the Internet of Things, Springer 2011

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SEMESTER - III

		L	T	P	C
IT20366	**GPU COMPUTING**				
	(Professional Electives – V and VI)	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Discover concepts in parallel programming*	*Analyze*
CO2:	*Construct the programs on GPUs*	*Apply*
CO3:	*Discuss on Synchronization*	*Create*
CO4:	*Analyze overlapping issues in GPU*	*Analyze*
CO5:	*Discuss on Case Studies*	*Create*

UNIT – I INTRODUCTION **[9]**

History – Graphics Processors – Graphics Processing Units – GPGPUs – Clock speeds – CPU / GPU comparisons – Heterogeneity – Accelerators – Parallel programming – CUDA OpenCL / OpenACC – Hello World Computation Kernels – Launch parameters – Thread hierarchy – Warps / Wavefronts – Thread blocks / Workgroups – Streaming multiprocessors – 1D / 2D /3D thread mapping – Device properties – Simple Programs

UNIT – II MEMORY **[9]**

Memory hierarchy – DRAM / global – Local / shared – Private / local – Textures – Constant Memory – Pointers – Parameter Passing– Arrays and dynamic Memory – Multi–dimensional Arrays – Memory Allocation – Memory copying across devices – Programs with matrices – Performance evaluation with different memories

UNIT – III SYNCHRONIZATION **[9]**

Memory Consistency – Barriers (local versus global) – Atomics – Memory fence – Prefix sum – Reduction – Programs for concurrent Data Structures such as Work lists – Linked Lists – Synchronization across CPU and GPU Functions – Device functions – Host functions – Kernels functions – Using libraries (such as Thrust) and developing libraries

UNIT – IV SUPPORT **[9]**

Debugging GPU Programs – Profiling – Profile tools – Performance aspects Streams – Asynchronous processing –Tasks – Task dependence – Overlapped data transfers – Default Stream – Synchronization with streams – Events – Event based – Synchronization – Overlapping data transfer and kernel execution – Pitfalls

UNIT – V CASE STUDIES **[9]**

Dynamic parallelism – Unified Virtual Memory – Multi GPU processing – Peer access – Heterogeneous Processing – Image Processing – Graph Algorithms – Simulations – Deep Learning

Total = 45 Periods

References

1. David Kirk Wen meiHwu Morgan Kaufman, Programming Massively Parallel Processors: A Hands-on Approach, 2010 (ISBN: 978-0123814722)
2. Shane Cook Morgan Kaufman, CUDA Programming: A Developer's Guide to Parallel Computing with GPUs, 2012 (ISBN: 978-0124159334)

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SEMESTER - III

		L	T	P	C
IT20367	**BUSINESS ANALYTICS (Professional Electives – V and VI)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Develop the knowledge of data analytics*	*Create*
CO2:	*Make use of Regression analysis for making decisions based on data and deep analytics*	*Apply*
CO3:	*Make Use of technical skills in predicative and prescriptive modelling to support business decision making*	*Apply*
CO4:	*Translate data into clear actionable insights*	*Understand*
CO5:	*Illustrate the concept of Decision analysis*	*Understand*

UNIT – I **BUSINESS ANALYTICS** **[9]**

Overview of Business analytics – Scope of Business analytics – Business Analytics Process – Relationship of Business Analytics – Process and organization – Competitive advantages of Business Analytics – Statistical Tools: Statistical Notation – Descriptive Statistical methods – Review of probability distribution and data modelling sampling and estimation methods overview

UNIT – II **TRENDINESS AND REGRESSION ANALYSIS** **[9]**

Modelling Relationships and Trends in Data – Simple Linear Regression – Important Resources Business Analytics – Personnel Data and models for Business analytics – Problem solving – Visualizing and Exploring Data – Business Analytics Technology

UNIT – III **ORGANIZATION STRUCTURES OF BUSINESS ANALYTICS** **[9]**

Organization Structures of Business analytics – Team management – Management Issues – Designing Information Policy – Outsourcing – Ensuring Data Quality – Measuring contribution of Business analytics – Managing Changes – Descriptive Analytics – Predictive analytics – Predicative Modelling – Predictive analytics – Analysis of Data Mining Methodologies – Prescriptive analytics and its step in the business analytics Process – Prescriptive Modelling – Nonlinear Optimization

