PAAVAI ENGINEERING COLLEGE, NAMAKKAL – 637 018
(AUTONOMOUS)
B.TECH. INFORMATION TECHNOLOGY
REGULATIONS - 2019
CHOICE BASED CREDIT SYSTEM
CURRICULUM

(For the candidates admitted during the academic year 2020-2021 onwards)

SEMESTER – V

S.No	Category	Course Code	Course Title	L	T	P	C
Theory							
1	HS	BA20151	Entrepreneurship Development	3	0	0	3
2	PC	IT20501	Computer Communication Networks	3	0	0	3
3	PC	IT20502	Database Management Systems	3	0	0	3
4	PC	IT20503	Artificial Intelligence	3	0	0	3
5	PC	IT20504	Object Oriented Modeling and Design	3	0	0	3
6	PE	IT2015*	Professional Elective – I	3	0	0	3
Practical							
7	PC	IT20505	Computer Networks Laboratory	0	0	2	1
8	PC	IT20506	Database Management Systems Laboratory	0	0	4	2
9	EE	EN20501	Career Development Laboratory I	0	0	2	1
			TOTAL	18	0	8	22

SEMESTER – VI

S.No	Category	Course Code	Course Title	L	T	P	C
Theory							
1	PC	IT20601	Mobile Computing	3	0	0	3
2	PC	IT20602	Internet of Things	3	0	0	3
3	PC	IT20603	Internet Programming	3	0	0	3
4	PC	IT20604	Compiler Design	3	0	0	3
5	PE	IT2025*	Professional Elective – II	3	0	0	3
6	OE	IT2090*	Open Elective – I	3	0	0	3
Practical							
7	PC	IT20605	Internet of Things Laboratory	0	0	2	1
8	PC	IT20606	Internet Programming Laboratory	0	0	4	2
9	EE	EN20601	Career Development Laboratory II	0	0	2	1
			TOTAL	18	0	8	22

PROFESSIONAL ELECTIVES (PE)

ELECTIVE – I

S.No	Category	Course Code	Course Title	L	T	P	C
1	PE	IT20151	Information Coding Techniques	3	0	0	3
2	PE	IT20152	Machine Learning	3	0	0	3
3	PE	IT20153	Graphics and Multimedia	3	0	0	3
4	PE	IT20154	C# and .Net framework	3	0	0	3

ELECTIVE – II

S.No	Category	Course Code	Course Title	L	T	P	C
1	PE	IT20251	Distributed Systems	3	0	0	3
2	PE	IT20252	Data Warehousing and Data Mining	3	0	0	3
3	PE	IT20253	User Interface Design	3	0	0	3
4	PE	IT20254	Advanced J2EE	3	0	0	3

OPEN ELECTIVE - I

S.No	Category	Course Code	Course Title	L	T	P	C
1.	OE	IT20901	Information Technology Essentials	3	0	0	3
2.	OE	IT20902	Green Computing	3	0	0	3

Approved
BOARD OF STUDIES
Information Technology

BA20151   ENTREPRENEURSHIP DEVELOPMENT   3   0   0   3
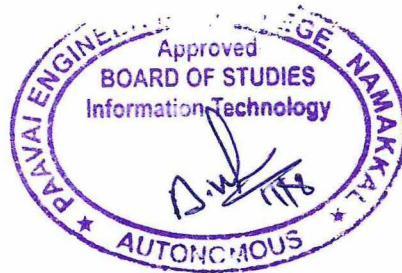
COURSE OBJECTIVES

To enable students to

- understand the management principles.
- build the entrepreneurial competencies and analyse the support rendered by government and other agencies in entrepreneurship development.
- understand the business opportunities and to prepare a feasibility report.
- propose a business plan.
- appraise and comprehend the various factors to be considered for launching a small business.

UNIT I   Basics of Management: 9

Management: Meaning, Definition, Nature and Importance; Roles of management, Functions of Management, Levels of Management, Functional areas of Management: Marketing, Finance, Production, HRM, IT, Research and Development.

The Evolution and Development of Management Thought: Classical, Neo-classical. System and Contingency Approaches, An Overview.

UNIT II   Entrepreneurial Competence and Environment   9

Entrepreneurial Competence: Entrepreneurship, Definition, Role and expectations, Entrepreneurial styles and types, Characteristics of the Entrepreneur, Entrepreneurial Competencies, Functions of an Entrepreneur.

Entrepreneurial Environment: Role of Socio-Cultural, Economic and Political Environment, Institutional Support for small entrepreneurs, Assistance Programme for Small Scale Units, Institutional Framework, Central and State Government Industrial Policies and Regulations.

UNIT III   Entrepreneurial Development   9

Ownership Structures, Proprietorship, Partnership, Company, Co-operative, Franchise.

Identification of Business Opportunity, Preparation of Feasibility Report, Financial and Technical Evaluation, Project Formulation, Common Errors in Project Formulation, Specimen Project Report, Entrepreneurial Development Programs, Role of SSI Sector in the Economy, IAS Units, Failure, Causes and Preventive Measures, Turnaround Strategies.

UNIT IV   Business Plan Preparation, Financing Ventures   9

Business Plan: Business opportunities-SWOT, Business plan process, Feasibility Study, Functional plan, Marketing plan, Operational plan, Organizational plan, financial plan, Evaluation Criteria.

Financing ventures: sources of raising capital, seed funding, venture capital funding, funding opportunities for start-ups in India.

UNIT V   Women Entrepreneurship & Entrepreneurship in various sectors   9

Women Entrepreneurship: Growth of women Entrepreneurship, Problems faced by Women Entrepreneurs, Development of women Entrepreneurship.

Entrepreneurship in Informal Sector: Rural Entrepreneurship, Entrepreneurship in Sectors like Agriculture, Tourism, Health care, Transport and allied services.

TOTAL PERIODS: 45

COURSE OUTCOMES

At the end of this course, the students will be able to

- implement the necessary managerial skills to become an entrepreneur.
- take up self-employment having been exposed to entrepreneurial environment.
- select a best business idea by using appropriate methods to assess its viability.
- formulate a business plan and deploy the resources for sustainable growth.
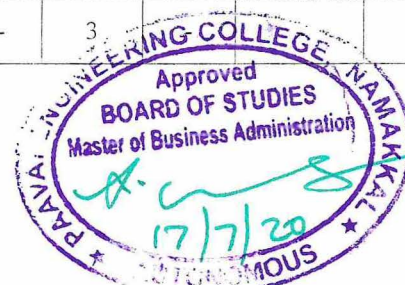- analyse channels and means of launching a small business in any sector.

TEXT BOOKS

1. Khanka S.S, "Entrepreneurial Development", S. Chand and Company Limited, New Delhi, 2016.
2. Saravanavel. P, "Entrepreneurial Development", Ess Pee Kay Publishing House, Chennai, 2013.

REFERENCES

1. Donald L. Sexton and Raymond W.Smilor, "The Art and Science of Entrepreneurship", Ballinger Publishing Company, 2008.
2. Clifford M.Baumback & Joseph R.Mancuso, "Entrepreneurship and Venture Management", Prentice Hall, 1975.
3. Gifford Pinchot, "Intrapreneuring" Harper & Row Publishers, New York, 2005.
4. Mathew Manimala, "Entrepreneurship Theory at the Crossroads", Paradigms and Praxis, Biztrantra, 2nd Edition, 2015.

CO – PO Mapping:

COs	Mapping of Course Outcomes with Programme Outcomes: (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak													
	Programme Outcomes (POs)												Program Specific Outcomes (PSOs)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	2	-	-	-	-	-	-	-
CO2	-	-	-	-	-	3	-	-	2	-	1	-	-	2
CO3	-	-	2	-	-	-	-	-	-	-	-	-	1	2
CO4	-	-	-	2	-	-	-	-	-	-	-	-	-	1
CO5	-	-	-	-	-	-	-	2	-	-	3			-

IT20501   **COMPUTER COMMUNICATION NETWORKS**   3   0   0   3

COURSE OBJECTIVES

To enable the students to

- understand the function of different layers of OSI model.
- know about the components required to build different types of networks
- study the various routing protocols operation.
- learn the flow control and congestion control algorithms
- acquire knowledge of application layer and its working principles.

UNIT I   FUNDAMENTALS & PHYSICAL LAYER   9

Introduction - Data communications, Networks, Network models; Layer tasks - The OSI Model, Layers in the OSI model, TCP/IP protocol suit; Overview of Data and signals; Transmission media; Switching.

UNIT II   DATA LINK LAYER   9

Error detection and correction; Data link control - Framing, HDLC; Multiple Access; Wired LANs - Standard Ethernet, Fast Ethernet, Gigabit Ethernet; Wireless LANs - IEEE 802.11, Bluetooth; Connecting Devices.

UNIT III   NETWORK LAYER   9

Logical addressing - IPv4 Addresses, IPv6Addresses; Internet protocol - Internetworking (IPv4, IPv6), Transitions from IP4 to IP6; ICMP; IGMP; Forwarding; Unicasting routing protocol; Multi casting routing protocol.

