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SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

Approved by AICTE, Recognized by UGC & Affiliated to Anna University
Accredited by NBA-AICTE, NAAC-UGC with 'A+' Grade

Saravanampatti , Coimbatore -641035

CURRICULA AND SYLLABI

REGULATION 2019

CHOICE BASED CREDIT SYSTEM

DEPARTMENT OF COMPUTER APPLICATION

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SNS College of Technology

(An Autonomous Institution)

COIMBATORE - 35

R2019 - SUGGESTED CURRICULUM AND SYLLABI

DEPARTMENT OF COMPUTER APPLICATIONS

		SEMESTER I								
Sl No.	Course Code	Course	L	T	P	J	Contact hrs/week	Cre dit	Int/Ext	Category
Theory Courses										
1	19MAT602	Computational Mathematics	3	1	0	0	4	4	50/50	PCC
2	19CAT601	Web Programming Essentials	3	0	0	0	3	3	50/50	PCC
3	19CAT602	Data structures and Algorithms	3	0	0	0	3	3	50/50	PCC
4	19CAT603	Data Communication and Network	3	0	0	0	3	3	50/50	PCC
5	19GET601	Professional Development	1	0	2	0	3	2	50/50	EEC
6	19GEB601	Design Thinking	1	0	4	0	5	3	50/50	EEC
Practical Courses										
7	19CAP601	Web Programming Essentials Laboratory	0	0	4	0	4	2	50/50	PCC
8	19CAP602	Data Structures & Algorithms laboratory	0	0	4	0	4	2	50/50	PCC
Total			14	1	14	0	29	22		

		SEMESTER II								
Sl No.	Course Code	Course	L	T	P	J	Contact hrs/week	Cre dit	Int/Ext	Category
Theory Courses										
1	19MAT609	Optimization Techniques	3	1	0	0	4	4	50/50	PCC
2	19CAT607	Principles of Management	3	0	0	0	3	3	50/50	PCC
3	19CAT608	Java Programming	3	0	0	0	3	3	50/50	PCC

4	19CAT609	Database Management System	3	0	0	0	3	3	50/50	PCC
5	E1	Elective-I	3	0	0	0	3	3	50/50	PEC
6	O1	Open Elective-I	3	0	0	0	3	3	50/50	OE
Practical Courses										
7	19CAP604	Database Management System Laboratory	0	0	4	0	4	2	50/50	PCC
8	19CAP605	Java Programming Laboratory	0	0	4	0	4	2	50/50	PCC
9	19CAP606	Mini project	0	0	0	2	-	1	50/50	EEC
10	19CAT610	VQAR	2	0	1	0	3	2	50/50	EEC
Total			**20**	**1**	**9**	**2**	**30**	**26**		

SEMESTER III										
Sl No.	**Course Code**	**Course**	**L**	**T**	**P**	**J**	**Contact hrs/week**	**Cre dit**	**Int/Ext**	**Category**
Theory Courses										
1	19CAT701	Mobile Application Development	3	0	0	0	3	3	50/50	PCC
2	19CAT702	Big Data Analytics	3	0	0	0	3	3	50/50	PCC
3	19CAT703	Machine Learning	3	0	0	0	3	3	50/50	PCC
4	E2	Elective-II	3	0	0	0	3	3	50/50	PEC
5	E3	Elective-III	3	0	0	0	3	3	50/50	PEC
Practical Courses										
6	19CAP701	Data Analytics Laboratory (Python)	0	0	4	0	4	2	50/50	PCC
7	19CAP702	Mobile Application Development Laboratory	0	0	4	0	4	2	50/50	PCC
8	19CAP703	Life Skills	1	0	2	0	3	2	50/50	EEC
Total			**16**	**0**	**10**	**0**	**26**	**21**		

		SEMESTER IV								
Sl No.	Course Code	Course	L	T	P	J	Contact hrs/week	Cre dit	Int/Ext	Category
					Theory Courses					
1	E4	Elective-IV (online mode)	3	0	0	0	3	3	50/50	PCC
					Practical Courses					
2	19CAP704	Project Work	0	0	0	24	24	12	50/50	EEC
	Total		6	0	0	24	30	15		

FOUNDATION COURSES

Sl. No	Course Code	Course	L/T/P/J	Contact hrs/week	Credits	Semester
1	19MAT602	Computational Mathematics	3/1/0/0	4	4	I
2	19MAT609	Optimization Techniques	3/1/0/0	4	4	II
3	19CAT607	Principles of Management	3/0/0/0	3	3	II

PROFESSIONAL COURSES

Sl. No	Course Code	Course	L/T/P/J	Contact hrs/week	Credits	Semester
1	19CAT601	Web Programming Essentials	3/0/0/0	3	3	I
2	19CAT602	Data structures and Algorithms	3/0/0/0	3	3	I
3	19CAT603	Data Communication and Network	3/0/0/0	3	3	I
4	19CAP601	Web Programming Essentials Laboratory	0/0/4/0	4	2	I
5	19CAP602	Data Structures & Algorithms laboratory	0/0/4/0	4	2	I
6	19CAT608	Java Programming	3/0/0/0	3	3	II
7	19CAT609	Database Management System	3/0/0/0	3	3	II
8	19CAP604	Database Management System Laboratory	0/0/4/0	4	2	II
9	19CAP605	Java Programming Laboratory	0/0/4/0	4	2	II

10	19CAT701	Mobile Application Development	3/0/0/0	3	3	III
11	19CAT702	Big Data Analytics	3/0/0/0	3	3	III
12	19CAT703	Machine Learning	3/0/0/0	3	3	III
13	19CAP701	Data Analytics Laboratory (Python)	0/0/4/0	4	2	III
14	19CAP702	Mobile Application Development Laboratory	0/0/4/0	4	2	III

PROFESSIONAL ELECTIVES

Sl. No	Course Code	Course	L/T/P/J	Contact hrs/week	Credits
1	19CAE709	Software Testing and Quality Assurance	3/0/0/0	3	3
2	19CAE710	Soft Computing	3/0/0/0	3	3
3	19CAE711	Enterprise Resource Planning	3/0/0/0	3	3
4	19CAE712	Cloud Computing & Virtualization Techniques	3/0/0/0	3	3
5	19CAE713	Accounting and Financial Management	3/0/0/0	3	3
6	19CAE714	Advanced databases	3/0/0/0	3	3
7	19CAE715	Aspect Oriented Programming	3/0/0/0	3	3
8	19CAE716	Data Science	3/0/0/0	3	3
9	19CAE717	Human Resource Management	3/0/0/0	3	3
10	19CAE718	Ad hoc and Sensor Networks	3/0/0/0	3	3
11	19CAE719	Information Security	3/0/0/0	3	3
12	19CAE720	Business Intelligence	3/0/0/0	3	3
13	19CAE721	Ethics in Computing	3/0/0/0	3	3
14	19CAE722	Electronic Commerce	3/0/0/0	3	3
15	19CAE723	Energy Aware Computing	3/0/0/0	3	3
16	19CAE724	Remote sensing Geographical Information System	3/0/0/0	3	3
17	19CAE725	Internet of Things	3/0/0/0	3	3
18	19CAE726	Linux Administration and Network Programming	3/0/0/0	3	3

19	19CAE727	Application Development Frameworks	3/0/0/0	3	3
20	19CAE728	Human Computer Interactions	3/0/0/0	3	3

OPEN ELECTIVES

Sl. No	Course Code	Course	L/T/P/J	Contact hrs/week	Credits
1	19CAO601	Digital Marketing and SEO	3/0/0/0	3	3
2	19CAO602	Content Management System	3/0/0/0	3	3
3	19CAO603	Business Intelligence for Managers	3/0/0/0	3	3

EMPLOYEE ENHANCEMENT COURSES

Sl. No	Course Code	Course	L/T/P/J	Contact hrs/week	Credits	Semester
1	19GEB601	Design Thinking	1/0/4/0	5	2	I
2	19GET601	Professional Development	1/0/2/0	3	2	I
3	19CAT607	VQAR	2/0/0/0	3	2	II
4	19CAP606	Mini project	0/0/0/2	2	1	II
5	19CAP703	Life Skills	1/0/2/0	3	2	III
6	19CAP704	Project Work	0/0/0/24	24	12	IV

CREDITS PER SEMESTER & CREDITS PER CATEGORY

Category / Semester	FC	PCC	PEC	EEC	OE	Total
I	4	13	-	5	-	22
II	4	13	3	3	3	26
III	-	13	6	2	-	21
IV	-	-	3	12	-	15
TOTAL	8	39	12	22	3	84

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19MAT602	COMPUTATIONAL MATHEMATICS	L	T	P	J	C
		3	1	0	0	4

UNIT I   MATRIX ALGEBRA   **9+3**

Matrices, Rank of Matrix, Solving System of Equations-Eigen Values and Eigen Vectors-Inverse of a Matrix - Cayley Hamilton Theorem

UNIT II   BASIC SET THEORY   **9+3**

Basic Definitions - Venn Diagrams and set operations - Laws of set theory - Principle of inclusion and exclusion - partitions- Permutation and Combination - Relations- Properties of relations - Matrices of relations - Closure operations on relations - Functions - injective, surjective and bijective functions.

UNIT III   AGILE SCRUM FRAMEWORK   **9+3**

Propositions and logical operators - Truth table - Propositions generated by a set, Equivalence and implication - Basic laws- Some more connectives - Functionally complete set of connectives- Normal forms - Proofs in Propositional calculus - Predicate calculus

UNIT IV   FORMAL LANGUAGES   **9+3**

Languages and Grammars-Phrase Structure Grammar-Classification of Grammars-Pumping Lemma for Regular Languages – Context Free Languages

UNIT V   FINITE STATE AUTOMATA & GRAPH THEORY   **9+3**

Finite State Automata-Deterministic Finite State Automata(DFA), Non Deterministic Finite State Automata (NFA)- Graph Theory – Basic Definitions – Paths, Reachability and Connectedness – Matrix Representation of Graphs – Trees

                                        L :45   T:15   P: 0   J: 0   Total: 60 PERIODS

TEXT BOOKS

1   Kenneth H.Rosen, " Discrete Mathematics and Its Applications", Tata McGraw Hill, Fourth Edition, 2002.

2.   Hopcroft and Ullman, "Introduction to Automata Theory, Languages and Computation", Narosa Publishing House, Delhi, 2002.

REFERENCES

1   Jean Paul Tremblay, Rampurkar Manohar, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill, 1997.

2   M.K.Venkataraman "Engineering Mathematics", Volume II, National Publishing Company, Second Edition,1989.

3   A.Tamilarasi&A.M.Natarajan, "Discrete Mathematics and its Application", Khanna Publishers, Second Edition, 2005.

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COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Gain knowledge on basic concepts and applications of matrix algebra.

CO2   Think and proceed for the expected solution in terms of set theory.

CO3   Learn how to use logical connectives to combine statements and explore how to draw conclusions using various argument forms.

CO4   Design grammars and automata for different language classes.

CO5   Prove and disprove theorems establishing key properties of formal languages and automata

19CAT601	WEB PROGRAMMING ESSENTIALS	L	T	P	J	C
		3	0	0	0	3

UNIT-I   ADVANCED HTML   9

HTML Basics – HTML 5 : features –new markup elements – media elements - canvas element - form elements - video on the web

UNIT-II   CSS   9

Introduction – syntax and structure - Backgrounds, ManipulatingText, Margins and Padding-Positioning using CSS -Advanced CSS 4 concepts

UNIT-III   JAVASCRIPT   9

JAVA SCRIPT – Introduction – Usage of variables – control structures –functions – objects: DOM —Events and Event Handling – form Validations - AJAX basics

UNIT-IV   ADVANCED JAVASCRIPT   9

Classes – Constructors – Object-Oriented Techniques in JavaScript – Object constructor and Prototyping - Sub classes and Super classes – Introduction to JSON – JSON Structure –Introduction to jQuery –Introduction to AJAX-Bootstrap - Bootstrap components.

UNIT-V   ANGULAR JS FRAMEWORK   9

MVC and Angular in HTML – communicating with server - expressions – filters –directives –controller –forms

L :45   T:0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS

1 Thomas A. Powell, "HTML & CSS: The Complete Reference", Fifth Edition, 2010

2. Thomas A Powell, Fritz Schneider, "JavaScript: The Complete Reference", Third Edition, Tata McGraw Hill, 2013

REFERENCES

1 David Flanagan, "JavaScript: The Definitive Guide, Sixth Edition", O'Reilly Media, 2011

2 Brad green, shyamsesbadri, "AngularJS: Up and Running", O'Reilly Media,Rodrigo Branas, "AngularJS Essentials", Packt Publishing, 2014.

COURSE OUTCOMES

At the end of the course student should be able to:

CO1	Explore HTML tag features for designing website.
CO2	Use CSS properties with HTML tags to develop interactive web designs
CO3	Design web application forms with validation constraints
CO4	Apply object oriented concepts in java scripts to make action
CO5	Gain knowledge on MVC architecture and its components

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19CAT602	DATA STRUCTURES & ALGORITHMS	L	T	P	J	C
		3	0	0	0	3

UNIT-I   ELEMENTARY DATA STRUCTURES   9

Introduction – Arrays – Structures – Stack: Definition and examples, Representing Stacks - Queues and lists: Queue and its Representation, lists – Applications of Stack, Queue and Linked Lists.

