M.Tech – Information Technology

CURRICULUM & SYLLABI

Regulation 2018

(Applicable to candidates admitted in the academic year 2018-2019 onwards)

K.S.R. College of Engineering

(Autonomous)
K.S.R. Kalvi Nagar, Tiruchengode – 637 215
Namakkal (Dt), Tamilnadu, India
Email : info@ksrce.ac.in   Website : www.ksrce.ac.in

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

DEPARTMENT OF INFORMATION TECHNOLOGY

(REGULATIONS 2018)

M.TECH INFORMATION TECHNOLOGY

Vision of the Department

> **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

> **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)

> **The graduates of the programme will be able to**
> **PEO1.**Incorporate with necessary background and significantly contribute to contemporary research in information technology to investigate complex problems.
>
> **PEO2.**Enhancing the abilities for successful teaching/research careers in industry or academia.
>
> **PEO3.** Apply and disseminate intellectual ideas related to IT field and advance in their profession.

Programme Outcomes (POs)

	M.Tech. Information Technology graduates will be able to:
PO1	**Scholarship of Knowledge:** Acquire in-depth knowledge of specific discipline or professional area, including wider and global perspective, with an ability to discriminate, evaluate, analyse and synthesise existing and new knowledge, and integration of the same for enhancement of knowledge.
PO2	**Critical Thinking:** Analyse complex engineering problems critically, apply independent judgement for synthesising information to make intellectual and/or creative advances for conducting research in a wider theoretical, practical and policy context.
PO3	**Problem Solving:** Think laterally and originally, conceptualise and solve engineering problems, evaluate a wide range of potential solutions for those problems and arrive at feasible, optimal solutions after considering public health and safety, cultural, societal and environmental factors in the core areas of expertise.
PO4	**Research Skill:** Extract information pertinent to unfamiliar problems through literature survey and experiments, apply appropriate research methodologies, techniques and tools, design, conduct experiments, analyse and interpret data, demonstrate higher order skill and view things in a broader perspective, contribute individually/in group(s) to the development of scientific/technological knowledge in one or more domains of engineering.
PO5	**Usage of modern tools:** Create, select, learn and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities with an understanding of the limitations.
PO6	**Collaborative and Multidisciplinary work:** Possess knowledge and understanding of group dynamics, recognise opportunities and contribute positively to collaborative-multidisciplinary scientific research, demonstrate a capacity for self-management and teamwork, decision-making based on open-mindedness, objectivity and rational analysis in order to achieve common goals and further the learning of themselves as well as others.
PO7	**Project Management and Finance:** Demonstrate knowledge and understanding of engineering and management principles and apply the same to one's own work, as a member and leader in a team, manage projects efficiently in respective disciplines and multidisciplinary environments after considerisation of economical and financial factors.
PO8	**Communication:** Communicate with the engineering community, and with society at large, regarding complex engineering activities confidently and effectively, such as, being able to comprehend and write effective reports and design documentation by adhering to appropriate standards, make effective presentations, and give and receive clear instructions.
PO9	**Life-long Learning:** Recognise the need for, and have the preparation and ability to engage in life-long learning independently, with a high level of enthusiasm and commitment to improve knowledge and competence continuously.
PO10	**Ethical Practices and Social Responsibility:** Acquire professional and intellectual integrity, professional code of conduct, ethics of research and scholarship, consideration of the impact of research outcomes on professional practices and an understanding of responsibility to contribute to the community for sustainable development of society.
PO11	**Independent and Reflective Learning:** Observe and examine critically the outcomes of one's actions and make corrective measures subsequently, and learn from mistakes without depending on external feedback.
PSO1	**Research Culture:** Integrate and administrate the design and solutions through IT in software industry, society and R&D activities.
PSO2	**Core Values:** Contribute core universal values and social good in the community.

	K.S.R. COLLEGE OF ENGINEERING (Autonomous) (Approved by AICTE& Affiliated to Anna University) K.S.R. Kalvi Nagar, Tiruchengode – 637 215	CURRICULUM PG R - 2018
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.	IT18111	Advanced Data Structures	3	0	0	3	30	70	100
2.	IT18112	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.	IT18121	Advanced Data Structures Laboratory	0	0	4	2	50	50	100
6.	IT18122	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.	IT18211	Advanced Algorithms	3	0	0	3	30	70	100
2.	IT18212	Soft Computing	3	0	0	3	30	70	100
3.	MA18231	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.	IT18221	Advanced Algorithms Laboratory	0	0	4	2	50	50	100
7.	IT18222	Software Development Laboratory	0	0	4	2	50	50	100
8.	IT18223	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	30	70	100
PRACTICAL									
4.	IT18321	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.	IT18421	Project Phase - II	0	0	32	16	50	50	100
		Total	0	0	32	16	100		

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

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.	IT18161	Advanced Computer Architecture	3	0	0	3	30	70	100
2.	IT18162	Ad-Hoc and Sensor Networks	3	0	0	3	30	70	100
3.	IT18163	Software Engineering Methodologies	3	0	0	3	30	70	100
4.	IT18164	Data Science	3	0	0	3	30	70	100
5.	IT18165	Scientific Computing	3	0	0	3	30	70	100
6.	IT18166	Digital Image Processing	3	0	0	3	30	70	100
7.	IT18167	XML and Web Services	3	0	0	3	30	70	100
8.	IT18168	Distributed Systems	3	0	0	3	30	70	100
9.	IT18169	Multimedia Communications	3	0	0	3	30	70	100
10.	IT18171	Information Retrieval Techniques	3	0	0	3	30	70	100