UNIT IV   TRANSPORT LAYER   9

Duties of Transport Layer; User datagram protocol (UDP); Transmission control protocol (TCP) - Connection establishment, Connection release; Congestion control; Quality of Service - Techniques to Improve QoS.

UNIT V   APPLICATION LAYER   9

Electronic Mail (SMTP, POP3, IMAP, MIME); File Transfer Protocol; WWW; HTTP; DNS; SNMP.

                                                        TOTAL PERIODS   45

COURSE OUTCOMES

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

- explain the basic layers and its functions in computer networks.
- design and analyze error and flow control algorithms for communication between adjacent nodes in a network.
- identify and apply the suitable routing algorithms for the given network.
- develop a client/server application using TCP/UDP and design algorithms for end-end communication.
- analyze the capabilities of application layer utilities and replicate the same for new applications.
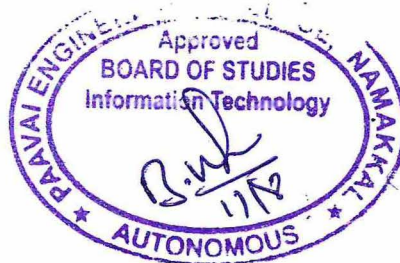
TEXT BOOKS

1. Behrouz A. Forouzan, "Data Communication and Networking", Fifth Edition, Tata McGraw -Hill, 2015.

2. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-Down Approach", Sixth Edition, Pearson Education, New Delhi 2017

REFERENCES

1. Larry L. Peterson, Bruce S. Davie, Computer Networks: A Systems Approach, Fifth Edition, Morgan Kaufmann Publishers Inc., 2012.

2. Andrew S Tanenbaum and David J Wetherall, Computer Networks, Fifth Edition, Pearson Education, 2012.

3. Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, Computer Networks: An Open Source Approach, McGraw Hill Publisher, 2011.

4. William Stallings, "Data and Computer Communications", 10th Edition, PHI, New Delhi 2015.

CO-PO MAPPING:

COs	Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak													
	Programme Outcomes (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	3	-	2	-	-	-	-	2	1	2	3	2
CO2	1	2	3	1	1	-	-	-	-	2	2	2	3	2
CO3	3	2	3	-	-	-	-	-	-	-	2	2	3	2
CO4	1	3	2	2	2	-	-	-	-	-	2	2	3	2
CO5	3	2	-	2	2	-	-	-	-	2	1	2	3	3

IT20502	DATABASE MANAGEMENT SYSTEMS	3	0	0	3

COURSE OBJECTIVES

To enable the students to

- learn the fundamentals of database Management Systems.
- make the students to understand the relational models
- study the SQL and relational database design.
- understand the internal data storage methods using different file and indexing techniques.
- acquire an introductory knowledge about the case studies and Recent Trends.

UNIT I   INTRODUCTION   9

Purpose of Database System - Views of data, Data Models, Database System Architecture, Database users and Administrator; Entity-Relationship model (E-R model) - E-R Diagrams, Introduction to relational databases.

UNIT II   RELATIONAL MODEL   9

The relational Model - The catalog, Types, Keys; Relational Algebra - Domain Relational Calculus, Tuple Relational Calculus, Fundamental operations, Additional I/O operations; SQL fundamentals - Integrity, Triggers, Security, Advanced SQL features, Embedded SQL, Dynamic SQL; Missing Information - Views; Introduction to Distributed Databases and Client/Server Databases.

UNIT III   DATABASE DESIGN   9

Functional Dependencies - Non-loss Decomposition, Functional Dependencies, First, Second, Third Normal Forms, Dependency Preservation, Boyce/ Code Normal Form, Multi-valued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form.

UNIT IV   STORAGE MANAGEMENT   9

RAID - File Organization, Organization of Records in Files, Indexing and Hashing, Ordered Indices, B+ tree Index Files, B tree Index Files, Static Hashing, Dynamic Hashing; Query Processing Overview - Algorithms for SELECT and JOIN operations , Query optimization using Heuristics and Cost Estimation.

UNIT V   CASE STUDIES AND RECENT TRENDS   9

Case Studies - Hospital Management System, Railway Reservation System, Timetable Management System, Hotel Management System; Distributed Databases - Architecture, Data Storage, Transaction Processing; Object-based Databases - Object Database Concepts, Object-Relational features, ODMG Object Model, ODL, OQL; XML.

TOTAL PERIODS   45

COURSE OUTCOMES

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

- classify the modern and futuristic database applications based on size and complexity.
- map ER model to Relational model to perform database design effectively.
- write queries using normalization criteria and optimize queries.
- compare and contrast various indexing strategies in different database systems.
- appraise how advanced database differ from traditional database.
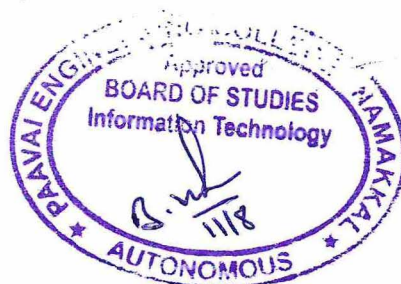
TEXT BOOKS

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, -Database System Concepts, Sixth Edition, Tata McGraw Hill,2011.
2. Raghu Ramakrishnan, -Database Management Systems, Fourth Edition, McGraw-Hill College Publications, 2015.

REFERENCES

1. Elmasri R. and Shamakant B. Navathe, "Fundamentals of Database Systems", 6th Edition,Addision Wesley ,2011.
2. C.J. Date, A.Kannan, S. Swamynathan, -An Introduction to Database Systems, Eighth Edition, Pearson Education, 2006.
3. Ramez Elmasri, Shamkant B. Navathe, -Fundamentals of Database Systems, Sixth Edition, Pearson, 2011.
4. G.K. Gupta, "Database Management Systems", Tata McGraw Hill, 2011.

CO-PO MAPPING:

Cos	Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak

Cos	Programme Outcomes (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	-	2	1	-	2	1	1	1	2	3	1	-
CO2	3	3	1	2	2	-	2	-	-	-	2	3	2	-
CO3	3	3	1	2	2	-	2	-	-	-	2	3	2	2
CO4	3	3	1	2	2	-	2	-	-	-	2	3	2	1
CO5	3	3	1	2	2	-	2	-	-	-	2	3	2	1

COURSE OBJECTIVES

To enable the students to

- acquire a knowledge of various methods of different problem solving and searching.
- understand the concepts of knowledge representation.
- understand about inference and how to solve the problems using various inference technique.
- realize the concepts of planning and learning.
- understand the method of various AI applications.

UNIT I   INTRODUCTION   9

Introduction to AI - Problem formulation, Problem Definition; Production systems - Control strategies, Search strategies, Problem characteristics, Production system characteristics, Specialized productions system; Problem solving methods; Problem graphs; Matching; Indexing and Heuristic functions; Hill Climbing; Depth first and Breath first; Constraints satisfaction; Related algorithms; Measure of performance and analysis of search algorithms.

UNIT II   REPRESENTATION OF KNOWLEDGE   9

Game playing; Knowledge representation - Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, Use of predicate calculus; Knowledge representation using other - Structured representation of knowledge.

UNIT III   KNOWLEDGE INFERENCE   9

Knowledge representation; Production based system; Frame based system. Inference - Backward logic chaining, Forward chaining; Rule value approach; Fuzzy reasoning.

UNIT IV   PLANNING AND EXPERT SYSTEM   9

Basic plan generation systems - Strips, Advanced plan generation systems, K strips; Strategic explanations - Why, Why not and how explanations; Expert systems - Architecture of expert systems, Roles of expert systems, Knowledge Acquisition; Typical expert systems Applications - MYCIN, DART, XOON.

UNIT V   AI APPLICATIONS   9

AI Applications - Language Models, Information Retrieval, Information Extraction, Natural Language Processing, Machine Translation, Speech Recognition; Robot - Hardware, Perception, Planning, Moving.

TOTAL PERIODS   45

COURSE OUTCOMES

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

- demonstrate awareness of intelligent agents and problem solving using uninformed, informed and local search methods.
- develop knowledge about usage of propositional logic and first order logic for making inferences.
- use the knowledge and the process of inference to derive new facts.

- describe the use of planning and explain about various expert systems.
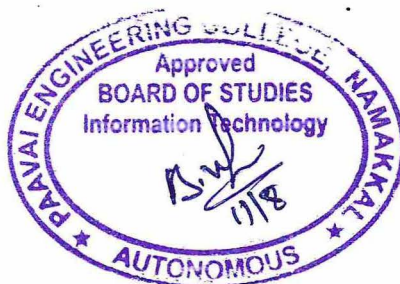- design and develop various AI systems.

TEXT BOOKS

1. Kevin Night and Elaine Rich, Nair B, "Artificial Intelligence", 3rd edition, McGraw Hill- 2017.
2. Stuart Russel and Peter Norvig, "AI -A Modern Approach", 3rd Edition, Pearson Education 2015.