UNIT II   TREES   9

Binary Trees – Operations on binary trees - Binary Tree Representations – node representation, internal and external nodes, implicit array representation – Binary tree Traversals - Huffman Algorithm – Representing Lists as Binary Trees

UNIT III   SORTING AND SEARCHING   9

General Background – Exchange sorts – Selection and Tree Sorting – Insertion Sorts – Merge and Radix Sorts – Basic Search Techniques – Tree Searching – General Search Trees – Hashing

UNIT IV   GREEDY AND BACKTRACKING   9

Fundamentals of the analysis of algorithm efficiency - Asymptotic notations - Greedy method – Prim's algorithm – Kruskal's algorithm – Dijkstra's algorithm – Backtracking: N-Queens problem

UNIT V   NP-HARD AND NP-COMPLETE PROBLEMS   9

P & NP problems – NP-complete problems – Approximation algorithms for NP-hard problems – Traveling salesman problem – Knapsack problem

L :45   T:0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS

1   Tanaenbaum A.S., Langram Y. Augestein M.J "Data Structures using C", Pearson Education , 2008.

2.   Anany Levitin "Introduction to the Design and Analysis of Algorithms" Pearson Education 2012.

REFERENCES

1.   Robert Kruse & Clovis L. Tondo "Data Structures and Program Design in C", Prentice Hall , 2nd edition., 2007.

2.   M.K.Venkataraman "Engineering Mathematics", Volume II, National Publishing Company, Second Edition,1989.

3.   A.Tamilarasi&A.M.Natarajan, "Discrete Mathematics and its Application", Khanna Publishers, Second Edition, 2005.

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19CAT603	DATA COMMUNICATION AND NETWORK	L	T	P	J	C
		3	0	0	0	3

UNIT-I   DATA COMMUNICATION   9

Introduction: Networks – Protocols and standards – Standards organizations – Line configurations – Topology – Transmission mode – Categories of networks – Inter networks.OSI model: Functions of the layers. Encoding and modulating: Digital-to-digital conversion – Analog-to-digital conversion – Digital-to-analog conversion – Analog-to-analog conversion. Transmission media: Guided media – Unguided media – Transmission impairment – Performance.

UNIT-II   ERROR CONTROL AND DATA LINK PROTOCOLS   9

Error detection and correction: Types of errors – Detection – Vertical Redundancy Check (VRC) – Longitudinal Redundancy Check (LRC) – Cyclic Redundancy Check (CRC) –Check sum – Error correction. Data link control: Line discipline – Flow control – Error control. HDLC, Project 802 – Ethernet – Token ring – FDDI- SONET – Bridges.

UNIT-III   NETWORKS AND SWITCHING, NETWORKING DEVICES   9

Switching: Circuit   switching   –   Packet   switching   –   Message   switching. Internetworks- IP addressing methods – Subnetting –Networking and internetworking devices: Repeaters – Bridges – Gateways – Other devices – Routing algorithms – Distance vector routing – Link state routing.

UNIT-IV   TRANSPORT LAYER   9

Duties of transport layer – Multiplexing – Demultiplexing – Sockets – User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – Congestion Control – Quality of services (QOS) – Integrated Services.

UNIT-V   APPLICATION LAYER   9

Domain Name Space (DNS) – SMTP – FTP – HTTP – WWW-SNMP– Network Security.

L :45   T:0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS
1   Behrouz A.Forouzan, "Data Communication and Networking", 5th Edition, Tata McGraw Hill, 2012.
2.   Andrew Tannenbaum.S, "Computer Networks", 5th Edition, Pearson Education, 2011.

REFERENCES
1   William Stallings, "Data and Computer Communication", 10th Edition, Pearson Education, 2013.

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Understand and explain Data Communications System and its components.
CO2   Identify the different types of network topologies and protocols.
CO3   Enumerate the layers of the OSI model and TCP/IP and identify the different types of Network devices and their functions within a network.
CO4   Able to understand the use of various networking devices.
CO5   Understand the role of application layer protocols in different scenarios

19GET601	PROFESSIONAL DEVELOPMENT	L	T	P	J	C
		2	0	0	0	2

UNIT-I   PROFESSIONAL COMMUNICATION   6

Importance of communication- Types of communication- Verbal and Non-verbal Communication -Barriers to communication

UNIT-II   PERSONALITY DEVELOPMENT   6

Significance of Personality development- Attitude - Motivation-Self Esteem-Body language - Problem-solving- Decision-making skills- Leadership qualities-Character building -Team-work -Work ethics -Good manners and etiquette

UNIT-III   PUBLIC SPEAKING   6

Introduction to public speaking- Barriers- Speech organization-Understanding audience-Information & Communicative Technologies (ICT)-Effective power point presentation-feedback

UNIT-IV   NETWORKING   6

Introduction to networking-Types of networking- Business Card- strategies for networking-networking database- Role of social media& internet

UNIT-V   SOCIALIZATION   6

Importance of socialization-Theories of self-development-Agents of socialization-socialization across the life

L :30   T:0   P: 0   J: 0   Total: 30 PERIODS

TEXT BOOKS

1   Personality development- 1. Hurlock, E.B (2006). Personality Development, 28th Reprint. New Delhi: Tata McGraw Hill.

2. Stephen P. Robbins and Timothy A. Judge(2014), Organizational Behaviour 16th Edition: Prentice Hall

REFERENCES

1   Butterfield, Jeff Soft Skills for Everyone. Cengage Learning: New Delhi, 2015

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Understand and explain Data Communications System and its components.

CO2   Identify the different types of network topologies and protocols.

CO3   Enumerate the layers of the OSI model and TCP/IP and identify the different types of Network devices and their functions within a network.

CO4   Able to understand the use of various networking devices.

CO5   Understand the role of application layer protocols in different scenarios

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19GEB601	DESIGN THINKING	L	T	P	J	C
		1	0	4	0	3

UNIT I   INTRODUCTION TO DESIGN THINKING   **3+12**

A brief insight to Design Thinking and Innovation- People Centered Design & Evoking the 'right problem'-Purpose of Design Thinking- Design Thinking Framework

UNIT II   PROCESS IN DESIGN THINKING (EMPATHY, DEFINE)   **3+12**

Design Thinking Process – Empathy – Uncovering and Investigating Community Concerns - Define : Examine and Reflect on the problem

UNIT-III   PUBLIC SPEAKING   **3+12**

Introduction to public speaking- Barriers- Speech organization-Understanding audience-Information & Communicative Technologies (ICT)-Effective power point presentation-feedback

UNIT IV   TESTING, REFINING AND PITCHING THE IDEAS   **3+12**

Importance & Testing the Design with People-Retest and Redefine Results-Creating a Pitch for the design

UNIT V   VALUE PROPOSITION DESIGN   **3+12**

Business Vs Startup-Briefing the Problem-Problem Validation and User Discovery- Challenge Brief

L :15   T:0   P:60   J: 0   Total: 75 PERIODS

TEXT BOOKS

1   Robert A Curedale, Design Thinking Process & Methods 4th Edition, December 2017, Design Community College Inc.

2.   Andrew Pressman, Design Thinking: A Guide to Creative Problem Solving for Everyone, First Edition, Nov 2018, Routledge.

REFERENCES

1   Idris Mootee, Design Thinking for Strategic Innovation - What They Can't Teach You at Business or Design School, First Edition, 2017, Wiley

2   Yves Pigneur, Greg Bernarda, Alan Smith, Trish Papadakos Alex Osterwalder, Value Proposition Design: How to Create Products and Services Customers Want, 2015, Wiley

3   Brown, Tim, and Barry Katz. Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation, 2009, Harper Business

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Learn new approach-design thinking—that enhances innovation activities in terms of market impact, value creation, and speed.

CO2   Feel the Empathy and can define their problems based on the Community Concerns

CO3   Strengthen their individual and collaborative capabilities to identify customer needs, create sound concept hypotheses, collect appropriate data, and develop a prototype that allows for meaningful feedback in a real-world environment

CO4   Translate broadly defined opportunities into actionable innovation possibilities and recommendations for client organization

CO5   Become an Entrepreneurs

19CAP601   WEB PROGRAMMING ESSENTIALS LABORATORY   L   T   P   J   C

0   0   4   0   2

LIST OF EXPERIMENTS

1. Develop online book store site (static) which should contain the following pages:
   - Home page
   - User Registration
   - Books catalog
   - Shopping cart
   - Order confirmation
   - Payment mode selection, the pages should resemble any professional online store.

2. Demonstrate Digital clock using canvas in HTML 5

3. Design a user registration page for student in online course management. Apply validation procedure using java script suitably. Show appropriate error messages using dialog box. Display the user profile in the report form once it is submitted.

4. Develop a java script program to design a calculator to perform mathematical functions

5. Design home page for healthcare portal using div tag. Create a CSS style sheet for the page. Use internal, external mode of CSS style sheets

6. Create a user registration form to enroll the events through event management system using JQuery.

7. Define JSON structure for Bus ticket booking system and parse the JSON file to list the passengers those who reserved for Coimbatore to Bangalore

8. Demonstrate input selection and sorting using filters in AngularJS. Assume cricket player data like player name, country, type of player, no of matches played, number of runs scored, number of wickets taken, number of catches made etc…

9. Implement AngularJS forms and validation in user profile page

MAJOR EQUIPMENTS / SOFTWARE REQUIRED

Hardware

- Intel Pentium IV Processor,
- Intel Mother Board,
- 2 GB RAM,
- 125 GB Hard Disk or above

Software

- Windows 7/ Higher OS
- Browser Mozilla/Chrome with Internet connection

L : 0   T: 0   P: 60   J: 0   Total: 60 PERIODS

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COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Develop simple web applications using HTML 5

CO2   Embed CSS properties into web pages to make interactive components

CO3   Create simple one page web application with interactive functionalities using scripts

CO4   Demonstrate on how data can be shared between client and server in JSON form

CO5   Apply scripting logics in web applications using framework

19CAP602	DATA STRUCTURE LAB	L	T	P	J	C
		0	0	4	0	2

LIST OF EXPERIMENTS

1. Strassen's matrix multiplication
2. Stack and Queue
3. Merge Sort
4. Quick Sort
5. Binary tree Traversals
6. DFS and BFS
7. Prim's Algorithm
8. Knapsack Problem – Dynamic Programming
9. Subset Sum Problem – Backtracking
10. Travelling salesperson problem – Branch and Bound

MAJOR EQUIPMENTS / SOFTWARE REQUIRED

Hardware

- Intel Pentium IV Processor,
- Intel Mother Board,
- 2 GB RAM,
- 125 GB Hard Disk or above

Software

- Windows 7/ Higher OS
- C Compiler

L : 0   T: 0   P: 60   J: 0   Total: 60 PERIODS

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Ability to design and analyze the time and space efficiency of the data structure.

CO2   Gain practical knowledge on the applications of data structure.

CO3   Ability to analyze and implement the various algorithms.

CO4   Able to understand dynamic programming concepts and write programs

CO5   Able to write programs implementing backtracking and branch & bound approaches

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19MAT609 **OPTIMIZATION TECHNIQUES** **L   T   P   J   C**

3   1   0   0   4

UNIT-I   LINEAR PROGRAMMING MODELS **9+3**

Mathematical Formulation - Graphical Solution of linear programming models – Simplex method – Artificial variable Techniques- Two Phase Simplex. Integer Programming: Gomory's IPP method – Gomory's mixed integer method.

UNIT-II   TRANSPORTATION AND ASSIGNMENT MODELS **9+3**

Mathematical formulation of transportation problem- Methods for finding initial basic feasible solution – optimum solution - degeneracy –Mathematical formulation ofassignment models – Hungarian Algorithm – Variants of the Assignment problem

UNIT-III   INVENTORY MODELS **9+3**

Costs involved in inventory-Deterministic inventory models: single item inventory, EOQ with and without shortage having production rate finite and infinite.

UNIT-IV   SCHEDULING BY PERT AND CPM **9+3**

Network Construction – Critical Path Method – Project Evaluation and Review Technique – Resource Analysis in Network Scheduling

UNIT-V   QUEUEING MODELS **9+3**

Characteristics of Queuing Models – Poisson Queues - $(M / M / 1) : (FIFO / \infty / \infty)$, $(M / M / 1) : (FIFO / N / \infty)$, $(M / M / C) : (FIFO / \infty / \infty)$, $(M / M / C) : (FIFO / N / \infty)$ models

L :45   T:15   P: 0   J: 0   Total: 60 PERIODS

TEXT BOOKS

1   Taha H.A., "Operations Research : An Introduction " 4th Edition, Pearson Education, 2011. .

2.   A.M.Natarajan, P.Balasubramani, A.Tamilarasi, "Operations Research", Pearson Education, Asia, 2005.

REFERENCES

1   Prem Kumar Gupta, D.S. Hira, "Operations Research", S.Chand& Company Ltd, New Delhi, 4rd Edition , 2015.

2   S.R. Yadav & A.K. Malik, "Operations Research", First Edtion, Oxford University Press, 2014

3   K Sharma., "Operations Research Theory &Applications , 3e", Macmillan India Ltd, 2007

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Represent problems as linear programming problems and solve it.

CO2   Apply optimization techniques in transportation and assignment problems

CO3   Gain knowledge to classify the inventory models and derive solution.

CO4   Apply PERT and CPM methods in projects and analyze resource requirements

CO5   Examine and distinguish various queuing models

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19CAT607	PRINCIPLES OF MANAGEMENT	L	T	P	J	C
		3	0	0	0	3

UNIT-I   INTRODUCTION TO MANAGEMENT   9

Management: Definition - Evolution of Management Studies –Nature, Functions, Levels and role of management - Basic Principles and Process of Management - Management vs. Administration – Taylor & Fayol's contribution to Management - Management styles -Qualities of good manager.

UNIT-II   PLANNING   9

Planning: Basic types of planning – Characteristics of a good plan- Features - Planning process- Obstacles in planning - MBO, MBE, Policy - Policy formulation - Types of policies - Forecasting, Process, Importance – Decision making process.

UNIT-III   ORGANISING   9

Organization: Need - forms of organization - features of a good organization. Departmentation – organizational charts - manuals - span of management, factors affecting span of management - authority relationship – delegation of authority and responsibility - centralization and decentralization.

UNIT-IV   STAFFING & DIRCTING   9

Staffing: Meaning, Nature, Need, and Process. Directing - Characteristics, Importance and Techniques of directing. Event & Time Management - Scope, Importance - Coordination - Need for coordination, Techniques for securing effective coordination.