SI.No.	Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		PROFESSIONAL ELECTIVES – III and IV (SEMESTER – II)	L	T	P	C	CA	ES	Total
1.	IT18261	Data Warehousing and Data Mining	3	0	0	3	30	70	100
2.	IT18262	Network Management	3	0	0	3	30	70	100
3.	IT18263	Multicore Architecture	3	0	0	3	30	70	100
4.	IT18264	Knowledge Discovery	3	0	0	3	30	70	100
5.	IT18265	Data Security and Access Control	3	0	0	3	30	70	100
6.	IT18266	Digital Forensics	3	0	0	3	30	70	100
7.	IT18267	Agent Based Intelligent Systems	3	0	0	3	30	70	100
8.	IT18268	Big Data and Analytics	3	0	0	3	30	70	100
9.	IT18269	Ontology and Semantic Web	3	0	0	3	30	70	100
10.	IT18271	Object Oriented Analysis and Design	3	0	0	3	30	70	100

SI.No.	Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		PROFESSIONAL ELECTIVES – V and VI (SEMESTER – III)	L	T	P	C	CA	ES	Total
1.	IT18361	Human Resource Management	3	0	0	3	30	70	100
2.	IT18362	Distributed Databases	3	0	0	3	30	70	100
3.	IT18363	Service Oriented Architecture	3	0	0	3	30	70	100
4.	IT18364	Cloud Computing	3	0	0	3	30	70	100
5.	IT18365	Internet of Things	3	0	0	3	30	70	100
6.	IT18366	GPU Computing	3	0	0	3	30	70	100
7.	IT18367	Business Analytics	3	0	0	3	30	70	100
8.	IT18368	Cost Management of Engineering Projects	3	0	0	3	30	70	100

SI.No.	Course Code	Course Name	Hours/ Week			Credit	Maximum Marks		
		AUDIT COURSE (SEMESTER – III)	L	T	P	C	CA	ES	Total
1.	IT183A1	English for Research Paper Writing	2	0	0	0	30	70	100
2.	IT183A2	Disaster Management	2	0	0	0	30	70	100
3.	IT183A3	Mobile and Pervasive Computing	2	0	0	0	30	70	100
4.	IT183A4	Constitution of India	2	0	0	0	30	70	100

Chairman (BoS)
Dr. G. Singaravel
Professor & Head
Department of Information Technology
K.S.R. College of Engineering (Autonomous)
Tiruchengode - 637 215
Namakkal (Dt), Tamilnadu, India.

Total no of Credits= 68

PRINCIPAL,
K.S.R. COLLEGE OF ENGINEERING,
TIRUCHENGODE - 637 209.

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SEMESTER - I

		L	T	P	C
IT18111	**ADVANCED DATA STRUCTURES**	3	0	0	3

Objectives:

- *The student should be able to choose appropriate data structures*
- *understand the ADT/libraries and use it to design algorithms for a specific problem*
- *Students should be able to understand the necessary mathematical abstraction to solve problems*
- *To familiarize students with advanced paradigms and data structure used to solve algorithmic problems*
- *Student should be able to come up with analysis of efficiency and proofs of correctness*

UNIT - I   DICTIONARIES & HASHING   [9]

Definition- Dictionary Abstract Data Type- Implementation of Dictionaries- 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]

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]

Binary Search Trees- AVL Trees- Red Black Trees- 2-3 Trees- B-Trees- Splay Trees

UNIT - IV   TEXT PROCESSING   [9]

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)-ApplyingDynamicProgrammingtotheLCSProblem

UNIT - V   COMPUTATIONAL GEOMETRY   [9]

One Dimensional Range Searching- Two Dimensional Range Searching- Constructing a Priority Search Tree- Searching a Priority Search Tree- Priority Range Trees- Quadtrees- k-D Trees- Recent Trands in Hashing- Trees- and various computationalgeometrymethodsfor effeciently solving the new evolvingproblem

Total :45 Periods

Course Outcomes: On Completion of the course- the students will be able to

- Understand the implementation of symbol table using hashing techniques
- Develop and analyze algorithms for red-black trees- B-trees and Splay trees
- Develop algorithms for text processingapplications
- Identifysuitabledatastructures anddevelop algorithmsfor computationalgeometry   problems

References

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

2   M T Goodrich Roberto Tamassia ,‾Algorithm Design‖, John Wiley,3rd Edition, 2009

<u>**SEMESTER - I**</u>

		L	T	P	C
IT18112	**RESEARCH METHODOLOGY AND IPR**	3	0	0	3

Objectives:

- *Understand research problem formulation*
- *Analyze research related information*
- *Follow research ethics*
- *Understand that today's world is controlled by Computer and Information Technology*

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 underPCT

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 Softwareetc- Traditional knowledgeCase Studies- IPR and IITs

Total =45 Periods

Course Outcomes: On Completion of the course, the students will be able to
- Analyze the concept of research problem
- Develop and analyze literature study
- Develop writing concept
- Identify intellectual property rights

References

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

SEMESTER – I

IT18121	ADVANCED DATA STRUCTURES LABORATORY	L	T	P	C
		0	0	4	2

Objective:

- *To develop programming skills in design and implementation of data structures and their applications*