REFERENCES

1. Lavika Goel "Artificial Intelligence Concepts and Applications", Wiley 2021.
2. Dan W. Patterson, "Introduction to AI and ES", Pearson Education, 2015.
3. Deepak Khemani, "Artificial Intelligence", Tata McGraw Hill Education 2013.

CO-PO MAPPING:

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	Programme Outcomes (POs)													
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CO1	3	3	3	3	2	-	-	-	-	-	-	1	3	2
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CO3	3	3	3	3	2	-	-	-	-	-	-	1	3	2
CO4	3	3	3	3	2	-	-	-	-	-	-	1	3	2
CO5	3	3	3	3	2	2	-	-	-	-	-	1	3	3

OBJECT ORIENTED MODELING AND DESIGN 3 0 0 3

COURSE OBJECTIVES

To enable the students to

- understand the concept of object oriented programming and its software domains.
- symbolic representation of methods using diagram.
- know about different design techniques of a model with help of tools.
- develop the model for the proper, accountable domain, in a specific software logics for usage.
- implement the model with the practical physical process.

UNIT I   INTRODUCTION   9

Abstraction, Encapsulation, Inheritance, Polymorphism, Message passing, OOAD methodologies, Object model, Elements, Class and object, Relationship among objects and classes, Quality classes and objects, Unified approach, Introduction to UML, Usage of UML, Views of UML.

UNIT II   USE CASE MODELING   9

Use cases in UML - Relationships between use cases, Describing use cases, Testing use cases, Realizing use cases.

UNIT III   OBJECT MODELING   9

Class diagrams, Perspectives, Associations, Attributes, Operations, Generalization, Constraint rules, Advanced concepts, Object diagram, Multiple and dynamic classification, Aggregation and composition, Derived associations and attributes, Interfaces and abstract classes, Reference objects and value objects, Frozen, Qualified associations, Association and parameterized class.

UNIT IV   DYNAMIC MODELING   9

Interaction diagrams - Sequence diagrams, Communication diagrams, State diagrams, Concurrent state diagrams, Activity diagrams, Dynamic concurrency, Swim lanes; Case study: Automated Teller Machine (ATM).

UNIT V   IMPLEMENTATION MODEL   9

Package diagrams, Deployment diagrams, Component diagrams, Combining component and deployment diagrams; Case study: University Enrollment System.

TOTAL PERIODS   45

COURSE OUTCOMES

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

- apply Object oriented concepts in software analysis.
- prepare Class Model, State Model and Interaction Model for any software system.
- analyze the application Domain and Prepare models from different view points.
- apply the re-engineering in the applications.
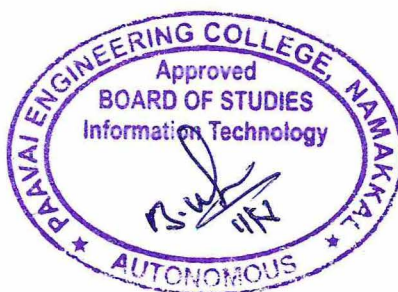- use the Concepts of Pattern Oriented design in software design.

TEXT BOOKS

1. James Rumbaugh, Ivar Jacobson and Grady Booch, ―The Unified Modeling Language Reference Manual‖, Pearson Education, New Delhi, 2009

2. Ali Bahrami, ―Object Oriented System Development, Tata McGraw Hill, New Delhi, 2008.

REFERENCES

1. Grady Booch, ―Object Oriented Analysis and Design with Applications, Addison Wesley, New Delhi, 2010.

2. Mahesh P Matha, ―Object Oriented Analysis and Design using UML: An Introduction to Unified Process and Design Patterns‖, Prentice Hall, New Delhi, 2008.

3. Atul Kahate, ―Object Oriented Analysis and Design, Tata McGraw Hill, New Delhi, 2007.

4. Martin Fowler and Kendall Scott, ―UML Distilled: A Brief Guide to the Standard Object Modeling Language‖, Pearson Education, New Delhi, 2013

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CO1	3	3	2	1	-	-	-	-	-	-	-	2	3	3
CO2	3	3	2	2	2	2	1	-	-	-	-	2	3	3
CO3	3	3	2	2	3	2	1	-	-	-	-	2	3	3
CO4	3	3	2	2	3	2	1	-	-	-	-	2	3	3
CO5	3	3	2	2	2	1	1	-	-	-	-	2	3	3

COURSE OBJECTIVES

To enable the students to ·

- understand the basics and working principles of Networking Protocols using Cisco Packet Tracer.

- understand the various function of protocols through Packet Tracer.

- familiar with the various routing algorithms.

- learn and use simulation tools.

LIST OF EXPERIMENTS

1. There are 20PC's in your network. Five PC's are connected to one Ethernet hub, and five PC's are connected to another hub. Each hub is connected to separate switch and both the switches are connected to a separate router. The routers are connected via an Ethernet bridge. The remaining 10 PC's are connected directly to one of the two switches. How many Ethernet segments are there? Implement this scenario using cisco packet tracer.

2. Write a code to implement bit stuffing and byte stuffing.

3. In CRC error correction scheme, choose pattern 1101 and data 100100. Write a code to encode the given data.

4. In an IPv4 packet the value of header length is 1000 in binary. Write a code to find, how many bytes of options are being carried by this packet?

5. Write a code to implement distance vector routing algorithm.

6. Write a code to implement HTTP web client program to download a web page using TCP sockets.

7. Write a code to implement border gateway protocol (BGP).

8. Configure a Web server, DHCP server and a DNS server all together in a single simulation through which IP have to be allocated for the host through DHCP server, Conversion of Canonical Name to IP address to be done by DNS server and Access to the webpage has to given by web server using Cisco Packet Tracer.

9. Study of Packet Analyzer using wireshark Tool.

TOTAL PERIODS   30

COURSE OUTCOMES

At the end the course, students will be able to

- demonstrate and Configure Networking Protocols using Cisco Packet Tracer.

- analyze the various working functionality of protocols through Packet Tracer .

- implement transport and application layer protocols in data networks.

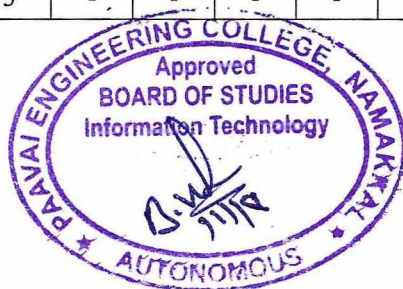- use simulation tools to analyze the performance of various protocols.

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS

SOFTWARE: C / C++ / Cisco Packet Tracer

HARDWARE: Standalone desktops 30 Nos.

CO-PO MAPPING:

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	Programme Outcomes (POs)													
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CO2	3	1	2	2	-	-	-	-	-	-	-	-	2	2
CO3	3	3	2	1	-	-	-	-	-	-	2	-	3	3
CO4	2	3	1	3	-	-	-	-	-	-	-	-	2	1

COURSE OBJECTIVES

To enable the students to

- learn to create and use a database.

- develop conceptual understanding of database management system.

- understand the problem which can be mapped to SQL table.

- develop different applications using ORACLE and MYSQL.

LIST OF EXPERIMENTS

1. Creation of a database and writing SQL queries to retrieve information from the database.

2. Performing Insertion, Deletion, Modifying, Altering, Updating and Viewing records based on conditions.

3. Creation of Views, Synonyms, Sequence, Indexes, Save point.

4. Creating an Employee database to set various constraints.

5. Creating relationship between the databases.

6. Study of PL/SQL block.

7. Write a PL/SQL block to satisfy some conditions by accepting input from the user.

8. Write a PL/SQL block that handles all types of exceptions.

9. Creation of Procedures.

10. Creation of database triggers and functions

11. Mini project (Application Development using Oracle/ Mysql)

     a) Hospital Management System.

     b) Personal Information System.

     c) Web Based User Identification System.

TOTAL PERIODS   60

COURSE OUTCOMES

At the end the course, students will be able to

- design and implement a database schema for a given problem-domain.

- create a database for given applications.

- create and maintain tables using PL/SQL.

- prepare forms and reports.

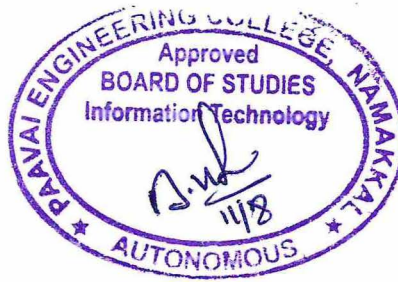## LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS

SOFTWARE: Front end: VB/VC ++/JAVA or Equivalent

            Back end: Oracle / SQL / My SQL / Post Gress / DB2 or Equivalent

HARDWARE: Standalone desktops 30 Nos.

CO-PO MAPPING:

Cos	Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak													
	Programme Outcomes (POs)													
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CO2	3	3	1	2	3	-	2	-	-	-	2	3	2	-
CO3	3	3	-	2	3	-	2	-	-	-	2	3	2	2
CO4	3	3	1	2	3	-	2	-	-	-	2	3	2	1

COURSE OBJECTIVES

To enable students to

- enhance their writing skills.
- evaluate their presentation skill to face the corporate world.
- solve the quantitative aptitude problems and improve their mental ability.
- improve the critical thinking and reasoning skills.