UNIT – IV **FORECASTING TECHNIQUES** **[9]**

Qualitative and Judgmental Forecasting – Statistical Forecasting Models – Forecasting Models for Stationary Time Series – Forecasting Models for Time Series with a Linear Trend Forecasting – Time Series with Seasonality – Regression Forecasting with Casual Variables – Selecting Appropriate Forecasting Models – Monte Carlo Simulation and Risk Analysis: Monte Carle – Simulation Using Analytic Solver Platform – New Product Development Model – News vendor Model – Overbooking Model – Cash Budget Model

UNIT – V **DECISION ANALYSIS** **[9]**

Formulating Decision Problems – Decision Strategies with and without Outcome Probabilities – Decision Trees – The Value of Information Utility and Decision Making – Embedded and collaborative business intelligence – Visual data recovery – Data Storytelling and Data journalism

Total = 45 Periods

References

1. Marc J. Schniederjans , Dara G.Schniederjans and Christopher M. Starkey, Business analytics Principles Concepts and Applications, Pearson FT Press , 2015
2. James Evans, Business Analytics , 2018

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SEMESTER - III

		L	T	P	C
IT20368	**COST MANAGEMENT OF ENGINEERING PROJECTS (Professional Electives – V and VI)**	3	0	0	3

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Illustrate the concept of cost*	*Understand*
CO2:	*Explain the concept of Project* Commissioning	*Understand*
CO3:	*Make use of technical skills to find cost behaviour*	*Apply*
CO4:	*Demonstrate about Resource planning*	*Understand*
CO5:	*Analyze Quantitative Techniques*	*Analyze*

UNIT – I **COST CONCEPTS** **[9]**

Cost concepts in decision making – Relevant Cost – Differential Cost – Incremental Cost and Opportunity Cost – Objectives of a Costing System – Inventory Valuation – Creation of a Database for operational control – Provision of data for Decision Making

UNIT – II **PROJECT** **[9]**

Project: Meaning – Different types – Why to manage – Cost over Runs – Centers – Various stages of Project Execution – Conception to Commissioning – Project Execution as Conglomeration of Technical and Nontechnical activities – Detailed Engineering Activities – Pre Project Execution – Main Clearances and Documents – Project Team – Role of each member – Importance – Project Site – Data required with Significance – Project Contracts – Types and Contents – Project Execution – Project Cost Control – Bar Charts and Network Diagram – Project Commissioning – Mechanical and Process

UNIT – III **COST BEHAVIOR** **[9]**

Cost Behaviour and Profit Planning – Marginal Costing – Distinction between Marginal Costing and Absorption Costing – Break – Even Analysis – Cost – Volume – Profit Analysis – Various Decision – Making Problems – Standard Costing and Variance Analysis – Pricing Strategies – Pareto Analysis – Target Costing – Life Cycle Costing – Costing of service sector

UNIT – IV **RESOURCE PLANNING** **[9]**

Just in time approach – Material Requirement Planning – Enterprise Resource Planning – Total Quality Management and Theory of constraints – Activity– Based Cost Management – Bench Marking – Balanced Score Card and Value – Chain Analysis – Budgetary Control – Flexible Budgets – Performance budgets – Zero based budgets – Measurement of Divisional profitability Pricing Decisions including Transfer Pricing

UNIT – V **QUANTITATIVE TECHNIQUES** **[9]**

Quantitative Techniques for Cost Management – Linear Programming – PERT/CPM – Transportation problems – Assignment Problems – Simulation – Learning Curve Theory

Total = 45 Periods

References

1 Charles T. Horngren and George Foster, Advanced Management Accounting
2 Robert S Kaplan and Anthony A. Alkinson, Management and Cost Accounting

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SEMESTER - III

		L	T	P	C
IT203A1	**ENGLISH FOR RESEARCH PAPER WRITING (AUDIT COURSE)**	2	0	0	0

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Know how to improve the writing skills and level of readability*	*Understand*
CO2:	*Learn about what to write in each section*	*Analyze*
CO3:	*Improve skills needed when writing a title*	*Understand*
CO4:	*Ensure the good quality of paper at very first time submission*	*Apply*
CO5:	*Prioritize the useful phrases for Research Paper writing*	*Apply*

UNIT – I **[6]**

Planning and Preparations – Word order – Breaking up long sentences – Structuring– Paragraphs and Sentences – Being concise and removing redundancy – Avoiding Ambiguity and vagueness