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

Course Outcomes: On Completion of this course, the student will be able to

- *Demonstrate and Implement the different queue operations by using the arrays and linked list*
- *Describe heap construction and implement the heap operations*
- *Construct AVL tree and perform the various rotation on AVL tree for balancing*
- *Design and develop various sorting algorithms*
- *Illustrate dynamic programming and backtracking*

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SEMESTER – I

L	T	P	C
0	0	4	2

IT18122   **XML AND WEB SERVICES LABORATORY**

Objective:
- *Understand simple network management practical issues, sockets and routing protocol*

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

Course Outcomes: On Completion of this course, the student will be able to
- *Develop web pages using markup languages and design by Cascading Style Sheets*
- *Create dynamic pages and perform validation using java script*
- *Develop online applications using ASP/JSP and perform session management*
- *Design a XML document and parse these document using DOM/SAX parsers*
- *Develop web applications using open source software*

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SEMESTER - II

		L	T	P	C
IT18211	ADVANCED ALGORITHMS	3	0	0	3

Objectives:

- *Introduce students to the advanced methods of designing and analyzing algorithms*
- *The student should be able to choose appropriate algorithms and use it for a specific problem*
- *To familiarize students with basic paradigms and data structures used to solve advanced algorithmic problems*
- *Students should be able to understand different classes of problems concerning their computation difficulties*
- *To introduce the students to recent developments in the area of algorithmic design*

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

Course Outcomes: On Completion of the course, the students will be able to

- *Analyze the complexity/performance of different algorithms*
- *Determine the appropriate data structure for solving a particular set of problems.*
- *Categorize the different problems in various classes according to their complexity.*
- *Students should have an insight of recent activities in the field of the advanced data structure*

References:

1　Cormen, Leiserson, Rivest, Stein,‖ Introduction to Algorithms‖,　4th Edition
2　Aho, Hopcroft, Ullman "The Design and Analysis of Computer Algorithms"

K.S.R. COLLEGE OF ENGINEERING (Autonomous)
SEMESTER - II

		L	T	P	C
IT18212	**SOFT COMPUTING**	3	0	0	3

Objectives:
- *To introduce soft computing concepts and techniques and foster their abilities in designing appropriate technique for a given scenario*
- *To implement soft computing based solutions for real-world problems*
- *To give students knowledge of non-traditional technologies and fundamentals of artificial neural networks fuzzy sets- fuzzy logic- genetic algorithms*
- *To provide student an hand-on experience on MATLAB to implement various strategies*

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 Artifici\\al Neural Network and Fuzzy Logic- Recent Trands in deep learning- various classifiers- neural networks and genetic algorithm-Implementation of recently proposed soft computing techniques

Total =45 Periods

Course Outcomes: On Completion of the course, the students will be able to
- *Identify and describe soft computing techniques and their roles in building intelligent machines*
- *Apply fuzzy logic and reasoning to handle uncertainty and solve various engineering problems*
- *Apply genetic algorithms to combinatorial optimization problems*
- *Evaluate and compare solutions by various soft computing approaches for a given problem*

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 EditionPrentice Hall

SEMESTER - II

MA18231	**OPERATIONS RESEARCH** **(M.Tech. Information Technology)**	L	T	P	C
		3	0	0	3

Objectives:

- *To develop and solve the Linear Programming concepts during the uncertain situations in engineering fields*
- *To acquire knowledge in obtaining the optimal solutions in Transportation and Assignment problems and to develop integer values by solving Integer Programming Problems*
- *To understand the concept of dynamic Programming Problems and its applications and also to study the importance of stock control by maximizing the profit*

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

Course Outcomes: On Completion of this course, the student will be able to

- *Develop the Linear Programming concepts during the uncertain situations in engineering fields*
- *Obtain the optimal solutions in Transportation and Assignment problems*
- *Develop integer values by solving Integer Programming Problems*
- *Identify the concept of dynamic Programming Problems and its applications*
- *Study the importance of stock control by maximizing the profit*

Reference Books :
1. P.K.Gupta & Man Mohan, ‖Operations Research‖ Sultan Chand & Sons, 12th edition, 2013.
2. N. D Vohra, Quantitative Techniques in Management,Tata Mcgraw Hill, 2014.
3. Gupta P.K, Hira D.S, Problem in Operations Research, S.Chand and Co, 2015.
4. Taha, H.A., ‾Operations Research: An Introduction‖, Pearson Education, New Delhi, 2013.

R 2018

	L	T	P	C
IT18221 **ADVANCED ALGORITHMS LABORATORY**	0	0	4	2

Objective:
- *To develop programming skills in design and implementation of advanced algorithms and their applications*

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

Course Outcomes: On Completion of this course, the student will be able to
- *Demonstrate and Implement the bellman algorithm*
- *Describe linear modulo operation and design the algorithm*
- *Construct Dijikstra algorithm*
- *Design and develop various sorting algorithms*
- *Illustrate searching algorithms*

R 2018

<u>**SEMESTER – II**</u>

IT18222	**SOFTWARE DEVELOPMENT LABORATORY**	L 0	T 0	P 4	C 2

Objective:

- *To develop the modeling through the Rational Rose & other Open Source software with design structure for pre request*

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. Datamodeling
3. Semantic data modeling
4. Source code generators
5. Re-engineering
6. Experimenting CASEEnvironments
    a. Toolkits
    b. Language-centered
    c. Integrated
    d. Fourthgeneration
    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. Projectmanagement