UNIT I   WRITING SKILLS   6

Writing Skills: The Essentials of Writing – The Importance of Structure – Types of Writing – Common Mistakes in Writing.

Activities: Email Writing - Paragraph writing – Report Writing – Story Writing - Story Telling Session: 2 – JAM Session 1.

UNIT II   PRESENTATION SKILLS AND GROUP DISCUSSION   6

Presentation Skills: Types of Presentation– Methods of Delivering Presentation –Ways to improve the Presentation – Presentation Aids: Group Discussion: Introduction –Types and Importance – Why GD – Types of GD- Evaluation Criteria – Do's and Don'ts of GD.

Activities: Presentation Session I, Group Discussion Session I, Role Play Session (Team): Level II – Personality Profile Session II – Company Profile Analysis Session II

UNIT III   QUANTITATIVE APTITUDE   6

Simplification – Cubes and Cube Roots – Squares and Square Roots – Boats and Streams – Trains – Profit and Loss – Pipes and Cisterns.

UNIT IV   LOGICAL REASONING - I   6

Series Completion – Letter Series – Symbol Series – Number Series – Arithmetic Reasoning.

UNIT V   LOGICAL REASONING - II   6

Blood Relations – Seating Arrangement - Character Puzzle.

TOTAL PERIODS: 30

COURSE OUTCOMES

Upon completion of the course, the students will be able to

- excel in drafting mails and speaking
- demonstrate the participative skills in group discussions.
- solve problems based on quantitative aptitude.
- enhance their logical and verbal reasoning.

TEXTBOOKS

1. Agarwal, R.S." a modern approach to Verbal and Non Verbal Reasoning", S.Chand and Co Ltd, new delhi.2015.

2. Agarwal, R.S. "Objective General English", S.Chand and Co.2016.

REFERENCES

1. Abhijit Guha, "Quantitative Aptitude ", Tata-Mcgraw Hill.2015
2. Word Power Made Easy By Norman Lewis ,Wr.Goyal Publications.2016
3. Johnson, D.W. Reaching out – Interpersonal Effectiveness and self actualization. Boston: Allyn and Bacon.2019
4. Infosys Campus Connect Program – students' guide for soft skills.2015

CO - PO Mapping

COs	Mapping of Course Outcomes with Programme Outcomes: (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium , 1-Weak													
	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	3	3	1	-	-	-	-	-	-	3	2
CO2	-	2	3	-	2	-	2	-	-	-	-	-	3	2
CO3	3	2	2	-	-	1	-	-	-	-	2	-	2	3
CO4	2	3	3	2	1	3	3	1	-	1	2	-	2	3

| IT20601 | MOBILE COMPUTING | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES

To enable the students to

- understand the basic concepts of mobile computing.
- be familiar with the network protocol stack.
- learn the basics of mobile telecommunication system.
- acquire knowledge on Ad-Hoc networks.
- gain knowledge about different mobile platforms and application development.

UNIT I   INTRODUCTION   9

Mobile Computing - Mobile Computing Vs. Wireless Networking, Mobile Computing Applications, Characteristics of Mobile computing, Structure of Mobile Computing Application; MAC Protocols - Wireless MAC Issues, Fixed Assignment Schemes, Random Assignment Schemes, Reservation Based Schemes.

UNIT II   MOBILE TELECOMMUNICATION SYSTEM   9

Global System for Mobile Communication (GSM), General Packet Radio Service (GPRS); Universal Mobile Telecommunication System (UMTS); Cellular Networks - Frequency Reuse and Specialization.

UNIT III   MOBILE INTERNET PROTOCOL AND TRANSPORT LAYER   9

Overview of Mobile IP - Features of Mobile IP, Key Mechanism in Mobile IP, route Improvement Optimization; Overview of TCP/IP - Architecture of TCP/IP, Adaptation of TCP Window, in TCP Performance.

UNIT IV   WIRELESS AD-HOC NETWORKS   9

Introduction - Wireless Mesh Networks, Ad-Hoc Basic Concepts, Characteristics, Applications, Design Issues; Routing - Essential of Traditional Routing Protocols, Popular Routing Protocols, Vehicular Ad Hoc networks (VANET), MANET Vs VANET , Security.

UNIT V   MOBILE PLATFORMS AND APPLICATIONS .   9

Mobile Device Operating Systems - Special Constraints and Requirements, Commercial Mobile Operating Systems; Software Development Kit: iOS, Android, BlackBerry, Windows Phone, M-Commerce, Structure - Pros and Cons, Mobile Payment System, Security Issues.

TOTAL PERIODS   45

COURSE OUTCOMES

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

- explain the basics of mobile telecommunication system.
- choose the required functionality at each layer for given application.
- identify solution for each functionality at each layer.
- use simulator tools and design Ad hoc networks.
- using different platforms to create a different applications. .

TEXT BOOKS

1. Jochen H. Schller, — Mobile Communications‖, Second Edition, Pearson Education, New Delhi, 2010.

2. Alan Colman, Jun Han, and Muhammad Ashad Kabir, Pervasive Social Computing Socially-Aware Pervasive Systems and Mobile Applications, Springer, 2016.

REFERENCES

1. Prashant Kumar Pattnaik, Rajib Mall, "Fundamentals of Mobile Computing" PHI Learning Pvt, Ltd. New Delhi-2012.

2. William.C.Y.Lee,—Mobile Cellular Telecommunications-Analog and Digital Systems, Second Edition, Tata Mc-Graw Hill Edition, 2006.

3. Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd, 2005.

4. UweHansmann, LotharMerk, Martin S. Nicklons and Thomas Stober, — Principles of Mobile Computing‖, Springer, 2003.

CO-PO MAPPING:

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CO4	3	3	1	2	2	-	2	-	-	-	2	3	2	1
CO5	3	3	1	2	2	-	2	-	-	-	2	3	2	1

Approved
BOARD OF STUDIES
Information Technology

INTERNET OF THINGS   **3   0   0   3**

COURSE OBJECTIVES

To enable the students to

- understand the logical behind Internet of Things.
- study the design methodology for Raspberry Pi and Arduino.
- study the characteristics and applications of domain specific IoTs for real life scenarios.
- understand the knowledge for cloud platforms & frameworks for developing IoT applications.
- know the approaches for collecting and analyzing data generated by IoT systems in the cloud.

UNIT I   INTRODUCTION TO IoT   9

Introduction - Definition and Characteristics of IoT, Physical Design of IoT, Logical Design of IoT; IoT Enabling Technologies; IoT Levels and Deployment Templates - Overview of Governance, Privacy and Security Issues.

UNIT II   DEVELOPING INTERNET OF THINGS   9

Building IOT with RASPERRY PI; Logical Design using Python; IoT Physical Devices & Endpoints; IoT Device - Building blocks; Raspberry Pi - Board, Raspberry Pi Interfaces, Programming Raspberry Pi with Python; Other IoT Platforms - Arduino.

UNIT III   DOMAIN SPECIFIC IoTs   9

Home Automation; NEST Sensor; Ninja Blocks; Cities; Environment; Energy; Retail; Logistics; Agriculture; Industry; Health and Lifestyle; IoT and M2M.

UNIT IV   IOT PROTOCOLS AND CLOUD OFFERINGS   9

IoT Protocols - MQTT, CoAP, AMQP; Cloud Storage Models and Communication APIs - WAMP; Xively Cloud for IoT - Django; Amazon Web Services for IoT; Sky Net IoT Messaging Platform; Case Study on Smart Parking and Air Pollution Monitoring.

UNIT V   DATA ANALYTICS FOR IoT   9

Introduction - Apache Hadoop, Using Hadoop Map Reduce for Batch Data Analysis; Apache Oozie; Apache Spark; Apache Storm - Using Apache Storm for Real-Time Data Analysis; Case Study on Weather Monitoring.

                                                          TOTAL PERIODS   45

COURSE OUTCOMES

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

- explain the basic concepts and technologies used in internet of things.
- apply the generic design methodology for internet of things with Raspberry Pi and Arduino.
- obtain the knowledge of the different types of domain specific IoT for real life applications.
- apply the knowledge in cloud platforms and other frameworks for developing IoT applications.
- develop the processes of collecting and analyzing data generated by IoT systems in the cloud.
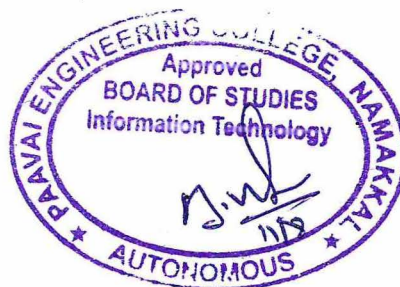
TEXT BOOKS

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

2. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry, —IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things, Cisco Press, 2017.