UNIT – II **[6]**

Clarifying Who Did What – Highlighting Your Findings – Hedging and Criticizing – Paraphrasing and plagiarism – Sections of a paper – Abstracts – Introduction – Review of the Literature – Methods – Results – Discussions – Conclusions – The final check

UNIT – III **[6]**

Key skills are needed when writing a title – Key skills are needed when writing abstract – Key skills are needed when writing an introduction – Skills needed when writing a review of literature

UNIT – IV **[6]**

Skills are needed when writing the methods – Skills needed when writing the results – Skills are needed when writing the discussion – Skills are needed when writing the conclusions

UNIT – V **[6]**

Useful phrases – how to ensure paper is as good as it could possibly the first time submission

Total = 30 Periods

References

1. Goldbort, Writing for Science, Yale University Press, First Edition, 2006
2. Day R, How to write and publish a scientific paper, Cambridge University Press, First Edition, 2006
3. Highman N, Handbook of Writing for the Mathematical Sciences, SIAM. Highman's book, First Edition, 1998
4. M Ashra Rizvi, Effective Technical Communication, Tata McGraw HILL, New Delhi,First Edition,2005

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SEMESTER - III

IT203A2	**DISASTER MANAGEMENT (AUDIT COURSE)**	L	T	P	C
		2	0	0	0

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Compare Disasters and Hazards*	*Understand*
CO2:	*Illustrate the concepts of Disasters and Hazards*	*Understand*
CO3:	*Analyze Disaster mitigations*	*Analyze*
CO4:	*Examine Disaster preparedness in remote sensing areas*	*Analyze*
CO5:	*Analyze Risk Assessment*	*Analyze*

UNIT – I **INTRODUCTION** **[9]**

Disaster: Definition – Factors and Significance – Difference Between Hazard and Disaster – Natural and Manmade Disasters Difference – Nature – Types and Magnitude

UNIT – II **REPERCUSSIONS OF DISASTERS AND HAZARDS** **[9]**

Economic Damage – Loss of Human And Animal Life – Destruction of Ecosystem – Natural Disasters: Earthquakes – Volcanisms – Cyclones – Tsunamis– Floods – Droughts and Famines – Landslides and Avalanches – Man – made disaster: Nuclear Reactor Meltdown – Industrial Accidents – Oil Slicks and Spills – Outbreaks of Disease and Epidemics – War and Conflicts

UNIT – III **DISASTER PRONE AREAS IN INDIA** **[9]**

Study of Seismic Zones – Areas Prone to Floods and Droughts – Landslides and Avalanches – Areas Prone to Cyclonic and Coastal Hazards With Special Reference to Tsunami – Post Disaster Diseases And Epidemics

UNIT – IV **DISASTER PREPAREDNESS AND MANAGEMENT** **[9]**

Preparedness: Monitoring of Phenomena – Triggering a Disaster or Hazard – Evaluation of Risk: Application of Remote Sensing – Data From Meteorological and Other Agencies – Media Reports: Governmental and Community Preparedness

UNIT – V **RISK ASSESSMENT AND DISASTER MITIGATION** **[9]**

Disaster Risk: Concept and Elements – Disaster Risk Reduction – Global and National Disaster Risk Situation – Techniques of Risk Assessment – Global Co Operation in Risk Assessment and Warning – People's Participation in Risk Assessment – Strategies for Survival – Disaster Mitigation Meaning – Concept And Strategies of Disaster Mitigation – Emerging Trends in Mitigation – Structural Mitigation and Non Structural Mitigation – Programs of Disaster Mitigation in India

Total = 45 Periods

References

1 R. Nishith and Singh AK, Disaster Management in India: Perspectives- issues and strategies, New Royal book Company.

2 Sahni Pardeep Et.Al. (Eds.),Disaster Mitigation Experiences and Reflections, Prentice Hall of India New Delhi.

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SEMESTER - III

		L	T	P	C
IT203A3	**MOBILE AND PERVASIVE COMPUTING (AUDIT COURSE)**	2	0	0	0

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Explain about various technologies and protocols used in wireless communication*	*Understand*
CO2:	*Discuss about principles, architecture, functionalities and security issues of mobile computing*	*Create*
CO3:	*Analyze and characterize hand off and location management in wireless mobile networks*	*Analyze*
CO4:	*Discover the characteristics of pervasive computing applications including the major system components and architectures of the systems*	*Analyze*
CO5:	*Analyze the strengths and limitations of the tools and devices for development of pervasive computing systems*	*Analyze*