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Total : 45 Periods

Course Outcomes: On Completion of this course, the student will be able to

- *Discuss the various types of case tools available*
- *Apply the modeling technique to develop the system*
- *Explain the code generation process*
- *Discuss the various CASE environments*
- *Apply the CASE in any workbenches*

<u>SEMESTER – II</u>

		L	T	P	C
IT18223	**MINI PROJECT WITH SEMINAR**	2	0	0	2

Objectives:

- *To prepare students to gain confidence in developing a project and report preparation.*

<u>Guidelines:</u>

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

Course Outcomes: On Completion of this course, the student will be able to

- *Refer and utilize various technical resources available from multiple fields.*
- *Analyze the importance of intonation, word and sentence stress for improving communicative*
- *Competence, identifying and overcoming problem sounds.*
- *Interact and share their technical knowledge to enhance the leadership skills.*
- *Prepare report and present oral demonstrations.*

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<u>SEMESTER – I</u>　<u>(ELECTIVE)</u>

		L	T	P	C
IT18161	**ADVANCED COMPUTER ARCHITECTURE**	3	0	0	3

Objective:

- *To develop student's knowledge in data level parallelism, instruction level parallelism, memory hierarchy design, multiprocessors and multicore architectures*

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

Course Outcomes: *On Completion of the course, the students will be able to*

- *Describe the fundamental concepts of computer architecture*
- *Identify the concepts and challenges of instruction level parallelism*
- *Discuss the data level parallelism*
- *Outline the Memory types and Hierarchy design*
- *Gain knowledge about Multiprocessor and Multicore architecture*

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 (ELECTIVE)

		L	T	P	C
IT18162	**AD-HOC AND SENSOR NETWORKS**	3	0	0	3

Objective:

- *Learning the basics of wireless adhoc network application and Motivation Enhancing working Knowledge on Routing Protocols for Ad Hoc Wireless Networks Security Protocols for Ad Hoc Wireless Networks Energy Management in Ad Hoc Wireless Networks*

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

Course Outcomes: On Completion of the course, the students will be able to

- *Analyze function- design issues and classification of MAC protocols that have been proposed for ad hoc networks*
- *Gain the knowledge in different types of routing protocols and transport layer issues in ad hoc networks*
- *Implement the principles- architecture and MAC protocol of wireless sensor networks (WSNs)*
- *Discuss the localization types and various routing issues in wireless sensor networks*
- *Systematically understand the architecture- MAC enhancement- routing and capacity models of mesh networks*

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 (ELECTIVE)

IT18163	SOFTWARE ENGINEERING METHODOLOGIES	L	T	P	C
		3	0	0	3

Objectives:

- *Providing basic knowledge in the software engineering*
- *Learning various techniques and tools required or efficient development of software*

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

Course Outcomes: On Completion of the course, the students will be able to

- *Explain the various traditional software development life cycle models*
- *Apply the behavior of executable and non-executable testing with real word example*
- *Discuss the behavior of object oriented and reusability*
- *Apply the design principles and get the outline of the object oriented analysis and design*
- *Illustrate about the implementation phase and maintenance phase*

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.

SEMESTER - I (ELECTIVE)

		L	T	P	C
IT18164	DATA SCIENCE	3	0	0	3

Objectives:

- Provide you with the knowledge and expertise to become a proficient data scientist
- Demonstrate an understanding of statistics andmachinelearning concepts that arevitalfor data science
- Produce Python code to statistically analyse a dataset
- Critically evaluate data visualisations based on theirdesign and use for communicating stories from data

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 fixingdata-Datastorageandmanagement-Usingmultipledata 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

Course Outcomes: On Completion of the course, the students will be able to

- Discuss the key concepts in data science- including their real-world applications and the toolkit used by data scientists
- Implement data collection and management scripts using MongoDB

References

1. Cathy O'Neil and Rachel Schutt. ¯Doing Data Science‖, Straight Talk From The Frontline,First Edition, O'Reilly, 2013.
2. Jure Leskovek, AnandRajaraman and Jeffrey Ullman,‖ Mining of Massive Datasets. v2.1‖,Cambridge University Press.

SEMESTER – I (ELECTIVE)

IT18165	SCIENTIFIC COMPUTING	L	T	P	C
		3	0	0	3

Objectives:
- *Scientific Computing using Matlab/Octave covering the fundamental programming concepts (data types, abstraction, control structures, I/O, modules) and demonstrating the use of Matlab/Octave to solve scientific computing problems from a variety of disciplines including physics, chemistry, biology, computer science and math.*

UNIT – I　INTRODUCTION TO SYSTEM MODELING　[9]

Modeling 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

Course Outcomes: On Completion of the course, the students will be able to
- *Analyze the various modeling technique available*
- *Explain the approximation in the scientific computing*
- *Discuss the optimization and its dimensions*
- *Analyze the various methods to find out the roots of the equation*
- *Analyze the partial difference equation along with integration*

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 SS,‖Introductory Methods of Numerical Analysis‖, Fourth Edition, Prentice Hall India, 2006.