REFERENCES

1. Andrian McEwen, Hakim Cassimally, "Designing the Internet of Things", 1st edition, John Wiley & Sons Ltd, 2014.

2. Honbo Zhou, "The Internet of Things in the Cloud: A Middleware Perspective", 1st edition, CRC Press, 2013.

3. Cuno Pfister , "Getting Started with Internet of Things: Connecting Sensors and Microcontrollers to the Cloud", 1st edition, Kindle edition.

4. Arshdeep Bahga, Vijay Madisetti, —Internet of Things – A hands-on approach, Universities Press, 2015.

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CO4	2	3	3	3	3	2	2	-	-	-	-	1	3	2
CO5	3	3	3	3	2	2	2	-	-	-	-	1	3	3

COURSE OBJECTIVES

To enable the students to

- learn different Internet Technologies.

- implement Client side programs.

- design and implement server side programs using Servlets and JSP.

- understand XML.

- understand the java specific web services architecture.

UNIT I   WEBSITES BASICS, HTML 5, CSS 3, WEB 2.0   10

Web 2.0 - Basics, RIA Rich Internet Applications, Collaborations tools; Understanding websites and web servers - Understanding Internet, Difference between websites and web server; Internet technologies – Overview, Understanding the difference between internet and intranet; HTML and CSS - HTML 5.0, XHTML, CSS 3.

UNIT II   CLIENT SIDE PROGRAMMING   8

Java Script - An introduction to JavaScript, JavaScript DOM Model, Date and Objects, Regular Expressions, Exception Handling, Validation, Built- in objects, Event Handling, DHTML with JavaScript.

UNIT III   SERVER SIDE PROGRAMMING   8

Servlets - Java Servlet Architecture, Servlet Life Cycle, Form GET and POST actions, Session Handling, Understanding Cookies; Installing and Configuring Apache Tomcat Web Server.

Database Connectivity - JDBC Perspectives, JDBC program example; JSP - Understanding Java Server Pages, JSP Standard Tag Library (JSTL), Creating HTML forms by embedding JSP code.

UNIT IV   PHP AND XMLWITH ANGULAR JS   10

PHP – Introduction to PHP, Using PHP, Variables, Program and control, Built-in functions, Connecting to Database, Using Cookies, Regular Expressions.

XML - Basic XML, Document Type Definition, XML Schema DOM and Presenting XML, XML Parsers and Validation, XSL and XSLT Transformation, News Feed (RSS and ATOM).

ANGULAR JS - Angular JS Basics, Expressions, Filters and Modules, Forms, Services and Server Communications.

UNIT V   INTRODUCTION TO FULL STACK WITH AJAX and WEB SERVICES   9

Full Stack Introduction - JavaScript Full Stack; Client Server Architecture - XML Http Request Object - Call Back Methods - Web Services – Introduction, Java web services Basics, Creating, Publishing, Testing and Describing a Web services (WSDL), Consuming a web service, Database Driven web service from an application, SOAP.

TOTAL PERIODS   45

COURSE OUTCOMES

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

- create a basic website using HTML and Cascading Style Sheets.
- design and implement dynamic web page with validation using JavaScript objects and by applying different event handling mechanisms.
- design and implement server side programs using Servlets and JSP.
- present data in XML format.
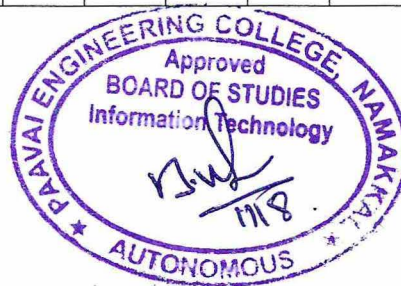- design rich client presentation using AJAX.

TEXT BOOKS

1. Deitel and Deitel and Nieto, "Internet and World Wide Web - How to Program", Prentice Hall, 5th Edition, 2011.

REFERENCES

1. UttamK.Roy, "Web Technologies", Oxford University Press, 2011.
2. Chris Bates, Web Programming -Building Intranet Applications, 3rd Edition, Wiley Publications, 2009.
3. Jeffrey C and Jackson, "Web Technologies A Computer Science Perspective", Pearson Education, 2011.
4. Gopalan N.P. and Akilandeswari J., "Web Technology", Prentice Hall of India, 2011.

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CO4	3	2	2	2	-	-	-	-	-	2	1	1	3	3
CO5	3	3	2	2	-	-	-	-	-	2	1	1	3	3

COURSE OBJECTIVES

To enable the students to

- learn the design principles of a Compiler.
- understand the various parsing techniques
- learn different levels of translation.
- learn to optimize machine codes
- learn to generate machine codes.

UNIT I   INTRODUCTION TO COMPILERS   5

Translators - Compilation and Interpretation, Language processors; The Phases of Compiler - Errors Encountered in Different Phases, The Grouping of Phases; Compiler Construction Tools; Programming Language basics.

UNIT II   LEXICAL ANALYSIS   9

Need and Role of Lexical Analyzer - Lexical Errors; Expressing Tokens by Regular Expressions -Converting Regular Expression to DFA, Minimization of DFA; Language for Specifying Lexical Analyzers - LEX, Design of Lexical Analyzer for a sample Language.

UNIT III   SYNTAX ANALYSIS   10

Need and Role of the Parser; Context Free Grammars; Top Down Parsing - General Strategies, Recursive Descent Parser Predictive Parser, LL(1); Parser - Shift Reduce Parser, LR Parser, LR (0)Item, Construction of SLR Parsing Table, Introduction to LALR Parser; Error Handling and Recovery in Syntax Analyzer - YACC - Design of a syntax Analyzer for a Sample Language.

UNIT IV   SYNTAX DIRECTED TRANSLATION AND RUN TIME ENVIRONMENT   12

Syntax directed Definitions - Construction of Syntax Tree - Bottom - up Evaluation of S-Attribute Definitions - Design of predictive translator - Type Systems - Specification of a simple type checker - Equivalence of Type Expressions-Type Conversions; Run-Time Environment - Source Language Issues, Storage Organization, Storage Allocation - Parameter Passing - Symbol Tables - Dynamic Storage Allocation - Storage Allocation in FORTAN.

UNIT V   CODE OPTIMIZATION AND CODE GENERATION   9

Principal Sources of Optimization - DAG - Optimization of Basic Blocks - Global Data Flow Analysis - Efficient Data Flow Algorithms - Issues in Design of a Code Generator - A Simple Code Generator Algorithm.

TOTAL PERIODS   45

COURSE OUTCOMES

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

- design and implement a prototype compiler.
- use the knowledge of patterns, tokens and regular expressions for solving a problem in the field of data mining.
- apply the various optimization techniques.
- develop the runtime structures used to represent constructs in typical programming languages.
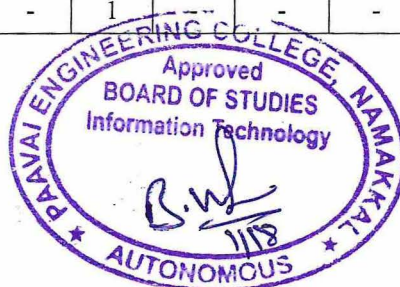- use the different compiler construction tools.

TEXT BOOKS

1. Alfred V Aho, Monica S. Lam, Ravi Sethi and Jeffrey D Ullman, "Compilers – Principles, Techniques and Tools", 2nd Edition, Pearson Education, 2007.

REFERENCES

1. Randy Allen, Ken Kennedy, "Optimizing Compilers for Modern Architectures: A Dependence-based Approach", Morgan Kaufmann Publishers, 2002.

2. Steven S. Muchnick, "Advanced Compiler Design and Implementation, "Morgan Kaufmann Publishers – Elsevier Science, India, Indian Reprint 2003.

3. Keith D Cooper and Linda Torczon, "Engineering a Compiler", Morgan Kaufmann Publishers Elsevier Science, 2004.

4. Charles N. Fischer, Richard. J. LeBlanc, "Crafting a Compiler with C", Pearson Education, 2008.

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CO4	2	2	-	2	-	-	-	2	-	-	-	-	-	2
CO5	3	1	2	1	3	-	-	1	-	-	-	3	-	3

COURSE OBJECTIVES

To enable the students to

- familiars arduino programming.
- understand python IoT programming and Raspberry PI.
- learn programming in arduino and Raspberry PI devices.
- use of Devices, Gateways and Data Management in IoT.

LIST OF EXPERIMENTS

1. Interfacing RTC module (DS3231) with MSP430 digital clock.
2. Sending email using MSP430 launchpad and ESP8266.
3. Motion detector using MSP430 launchpad and PIR sensor
4. Alphanumeric 16*2 LCD display interface with MSP430 using code composer studio.
5. Interrupts in MSP430 – writing GPIO interrupt program using code composer studio.
6. Pulse width modulation (PWM) using MSP430 G2: controlling brightness of LED.
7. Measuring analog voltage using MSP430G2 with ADC.
8. Blinking LED sequence with MSP430 G2.
9. Interfacing stepper motor with MSP430 G2.
10. Interfacing HC-05 Bluetooth module with MSP430 launchpad to control an LED.