UNIT-V   CONTROLLING   9

Concept of Control – Importance of control- Essentials of control system - Process of control – Communication - Process of Communication - Types - Barriers - Management Information Systems.

                                        L :45   T: 0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS

 1   Harold Koontz, and Weihrich, "Essentials of Management", 8th Edition, 2010

REFERENCES

 1   Tripathy.P.C and Reddy.P.N., "Principles of Management" , 4th Edition, Tata McGraw Hill, 2011.

 2   Stephen.P.Robbins, Mary coulter, Neharikavohra, Pearson, Management, 10th Edition, 2010.

 3   Dr.Kumkum Mukherjee, Principles of Management, 2nd Edition, Tata McGraw Hill, 2009.

COURSE OUTCOMES

At the end of the course student should be able to:

 CO1   Understand various functions of management

 CO2   Work as an effective team member and leader.

 CO3   Effectiveness of organizing and controlling aspects of management.

 CO4   Use problem-solving strategies and critical thinking in real life situations.

 CO5   Able to understand the significance of communication in business.

19CAT608	JAVA PROGRAMMING	L	T	P	J	C
		3	0	0	0	3

UNIT-I   JAVA FUNDAMENTALS   9

Java features – Java Platform – Java Fundamentals – Classes, Packages and Interfaces – Exception Handling – utilities and collections.

UNIT-II   PACKAGES   9

Applets- AWT package – Layouts – Containers – Event Package – Event Model – Painting – Garbage Collection.

UNIT-III   NETWORKING AND I/O PACKAGES   9

Multithreading – Network programming - InetAddress - URL - TCP/IP and datagram - Input Output Packages - inner classes.

UNIT-IV   ADVANCED JAVA PROGRAMMING I   9

Java Database Connectivity: drivers - connection- query execution – Servlets: Generic servlet-HttpServlet

UNIT-V   ADVANCED JAVA PROGRAMMING II   9

RMI – Java Beans – Introduction- Difference between AWT and SWING - Components hierarchy- Panes - Individual Swings components J Label - JButton, JTextField, JTextAres

L :45   T: 0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS

1   Herbert Schildt, The Complete Reference – Java 2, 8th Edition, Tata McGraw Hill, 2011.

REFERENCES

1   Ralph Bravaco, Shai Simonson, "Java Programming : From the Ground Up", Tata McGraw Hill Edition, 2012.

2   Keyur shah, "Gateway to Java Programmer Sun Certification", Tata Mc Graw Hill 2002.

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Able to develop and execute Java programs using object oriented programming concepts.

CO2   Design user interface program using applets and events package.

CO3   Understand the use of networking and I/O packages.

CO4   Able to apply the server side programming with database technologies.

CO5   Able to develop and deploy Java bean and swing programs.

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19CAT609	DATABASE MANAGEMENT SYSTEMS	L	T	P	J	C
		3	0	0	0	3

UNIT-I INTRODUCTION 9

Historical perspective - Files versus database systems - Architecture - E-R model - Security and Integrity - Data models.

UNIT-II RELATIONAL MODEL 9

The relation - Keys - Constraints - Relational algebra and Calculus - Queries - Programming and triggers.

UNIT-III DATA STORAGE 9

Disks and Files - file organizations - Indexing - Tree structured indexing - Hash Based indexing

UNIT-IV QUERY EVALUATION AND DATABASE DESIGN 9

External sorting - Query evaluation - Query optimization - Schema refinement and normalization - Physical database design and tuning – Security.

UNIT-V COLUMN ORIENTED DATABASE 9

Definition of NOSQL- NOSQL Storage Architecture, CRUD operations with MongoDB, Querying, Modifying and Managing NOSQL Data stores, Indexing and ordering datasets

L :45 T: 0 P: 0 J: 0 Total: 45 PERIODS

TEXT BOOKS

1. Raghu RamaKrishnan and Johannes Gehrke, "Database Management Systems", McGraw Hill International Editions, 2000.
2. Shakuntala Gupta Edward, Navin Sabharwal, "Practical MongoDB, Architecture, Developing and Administrating MongoDB", Apress, 2015.

REFERENCES

1. C. J. Date, "An Introduction to Database Systems", Seventh Edition, Addison Wesley, 1997.
2. Abraham Silberschatz, Henry. F. Korth and S. Sudharshan, "Database system Concepts", Third Edition, Tata McGraw Hill, 1997.
3. Hector Garcia- Molina, Jeffrey D Ullman, Jennifer widom, "Database Systems – The complete book", Pearson Education, 2nd edition, 2008.

COURSE OUTCOMES

At the end of the course student should be able to:

CO1 Master the basic concepts and appreciate the applications of database systems

CO2 Be familiar with a commercial relational database system (Oracle) by writing SQL.

CO3 Gain the knowledge on indexing techniques, transaction processing and concurrency control.

CO4 Able to apply normalization on database design during software development.

CO5 Apply security components on database.

19CAP604 DATABASE MANAGEMENT SYSTEM LABORATORY

L	T	P	J	C
0	0	4	0	2

LIST OF EXPERIMENTS

1. Creation of base tables and views.

2. Data Manipulation

      INSERT, DELETE and UPDATE in tables

      SELECT, Sub Queries and JOIN

3. Data Control Commands.

4. High level language extensions – PL/SQL Or Transact SQL.

5. Use of Cursors, Procedures and Functions.

6. Embedded SQL or Database Connectivity.

7. Oracle or SQL Server Triggers.

8. Create the schema in a document database, add a key and insert data

9. Create cricket database with necessary information.

   (i) list all the records

   (ii) search for particular player using ID

   (iii) list the player having batting average 40 and above

   (iv) list the player who have scored 1000 and above runs in the world cup

10. Case 1

      A database is to be designed for a college to monitor students' progress throughout their Course of study. The students are reading for a degree (such as MCA, MBA, MSc, etc.) within the framework of the modular system. The college provides a number of module, each being characterized by its Code, title, Credit value, module leader, teaching staff and the department they come from. A module is co-ordinated by a module leader who shares teaching duties with one or more lecturers. A lecturer may teach (and be a module leader for) more than one module. Students are free to choose any module they wish but the following rules must be observed some modules require pre-requisites modules and some degree programmes have compulsory modules. The database is also to contain some information about students including their numbers, names, addresses, degrees they read for and their past performance (i.e., modules taken and examination results).

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1. To retrieve the list of tables present in a database
2. To list which students attended which class frequently
3. To identify the most wanted modules by the students
4. To identify how many lectures teach more than one module
5. List out the students in ascending order depends on their performance.
6. Use join query to identify the relationship between mentor and students.
7. Compare past result performance with present examination result.

11. Case 2

A Rental car service company requires database management system which includes information about cars & subcontractors, garages, company expenditures & revenues and customers. Cars could be described by make, model, year of production, engine size, fuel type, number of passengers, registration number, cost & purchase date, rent price/km, insurance amount and insurance date details. The company policy is not to keep any car for a period exceeding five year. All major repairs and maintenance are done by subcontractors. Therefore the data about garages to be kept in the database includes garage names, addresses, range of services and the like. Some garages require payments immediately after a repair has been made; with others C2C has made arrangements for credit facilities. Company expenditures are to be registered for all outgoings connected with purchases, repairs, maintenance, insurance etc. Similarly the cash inflow coming from all sources - car hire, car sales, insurance claims - must be kept of file.C2C maintains a reasonably stable client base. For this privileged category of customers special credit card facilities are provided. These customers may also book in advance a particular car.

1. Design database and tables for the requirements. Prepare query
2. To find the cars which are to be out of service
3. To identify the cars which are going to be out of service for the next one month
4. To rank the cars based on the maintenance cost consumes
5. To list the cars which consumes maximum insurance claim within 5 year.
6. Displays the total number of customers by counting each customer ID. In addition, it groups the results according to the privilege of each customer.

12. Case3

Start Oracle NoSQL Database instance and load the user profile data

MAJOR EQUIPMENTS / SOFTWARE REQUIRED

Hardware

- Intel Pentium IV Processor,
- Intel Mother Board,
- 2 GB RAM,
- 125 GB Hard Disk or above

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Software

- Windows 7/ Higher OS
- C Compiler
- Microsoft SQL Server/ Oracle/ MySQL

L : 0   T: 0   P: 60   J: 0   Total: 60 PERIODS

COURSE OUTCOMES

At the end of the course student should be able to:

CO1	Creation of tables, queries, forms, reports, data access pages, & macros.
CO2	To provide comprehensive instruction in the Structured Query Language (SQL) and transact-SQL for Microsoft's SQL Server users.
CO3	Will learn how to create multiple forms and reports using PL/SQL triggers, the Object Navigator, and Oracle's Form & Report Builders.
CO4	Able to write triggers and procedures for effectively utilizing the backend for application Development.
CO5	Apply visual basic technology for application development.

19CAP605	JAVA PROGRAMMING LABORATORY	L	T	P	J	C
		0	0	4	0	2

LIST OF EXPERIMENTS

1. Write a java program to implement

   - Function overloading

   - Inheritance

   - Exception handling

2. Java program to implement package and interface

3. Writing a GUI program using AWT components

4. Writing a GUI program with event classes

5. Java program to implement network sockets

6. Application of threads and I/O files

7. Implementing database connectivity using JDBC

8. Creating RMI program

9. Create and use Java bean

   Writing java GUI program with swing components

MAJOR EQUIPMENTS / SOFTWARE REQUIRED

Hardware

- Intel Pentium IV Processor,
- Intel Mother Board,
- 2 GB RAM,
- 125 GB Hard Disk or above

Software

- Windows 7/ Higher/ Linux Operating System
- Java SDK (1.6) / Tomcat Server / IIS Server
- Browser (IE /Netscape/Mozilla)

L : 0   T: 0   P: 60   J: 0   Total: 60 PERIODS

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Able to develop small applications with Object oriented programming.

CO2   Able to develop and execute Java programs using object oriented programming concepts.

CO3   Able to develop remote applications with database technology

CO4   Able to write client server programs using RMI.

CO5   Able to develop and deploy Java bean programs.

19CAP606	Mini Project I	L	T	P	J	C
		0	0	0	1	1

1. This course encourages students in developing software which deals with simple problem within the short term of duration. The student acquires skill on learning the problem environment, preparing requirements specification, designing through diagrams, and coding.

2. Individual student project only permitted

3. Students are expected to work on a real-life project preferably in some industry/ Research and Development Laboratories/Educational Institution/Software Company.

4. Each student shall finally produce a comprehensive report covering background information, problem statement, project work details, and sample coding, result and conclusion.

5. This final report shall be typewritten form as specified in the guidelines.

6. Students are excepted to apply the design thinking approach to empathize the problem, define the requirements, ideate design components, prepare software model(prototype) and test the performance

L : 0   T: 0   P: 0   J: 1   Total: 15 PERIODS

COURSE OUTCOME

At the end of the course, student will be able to

- Identify the problems to solve by programming technologies
- Apply theoretical and programming knowledge to formulate, design, program and test the solution

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19CAT610	VERBAL, QUANTITATIVE, APTITUDE AND REASONING (VQAR)	L	T	P	J	C
		2	0	0	0	2

UNIT-I   COMMUNICATION   6

Stage Talk - Initiation, Stage fear, JAM, Verbal Communication – Effective communication, Active listening, Comprehend and understand a paragraph, Paragraph Writing, Non Verbal

Communication

UNIT-II   VERBAL   6

Different Parts of speech, Synonyms, Antonyms, Verbs, Tense & Voice, Idioms & Phrases, Spot the Error & corrected Sentence, Reading comprehension, Spellings

UNIT-III   QUANTITATIVE APTITUDE   6

Simple & compound interest, Work & Wages, Cubes & Roots, Fractions, Probability, Mixture & partnerships, Profit, loss & discounts, Heights & distances

UNIT-IV   REASONING   6

Alphabet test, Blood relation, Odd man out, Puzzles, Figure series, Directional problem,

Syllogisms, Coding & decoding

UNIT-V   SOFT SKILLS   6

Resume Preparation, Group discussion, Do's & Don'ts, Mock GD & Feedback, Self-confidence, Self-discipline, Self-Assessment

                         L :30   T: 0   P: 0   J: 0   Total: 30 PERIODS

TEXT BOOKS

1   Dr. Aggarwal R.S, "Quantitative Aptitude", Sultan Chand & Company Ltd., 2013.

2   Dr. Aggarwal R.S and Monika Agarwal, "Objective General English", New Delhi, Sultan Chand and Company Ltd., 1999.

3   P.Prasad, "Professional Communication" S.K.Kataria& Sons – 2010-11

4   M. Asraf Rizvi "Effective Technical Communication" Tata McGraw Hill Company Limited, 2005

REFERENCES

1   R.V. Praveen, "Quantitative Aptitude and Reasoning", New Delhi, PHI Learning Private Limited. 2012.Arvind Ravularvaru , "Learning IONIC", PACKT Publications, First Edition, 2015

2   "Aptimithra" , McGraw Hill Publications, 2012

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Students will improve their communication.

CO2   Students acquire knowledge on English grammar.

CO3   Student will be familiar with application orientated concepts quantitative aptitude.

CO4   Enhance the ability of the students to solve problems

CO5   : Trained to face the recruitment challenges.

19CAT701	MOBILE APPLICATION DEVELOPMENT	L	T	P	J	C
		3	0	0	0	3

UNIT-I   GETTING STARTED WITH MOBILITY   9

Mobility landscape, Mobile platforms, Mobile apps development, Overview of Android platform, setting up the mobile app development environment along with an emulator, a case study on Mobile app development.

UNIT-II   BUILDING BLOCKS OF MOBILE APPS - I   9

App user interface designing – mobile UI resources (Layout, UI elements, Draw-able, Menu), Activity- states and life cycle, interaction amongst activities. App functionality beyond user interface - Threads, Async task, Services – states and lifecycle, Notifications.