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SEMESTER – I (ELECTIVE)

IT18166	DIGITAL IMAGE PROCESSING	L	T	P	C
		3	0	0	3

Objective:

- *To develop student's knowledge in image enhancement- image segmentation and feature analysis- multi resolution analysis and compressions- and applications of image processing*

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 Filterin

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

Course Outcomes: On Completion of the course, the students will be able to

- *Explain digital image processing fundamentals- sampling and quantization concepts for 2D images*
- *Apply image enhancement techniques*
- *Develop new techniques in the areas of image enhancement-restoration segmentation*
- *Apply various image processing techniques for real time applications*
- *Apply the concepts of Image Processing to real-world applications*

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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<u>**SEMESTER – I (ELECTIVE)**</u>

IT18167	XML AND WEB SERVICES	L	T	P	C
		3	0	0	3

Objective:

- *To know about XML technology family and architecting web services, web services building block, implementing xml in e-business, XML and content management*

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 - X- Files - XML processing - DOM (Document Object Model) - SAX (simple API for XML)- presentation technologies - XSL (XML Stylesheet 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

Course Outcomes :On Completion of the course, the students will be able to

- *Discuss the basics of XML Technology*
- *Overview of Web Services*
- *Discuss the web services building blocks*
- *Illustrate the use of XML in e-business*
- *Usage of XML and content management*

References

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

SEMESTER – I (ELECTIVE)

IT18168	DISTRIBUTED SYSTEMS	L	T	P	C
		3	0	0	3

Objective:
- To introduce the fundamental concepts and issues of managing large volume of shared data in a parallel and distributed environment- and to provide insight into related research problems

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

Course Outcomes: On Completion of the course, the students will be able to
- *Analyze the distributed system architecture*
- Discuss the design trends in distributed system
- Apply network virtualization
- Apply remote method invocation andobjects

References

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

<u>**SEMESTER – I (ELECTIVE)**</u>

IT18169	MULTIMEDIA COMMUNICATIONS	L	T	P	C
		3	0	0	3

Objective:

- *To develop student's knowledge in multimedia operating system and file system, network and communication system, hypertext, MHEG and synchronization, applications and software tools*

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 - Interprocess 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

Course Outcomes: On Completion of the course, the students will be able to
- *Acquire the knowledge in various standards and compression techniques used in multimedia communication*
- *Gain the knowledge about multimedia operating system and file system used in multimedia communication*
- *Analyze various routing and communication protocols used in multimedia system*
- *Realize the concepts about various synchronization models and multimedia objects in distributed environment*
- *Obtain the knowledge about recent tools used for multimedia application and development*

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
4   Ralf Steinmetz, Klara Nahrstedt, ‖Multimedia Systems‖, Springer, First Edition, 2007

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SEMESTER – I (ELECTIVE)

IT18171	INFORMATION RETRIEVAL TECHNIQUES	L	T	P	C
		3	0	0	3

Objectives:

- *To identify basic theories and analysis tools to apply for information retrieval*
- *To develop understanding of problems and potentials of current IR systems*
- *To learn and appreciate different retrieval algorithms and systems*
- *To apply various indexing- matching- organizing and evaluating methods to IR problems*

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

Course Outcomes: On Completion of the course, the students will be able to

- *Explain the basics of the information retrieval technique*
- *Discuss the retrieval process by using the query method*
- *Explain the text operation process along with the user interface*
- *Analyze the various multimedia information retrieval techniques*
- *Discuss the applications of the information retrieval techniques*

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 lurafsky 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

<u>SEMESTER – II (ELECTIVE)</u>

IT18261	DATA WAREHOUSING AND DATA MINING	L	T	P	C
		3	0	0	3

Objectives:
- *To conceptualize the architecture of a Data Warehouse and the need for pre- processing*
- *To utilize various levels and types of summarization of data to support management decision making*
- *To enable students to understand and implement classical algorithms in data mining*

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 Preprocessing - 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

Course Outcomes: On Completion of the course, the students will be able to
- *Explain the concepts of Data Warehousing architecture and implementation*
- *Apply the association rules for mining applications*
- *Discuss on appropriate Classification techniques for various problems*
- *Apply the suitable Clustering methods for mining applications*
- *Illustrate various data mining techniques on complex data objects*

References

1   Jiawei Han and Micheline Kamber, ˉData 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, 13 th Reprint 2010

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

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

<u>**SEMESTER – II (ELECTIVE)**</u>

IT18262	**NETWORK MANAGEMENT**	L	T	P	C
		3	0	0	3

Objectives:

- *To know the basic functionality and common uses of network packets and layer with the multifunction devices*
- *To understand simple network management protocols & practical issues*
- *To manage today's systems effectively and to plan intelligently for the future use of network management systems*

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

Course Outcomes: On Completion of the course, the students will be able to

- *Attain the knowledge in fundamental concepts and basic taxonomy and terminology used in computer networks*
- *Known about IEEE 802-11 LAN system architecture and MAC management concepts*
- *Clearly understood about necessity of transport layer in IEEE 802-11 standard*
- *Build the skills in IP layer- sub netting and routing mechanisms in network*
- *Gain the knowledge about various tools and models used for measure the network performance*

References

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

IT18263	MULTI CORE ARCHITECTURE	L	T	P	C
		3	0	0	3

Objectives:
- *To introduce the fundamentals of Computer architecture and Parallel architecture*
- *To explore Instruction Level Parallelism- VLIW architecture*
- *To provide recent trends in architectural design of computer like Vector and Shared memory architecture*

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

Course Outcomes: On Completion of the course, the students will be able to
- *Explain the basics of computer architecture concepts*
- *Discuss the pipeline processing process and its principles*
- *Analyze the parallel processing principles*
- *Discuss the vector architecture and its types*
- *Explain the shared memory architecture*