TOTAL PERIODS   30

COURSE OUTCOMES

At the end the course, students will be able to

- use wireless peripherals for exchange of data.
- make use of Cloud platform to upload and analyse any sensor data.
- use the knowledge and skills acquired during the course to build and test a complete, working IoT system involving prototyping, programming and data analysis.
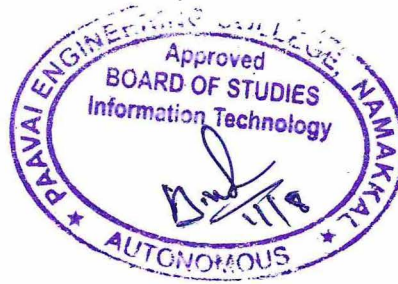- develop cloud based platform to log the data.

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS

SOFTWARE: Turbo C, Python Shell

HARDWARE: Raspberry Pi, Arudino Board, Sensor-LM35 TEMP.SENSOR, Wireless Module-USB Dongles

CO-PO MAPPING:

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CO3	3	3	3	1	3	-	-	-	1	-	1	2	2	1
CO4	3	3	3	1	3	-	-	-	1	-	2	3	2	1

IT20606   **INTERNET PROGRAMMING LABORATORY**   0   0   4   2

COURSE OBJECTIVES

To enable the students to

- create a webpage using HTML and Cascading Style Sheets.
- design interactive web pages using Scripting languages.
- learn server side programming using servlets and JSP.
- develop web pages using XML/XSLT.

LIST OF EXPERIMENTS

1. Create a web page with the following using HTML
    a. To embed a map in a web page.
    b. To fix the hot spots in that map.

    Show all the related information when the hot spots are clicked.

2. Design an attractive webpage using style sheets.

3. Client side Scripts for Validating Web Form Controls using DHTML.

4. Design a webpage to create simple interactive CGPA calculator using Event Handling.

5. Write programs in Java to create three-tier applications using JSP and Databases
    - For conducting on-line examination.
    - For displaying student mark list. Assume that student information is available in a database which has been stored in a database server.

6. Programs using XML – Schema – XSLT/XSL.

7. Write a Angular JS Program Forms and its Current Validation Status.

8. Programs using DOM and SAX parsers.

9. Programs using AJAX.

10. Consider a case where we have two web Services- an airline service and a travel agent and the travel agent is searching for an airline. Implement this scenario using Web Services and Database.

TOTAL PERIODS   60

COURSE OUTCOMES

At the end the course, students will be able to

- design simple web pages using markup languages like HTML and XHTML.
- develop server side web pages that have to process request from client side web pages.
- design a web pages using JSP.
- implement the web data using XML

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS

SOFTWARE: Dream Weaver or Equivalent, MySQL or Equivalent, Apache Server,WAMP/XAMPP

HARDWARE: Flavor of any WINDOWS or LINUX and Standalone desktops 30 Nos.

CO-PO MAPPING:

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CO4	2	3	3	3	3	2	2	-	-	-	-	1	3	2

　　CAREER DEVELOPMENT LABORATORY II　　　0　0　2　1

COURSE OBJECTIVES

To enable students to

- draft resume and enhance their skills to manage stress to survive in corporate world.
- excel in interview skills.
- solve the quantitative aptitude problems and improve their problem-solving skills.
- improve their reasoning skills to get placed in reputed companies.

UNIT I　　RESUME WRITINGS　　　　　　　　　　　　　　　　　　6

Resume Writing Skills: Curriculum Vitae and Resume – Things to do while writing a Resume – Mistakes and Pitfalls to Avoid- Cover Letter: General Guidelines – The Content - Stress Management – Dressing Etiquette

Activities: Corporate Resume Building Session I – JAM Session: Level III – Role Play Session (Individual): Level III - Company Profile Analysis Session III – Personality Profile Analysis Session III

UNIT II　　INTERVIEW SKILLS　　　　　　　　　　　　　　　　6

Interview Skills: Introduction – Before the Interview – During the Interview – After the Interview – Types of Interview.

Activities: Presentation Session: Level II- Group Discussion Session: Level III ,Mock Interview Practice Session, Corporate Resume Building Session II

UNIT III　　QUANTITATIVE APTITUDE　　　　　　　　　　　　　6

Permutation and Combination – Probability: Dice, Colours, Coin, Cards ; Partnership – Ages – Calendars

UNIT IV　　LOGICAL REASONING -I　　　　　　　　　　　　　　6

Making Judgements – Matching Definitions – Cause and Effect

UNIT V　　LOGICAL REASONING II　　　　　　　　　　　　　　6

Directions – Syllogism – Analogy – Statements and Arguments

TOTAL PERIODS:　30

COURSE OUTCOMES

Upon completion of the course, the students will be able to

- write resume and enhance their etiquettes.
- demonstrate the interpersonal skills in group discussions.
- compute problems based on quantitative aptitude.
- reveal their logical and verbal reasoning by scoring the expected percentage to get placed in reputed companies.
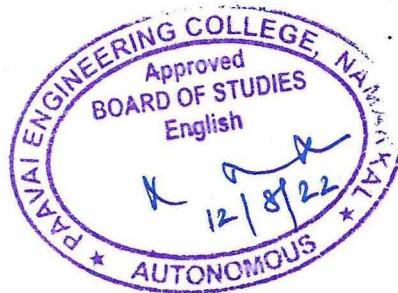
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CO - PO Mapping

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<tr><td>CO2</td><td>-</td><td>2</td><td>3</td><td>-</td><td>2</td><td>-</td><td>2</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>3</td><td>2</td></tr>
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<tr><td>CO4</td><td>2</td><td>3</td><td>3</td><td>2</td><td>1</td><td>3</td><td>3</td><td>1</td><td>-</td><td>1</td><td>2</td><td>-</td><td>2</td><td>3</td></tr>
</table>

PROFESSIONAL ELECTIVE – I

IT20151	INFORMATION CODING TECHNIQUES	3	0	0	3

COURSE OBJECTIVES

To enable the students to

- understand encoding and decoding of digital data streams.
- know the various modulation techniques.
- know about the methods in coding and decoding techniques.
- study the compression and decompression techniques.
- learn the concepts of multimedia communication.

UNIT I   INFORMATION ENTROPY FUNDAMENTALS   9

Introduction - Uncertainty, Information and Entropy, Source coding Theorem, Huffman coding, Shannon Fano-Elias coding, Discrete Memory less channels, channel capacity, channel coding Theorem, Information capacity Theorem.

UNIT II   DATA AND VOICE CODING   9

Delta Modulation; Differential Pulse code Modulation; Adaptive Differential Pulse Code Modulation; Adaptive subband coding; Adaptive Delta Modulatio; Coding of speech signal at low bit rates (Vocoders, LPC).

UNIT III   ERROR CONTROL CODING   9

Linear Block codes - Syndrome Decoding, Minimum distance consideration; Cyclic Codes - Generator Polynomial, Parity check polynomial, Encoder for cyclic codes, calculation of syndrome; Convolutional codes.

UNIT IV   COMPRESSION TECHNIQUES   9

Principles - Text compression - Static Huffman Coding, Dynamic Huffman coding, Arithmetic coding; Image Compression - Graphics Interchange format, Tagged Image File Format, Digitized documents; Introduction to JPEG standards.

UNIT V   AUDIO AND VIDEO COMPRESSION   9

Audio compression - Linear Predictive coding, code excited LPC, Perceptual coding, MPEG audio coders, Dolby audio coders; Video compression – Principles; Introduction to H.261 and MPEG Video standards.

TOTAL PERIODS   45

COURSE OUTCOMES

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

- design an application with error–control.
- apply the principles of differential coding to compress speech
- analyze the various error control coding and apply to given problem.
- use compression and decompression techniques.
- apply the concepts of multimedia communication.
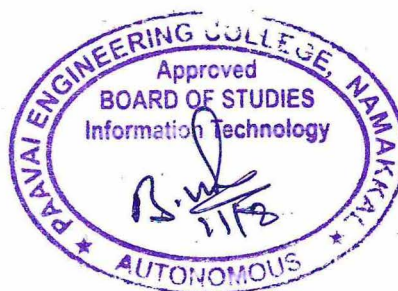
TEXT BOOKS

1. Simon Haykin, Communication Systems, John Wiley and Sons, 4th Edition, 2014.

2. Fred Halsall, "Multimedia Communications, Applications, Networks, Protocols and Standards", 4th Edition, Pearson Education, 2009.