UNIT-III   BUILDING BLOCKS OF MOBILE APPS - II   9

Broadcast receivers, Telephony and SMS APIs , Native data handling – on-device file I/O, shared preferences, mobile databases such as SQLite, and enterprise data access (via Internet/Intranet).

UNIT-IV   SPRUCING UP MOBILE APPS   9

Graphics and animation – custom views, canvas, animation APIs, multimedia – audio/video playback and record, location awareness, and native hardware access (sensors such as accelerometer and gyroscope).

UNIT-V   IONIC Hybrid framework   9

 Mobile Hybrid Architecture – how angular JS powers IONIC - CSS components and Navigation – SCSS   - Directives and services

L :45   T: 0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS

 1   Anubhav Pradhan, Anil V Deshpande, "Composing Mobile Apps: Learn| Explore| Apply using Android", First Edition, 2014.

 2   Barry Burd, "Android Application Development All in one for Dummies", First Edition ,2011

REFERENCES

 1   Lauren Darcey , Shane Conder, "Teach Yourself Android Application Development In 24 Hours", Second Edition, 2012.

 2   Arvind Ravularvaru , "Learning IONIC", PACKT Publications, First Edition, 2015

COURSE OUTCOMES

At the end of the course student should be able to:

 CO1   Able to get familiarize with Mobile apps development aspects.

 CO2   Design and develop mobile apps, using Android as development platform, with key focus on user experience design, native
            data handling and background tasks and notifications.

 CO3   Understand the use of graphics, animation in Android apps.

 CO4   Able to develop mobile apps implementing location awareness and sensors.

 CO5   Perform testing, signing, packaging and distribution of mobile apps.

19CAT702	BIG DATA ANALYTICS	L	T	P	J	C
		3	0	0	0	3

UNIT-I   INTRODUCTION TO BIG DATA   9

Introduction to BigData – Challenges of Conventional Systems - Intelligent data analysis – Data - Analytic Processes and Tools - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error.

UNIT-II   HADOOP   10

History of Hadoop- The Hadoop Distributed File System – Components of Hadoop- Analyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFS-Java interfaces to HDFS Basics- Developing a Map Reduce Application-How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort – Task execution - Map Reduce Types and Formats- Map Reduce Features

UNIT-III   HADOOP ENVIRONMENT   9

Setting up a Hadoop Cluster - Cluster specification - Cluster Setup and Installation - Hadoop

Configuration-Security in Hadoop - Administering Hadoop – HDFS - Monitoring-Maintenance-Hadoop benchmarks- Hadoop in the cloud

UNIT-IV   FRAMEWORKS   9

Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive - fundamentals of HBase and ZooKeeper - Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications

UNIT-V   R PROGRAMMING   9

Introduction to R: Overview of R; functions and packages in R; working with dataset in R; use R for doing statistical analysis and graphics; R commands . Adoption of R in Industry :Oralce R, Revolution Analytics

L :45   T: 0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS

1   Tom White, " Hadoop: The Definitive Guide" Third Edition, O'reilly Media, 2012

2   A.Ohri, "R for Business Analytics", Second edition, Springer, 2012

REFERENCES

1   Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data", McGrawHill Publishing, 2012

2   Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley & sons, 2012.

3   Jiawei Han, Micheline Kamber "Data Mining Concepts and Techniques", Second Edition, Elsevier, Reprinted 2008.

4   PrabhanjanNarayanacharTattar, "R Statistical Application Development byExample Beginner's Guide", PACKT, 2013

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COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Analyze the big data analytic techniques for useful business applications.

CO2   esign efficient algorithms for mining the data from large volumes

CO3   Analyze the HADOOP and Map Reduce technologies associated with big data analytics

CO4   Explore on Big Data applications Using Pig and Hive

CO5   Apply R programming language on analytical applications

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19CAT703	MACHINE LEARNING	L	T	P	J	C
		3	0	0	0	3

UNIT-I   FOUNDATIONS OF LEARNING   9

Components of learning –learning models –geometric models –probabilistic models –logic models –grouping and grading –learning versus design –types of learning –supervised –unsupervised –reinforcement –theory of learning –feasibility of learning–error and noise –training versus testing –theory of generalization –generalization bound –approximation-generalization tradeoff –bias and variance –learning curve

UNIT-II   LINEAR MODELS   9

Linear classification –univariate linear regression –multivariate linear regression –regularized regression –Logistic regression –perceptrons –multilayer neural networks –learning neural networks structures –support vector machines –soft margin SVM –going beyond linearity –generalization and overfitting –regularization –validation

UNIT-III   DISTANCE-BASED MODELS   9

Nearest neighbor models –K-means –clustering around medoids –silhouttes –hierarchical clustering –k-d trees –locality sensitive hashing–non-parametric regression –ensemble learning –bagging and random forests –boosting –meta learning

UNIT-IV   TREE AND RULE MODELS   9

Decision trees –learning decision trees –ranking and probability estimation trees –regression trees –clustering trees –learning ordered rule lists –learning unordered rule lists –descriptive rule learning –association rule mining –first-order rule learning

UNIT-V   Machine Learning with Python's scikit-learn   9

Introduction to scikit-learn library – supervised learning – k nearest neighbors – linear regressions – support vector machines – support vector regression

L :45   T: 0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS

1   Y. S. Abu-Mostafa, M. Magdon-Ismail, and H.-T. Lin, ―Learning from Data, AML Book Publishers, 2012.

2   P. Flach, Machine Learning: The art and science of algorithms that make sense of data‖, Cambridge University Press, 2012.

REFERENCES

1   K. P. Murphy ―Machine Learning: A probabilistic perspective‖, MIT Press, 2012.

2   M. Mohri, A. Rostamizadeh, and A. Talwalkar ―Foundations of Machine Learning‖, MIT Press, 2012.

3   C. M. Bishop ―Pattern Recognition and Machine Learning‖, Springer, 2007.

4   D. Barber ―Bayesian Reasoning and Machine Learning‖, Cambridge University Press, 2012

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COURSE OUTCOMES

At the end of the course student should be able to:

CO1 Able to understand   various learning models of Machine Learning.

CO2 Develop algorithms to learn linear and non-linear models.

CO3 Apply data clustering algorithms on Analytical Problems.

CO4 Gain the knowledge on tree and rule-based models.

CO5 Apply reinforcement learning techniques for real life problems.

19CAP701   **DATA ANALYTICS LABORATORY (PYTHON)**   **L**   **T**   **P**   **J**   **C**

                                                    0   **0**   **4**   **0**   **2**

LIST OF EXPERIMENTS

1. Implement linear regression machine learning algorithm using appropriate dataset
2. Demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
3. Implement k-Nearest Neighbour algorithm to classify the iris data set using Python ML library classes
4. Use diabetes dataset in scikit-learn library and make baseline prediction of disease progression for future patients
5. Logistic Regression using Scikit-Learn
6. Implementation of classifier using Random forest model
7. Perform outlier detection using appropriate dataset
8. Implement multiclass classification using SVM

MAJOR EQUIPMENTS / SOFTWARE REQUIRED

    Hardware

- Intel Pentium IV Processor,
- Intel Mother Board,
- 2 GB RAM,
- 125 GB Hard Disk or above

    Software

- Windows 7/Higher OS
- Python Environment

                                          L : 0   **T: 0**   **P: 4**   **J: 0**   **Total: 60 PERIODS**

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Ability to understand and implement the concepts of Python programming.

CO2   Understand and apply/use array in programming

CO3   To gain knowledge on functions and data types.

CO4   To gain knowledge on use of appropriate data structures

CO5   Ability to understand GUI concept

		L	**T**	**P**	**J**	**C**

19CAP702   **MOBILE APPLICATION AND DEVELOPMENT LABORATORY**   **L   T   P   J   C**

0   0   4   0   2

LIST OF EXPERIMENTS

1. Understand the app idea and design user interface/wireframes of mobile app.

2. Set up the mobile app development environment.

3. Form design for mobile applications.

4. Applications using controls.

5. Graphical and Multimedia applications.

6. Data retrieval applications.

7. Gaming applications.

8. Web Portal Development.

9. Using emulator to deploy and run mobile apps

10. Testing mobile app - unit testing, black box testing and test automation

MAJOR EQUIPMENTS / SOFTWARE REQUIRED

Hardware

- Pentium P4, 2.8 GHz or higher
- 2 GB (or higher) RAM, 125 GB (or higher) HD
- Windows 7/Higher OS

Software

- Android ADT bundle, MonkeyTalk, Robotium, Tomcat (or any other J2EE web container)

L : 0   T: 0   P: 4   J: 0   Total: 60 PERIODS

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Setup the mobile app development environment with necessary tools.

CO2   Able to design user interface/ wireframes of mobile apps.

CO3   Develop mobile applications using controls.

CO4   Create graphical, multimedia, gaming and data retrieval applications.

CO5   Test and deploy mobile apps.

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19CAP703	LIFE SKILLS	L	T	P	J	C
		1	0	2	0	2

UNIT-I   SELF AWARENESS   **3+6**

Self Image – Understanding self image – shadows down the lane – self acceptance- Self Knowledge – Knowing oneself - Self confidence – Guilt and grudges - Power of belief – positive thinking– optimizing confidence - Self development – perception, attitude and Behavioural change, developing a healthy and balance personality – Self esteem – signs - indicators

UNIT-II   INTERPERSONAL SKILLS   **3+6**

Leadership development skills – difference between leader and manager, different styles and their utilities, functions of leadership, application of knowledge, overcoming from obstacles, influential skills and Leadership qualities. Problem solving skills – Process, approaches and its components, creative problem solving, Tools and techniques, application of SMART analysis and barriers to problem solving.

UNIT-III   LIFE COPING SKILLS   **3+6**

Stress Coping skills – Definition of stress, strategies to alleviate stress, problem and emotion focused coping, techniques to reduce stress, stress reaction phases, crisis intervention steps, creating positive affirmations, Signs, Symptoms and Reactions of Stress

UNIT-IV   Modern day SKILLS   **3+6**

Creativity, Critical Thinking, Collaboration, Problem Solving, Decision Making, Need for Creativity in the 21st century, Imagination, Intuition, Experience, Sources of Creativity, Lateral Thinking, Myths of creativity, Critical thinking Vs Creative thinking, Functions of Left Brain & Right brain, Convergent & Divergent Thinking, Critical reading & Multiple Intelligence.

UNIT-V   UNIVERSAL HUMAN VALUES   **3+6**

 Love & Compassion – Truth -Non-Violence – Righteousness – Peace- Service - Renunciation (Sacrifice)

L :15   T: 0   P:30   J: 0   Total: 45 PERIODS

TEXT BOOKS

1   Barun K. Mitra, "Personality Development & Soft Skills", Oxford Publishers, Third Edition.

REFERENCES

1   Larry James, "The First Book of Life Skills"; First Edition, Embassy Books, 2016 Shantikumar Ghosh, UniversalValues. The Ramakrishna Mission, Kolkata, 2004.

2   Robbins & Hunsaker, 'Training in Interpersonal Skills: Tips for Managing People at Work', 6th Edition, Pearson Education, 2015

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Gain Self Competency and Confidence.

CO2   Examine various leadership models and understand/assess their skills, strengths and apply own management style

CO3   Develop interpersonal skills to manage stress and emotions

CO4   Understand the use of social networking and ethical issues involved in it.

CO5   Become conscious practitioners of human values.

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19CAE709　　　SOFTWARE TESTING AND QUALITY ASSURANCE　　　L　T　P　J　C

**　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　3　0　0　0　3**

UNIT-I　　　TESTING ENVIRONMENT AND TEST PROCESSES　　　　　9

World-Class Software Testing Model – Building a Software Testing Environment - Overview of Software Testing Process – Organizing for Testing – Developing the Test Plan – Verification Testing –Analyzing and Reporting Test Results – Acceptance Testing – Operational Testing – Post Implementation Analysis.

UNIT-II　　　TESTING TECHNIQUES AND LEVELS OF TESTING　　　　9

Using White Box Approach to Test design - Static Testing Vs. Structural Testing – Code Functional Testing – Coverage and Control Flow Graphs –Using Black Box Approaches to Test Case Design – Random Testing – Requirements based testing –Decision tables –State-based testing – Cause-effect graphing – Error guessing – Compatibility testing – Levels of Testing - Unit Testing – Integration Testing - Defect Bash Elimination. System Testing - Usability and Accessibility Testing – Configuration Testing - Compatibility Testing - Case study for White box testing and Black box testing techniques.

UNIT-III　　　INCORPORATING SPECIALIZED TESTING RESPONSIBILITIES　　　9

Testing Client/Server Systems – Rapid Application Development Testing – Testing in a Multiplatform Environment – Testing Software System Security - Testing Object-Oriented Software – Object Oriented Testing – Testing Web based systems – Web based system – Web Technology Evolution – Traditional Software and Web based Software – Challenges in Testing for Web-based Software – Testing a Data Warehouse - Case Study for Web Application Testing.

UNIT-IV　　　TOOLS TO AUTOMATE TESTING　　　　　　　　9

Selecting tools - requirements - tool market - tool selection project – tool selection team - Identifying requirements - Identifying constraints – Identifying tools availability in market - Evaluating the candidate tools - decision making, Testing Tools - WinRunner, SilkTest, LoadRunner, JMeter.

UNIT-V　　　SOFTWARE TESTING AND QUALITY METRICS　　　　　9

Testing Software System Security - Six-Sigma – TQM - Complexity Metrics and Models – Quality Management Metrics - Availability Metrics - Defect Removal Effectiveness - FMEA - Quality Function Deployment – Taguchi Quality Loss Function – Cost of Quality. Case Study for Complexity and Object Oriented Metrics.