References

1   Dezso Sima, Peter Karsuk, Terence Fountain,‖ Advanced Computer Architectures‖, A Design Space Approach‖, 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

SEMESTER – II (ELECTIVE)

IT18264	KNOWLEDGE DISCOVERY	L	T	P	C
		3	0	0	3

Objective:

- Conduct case studies on real data mining examples

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 - Perceptrons - Multilayer Networks - The Backpropagation Algorithm- Iterative Distance-based Clustering- Incremental Clustering- The EM Algorithm

Total = 45 Periods

Course Outcomes: On Completion of the course, the students will be able to

- Able to have knowledge of various knowledge representation methods

References

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

2   Data Cleansing : A Prelude to knowledge Discovery

<u>**SEMESTER – II (ELECTIVE)**</u>

IT18265	**DATA SECURITY AND ACCESS CONTROL**	L	T	P	C
		3	0	0	3

Objective:

- The objective of the course is to provide fundamentals of database security, Various access control techniques mechanisms were introduced along with application areas of access control techniques

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'sintrigity 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- designand 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

Course Outcomes: On Completion of the course, the students will be able to

- Implement classical models and algorithms
- Analyze the data andidentify the problems
- Choose the relevant models
- Apply the algorithms
- Able to assess the strengths and weaknesses of various access control models and to analyze their behavior

References

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

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

SEMESTER – II (ELECTIVE)

IT18266	DIGITAL FORENSICS	L	T	P	C
		3	0	0	3

Objectives:

- *Provides an in-depth study of the rapidly changing and fascinating field ofcomputer forensic*
- *Combines both the technical expertise and the knowledge required to investigatedetect and prevent digital crimes*
- *Knowledge on digital forensics legislations, digital crime, forensics processes and procedures, data acquisition and validation, e-discovery tools*
- *E-evidence collection and preservation investigating operating systems and file systems, network forensics, art of steganography and mobile device forensics*

UNIT - I   DIGITAL FORENSICS SCIENCE   [9]

Forensics 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 un-retrieved 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

Course Outcomes: On Completion of the course, the students will be able to

- *Discuss relevant legislation and codes of ethics*
- *Analyze Computer forensics and digital detective and various processes policies and procedures*
- *Gain knowledge on E-discovery guidelines and standards E-evidence tools and environment*
- *Discuss Email and web forensics and network forensics*

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

SEMESTER – II (ELECTIVE)

IT18267	AGENT BASED INTELLIGENT SYSTEMS	L	T	P	C
		3	0	0	3

Objectives:

- *To learn the fundamentals of Artificial Intelligence Systems-*
- *To get knowledge about the agents and agent based systems-*

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

Course Outcomes: On Completion of the course, the students will be able to

- *Discuss the basics of intelligent agent ad searching methods*
- *Analyze the knowledge management and agent based process event*
- *Explain the various techniques used in planning agents*
- *Analyze the rules ad responsibility of Bayesian network*
- *Discuss the basics and applications of Knowledge in Learning*

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 (ELECTIVE)

IT18268	BIG DATA AND ANALYTICS	L	T	P	C
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Objectives:
- *Understand big data for business intelligence- Learn business case studies for big data analytics*
- *Understand NoSQLbigdatamanagement,Performmap and reduceanalyticsusingHadoopandrelated tools*

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 dataand 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- schemaless databases- materialized views- distribution models- sharding- master-slave replication- peer- peer replication- sharding 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

Course Outcomes: On Completion of the course, the students will be able to
- *Describe big data and use cases from selected business domains*
- *Explain NoSQL big data management*
- *Install, configure and run Hadoop and HDFS*
- *Perform map-reduce analytics using Hadoop*
- *Use Hadoop related tools such as HBase, Cassandra, Pig and Hive for big data analytics*

References

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

IT18269	ONTOLOGY AND SEMANTIC WEB	L	T	P	C
		3	0	0	3

Objectives:
- *Introduces basic concepts tasks methods and techniques in semantic web*
- *Develop an understanding of the semantic web process and issues*

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

Course Outcomes: On Completion of the course, the students will be able to
- *Explain the fundamentals of Ontology*
- *Identify the languages of the semantic web and ontologies*
- *Analyze ontology learning for semantic web*
- *Construct ontology using different tools*
- *Use semantic web services with web applications*

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

SEMESTER – II (ELECTIVE)

| IT18271 | OBJECT ORIENTED ANALYSIS AND DESIGN | L
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Objectives:
- *Object-Oriented Analysis with UML teaches the analyst w i t h fundamental techniques to apply the Unified Modeling Language (UML 2-0) to building an analysis model for a software application*
- *Learn how to derive analysis model from use case requirements*
- *Learn how to model event-driven state of object*

UNIT - I   INTRODUCTION   [9]

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

UNIT - II   INCEPTION   [9]

Unified Approach - Unified Modeling Language - Static behavior diagrams - Dynamic behavior 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

Course Outcomes: On Completion of the course, the students will be able to
- *Explain the various system development methods available*
- *Apply the object behavior in the system using the UML diagrams*
- *Discuss the system behavior in the design phase using the axioms*
- *Apply the design principles and get the outline of the system*
- *Illustrate the architectural analysis of the proposed system using the tools available*

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

SEMESTER – III

IT18361	HUMAN RESOURCE MANAGEMENT	L	T	P	C
		3	0	0	3

Objective:

- *To provide knowledge about management issues related to staffing, training, performance, compensation, human factors consideration and compliance with human resource requirements*