REFERENCES

1. Ranjan Bose, "Information Theory, Coding and Cryptography", 2 Edition, Tata McGraw-Hill, India, 2008.

2. Mark S. Drew, Ze-Nian Li, "Fundamentals of Multimedia", 1 Edition, Pearson Education, 2003.

3. Mark Nelson, "Data Compression Book", 2 Edition, BPB Publication, 2004.

4. Rafael C.Gonzalez and Richard E.Woods, Digital image processing, PHI, 2013.

CO-PO MAPPING:

COs	Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak													
	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	2	-	-	-	-	-	-	-	-	-	3	1
CO2	3	2	1	1	-	-	-	-	-	-	-	-	3	2
CO3	3	2	-	2	-	-	-	-	-	-	-	-	3	2
CO4	2	1	-	-	-	-	-	-	-	-	-	-	3	1
CO5	2	1	2	1	-	-	-	-	-	-	-	-	3	2

COURSE OBJECTIVES

To enable the students to

- understand the need for machine learning for various problem solving.
- learn about the Linear Models and Classification in machine.
- study the various Neural networks and algorithms in machine learning.
- understand the latest trends and methods in machine learning.
- study of appropriate Unsupervised and Reinforment Learning.

UNIT I　　　INTRODUCTION　　　　　　　　　　　　　　　　　　　　9

Types of Learning, Designing a learning system, concept learning, Find-s Algorithm, Candidate Elimination, Data Preprocessing, Data Cleaning, Data Scales, Transformation, Dimensionality Reduction.

UNIT II　　　LINEAR MODELS　　　　　　　　　　　　　　　　　　　9

Linear Regression Models, Maximum Likelihood Estimation, Least Squares, Bias-Variance Decomposition, Bayesian Linear Regression, Linear Models for Classification, Probabilistic Generative Models, Probabilistic Discriminative Models, Linear Discriminant Analysis.

UNIT III　　　NEURAL NETWORKS AND DECISION TREES　　　　　　　9

Feed-forward Networks - Network Training, Delta Rule, Gradient Descent, Error Back propagation, Regularization in Neural Networks, Generalization; Decision Tree Learning – Representation, Inductive Bias, Issues.

UNIT IV　　　KERNEL AND GRAPHICAL METHODS　　　　　　　　　9

Constructing Kernels, Radial Basis Function Networks, Gaussian Processes, Maximum Margin Classifiers, SVM, Bayes Theorem, Naive Bayes, Bayesian Networks.

UNIT V　　　UNSUPERVISED AND REINFORCEMENT LEARNING　　　9

Measures of Similarity and Dissimilarity, Clustering, Partitioning methods, K Means, Hierarchical Methods, Outliers; Reinforcement Learning - Reinforcement Learning Tasks, Q-learning.

TOTAL PERIODS　　45

COURSE OUTCOMES

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

- differentiate between supervised, unsupervised, semi-supervised machine learning approaches.
- apply specific supervised or unsupervised machine learning algorithm for a particular problem.
- analyze and suggest the appropriate machine learning approach for the various types of problem.
- design and make modifications to existing machine learning algorithms to suit an individual application.
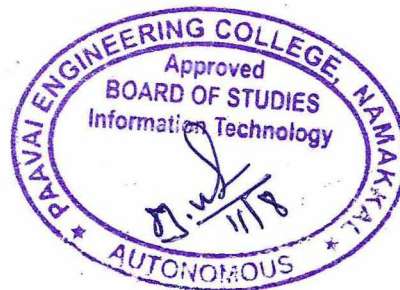- analyze case studies on the advanced machine learning algorithms.

TEXT BOOKS

1. Tom M. Mitchell, Machine Learningǁ, McGraw-Hill Education (India) Private Limited, 2013.

2. Christopher M Bishop , "Pattern Recognition and Machine Learning Learning", Springer, 2011.

REFERENCES

1. Trevor Hastie, Robert Tibshirani, Jerome friedman , "The Elements of Statistical learning", 2nd Edition, Springer, 2017

2. Ethem Alpaydin, Introduction to Machine Learning (Adaptive Computation and Machine Learning), 3rd Edition, PHI Learning, 2015.

3. Kevin Murphy , "Machine Learning - A Probabilistic Perspective", MIT Press, 2012.

4. Yaser S. Abu-Mostafa , "Learning from Data", AML, 2017.

CO-PO MAPPING:

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CO3	3	3	3	1	-	1	-	-	1	-	-	1	2	1
CO4	3	3	3	1	-	-	-	-	1	-	-	2	1	1
CO5	3	3	3	2	-	-	-	-	-	-	-	-	1	1

| IT20153 | GRAPHICS AND MULTIMEDIA | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES

To enable the students to

- acquire knowledge on the graphics mode, with the help of basic algorithms and methodologies.

- understand a computer draws the 2D and 3D objects.

- learn the implementation of Color models.

- understand principles and different components of multimedia. learn the devices and tools for generating and representing multimedia.

- know the concepts of basic animation and interfaces.

UNIT I   FUNDAMENTALS   9

Introduction to Computer Graphics - Raster and vector graphics systems; Output primitives - points and lines, line drawing algorithms, loading the frame buffer, line function circle and ellipse generating algorithms, Pixel addressing and object geometry, filled area primitives, anti - aliasing.

UNIT II   2D - 3D REPRESENTATION AND MANIPULATION   9

2D Transformation - Translation, rotation, scaling, reflection and shearing, Matrix and homogeneous Coordinates, Composite 2D transformations, 2D Viewing; Clipping - line, polygon and text clipping; 3D Transformation - Translation, rotation, scaling, reflection, shearing, Composite 3D transformation, 3D Viewing, Projection, 3D clipping; Case Study.

UNIT III   VISIBLE SURFACE DETECTION AND COLOR MODELS   9

Back face detection, Depth buffer method, A-Buffer method, Scan line method, Depth sorting method, BSP - Tree method, Area Subdivision method, Octree method, Ray casting, Curved surfaces, Wireframe methods; Visibility Detection Functions; Color Models - RGB, CMY, HSV, HLS, CIE models.

UNIT IV   MULTIMEDIA SYSTEM DESIGN & MULTIMEDIA FILE HANDLING   9

Multimedia - Basics, Multimedia applications, Multimedia system architecture, Evolving technologies for multimedia, Defining objects for multimedia systems, Multimedia data interface standards, Multimedia databases, Compression and decompression, Data and file format standards; Multimedia I/O technologies - Digital voice and audio, Video image and animation, Full motion video, Storage and retrieval technologies; Virtual Reality.

UNIT V   ANIMATION AND HYERMEDIA   9

Basic principles of animation - Multimedia authoring and user interface; Hypermedia messaging - Mobile messaging, Hypermedia message component, Creating hypermedia message, Integrated multimedia message standards, Integrated document management, Distributed multimedia systems.

TOTAL PERIODS   45

COURSE OUTCOMES

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

- design the basic concepts to draw the transformations.
- design two and three dimensional graphics transformations.
- apply color models to graphics.
- create basic multimedia presentations.
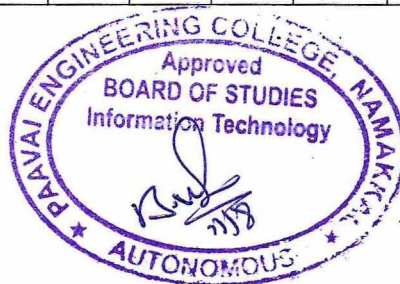- design animation sequences and standards of multimedia.

TEXT BOOKS

1. Donald Hearn and M. Pauline Baker, "Computer Graphics C Version", Pearson Education, 2011. [UNIT I,II,III]

2. Andleigh, P. K and Kiran Thakrar, "Multimedia Systems and Design", PHI, 2015. [UNIT IV,V]

REFERENCES

1. Foley, Vandam, Feiner and Huges, "Computer Graphics: Principles and Practice", 2nd Edition, Pearson Education, 2013.

2. Nigel Chapman and Jenny Chapman, "Digital Multimedia", John Wiley & Sons Ltd.,2009.

3. Judith Jeffcoate, "Multimedia in practice: Technology and Applications", PHI, 2006.

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CO3	3	2	1	1	3	-	-	-	-	2	1	1	2	2
CO4	3	2	2	1	3	-	-	-	-	2	-	1	3	3
CO5	3	3	2	2	3	-	-	-	-	2	-	1	3	3

IT20154	C# AND .NET FRAMEWORK	3	0	0	3

COURSE OBJECTIVES

To enable the students to

- know the object oriented aspects and basic concepts of C#.
- understand various Application development in .NET.
- learn about database connectivity for applications with ADO.NET.
- know the working of distributed applications.
- study to create and work with deployment of applications.

UNIT I   NET FREMEWORK   9

Introduction - Web framework, History, Types of Framework and Versions, Common Language Runtime (CLR), Common Type System (CTS), Common Language Specification (CLS), Types of JIT Compliers, Assemblies, Shared Assemblies, Namespaces, Garbage Collection(MISL), Error handling.

UNIT II   C# LANGUAGE BASICS   9

Core C# - OOPs Concepts, Variables, Data Types, Flow control, Objects and Types, Methods and Parameters, Named Parameters and Optional Parameters, String Handling, Classes and Struts, Inheritance, Interface, Generics, Arrays and Tuples, Operators and Casts, Indexers.