**　　　　　　　　　　　　　　　　L :45　　T: 0　　P: 0　　J: 0　　Total: 45 PERIODS**

TEXT BOOKS

1　　　William Perry, "Effective Methods of Software Testing", 3rd Edition, Wiley Publishing 2007

2　　　Srinivasan Desikan and Gopalaswamy Ramesh, "Software Testing – Principles and Practices", Pearson Education, 2007.

3　　　LleneBurnstein, "Practical Software Testing", Springer International Edition, Chennai, 2003

REFERENCES

1   Naresh Chauhan , "Software Testing Principles and Practices ", Oxford University Press , New Delhi , 2010.

2   Dale H. Besterfiled et al., "Total Quality Management", Pearson Education Asia, 3rd Edition, Indian Reprint 2006.

3   Stephen Kan, "Metrics and Models in Software Quality", Addison – Wesley, 2nd Edition, 2004.

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Test the software by applying testing techniques to deliver a product free from bugs.

CO2   Investigate the scenario and be able to select the proper testing technique.

CO3   Able to explore the test automation concepts and tools.

CO4   Able to deliver quality product to the clients by way of applying standards.

CO5   Understand the software quality management metrics and quality function deployment.

19CAE710   **SOFT COMPUTING**   **L T P J C**
                                                                                  3 0 0 0 3

UNIT-I   INTRODUCTION TO SOFT COMPUTING   9

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

UNIT-II   GENETIC ALGORITHMS   9

Introduction - Building block hypothesis - working principle - Basic operators and Terminologies like individual, gene, encoding, fitness function and reproduction - Genetic modeling: Significance of Genetic operators, Inheritance operator, cross over, inversion & deletion, mutation operator, Bitwise operator - GA optimization problems - JSPP (Job Shop Scheduling Problem) - TSP (Travelling Salesman Problem) - Differences & similarities between GA & other traditional methods - Applications of GA

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   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-V   NEURO-FUZZY MODELING   9

Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rule base Structure Identification – Neuro-Fuzzy Control – Case Studies

                              L :45   T: 0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS
1   Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall of India, 2003.

REFERENCES
1   Kwang H.Lee, "First course on Fuzzy Theory and Applications", Springer–Verlag Berlin.
2   George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995
3   James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn., 2003.
4   David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley, 2007.
5   Mitsuo Gen and Runwei Cheng, "Genetic Algorithms and Engineering Optimization", Wiley Publishers 2000.

COURSE OUTCOMES

At the end of the course student should be able to:

CO1	Implement machine learning through neural networks and gain knowledge on Genetic algorithm.
CO2	Understand machine learning techniques and neural networks.
CO3	Write Genetic Algorithm to solve the optimization problem and understand fuzzy concepts and develop a Fuzzy expert system to derive decisions.
CO4	Understand fuzzy logics and develop a fuzzy expert system .
CO5	Model Neuro Fuzzy system for data clustering and classification.

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19CAE711   **ENTERPRISE RESOURCE PLANNING**   **L   T   P   J   C**

                                                                            3   0   0   0   3

UNIT-I   **INTRODUCTION TO ERP**   **9**

Overview – Benefits of ERP – ERP and Related Technologies – Business Process Reengineering – Data Warehousing – Data Mining – On–line Analytical Processing – Supply Chain Management - Customer Relationship Management (CRM), MIS - Management Information System, EIS - Executive Information System.

UNIT-II   **ERP IMPLEMENTATION**   **9**

Implementation Life Cycle – Implementation Methodology – Hidden Costs – Organizing Implementation – Vendors, Consultants and Users – Contracts – Training and Education – Data Migration - Project Management and Monitoring.

UNIT-III   **BUSINESS MODULES**   **9**

Business Modules in an ERP Package – Finance – Manufacturing – Human Resource – Plant Maintenance – Materials Management – Quality Management - Marketing – Sales and Distribution.

UNIT-IV   **ERP MARKET**   **9**

ERP Market Place – SAP AG – PeopleSoft – Baan Company – JD Edwards World Solutions Company – Oracle Corporation – QAD – System Software Associates.

UNIT-V   **ERP – PRESENT AND FUTURE**   **9**

Turbo Charge the ERP System – EAI – ERP and E–Business – ERP Case studies - ERP and Internet – ERP and TQM - Future Directions in ERP.

                                       L :45   T: 0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS

    1   Alexis Leon, "ERP Demystified", Tata McGraw Hill, 2008.

REFERENCES

    1   Joseph A. Brady, Ellen F. Monk, Bret J. Wangner, "Concepts in Enterprise Resource Planning", Thomson Learning, 2001.

    2   Vinod Kumar Garg and N.K .Venkata Krishnan, "Enterprise Resource Planning - concepts and Planning", Prentice Hall, 1998.

    COURSE OUTCOMES

    At the end of the course student should be able to:

    CO1   Able to understand ERP benefits and related technologies.

    CO2   Able to understand architecture of ERP and working of different modules in ERP.

    CO3   Understand the concepts of planning and utilizing resources.

    CO4   Able to evaluate and analyze the various ERP packages available in the market.

    CO5   Able to plan and implement ERP system in an organization.

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19CAE712	CLOUD COMPUTING AND VIRTUALIZATION TECHNIQUES	L	T	P	J	C
		3	0	0	0	3

UNIT-I   CLOUD ARCHITECTURE AND MODEL   9

Technologies for Network-Based System – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture.

Cloud Models:- Characteristics – Cloud Services – Cloud models (IaaS, PaaS, SaaS) – Public vs Private Cloud – Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.

UNIT-II   VIRTUALIZATION   9

Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data-center Automation.

UNIT-III   CLOUD INFRASTRUCTURE   9

Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.

UNIT-IV   PROGRAMMING MODEL   9

Parallel and Distributed Programming Paradigms – MapReduce , Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments -Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim.

UNIT-V   SECURITY IN THE CLOUD   9

Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security –Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control – Autonomic Security.

L :45   T: 0   P:0   J:0   Total: 45 PERIODS

TEXT BOOKS

1   Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.

REFERENCES

1   James E. Smith, Ravi Nair, "Virtual Machines: Versatile Platforms for Systems and Processes", Elsevier/Morgan Kaufmann, 2005.

2   Kumar Saurabh, "Cloud Computing – insights into New-Era Infrastructure", Wiley India,2011.

3   Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", TMH, 2009.

4   John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.

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COURSE OUTCOMES

At the end of the course student should be able to:

CO1 Compare the strengths and limitations of cloud computing.

CO2 Identify the architecture, infrastructure and delivery models of cloud computing.

CO3 Apply suitable virtualization concept in clouds.

CO4 Able to understand the various cloud software environments.

CO5 Recognize the importance of security in the cloud.

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19CAE713	ACCOUNTING AND FINANCIAL MANAGEMENT	L	T	P	J	C
		3	0	0	0	3

UNIT-I   FINANCIAL ACCOUNTING   9

Meaning and Scope of Accounting - Principles – Concepts – Conventions - Accounting Standards - Final Accounts – Journal - Ledger -Trail Balance -Trading Account - Profit and Loss Account - Balance Sheet.

UNIT-II   ACCOUNTING   9

Accounting Ratio Analysis-definition - objectives - classification of ratios - Funds Flow Analysis - Cash Flow Analysis Meaning – Objectives – Elements of Cost - Cost Sheet - Marginal Costing and Cost Volume Profit Analysis - Break Even Analysis – Applications –Limitations - Standard Costing.

UNIT-III   BUDGETS AND BUDGETING CONTROL   9

Budgets and Budgetary Control-Meaning – Types - Sales Budget - Production Budget - Cost of Production Budget - Flexible Budgeting - Cash Budget - Master Budget - Zero Base Budgeting -Computerized Accounting.

UNIT-IV   INVESTMENT DECISION AND COST OF CAPITAL   9

Objectives and Functions of Financial Management – Risk - Return Relationship - Time Value of Money Concepts - Capital Budgeting - Methods of Appraisal - Cost of Capital- Factors Affecting Cost of Capital - Computation for Each Source of Finance and Weighted Average Cost of Capital.

UNIT-V   FINANCIAL STATEMENT ANALYSIS   9

Introduction - financial statement Analysis – Need- Objectives- Tools - Limitations of Financial Statement Analysis- Common Size - Comparative Statements - Ratio Analysis - Fund flow statement - Cash flow statement – case study.

L :45   T: 0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS

1   S.N.Maheswari, "Financial and Management Accounting", Sultan Chand & Sons, 2003.
2   I.M.Pandey, "Financial Management", Vikas Publications, 4th Reprint, 2002.

REFERENCES

1   S.P.Iyengar, "Cost and Management Accounting", Sultan Chand & Co,
2   I.M.Pandey, "Elements of Management Accounting" Vikas Publishing House, 1993.
3.   S P Jain & K L Narang, 'Financial Accounting and Analysis', Kalyani Publishers, 2009.

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Able to gain knowledge on principles of accounting and financial standards.
CO2   Gain a working knowledge of budget, cost of capital and working capital.
CO3   Use fund flow and cash flow statement as an analytical tool.
CO4   Understand the objectives and functions of financial management.
CO5   Able to understand capital structure and dividend policies.

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19CAE714	ADVANCED DATABASES	L	T	P	J	C
		3	0	0	0	3

UNIT-I   PARALLEL AND DISTRIBUTED DATABASES   9

Database System Architectures: Centralized and Client-Server Architectures – Server System Architectures – Parallel Systems- Distributed Systems – Parallel Databases: I/O Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism – Design of Parallel Systems - Distributed Database Concepts - Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing – Case Studies.

UNIT-II   OBJECT AND OBJECT RELATIONAL DATABASES   9

Concepts for Object Databases: Object Identity – Object structure – Type Constructors – Encapsulation of Operations – Methods – Persistence – Type and Class Hierarchies – Inheritance – Complex Objects – Object Database Standards, Languages and Design: ODMG Model – ODL – OQL – Object Relational and Extended – Relational Systems: Object Relational features in SQL/Oracle – Case Studies.

UNIT-III   XML DATABASES   9

XML: Motivation – Structure of XML Data – XML Document Schema – Querying and Transformation – Application Program Interfaces to XML – Storage of XML Data – XML Applications.

UNIT-IV   MOBILE DATABASES   9

Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management - Location Dependent Data Distribution - Mobile Transaction Models -Concurrency Control - Transaction Commit Protocols – Mobile Database Recovery Schemes.

UNIT-V   MULTIMEDIA DATABASES   9

Multidimensional Data Structures:k-d Trees – Point Quadtrees – MX – Quadtree – R-Tree – Image Databases : Representing Image DBs with Relations – Representing Image DBs with R-Trees – Text/Document Databases: TV Trees – Video Databases – Audio Databases.

L :45   T: 0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS

1   R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education/Addison Wesley, 2007.

REFERENCES

1   Thomas Cannolly and Carolyn Begg, "Database Systems, A Practical Approach to Design, Implementation and Management", Third Edition, Pearson Education, 2007.

2   Henry F Korth, Abraham Silberschatz, S. Sudharshan, "Database System Concepts", Fifth Edition, McGraw Hill, 2006.

3   C.J.Date, A.Kannan and S.Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.

4   Raghu Ramakrishnan, Johannes Gehrke, "Database Management Systems", McGraw Hill, Third Edition 2004.

5   Vijay Kumar, " Mobile Database Systems", John Wiley & Sons, 2006.

`

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Select the appropriate high performance database like parallel and distributed databases.

CO2   Embed the rule set in the database to implement intelligent databases and represent the data using XML database for better interoperability.

CO3   Understand the concepts and applications of mobile databases.

CO4   Able to understand the structure and applications of multimedia databases.

CO5   Able to analyze the use of various databases in real time applications.

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19CAE715   **ASPECT ORIENTED PROGRAMMING**   **L   T   P   J   C**
                                                               3   0   0   0   3

UNIT-I   ASPECT-ORIENTED PROGRAMMING CONCEPTS   9

Introduction to Aspect-Oriented programming – From OO to Aspects – A First Look at AspectJ – Strategies for a Real Application: Application Description – Implementation Details – Crosscutting by Design.

UNIT-II   FUNDAMENTALS OF ASPECTS   9

Extension – Reflection – Instantiation – Domination – Picking Join Points: Point cuts – Types of Point cuts.

UNIT-III   ADVICES AND STATIC CROSSCUTTING   9

Fundamentals – The before Advice – The after Advice – Around Advice – Precedence Rules – Text Case – Field Introduction – Method Introduction – Constructor Introduction – Access Rules and Privileged Aspects.

UNIT-IV   USES OF ASPECTJ AND ASPECTJ TOOLS   9

Adopting AspectsJ – Development Uses – Product AspectsJ – AspectJ Compiler Options – The Structure Browser for Aspects – Using AspectJ IDE Extensions – Debugging with AspectJ.

UNIT-V   ERROR HANDLING AND COMMON PROBLEMS   9

Compilation Errors – Extended Runtime Error Handling – Exception Throwing and Catching – Using TraceJoinPoints.java – Differentiating between Call and Execution Designators – Aspect – Oriented Examples: Patterns and Reuse

L :45   T: 0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS

1   D.JosephGradecki, Nicholas Lesiecki, "Mastering AspectJ: Aspect -Oriented Programming in Java ", Wiley, First Edition, 2003.

REFERENCES

1   Ivan Kiselev, "Aspect-Oriented Programming with AspectJ", Sams , 2002

2   O .Vladimir Safonov, "Using Aspect-Oriented Programming for Trustworthy Software Development", John Wiley & Sons, 2008

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Able to understand the basics of aspect oriented programming.

CO2   Understand fundamental components of aspect programming.

CO3   Apply crosscutting before and after case.

CO4   Handle exception using aspect oriented concepts.

CO5   Able to know the various concepts and tools of AspectJ.