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 expatriates 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

Course Outcomes: On Completion of the course, the students will be able to

- *Discuss the roles and responsibilities of HR manager*
- *Analyze the various processes in international level staff recruitment*
- *Explain the need of training in performance management*
- *Discuss the benefits of compensation*
- *Analyze the process in practicing the industrial relations and people management*

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

<u>**SEMESTER – III**</u>

IT18362	**DISTRIBUTED DATABASES**	L	T	P	C
		3	0	0	3

Objective:

- *The objective of course is to provide insight to distributed database normalization techniques and integrity rules. It also includes parallel database systems along with object oriented models*

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: Problem 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 Bases 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

Course Outcomes: On Completion of the course, the students will be able to

- *Able to analyze relational database management systems*
- *Apply normalization to make efficient retrieval from database and query*
- *Discuss about Query processors*
- *Analyze about parallel Database Systems*
- *Explain Distributed Object database Management systems*

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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<u>**SEMESTER – III**</u>

IT18363	SERVICE ORIENTED ARCHITECTURE	L	T	P	C
		3	0	0	3

Objectives:
- *To design modern SOA and apply SOA specific methodologies technologies and standards*
- *To evaluate and analyze organization to map it as a "set of services"*
- *To develop service architectures using the Service Oriented Modeling Framework*
- *To orchestrate services to create new applications by leveraging your SOA*

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

Total = 45 Periods

Course Outcomes: On Completion of the course, the students will be able to
- *Discuss the fundamentals of SOA and its Architecture*
- *Acquire the knowledge of SOA technologies SOAP, WSDL and JAX etc.*
- *Implement SOA Development and orchestration*
- *Identify the SOA security services like XML signature,WS security*
- *Perform Transaction processing issues and SOA in mobile research*

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

IT18364	CLOUD COMPUTING	L	T	P	C
		3	0	0	3

Objectives:

- *The student will also learn how to apply trust-based security model to real-world security problems*
- *An overview of the concepts, processes and best practices needed to successfully secure information within Cloud infrastructures*
- *Students will learn the basic Cloud types and delivery models and develop an understanding of the risk and compliance responsibilities and Challenges for each Cloud type and service delivery model*

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

Total = 45 Periods

Course Outcomes: On Completion of the course, the students will be able to

- *Identify security aspects of each cloud model*
- *Develop a risk-management strategy for moving to the Cloud*
- *Implement a public cloud instance using a public cloud service provider*
- *Apply trust-based security model to different layer*
- *Acquire the knowledge on GRC*

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

<u>**SEMESTER – III**</u>

IT18365	**INTERNET OF THINGS**	L	T	P	C
		3	0	0	3

Objectives:
- *To learn the fundamentals of Internet of Things*
- *To learn about the basics of IOT protocols*
- *To build a small low cost embedded system using Raspberry Pi*
- *To apply the concept of Internet of Things in the real world scenario*

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 - Modbus - Zigbee 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]

RealWorld 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

Course Outcomes: On Completion of the course, the students will be able to
- *Analyze various protocols for IoT*
- *Develop web services to access/control IoT devices*
- *Design a portable IoT using Rasperry Pi*
- *Deploy an IoT application and connect to the cloud.*
- *Analyze applications of IoT in real time scenario*

References

1   Arshdeep Bahga Vijay Madisett,i ,‾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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<u>**SEMESTER – III**</u>

IT18366	**GPU COMPUTING**	L	T	P	C
		3	0	0	3

Objective:

* *To learn parallel programming with Graphics Processing Units (GPUs)*

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 Worklists - 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

Course Outcomes: On Completion of the course, the students will be able to

* *Learn concepts in parallel programming*
* *implementation of programs on GPUs*
* *Discuss on Synchronization*
* *Analyze overlapping issues in GPU*

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)

SEMESTER – III

IT18367	BUSINESS ANALYTICS	L	T	P	C
		3	0	0	3

Objectives:

- *Analyze data using statistical and data mining techniques*
- *Understand relationships between the underlying business processes of an organization*
- *To gain an understanding of how managers use business analytics to formulate and solve business problems and to support managerial decision making*
- *To become familiar with processes needed to develop report and analyze business data*
- *Use decision making tools/Operations research techniques*

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 modeling sampling and estimation methods overview

UNIT II　　　TRENDINESS AND REGRESSION ANALYSIS　　　　　　　　[9]

Modeling 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 analytic s- predicative Modeling - Predictive analytics - Analysis of Data Mining Methodologies - Prescriptive analytics and its step in the business analytics Process - Prescriptive Modeling - 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

Course Outcomes: On Completion of the course, the students will be able to

- *Gain knowledge of data analytics*
- *The ability to think critically in making decisions based on data and deep analytics*
- *Use technical skills in predicative and prescriptive modeling to support business decision making*
- *Able to translate data into clear actionable insights*

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

SEMESTER – III

IT18368	COST MANAGEMENT OF ENGINEERING PROJECTS	L	T	P	C
		3	0	0	3

Objectives:
- *To learn the role of cost management*
- *To analyze cost behavior based on projects*
- *To know about project resources needed for project planning*
- *To gain knowledge on quantitative techniques*

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 Behavior 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

Course Outcomes: On Completion of the course, the students will be able to
- *Gain knowledge of cost concepts*
- *The ability to think critically in making decisions based on project*
- *The ability to use technical skills in resource planning and cost behavior*
- *Able to solve quantitative problems*