UNIT – I **EMERGING WIRELESS TECHNOLOGIES** **[9]**

Wireless Networks – Emerging Technologies – Bluetooth – WiFi – WiMAX – 4G – 5G – WATM – Mobile IP Protocols – WAP Push Architecture – WML scripts and applications

UNIT – II **MOBILE COMPUTING PRINCIPLES** **[9]**

Mobile Computing Environment – Functions – Architecture Design Considerations – Content Architecture – CC/PP Exchange Protocol – Context Manager – Data Management in WAE – Coda Files System – Caching Schemes – Mobility QOS – Security issues in Mobile Computing

UNIT – III **HANDOFF AND LOCATION MANAGEMENT** **[9]**

Handoff in Wireless Mobile Networks – Reference Model – Handoff Schemes – Location Management in Cellular Networks – Mobility Models – Location and Tracking Management Schemes – Time – Movement – Profile and Distance based Update Strategies

UNIT – IV **PERVASIVE COMPUTING PRINCIPLES** **[9]**

Pervasive Computing – Principles – Characteristics – Architecture for Pervasive Computing – Devices – Information Access Devices – Smart Identification – Embedded Controls – Entertainment Systems – Device Management

UNIT – V **PERVASIVE SOFTWARE** **[9]**

Software – JAVA – Operating Systems : Windows CE – Palm OS – Symbian OS – Android OS – JAVA Card – Client Middle ware – Synchronization – Security

Total = 45 Periods

References

1 Saad Asif ,5G Mobile Communications - Concepts and Technologies, CRC Press , 2018

2 Marc Langheinrich, Florian Schaub ,Privacy in Mobile and Pervasive Computing, Morgan & Claypool Publishers ,2018

3 Alexander Kukushkin ,Introduction to Mobile Network Engineering: GSM, 3G-WCDMA, LTE and the Road to 5G,Wiely, 2018

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SEMESTER - III

IT203A4	**CONSTITUTION OF INDIA (AUDIT COURSE)**	L	T	P	C
		2	0	0	0

Prerequisite:

Course Outcomes : On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Analyze the history of Indian constitution*	*Analyze*
CO2:	*Analyze Preamble salient features*	*Analyze*
CO3:	*Identify constitutional Rights and Duties*	*Apply*
CO4:	*Discuss rules of Election Commission*	*Create*
CO5:	*Identify the importance of Local Administration*	*Analyze*

UNIT – I **HISTORY OF MAKING OF THE INDIAN CONSTITUTION** **[9]**

History Drafting Committee (Composition & Working)

UNIT – II **PHILOSOPHY OF THE INDIAN CONSTITUTION** **[9]**

Preamble Salient Features

UNIT – III **CONTOURS OF CONSTITUTIONAL RIGHTS & DUTIES** **[9]**

Fundamental Rights: Right to Equality – Right to Freedom – Right against Exploitation – Right to Freedom of Religion – Cultural and Educational Rights – Right to Constitutional Remedies – Directive Principles of State Policy – Fundamental Duties

UNIT – IV **ORGANS OF GOVERNANCE** **[9]**

Parliament: Composition – Qualifications and Disqualifications – Powers and Functions – Executive – President – Governor Council of Ministers – Judiciary Appointment and Transfer of Judges Qualifications – Powers and Functions – Election Commission: Role and Functioning Chief Election Commissioner and Election Commissioners – State Election Commission: Role and Functioning Institute and Bodies for the welfare of SC/ST/OBC and women

UNIT – V **LOCAL ADMINISTRATION** **[9]**

District's Administration head: Role and Importance – Municipalities: Introduction – Mayor and Role of Elected Representative – CEO of Municipal Corporation – Pachayati Raj: Introduction – PRI: Zila Pachayat – Elected Officials and their roles – CEO – Zila Pachayat: Position and Role – Block level: Organizational Hierarchy (Different departments) Village level:Role of Elected and Appointed Officials – Importance of Grass Root Democracy

Total = 45 Periods

References

1 Dr. S. N. Busi ,Dr. B. R. Ambedkar, Framing of Indian Constitution ,1st Edition, 2015

2 M. P. Jain , Indian Constitution Law, 7th Edition Lexis Nexis, 2014