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19CAE716	DATA SCIENCE	L	T	P	J	C
		3	0	0	0	3

UNIT-I   **Introduction to Data Science**   **8**

Definition – Big Data and Data Science – Facets of data – big data ecosystem and data science- Data Science Ethics – Doing good data science – Owners of the data – Valuing different aspects of privacy

UNIT-II   **Data science process**   **10**

Overview- research goals – retrieving data – cleaning, integrating and transforming data-exploratory data analysis – build models – present finds

UNIT-III   **Machine learning**   **9**

Machine learning – Modeling Process – Training model – Validating model – Predicting new observations – Supervised learning algorithms – Unsupervised learnidng algorithms

UNIT-IV   **Deep Learning**   **9**

Introduction – Deep Feedforward Networks – Regularization – Optimization of Deep Learning – Convolutional Networks – Recurrent and Recursive Nets – Applications of Deep Learning

UNIT-V   **Data Visualization**   **9**

Introduction to data visualization – Data visualization options – Filters – MapReduce – Dashboard development tools – Creating an interactive dashboard with dc.js-dashboard development tools

L :45   **T: 0**   **P: 0**   **J: 0**   **Total: 45 PERIODS**

TEXT BOOKS

1   Davy Cielen, Arno D. B. Meysman, Mohamed Ali , "Introducing Data Science", Manning Publications Co., 1st edition, 2016

REFERENCES

1   Ian Goodfellow, YoshuaBengio, Aaron Courville , "Deep Learning", MIT Press, 1st edition, 2016

2   Joel Grus, "Data Science from Scratch: First Principles with Python:, O'Reilly, 1st edition, 2015

3   Cathy O'Neil, Rachel Schutt , "Doing Data Science, Straight Talk from the Frontline", O' Reilly, 1st edition, 2013

4   D J Patil, Hilary Mason, Mike Loukides , "Ethics and Data Science", O' Reilly, 1st edition, 2018

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Gain knowledge on fundamental concepts of data science

CO2   Apply data processing techniques on different application domains

CO3   Demonstrate machine learning algorithms in data science process

CO4   Infer the concept of deep learning for data analysis

CO5   Recognize Visualization and present the them using various tool

19CAE717	HUMAN RESOURCE MANAGEMENT	L	T	P	J	C
		3	0	0	0	3

UNIT-I FUNDAMENTALS OF HRM 9

Introduction- importance of HRM – functions- qualities of HR manager – evolution and growth of HRM– trends and opportunities - HRM in global environment – legal and ethical context – laws for discriminatory practices – equal opportunity employment.

UNIT-II STAFFING, RECRUITMENT AND SELECTION 9

HR polices - need, type and scope – human resource planning – job analysis – recruiting goals –recruiting sources – global perspective – selection process – pre-employment testing – interviews –job offers – hiring mistakes - key element for successful predictors.

UNIT-III TRAINING AND DEVELOPMENT 9

Socialization – new employee orientation, training, development – organizational development – methods – evaluating training –international training and development issues – Talented Professionals – Characterization – Identification – Assessment and Recognizing Talent- Developing Technical Talent –Developing Managerial Talents-Career Counseling.

UNIT-IV PERFORMANCE EVALUATION, REWARDS AND BENEFITS 9

Appraisal process – methods – factors distort appraisal – team appraisal – international appraisal - rewards – Theories of motivation - compensation administration – job evaluation and pay structure –special cases of compensation – executive compensation programs – employee benefits.

UNIT-V SAFE AND HEALTHY WORK ENVIRONMENT 9

Occupational safety and health act - issues – stress – assistance program – labor management -employee unions – labor legislation. Promotion, demotion, transfer and separation – employee grievances - redressal methods.

L :45   T: 0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS

1   Decenzo and Robbins, "Human Resource Management",Wilsey, 10th edition, 2012.

REFERENCES

1   Mamoria C.B. and Mamoria. S., "Personnel Management", Himalaya Publishing Company, 1997.

2   Mirza S. Saiyadain, "Human Resource Management" , Tata McGraw Hill, 4th edition 2009.

3   Eugence Mckenna and Nic Beach, "Human Resource Management", Pearson Education Limited, 2002.

4   Dessler, "Human Resource Management", Pearson Education Limited, 2002.

5   Decenzo and Robbins, Human Resource Management,Wilsey, 6th edition, 2001.

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COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Identify the primary external influences affecting HRM and outline the components and the goals of staffing, training and development.

CO2   Understand the selection procedure in various organizations.

CO3   Understand the practices used to retain the employees and able to evaluate their performance.

CO4   Recognize the importance of occupational safety and healthy work environment.

CO5   Able to effectively manage human resource in an organization.

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19CAE718	AD HOC AND SENSOR NETWORKS	L	T	P	J	C
		3	0	0	0	3

UNIT-I ADHOC NETWORKS FUNDAMENTALS AND MACPROTOCOLS 9

Fundamentals of WLans – IEEE 802.11 Architecture - self configuration and auto configuration- Issues in Ad-Hoc wireless networks – MAC protocols for Ad-Hoc wireless networks – contention based protocols - TCP over Ad-Hoc Networks-TCP protocol overview - TCP and MANETs – solutions for TCP over Ad-Hoc networks.

UNIT-II ADHOC NETWORK ROUTING AND MANAGEMENT 9

Routing in Ad-Hoc Networks- Introduction -Topology based versus position based approaches - proactive, reactive, hybrid routing approach - Principles and issues – Location services - DREAM – Quorums based location service – grid – forwarding strategies – greedy packet forwarding – Restricted directional flooding-Hierarchical routing- Other routing protocols.

UNIT-III SENSOR NETWORK COMMUNICATION PROTOCOLS 9

Introduction – Architecture - Single node architecture – sensor network design considerations – Energy efficient design principles for WSN's – Protocols for WSN – physical layer – transceiver design considerations – MAC layer protocols – IEEE 802.15.4 Zigbee – Link layer and Error control issues - routing protocols – mobile nodes and mobile robots - data centric &contention based networking – transport protocols & QoS – congestion control issues – Application layer support.

UNIT-IV TRANSPORT & QOS IN WIRELESS SENSOR NETWORKS 9

Data-centric and contention-based networking – Transport layer and QoS in Wireless Sensor Networks – congestion control – In-network processing – operating systems for wireless sensor networks – examples.

UNIT-V ADHOC AND SENSOR NETWORK SECURITY 9

Security in Ad-Hoc and Sensor Networks – Key distribution and management – software based antitamper techniques – water marking techniques – defense against routing attacks - Secure adhoc routing protocols – broadcast authentication WSN protocols – TESLA – biba – Sensor network security protocols – SPINS.

L :45　　T: 0　　P: 0　　J: 0　　Total: 45 PERIODS

TEXT BOOKS

1　Carlos De Morais Cordeiro, Dharma Prakash Agrawal, "Ad Hoc and Sensor Networks: Theory and Applications", 2nd Edition, World Scientific Publishing, 2011.

REFERENCES

1　C.Siva Ram Murthy and B.S.Manoj, "Ad Hoc Wireless Networks – Architectures and Protocols", Pearson Education, 2004.

2　Holger Karl, Andreas willig, "Protocols and Architectures for Wireless Sensor Networks", John Wiley & Sons, Inc .2005.

3　ErdalÇayirci ,Chunming Rong, "Security in Wireless Ad Hoc and Sensor Networks", John Wiley and Sons, 2009

4　WaltenegusDargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks Theory and Practice", John Wiley and Sons, 2010.

5　Adrian Perrig, J. D. Tygar, "Secure Broadcast Communication: In Wired and Wireless Networks", Springer, 2006.

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COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Able to understand Ad-hoc network fundamentals and MAC protocols.

CO2   Able to work with existing Ad-hoc and sensor network protocols and standards.

CO3   Design ad-hoc and sensor network architectures using QoS and Congestion control

CO4   Able to understand and manage Ad-hoc network routing.

CO5   Deploy security mechanisms in the wireless ad-hoc and sensor networks.

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19CAE719	**INFORMATION SECURITY**	L	T	P	J	C
		3	0	0	0	3

UNIT-I   INTRODUCTION   9

An Overview of Computer Security-Security Services-Security Mechanisms-Security Attacks- Access Control Matrix, Policy-Security policies, Confidentiality policies, Integrity policies and Hybrid policies.

UNIT-II   CRYPTOSYSTEMS & AUTHENTICATION   9

Classical Cryptography-Substitution Ciphers-permutation Ciphers-Block Ciphers-DES- Modes of Operation-AES-Linear Cryptanalysis, Differential Cryptanalysis- Hash Function - SHA 512- Message Authentication Codes-HMAC - Authentication Protocols.

UNIT-III   PUBLIC KEY CRYPTOSYSTEMS   9

Introduction to Public key Cryptography- Number theory- The RSA Cryptosystem and Factoring Integer-Attacks on RSA-The ELGamal Cryptosystem- Digital Signature Algorithm-Finite Fields- Elliptic Curves Cryptography- Key management – Session and Interchange keys, Key exchange and generation-PKI.

UNIT-IV   SYSTEM IMPLEMENTATION   9

Design Principles, Representing Identity, Access Control Mechanisms, Information Flow and Confinement Problem. Secure Software Development: Secured Coding - OWASP/SANS Top Vulnerabilities – Buffer Overflows - Incomplete mediation - XSS - Anti Cross Site Scripting Libraries - Canonical Data Format - Command Injection - Redirection - Inference – Application Controls.

UNIT-V   NETWORK SECURITY   9

Secret Sharing Schemes-Kerberos- Pretty Good Privacy (PGP)-Secure Socket Layer (SSL) - Intruders – HIDS - NIDS - Firewalls – Viruses.

L :45   T: 0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS

 1   W. Stallings, Cryptography and Network Security: Principles and Practice, 6th Edition, Prentice Hall, 2013.

REFERENCES

 1   Wade Trappe and Lawrence C. Washington, "Introduction to Cryptography with Coding Theory" Second Edition, Pearson Education, 2007.
 2   Jonathan Katz, and Yehuda Lindell, "Introduction to Modern Cryptography", CRC Press, 2007.
 3   Douglas R. Stinson, "Cryptography Theory and Practice", Third Edition, Chapman & Hall/CRC, 2006.
 4   Wenbo Mao, "Modern Cryptography – Theory and Practice", Pearson Education, First Edition, 2006.
 5   Menezes Bernard, Network Security and Cryptography, Cengage Learning, New Delhi, 2011.

COURSE OUTCOMES

At the end of the course student should be able to:

 CO1   Implement security algorithms required by any computing system and analyze the vulnerabilities.
 CO2   Analyze the possible security attacks in complex real time systems and their effective counter measures.
 CO3   Able to understand various cryptosystems and authentication mechanisms.
 CO4   Identify the security issues in the network and resolve it.
 CO5   Able to design and develop highly secured software.

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19CAE720	BUSINESS INTELLIGENCE	L	T	P	J	C
		3	0	0	0	3

UNIT-I   BUSINESS INTELLIGENCE   9

Effective and timely decisions – Data, information and knowledge – Role of mathematical models – Business intelligence architectures: Cycle of a business intelligence analysis – Enabling factors in business intelligence projects – Development of a business intelligence system – Ethics and business intelligence.

UNIT-II   KNOWLEDGE DELIVERY   9

The business intelligence user types - Standard reports - Interactive Analysis and Ad Hoc Querying - Parameterized Reports and Self-Service Reporting - dimensional analysis -Alerts/Notifications - Visualization: Charts, Graphs, Widgets, Scorecards and Dashboards - Geographic Visualization - Integrated Analytics - Considerations: Optimizing the Presentation for the Right Message.

UNIT-III   EFFICIENCY   9

Efficiency measures – The CCR model: Definition of target objectives- Peer groups – Identification of good operating practices - cross efficiency analysis – virtual inputs and outputs – Other models - Pattern matching – cluster analysis - outlier analysis.

UNIT-IV   MODELLING AND ANALYSIS   9

Exploring Excel Modeling capabilities to solve business problems, summarize and present selected data, introduction to business metrics and KPIs, creating cubes using Microsoft Excel.

UNIT-V   FUTURE OF BUSINESS INTELLIGENCE   9

Future of business intelligence – Emerging Technologies - Machine Learning - Predicting the Future - BI Search & Text Analytics – Advanced Visualization – Rich Report - Future beyond Technology.

L :45   T: 0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS

1   Efraim Turban, Ramesh Sharda, DursunDelen, "Decision Support and Business Intelligence Systems", 9th Edition, Pearson 2013.

REFERENCES

1   Carlo Vercellis, "Business Intelligence: Data Mining and Optimization for Decision Making", Wiley Publications, 2009.

2   David Loshin Morgan, Kaufman, "Business Intelligence: The Savvy Manager"s Guide", Second Edition, 2012.

3   Cindi Howson, "Successful Business Intelligence: Secrets to Making BI a Killer App", McGraw-Hill, 2007.

4   Ralph Kimball ,Margy Ross , Warren Thornthwaite, Joy Mundy, Bob Becker, "The Data Warehouse Lifecycle Toolkit", Wiley Publication Inc.,2007.

5   G.K.Gupta, "Introduction to Data Mining with case studies", Prentice Hall of India, 2011.

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Explain the fundamentals of business intelligence and link data mining with business Intelligence.

CO2   Apply various modeling techniques and business intelligence methods to various situations.

CO3   Explain the data analysis and knowledge delivery stages.

CO4   To understand Data mining principles and techniques and Introduce DM as a cutting edge business intelligence.

CO5   Able to understand the emerging technologies and predict the future of business intelligence.

19CAE721	ETHICS IN COMPUTING	L	T	P	J	C
		3	0	0	0	3

UNIT-I   COMPUTER ETHICS AND HACKING   9

A general Introduction – Computer ethics: an overview – Identifying an ethical issue – Ethics and law – Ethical theories - Professional Code of conduct – An ethical dilemma – A framework for ethical decision making - Computer hacking – Destructive programs – hacker ethics - Professional constraints — Ethical positions on hacking

UNIT-II   ASPECTS OF COMPUTER CRIME AND INTELLECTUAL PROPERTY   9
**   RIGHTS**

Aspects of computer crime - Introduction - What is computer crime – computer security measures – Professional duties and obligations - Intellectual Property Rights – The nature of Intellectual property – Intellectual Property – Patents, Trademarks, Trade Secrets, Software Issues, Copyright - The extent and nature of software piracy – Ethical and professional issues – free software and open source code.