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

SEMESTER – III

IT183A1	ENGLISH FOR RESEARCH PAPER WRITING	L	T	P	C
		3	0	0	3

Objectives:
- *To improve your writing skills and level of readability*
- *Learn about what to write in each section*
- *To analyze the skills needed when writing a Title*

UNIT I   PLANNING AND PREPARATION   [9]

Planning and Preparation - Word Order - Breaking up long sentences - Structuring Paragraphs and Sentences - Being Concise and Removing Redundancy - Avoiding Ambiguity and Vagueness

UNIT II   REVIEW OF THE LITERATURE   [9]

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 - Discussion - Conclusions - The Final Check

UNIT III   WRITING AN ABSTRACT   [9]

Key Skills are needed when Writing a Title - Key Skills are needed when writing an Abstract - Key Skills are needed when Writing an Introduction - Skills needed when Writing a Review of the Literature

UNIT IV   WRITING THE METHODS   [9]

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   SUBMISSION OF PAPER   [9]

Useful phrases - How to ensure paper is as good as it could possibly be the first - Time Submission

Total = 45 Periods

Course Outcomes: On Completion of the course, the students will be able to
- *Plan and prepare the Objective needed for writing the paper*
- *Review of the Literature*
- *Discuss on writing the abstract*
- *Ensure the good quality of paper at very first-time submission*

References

1   Goldbort R Writing for Science, ⁻Yale University Press (available on Google Books)‖, 2006
2   Adrian Wallwork, ⁻English for Writing Research Papers‖, Springer New York Dordrecht Heidelberg London, 2011

IT183A2	DISASTER MANAGEMENT	L	T	P	C
		3	0	0	3

Objectives:

- *Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response*
- *Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives*
- *Develop standards of humanitarian response and practical relevance in specific types of disasters and conflict situations*
- *Critically understand the strengths and weaknesses of disaster management approaches*
- *Planning and programming in different countries and particularly their home country or the countries they work in*

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

Course Outcomes: On Completion of the course, the students will be able to

- *Learn concepts in Disasters and Hazards*
- *Discuss about Disaster prone areas in India*
- *Analyze risk assessment and disaster mitigation*
- *Implement disaster preparedness in remote sensing areas*

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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<u>**SEMESTER – III**</u>

IT183A3	**MOBILE AND PERVASIVE COMPUTING**	L	T	P	C
		3	0	0	3

Objectives:
- *To illustrate the current trends in mobile and pervasive computing*
- *To discuss the fundamental problems in the emerging area of mobile and pervasive computing*
- *To motivate students to take up research work in mobile and pervasive computing*

UNIT I   EMERGING WIRELESS TECHNOLOGIES   [9]

Wireless Networks - Emerging Technologies - Bluetooth - WiFi - WiMAX - 3G - 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

Course Outcomes: On Completion of the course, the students will be able to
- *Gain the knowledge about the various technologies and protocols used in wireless communication*
- *Discuss about principles, architecture, functionalities and security issues of mobile computing*
- *Analyze and characterize hand off and location management in wireless mobile networks*
- *Discover the characteristics of pervasive computing applications including the major system components and architectures of the systems*
- *Analyze the strengths and limitations of the tools and devices for development of pervasive computing systems*

References

1   Asoke K Taukder ,Roopa R Yavagal ,¯Mobile Computing‖ ,Tata McGraw Hill, 2006
2   Ivan Stojmenovic „‖ Handbook of Wireless Networks and Mobile Computing‖ ,John Wiley & Sons Inc, 2008
3   Uwe Hansmann , Lothar Merk, Martin S. Nicklous and Thomas Stober , ¯Pervasive Computing‖, Springer Second Edition, 2003

<u>SEMESTER – III</u>

IT183A4	CONSTITUTION OF INDIA	L 3	T 0	P 0	C 3

Objectives:
- *To learn the premises informing the twin themes of liberty and freedom from a civil rights perspective*
- *To address the growth of Indian opinion regarding modern Indian intellectuals constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism*
- *To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.*

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: ZilaPachayat - Elected Officials and their roles - CEO - ZilaPachayat: 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

Course Outcomes: On Completion of the course, the students will be able to
- *Analyze the history of Indian constitution*
- *Gain knowledge on constitutional Rights and Duties*
- *Learn the rules of Election Commission*
- *Identify the importance of Local Administration*

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

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<u>**SEMESTER – III**</u>

IT18321	**PROJECT PHASE – I**	L	T	P	C
		0	0	20	10

Objectives:

- *To prepare students to gain confidence in solving real time problems related to Information Technology.*

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.*

Course Outcomes: On Completion of this course, the student will be able to

- *Formulate a real world problem, identify the requirement and develop the design solutions.*
- *Identify technical ideas, strategies and methodologies.*
- *Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.*
- *Test and validate through conformance of the developed prototype and analysis the cost effectiveness.*
- *Prepare report and present oral demonstrations.*

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SEMESTER – IV

IT18421 PROJECT PHASE – II

L T P C
0 0 32 16

Objectives:

* To prepare students to gain confidence in solving real time problems related to Information Technology.

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.

Course Outcomes: On Completion of this course, the student will be able to

* Analyze the real world problems.
* Identify the requirement and develop the design solutions.
* Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.
* Test and validate through conformance of the developed prototype and analysis the cost effectiveness.
* Prepare report and oral demonstrations.

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