UNIT-III   REGULATING INTERNET CONTENT, TECHNOLOGY AND SAFETY   9

Introduction – In defence of freedom expression – censorship – laws upholding free speech – Free speech and the Internet - Ethical and professional issues - Internet technologies and privacy – Safety and risk – assessment of safety and risk – risk benefit analysis – reducing risk

UNIT-IV   SOFTWARE DEVELOPMENT AND SOCIAL NETWORKING   9

Software Development – strategies for engineering quality standards – Quality management standards – Social Networking – Company owned social network web site – the use of social networks in the hiring process – Social Networking ethical issues – Cyber bullying – cyber stalking – Online virtual world – Crime in virtual world - digital rights.

UNIT-V   GREEN COMPUTING   9

Green IT Fundamentals: Business, IT, and the Environment – Green computing: carbon foot print, scoop on power – Green IT Strategies: Drivers, Dimensions, and Goals – Environmentally Responsible Business: Policies, Practices, and Metrics

L :45   T: 0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS

1 Penny Duquenoy, Simon Jones and Barry G Blundell, "Ethical , legal and professional issues in computing", Middlesex University Press, 2008

2 George Reynolds, "Ethics in Information Technology", Cengage Learning, 2011

REFERENCES

1 BhuvanUnhelkar, "Green IT Strategies and Applications-Using Environmental Intelligence", CRC Press, June 2011

2 Caroline Whitback, " Ethics in Engineering Practice and Research ", Cambridge University Press, 2011

3 Richard Spinello, "Case Studies in Information and Computer Ethics", Prentice Hall, 1997.

4 Sara Baase, "A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet", 3rd Edition, Prentice Hall, 2008

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COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Helps to examine situations and to internalize the need for applying ethical principles, values to tackle with various situations.

CO2   Develop a responsible attitude towards the use of computer as well as the technology.

CO3   Able to envision the societal impact on the products/ projects they develop in their career.

CO4   Understand the use of social networking and ethical issues involved in it.

CO5   Recognize the importance of green computing and environmentally responsible business.

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19CAE722   **ELECTRONIC COMMERCE**   L   T   P   J   C
                                                               3   0   0   0   3

UNIT-I   INTRODUCTION   9

Networks and Commercial Transactions - Internet and Other Novelties - Electronic Transactions Today - Commercial Transactions - Establishing Trust - Internet Environment - Internet Advantage - World Wide Web.

UNIT-II   SECURITY TECHNOLOGIES   9

Why Internet Is Unsecure - Internet Security Holes - Cryptography : Objective - Codes and Ciphers - Breaking Encryption Schemes - Data Encryption Standard - Trusted Key Distribution and Verification - Cryptographic Applications - Encryption - Digital Signature – Non repudiation and Message Integrity.

UNIT-III   ELECTRONIC PAYMENT METHODS   9

Traditional Transactions : Updating - Offline and Online Transactions - Secure Web Servers - Required Facilities - Digital Currencies and Payment Systems - Protocols for the Public Transport - Security Protocols - SET - Credit Card Business Basics.

UNIT-IV   MOBILE COMMERCE   9

Introduction – Infrastructure of M–Commerce – Types of Mobile Commerce Services – Technologies of Wireless Business – Benefits and Limitations, Support, Mobile Marketing & Advertisement, Non– Internet Applications in M–Commerce –Wireless/Wired Commerce Comparisons.

UNIT-V   MOBILE COMMERCE: TECHNOLOGY   9

A Framework for the study of Mobile Commerce – NTT Docomo's I– Mode – Wireless Devices for Mobile Commerce – Towards a Classification Framework for Mobile Location Based Services –Wireless Personal and Local Area Networks –The Impact of Technology Advances on Strategy Formulation in Mobile Communications Networks.

                                  L :45   T: 0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS

1   Pete Loshin, "Electronic Commerce", 4th Edition, Firewall media, An imprint of laxmi publications Pvt. Ltd., New Delhi, 2004.

2   Dave Chaffey, "E-Business and E-Commerce Management", 3rd Edition, Pearson Education, 2009.

3   Brian E.Mennecke, Troy J, "Mobile Commerce: Technology, Theory and Applications", Idea Group Inc., IRM press, 2003.

REFERENCES

1   Paul May, "Mobile Commerce: Opportunities, Applications, and Technologies of Wireless Business" Cambridge University Press, March 2001.

2   Dr.Pandey , Saurabh Shukla, " E-commerce and Mobile commerce Technologies" , Sultan chand, 2011.

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Able to apply E–commerce principles in market place.

CO2   Able to understand E-Commerce security and e-payments.

CO3   Able to apply M–commerce principles to various business domains.

CO4   Able to understand the theory and applications of M-commerce in business domain.

CO5   Able to understand the framework of mobile commerce.

19CAE723	ENERGY AWARE COMPUTING	L	T	P	J	C
		3	0	0	0	3

UNIT-I INTRODUCTION 9

Energy efficient network on chip architecture for multi core system-Energy efficient MIPS CPU core with fine grained run time power gating – Low power design of Emerging memory technologies.

UNIT-II ENERGY EFFICIENT STORAGE 9

Disk Energy Management-Power efficient strategies for storage system-Dynamic thermal management for high performance storage systems-Energy saving technique for Disk storage systems.

UNIT-III ENERGY EFFICIENT ALGORITHMS 9

Scheduling of Parallel Tasks – Task level Dynamic voltage scaling – Speed Scaling – Processor optimization-Memetic Algorithms – Online job scheduling Algorithms

UNIT-IV REAL TIME SYSTEMS 9

Multi processor system – Real Time tasks- Energy Minimization – Energy aware scheduling- Dynamic Reconfiguration- Adaptive power management-Energy Harvesting Embedded system.

UNIT-V ENERGY AWARE APPLICATIONS 9

On chip network – Video codec Design – Surveillance camera- Low power mobile storage

L :45   T: 0   P: 0   J:0   Total: 45 PERIODS

TEXT BOOKS

1   Ishfaq Ah mad, Sanjay Ranka, "Handbook of Energy Aware and Green computing" , Chapman and Hall /CRC , 2012.

REFERENCES

1   Chong-Min Kyung, Sungiooyoo, "Energy Aware system design Algorithms and Architecture", Springer, 2011.

2   Bob steigerwald ,Chris:Luero, "Energy Aware computing" , Intel Press, 2012.

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Design Energy efficient architecture Hardware and Software components.

CO2   Analyze power and performance trade off between various energy aware storage devices.

CO3   To implement various energy aware algorithms.

CO4   To understand significance of energy aware techniques used in real time system.

CO5   Restructure the software and Hardware for Energy aware applications.

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19CAE724	REMOTE SENSING GEOGRAPHICAL INFORMATION SYSTEM	L	T	P	J	C
		3	0	0	0	3

UNIT-I   BASICS   9

Maps: Types – Characteristics – Coordinate systems – Map projections – Definition of GIS – Evolution – Components of GIS – Data : Spatial and Non-spatial – Spatial Data: Point, Line, Polygon/Area and Surface – Non-Spatial Data: Levels of measurement – Database Structures.

UNIT-II   DATA MODEL AND INPUT   9

Raster Data Model – Grid – Tessellations – Geometry of Tessellations — Data Compression – Vector Data Model – Topology –Topological consistency – Vector data input– Raster Vs. Vector comparison – File Formats for Raster and Vector – Vector to Raster conversion- raster formats.

UNIT-III   DATA ANALYSIS AND OUTPUT   9

Modeling in GIS – types – Digital Elevation Models: Generation, Representation, Applications – ALTM.

UNIT-IV   DATA QUALITY AND MISCELLANEOUS TOPICS   9

Data quality analysis – Sources of Error – Components of Data Quality – Meta Data – Open GIS consortium – Customization in GIS – Object Oriented GIS – WebGIS - GIS system evaluation and bench marking.

UNIT-V   APPLICATIONS   9

GIS Applicant – Natural Resource Management – Engineering – Navigation – Vehicle tracking and fleet management – Marketing and Business applications – Case Studies.

L :45   T: 0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS

1   Lo. C P and Yeung, Albert K W, "Concepts and Techniques of Geographic Information Systems", Prentice Hall of India, 2006

2   Robert Laurini and Derek Thompson, "Fundamentals of Spatial Information Systems", Academic Press, 1996.

REFERENCES

1   Peter A Burrough, Rachael A Mc.Donnell, "Principles of GIS", Oxford University Press, 2000.

2   Allan Brimicombe, GIS Environmental Modeling and Engineering, Taylor & Francis, 2003

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Apply the fundamental concepts and techniques related to the use of Geographic Information System.

CO2   Apply this knowledge to a wide range of spatial/environmental problems.

CO3   Describe GIS data models and spatial data collection.

CO4   Apply quality metrics on design of data model on GIS.

CO5   Practice GIS in the real world Applications.

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19CAE725	INTERNET OF THINGS	L	T	P	J	C
		3	0	0	0	3

UNIT-I   FUNDAMENTALS of IoT   9

Introduction-Characteristics-Physical design - Protocols – Logical design – Enabling technologies – IoT Levels – Domain Specific IoTs – IoT vs M2M.

UNIT-II   IoT DESIGN METHODOLOGY   9

IoT systems management – IoT Design Methodology – Specifications Integration and Application Development.

UNIT-III   BUILDING IoT WITH RASPBERRY PI   9

Physical device – Raspberry Pi Interfaces – Programming – APIs / Packages – Web services.

UNIT-IV   BUILDING IoT WITH GALILEO/ARDUINO   9

Intel Galileo Gen2 with Arduino- Interfaces - Arduino IDE – Programming - APIs and Hacks .

UNIT-V   CASE STUDIES and ADVANCED TOPICS   9

Various Real time applications of IoT- Connecting IoT to cloud – Cloud Storage for IoT – Data Analytics for IoT – Software & Management Tools for IoT.

L :45   T: 0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS

1   ArshdeepBahga, Vijay Madisetti, "Internet of Things – A hands-on approach", Universities Press, 2015.

2   Manoel Carlos Ramon, "Intel® Galileo and Intel® Galileo Gen 2: API Features and Arduino Projects for Linux Programmers", Apress, 2014.

REFERENCES

1   Marco Schwartz, "Internet of Things with the Arduino Yun", Packt Publishing, 2014

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Able to design a IoT using Arduino/ equivalent boards and relevant protocols.

CO2   Develop web services to access IoT devices using Raspberry Pi Interfaces.

CO3   Understand the design methodology and specification of IoT.

CO4   Develop an IoT application using Arduino.

CO5   Understand the data analytics and management of IoT in cloud.

19CAE726	LINUX ADMINISTRATION AND NETWORK PROGRAMMING	L	T	P	J	C
		3	0	0	0	3

UNIT-I INTRODUCTION TO LINUX   9

Linux Distributions -Operating Systems and Linux - History of Linux and Unix- Unix -Linux -Linux Overview - Open Source Software - Linux Software -Software Repositories - Third-Party Linux Software Repositories - Linux Office and Database Software - Internet Servers - Development Resources - The Linux Shell and File Structure - The Shell - The Command Line - Command Line Editing -Command and Filename Completion - History - Filename Expansion - Standard Input/Output and Redirection - Pipes - Linux Files, Directories, and Archives - Linux Files - The File Structure - Home Directories - Pathnames - System Directories – Displaying and Printing Files- Managing Directories - File and Directory Operations -File Compression.

UNIT-II SYSTEM AND USER ADMINISTRATION   9

Basic System Administration - Superuser Control - System Time and Date - Scheduling Tasks - System Runlevels - System Directories -Configuration Directories and Files -System Logs -The Linux Auditing System - Performance Analysis Tools and Processes - Grand Unified Bootloader (GRUB) - Managing Users - GUI User Management Tools - User Configuration Files - The Password Files - Managing User Environments- Adding and Removing Users with useradd, usermod, and userdel - Managing Groups - Controlling Access to Directories and Files - Disk Quotas - Lightweight Directory Access Protocol - Pluggable Authentication Modules.

UNIT-III SOCIAL MEDIA OPTIMIZATION (SMO)   9

Social Media & e-PR - Online reputation management, Social Media measuring, monitoring & reporting, Tracking & Monitoring platforms. Content seeding, How to use blogs, forums and discussion boards, Blogs, forums and communities, Viral campaigns and the social graph.

UNIT-IV INTERNET AND NETWORK SERVICES   9

Managing Services-System Startup Files-SysV Init-Starting Services-Service Management-Service Scripts-Extended Internet Services Daemon (xinetd)- FTP Servers-Anonymous FTP-The FTP User Account-Using FTP with rsync-The Very Secure FTP Server-Professional FTP Daemon-Web Servers-Tux-Alternate Web Servers-Apache Web Server-Apache Configuration Files-Apache Configuration and Directives-Virtual Hosting on Apache-PHP-Apache Configuration Tool-Web Server Security: SSL.

UNIT-V NETWORK ADMINISTRATION SERVICES   9

Administering TCP/IP Networks-TCP/IP Protocol Suite-Configuring Networks on GNOME and KDE-IPv4 and IPv6-TCP/IP Network Addresses-IPv6 Addressing-IPv6 and IPv4 Coexistence Methods-TCP/IP Configuration Files-Domain Name Service (DNS)- Network Interfaces and Routes: ifconfi g and route-Wireless Networking-Command Line PPP Access-Monitoring Your Network-IP Aliasing-Network File Systems: NFS-Network Information Service: NIS.

L :45   T: 0   P: 0   J: 0   Total: 45 PERIODS

`

TEXT BOOKS

1   Richard Petersen, "Linux: The Complete Reference", Tata McGraw Hill, Sixth Edition, 2007.

REFERENCES

1   Evi Nemeth, Garth Snyder, Trent R Hein, Ben Whaley, "Unix and Linux System Administration Handbook", Prentice Hall, Fourth Edition, 2010.

2   Richard Blum, "Linux Command Line and Shell Scripting Bible", Wiley, Second Edition, 2011.

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Understand Linux file system and manage files and directories.

CO2   Perform the user and group administration.

CO3   Integrate a workstation with an existing network.

CO4   Manage FTP server and apache web servers.

CO5   Configure a workstation as a client to internet and network services.

`

19CAE727   APPLICATION DEVELOPMENT FRAMEWORKS   L   T   P   J   C
**   3   0   0   0   3**

UNIT-I   MVC ARCHITECTURE   9

MVC Architecture – Why MVC? – Benefits of MVC Architecture – Struts and MVC – Implementing MVC Architecture – How MVC Application work – How MVC maps into Struts.

UNIT-II   DESIGNING WITH STRUTS   9

Validator – Tiles – Tiles overview – Internationalizing Tiles – Using the tiles tag library – The tiles tag library tags – Declarative Exception Handling.

UNIT-III   APPLYING STRUTS   9

 Internationalizing Struts Applications – Securing Struts Applications – Testing Struts Applications.

UNIT-IV   INTRODUCING THE SPRING FRAMEWORK   9

Why Spring – Lightweight Frameworks – Enter Spring – Architecting Applications with Spring – Persistence and Integration – Business Service Objects.

UNIT-V   Model-View-View Model   9

MVVM-Basics – Structure- Model-View-ViewModel-Advantages-looser data binding- MVC vs MVVM

L :45   T: 0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS

 1   James Holmes, "Struts: The Completer Reference", McGraw Hill, 2nd Edition, 2007.

 2   Rod Johnson, JwergenHoeller, AlofArendsen, Thomas Risberg, Colin Sampaleanu, "Professional Java development with the Spring framework", Wiley, 2008 Reprint

REFERENCES

 1   Addy Osmani, "Learning JavaScript Design Patterns", O'Reilly, 2012

 2   Kogent Solutions Inc., "Struts 2 Black Book", Dreamtech Press, 2nd Edition, 2008.

 3   Ted N Husted, Cedric Dumoulin, George Franciscus and David Winterfeldt, "Struts in Action", Manning Publications, 2002. Chuck Cavaness, "Programming Jakarta Struts", O' Reilly Media, 2nd Edition.

COURSE OUTCOMES

At the end of the course student should be able to:

 CO1   Develop applications using Model-View-Controller (MVC) design pattern..

 CO2   Understand Struts architecture and develop applications using Struts framework.

 CO3   Understand Spring architecture and develop applications using Spring framework.

 CO4   Design a web application using Model-view-View model.

 CO5   Able to evaluate the various application development frameworks.

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19CAE728	HUMAN COMPUTER INTERACTIONS	L	T	P	J	C
		3	0	0	0	3

UNIT-I   INTRODUCTION TO HUMAN COMPUTER INTERFACE   9

Importance of User Interface - Human Computer Interface- Importance of Good Design- Benefits of Good Design, The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics- Principles of User Interface Design

UNIT-II   USER INTERFACE DESIGN PROCESS   9

Understanding How User Interact With Computers- User Interface Models- Design Methodologies- Designing an Interface- Process of Interaction Design - Human Interaction Speeds, Human Characteristics in Design, Human Consideration in Design.

UNIT-III   SCREEN DESIGN   9

Design Goals, Test for a Good Design- Screen and Web Page Meaning and Purpose- Organizing Screen Elements Clearly -Ordering of Screen Data and Content- Screen Navigation and Flow - Visually pleasing composition - Technological consideration in interface design

UNIT-IV   SOFTWARE TOOLS   9

Specification Methods- Interface Building Tools-Interface Mock Up Tools, Software Engineering Tools-Windowing System Layer- GUI Tool Kit Layer

UNIT-V   INFORMATION SEARCH AND VISUALIZATION   9

Database Query- Phase Search in Documents- Multimedia Document Searches- Information Visualization-Advanced Filtering- Hypertext- Web Technology- Static Web Content and Dynamic Web Content

L :45   T: 0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS

 1   Wilbert O Galitz , "The essential guide to user interface design", 3rd edition, Wiley DreamaTech, 2007

 2   Rod Johnson, JwergenHoeller, AlofArendsen, Thomas Risberg, Colin Sampaleanu, "Professional Java development with the Spring framework", Wiley, 2008 Reprint

REFERENCES

 1   Ben Shneidermann , "Designing the user interface", 3rd Edition , Pearson Education Asia

 2   Alan Dix, Janet Fincay, GreGoryd, Abowd, Russell Bealg , "Human – Computer Interaction", Pearson Education, 3rd edition, 2004

 3   Soren Lauesen , "User Interface Design", Pearson Education, 2005

 4   Prece, Rogers, Sharps, "Interaction Design", Wiley Dreamtech, 3rd Edition, 2011

COURSE OUTCOMES

At the end of the course student should be able to:

 CO1   Discover the process involved in designing user interface

 CO2   Associate components consideration with user interface design of application develop- ment

 CO3   Relate different elements of user interface for good user interface design

 CO4   Experiment the design consideration on various levels of software development using tools

 CO5   Analyze the various methods of information retrieval and visualization

19CAP704	**PROJECT WORK**	**L**	**T**	**P**	**J**	**C**
		0	**0**	**0**	**24**	**12**

1. The objective of the project work is to enable the students to demonstrate their skills, abilities and specialization. The project work should compulsorily include the software development.

2. Individual student project only permitted

3. Students are expected to work on a real-life project preferably in some industry/ Research and Development Laboratories/Educational Institution/Software Company.

4. Project periods shall be utilized by the students to receive the directions from the guide, on library reading, laboratory work, and computer analysis and also to present in periodical seminars on the progress made in the project.

5. The aim of the project work is to deepen comprehension of principles by applying them to a new problem which may be the design and software solution.

6. The continuous assessment shall be made as per the regulation which is tabulated below.

7. The progress of the project is evaluated based on a minimum of three reviews.

8. The review committee may be constituted by the Head of the Department

9. Each student shall finally produce a comprehensive report covering background information, problem statement, project work details, and sample coding, result and conclusion.

10. This final report shall be typewritten form as specified in the guidelines.

11. Each batch should create a video demonstration of their prototype.

12. Students are excepted to apply the design thinking approach to empathize the problem, define the requirements, ideate design components, prepare software model(prototype) and test the performance.

L : 0   T: 0   P: 0   J: 24   Total: 180 PERIODS

Course Outcome

At the end of the course, student will be able to

*   Identify the problems to solve by programming technologies
*   Apply theoretical and programming knowledge to formulate, design, program and test the solution

19CAO601	DIGITAL MARKETING AND SEO	L	T	P	J	C
		3	0	0	0	3

UNIT-I INTRODUCTION TO DIGITAL MARKETING 9

Role of digital marketing (scope & context), Emerging trends, Technology shifts, the online ecosystem. Role of digital marketing in B2B, B2C marketing. The digital consumer - Online consumer definition & types, Audience segmentation and profiling, Consumer online usage and behavior, Emerging trends and patterns in digital consumption, Consumer engagement – meaning and implication.

UNIT-II USER INTERFACE DESIGN PROCESS 9

Understanding How User Interact With Computers- User Interface Models- Design Methodologies- Designing an Interface- Process of Interaction Design - Human Interaction Speeds, Human Characteristics in Design, Human Consideration in Design.

UNIT-III SOCIAL MEDIA OPTIMIZATION (SMO) 9

Social Media & e-PR - Online reputation management, Social Media measuring, monitoring & reporting, Tracking & Monitoring platforms. Content seeding, How to use blogs, forums and discussion boards, Blogs, forums and communities, Viral campaigns and the social graph.

UNIT-IV EMAIL AND MOBILE MARKETING 9

Email Marketing - Principles and best practice, In-house, rental, vendors and 3rd party, Email platforms, Dynamic campaign management tools, Testing & Optimization, Trigger marketing, Contact strategy.

Mobile Marketing - The 3rd screen, Landscape & trends, Mobile advertising – WAP & mobile search, Mobile applications and consumer usage behavior, Role of the service provider, publisher & consumer, The Next level of mobile interaction.

UNIT-V WEB ANALYTICS 9

Introduction - Google Analytics- Navigate Google Analytics – GA reports- Case Study.

L :45 T: 0 P: 0 J: 0 Total: 45 PERIODS

TEXT BOOKS

1 Smith P R Chaffey Dave, "E-Marketing Excellence: The Heart of E-Business", Butterworth Heinemann, USA.

2 Deepak Bansal, "A Complete Guide To Search Engine Optimization", B.R. Publishing Corporation, First edition 2009.

REFERENCES

1 Strauss Judy, "E-Marketing", Prentice Hall, India

2 Grienstein and Feinman, "E-commerce –Security, Risk Management and Control", TMH, Second Edition, 2011

COURSE OUTCOMES

At the end of the course student should be able to:

CO1 Able to understand role of digital media in marketing.

CO2 Able to use SEO techniques and social media for business success.

CO3 Optimize the social media as a effective marketing tool.

CO4 Understand the principles of mobile management and its strategies.

CO5 Able to apply the web analytics on digital marketing.

19CAO602	CONTENT MANAGEMENT SYSTEM	L	T	P	J	C
		3	0	0	0	3

UNIT-I INTRODUCTION TO CONTENT 8

Introduction -Defining Data, Information, and Content - Content Format - Content Structure - Content Functionality

UNIT-II CONTENT MANAGEMENT 10

Understanding Content Management - Major Parts of a CMS - The Branches of Content Management - Knowing When You Need a CMS - Component Management versus Composition Management - The Roots of Content Management - The Branches of Content Management

UNIT-III DESIGNING CONTENT MANAGEMENT SYSTEM 9

Requirement gathering-Doing Logical Design - Selecting Hardware and Software - Implementing the System -The Wheel of Content Management - Working with Metadata - Cataloguing - Designing Publications - Designing Content Types - Content Access - Designing Personalization - Designing Workflow and Staffing Model

UNIT-IV WORD PRESS 9

Introduction – configuring wordpress- Directory structure- creating and managing content-security

UNIT-V JOOMLA 9

Introduction – installation and configuration – content type- templates –plugins – security

L :45   T: 0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS

1. Bob Boiko – Content Management Bible, 2nd Edition - Wiley Publishing, Inc., 2005

2. Dan Rahmel, "Professional Joomla",wrox publications, 2011

REFERENCES

1. Tris Hussey, "Using wordpress", Pearson education, 2011

2. Eric Tiggeler," Joomla! 3 Beginner's Guide", PACKT Publishing, 2013.

3. Sofia Hauschildt,"CMS Made Simple 1.6 Beginers Guide",– PACKT Publishing, 2010.

4. IshaiSagi, "SharePoint 2010 How To", Pearson Education, SAMS Publication, 2011

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Know how to organize content of website

CO2   Design efficient algorithms for mining the data from large volumes.

CO3   Design own content management system with necessary functions

CO4   Develop dynamic website with wordpress

CO5   Develop and manage websites with Joomla

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19CAO603   **BUSINESS INTELLIGENCE FOR MANAGERS**

L	T	P	J	C
3	0	0	0	3

UNIT-I   BUSINESS INTELLIGENCE   9

Effective and timely decisions – Data, information and knowledge – Role of mathematical models – Business intelligence architectures: Cycle of a business intelligence analysis – Enabling factors in business intelligence projects – Development of a business intelligence system – Ethics and business intelligence.

UNIT-II   KNOWLEDGE DELIVERY   9

The business intelligence user types - Standard reports - Interactive Analysis and Ad Hoc Querying - Parameterized Reports and Self-Service Reporting - dimensional analysis -Alerts/Notifications - Visualization: Charts, Graphs, Widgets, Scorecards and Dashboards - Geographic Visualization - Integrated Analytics - Considerations: Optimizing the Presentation for the Right Message.

UNIT-III   EFFICIENCY   9

Efficiency measures – The CCR model: Definition of target objectives- Peer groups – Identification of good operating practices - cross efficiency analysis – virtual inputs and outputs – Other models - Pattern matching – cluster analysis - outlier analysis.

UNIT-IV   BUSINESS INTELLIGENCE APPLICATIONS   9

Marketing models – Logistic and Production models – Case studies.

UNIT-V   FUTURE OF BUSINESS INTELLIGENCE   9

Future of business intelligence – Emerging Technologies - Machine Learning - Predicting the Future - BI Search & Text Analytics – Advanced Visualization – Rich Report - Future beyond Technology.

L :45   T: 0   P: 0   J: 0   Total: 45 PERIODS

TEXT BOOKS
1   Efraim Turban, Ramesh Sharda, DursunDelen, "Decision Support and Business Intelligence Systems", 9th Edition, Pearson, 2013.

REFERENCES
1   Larissa T. Moss, S. Atre, "Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making", Addison Wesley, 2003.
2   Carlo Vercellis, "Business Intelligence: Data Mining and Optimization for Decision Making", Wiley Publications, 2009.
3   David Loshin Morgan, Kaufman, "Business Intelligence: The Savvy Managers Guide", Second Edition, 2012.
4   Cindi Howson, "Successful Business Intelligence: Secrets to Making BI a Killer App", McGraw-Hill, 2007.
5   G.K.Gupta, "Introduction to Data Mining with case studies", Prentice Hall of India, 2011.

COURSE OUTCOMES

At the end of the course student should be able to:

CO1   Explain the fundamentals of business intelligence and link data mining with business intelligence.

CO2   Apply various modeling techniques and business intelligence methods to various situations.

CO3   Explain the data analysis and knowledge delivery stages.

CO4   To understand Data mining principles and techniques and Introduce DM as a cutting edge business intelligence.

CO5   Able to understand and apply business intelligence tools in management.