UNIT III   C# ADVANCED FEATURES   9

Events - Event Publisher, Event Listener; Strings and Regular Expressions - Generics, Collections; Memory Management and Pointers; Errors and Exceptions; Reflection; Delegates; Lambdas - Lambda Expressions; ADO.Net – Peer-to-Peer Networking, PNRP, Building P2P Applications, Windows Presentation Foundation (WPF), LINQ, Entity Framework, NUNIT.

UNIT IV   WINDOWS BASED APPLICATION   9

Window based applications – Add and configure a Windows Form, Add configure a Windows Forms control, Windows Communication Foundation(WCF); Introduction to web services - Windows Workflow Foundation(WWF), Workflows; Core ASP .NET - ASP.NET Web Forms.

UNIT V   MODEL VIEW CONTROLLER   9

Model View Controller Architecture - Role of Model View Controller, Benefits of Model View Controller, MVC State Management, HTML Helpers, URLS and Routings, Areas, MVVM, Razor Basis, MVC State Management, Testing and Debugging, Optimizing performance, Packaging and Deployment, Networking and Mobile Devices.

TOTAL PERIODS   45

COURSE OUTCOMES

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

- implement the basic and advanced features of C# and .NET.
- utilize the object oriented aspects of C#.

- develop windows applications using .NET.
- design web based applications using .NET.
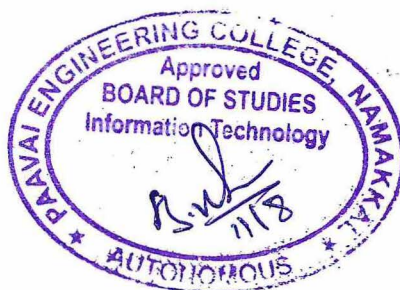- develop applications in .Net framework.

TEXT BOOKS

1. Herbert Scheldt, ―The Complete Reference: C# 4.0‖, Tata McGraw Hill, 2012.
2. Christian Nagel et al. "Professional C# 2012 with .NET 4.5", Wiley India, 2012.

REFERENCES

1. Andrew Troelsen , ―Pro C# 2010 and the .NET 4 Platform,‖Fifth edition, APress, 2010.
2. I Griffiths, Matthew Adams, Jesse Liberty, ―Programming C# 4.0‖, Sixth Edition, _Reilly, 2010.
3. E. Balagurusamy, ―Programming in C# - A Primer‖, Third Edition, Tata McGraw- Hill,2010.
4. Charles Petzold, ―Programming in the key of C# – A Primer for Aspiring Programmers‖, Microsoft Press US; 1 edition (6 August 2003).

CO-PO MAPPING:

<table>
<tr><td colspan="14">Mapping of Course Outcomes with Programme Outcomes
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<tr><td rowspan="2">Cos</td><td colspan="13">Programme Outcomes(POs)</td></tr>
<tr><td>PO1</td><td>PO2</td><td>PO3</td><td>PO4</td><td>PO5</td><td>PO6</td><td>PO7</td><td>PO8</td><td>PO9</td><td>PO10</td><td>PO11</td><td>PO12</td><td>PSO1</td><td>PSO2</td></tr>
<tr><td>CO1</td><td>3</td><td>3</td><td>2</td><td>2</td><td>3</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>1</td><td>3</td><td>2</td></tr>
<tr><td>CO2</td><td>3</td><td>3</td><td>2</td><td>1</td><td>3</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>1</td><td>3</td><td>2</td></tr>
<tr><td>CO3</td><td>3</td><td>2</td><td>3</td><td>2</td><td>3</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>1</td><td>3</td><td>2</td></tr>
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</table>

PROFESSIONAL ELECTIVE - II

| IT20251 | DISTRIBUTED SYSTEMS | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES

To enable the students to

- understand the distributed environment.
- acquire knowledge on foundations of distributed Systems.
- introduce the idea of RMI and distributed objects related issues.
- understand in detail about middleware services and file system for distributed system.
- apply synchronization and replication methods.

UNIT I   INTRODUCTION   9

Fundamentals of Distributed System - Examples of Distributed Systems, Advantages, Disadvantages and issues, Trends in Distributed Systems, Focus on resource sharing; Case Study - Web Challenges.

UNIT II   COMMUNICATION IN DISTRIBUTED SYSTEM   9

Distributed System Models; Inter process Communication the API for internet protocols; External data representation - Multicast communication Distributed Systems; Network virtualization - Overlay networks; Case study - Message Passing Interface (MPI).

UNIT III   REMOTE METHOD INVOCATION AND OBJECTS   9

Remote Method Invocation (RMI) Architecture - Request-Reply protocols, Remote Procedure Call (RPC); Case study - Java RMI; Group communication - Publish Subscribe Assessment; Distributed Message queue - Shared memory - Distributed objects; Case study - CORBA features, Objects to Components.

UNIT IV   PEER TO PEER SERVICES AND FILE SYSTEM   9

Peer-to-Peer Systems - Napster and its legacy, Middleware, Routing Overlays; overlay case studies - Pastry; Distributed File Systems – Introduction, File service architecture, Andrew File system.

UNIT V   SYNCHRONIZATION AND REPLICATION   9

Clocks, events states, Clock Synchronizing physical clock, Logical clocks, Global states; Distributed mutual exclusion - Election Algorithm (Bully Algorithm), Concurrency Control, Transactions Execution, Nested transactions, Optimistic Concurrency Control, Timestamp ordering; Case study - Coda.

TOTAL PERIODS   45

COURSE OUTCOMES

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

- develop the principles and standard practices underlying the design of distributed and parallel systems.
- explain the core issues of distributed and parallel systems.
- analyze the difficulties in implementing basic communication in parallel and distributed systems.
- solve the difficulty in designing parallel and distributed algorithms.
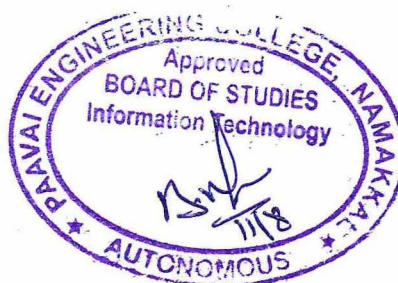- apply the centralized algorithm for applications.

TEXT BOOKS

1. George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems Concepts and Design" Fifth edition – 2011 – Addison Wesley.

2. Pradeep K Sinha , "Distributed Operating Systems: Concepts and Design", Prentice Hall of India, New Delhi, 2009.

REFERENCES

1. Andrew S Tanenbaum, Marteen Van Steen , "Distributed Systems Principles and Paradigms", Pearson Education / Prentice Hall of India, New Delhi, 2007

2. Liu M.L., "Distributed Computing, Principles and Applications", Pearson and education,2004.

3. David S Linthicium, "Cloud Computing and SOA Convergence in your Enterprise", Pearson, USA, 2010.

4. Sebastien Goasguen , "Docker in the Cloud –Recipes for AWS, Azure, Google, and More", O'Reilly Media, USA, 2016.

CO-PO MAPPING:

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CO3	-	1	-	2	1	2	1	-	1	2	3	3	3	1
CO4	1	1	2	3	-	1	3	1	-	1	2	1	2	3
CO5	3	2	2	1	-	1	-	1	-	1	1	3	3	2

COURSE OBJECTIVES

To enable the students to .

- understand the design and implementation of a data store.
- acquire knowledge on data and various preprocessing techniques.
- study the various correlation based frequent patterns mining in large datasets.
- learn various classifiers in data mining.
- understand the data mining techniques and methods to be applied on large datasets.

UNIT I   DATA WAREHOUSING   9

Data warehouse - Basic Concept, Modeling, Design and usage; Implementation - Data cube Computation Methods, Data Generalization by Attribute, Oriented Induction approach.

UNIT II   DATA MINING   9

Introduction - Kinds of Data and Patterns, Major Issues in Data Mining, Statistical Description of Data, Measuring Data Similarity and Dissimilarity; Data preprocessing - Data Cleaning, Data Integration, Data Transformation Data Reduction; Data Discretization - Concept Hierarchy Generation.

UNIT III   ASSOCIATION RULE MINING   9

Basic concepts - Frequent Item set Mining Methods, Apriori algorithm; A Pattern Growth Approach for Mining Frequent Item sets; Mining Various Kinds of Association Rules; Correlation Analysis; Constraint Based Association Mining.

UNIT IV   CLASSIFICATION   9

Basic Concepts - Decision Tree Induction, Bayes Classification Methods, Rule Based Classification, Classification by Back propagation, Support vector machines, Associative Classification, Lazy Learners, Other Classification Methods, Prediction.

UNIT V   CLUSTERING AND DATA MINING APPLICATIONS   9

Cluster analysis, Partitioning Methods, Hierarchical Methods, Density Based Methods, Grid Based Methods, Model Based Clustering Methods, Clustering High Dimensional Data, Constraint Based Clustering Analysis - Outlier Analysis; Data Mining Applications - Financial Data Analysis, Science and Engineering, Intrusion Detection and Prevention.

TOTAL PERIODS   45

COURSE OUTCOMES

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

- understand the design of a data warehouse.
- apply preprocessing techniques.

- analyze the various correlation based frequent patterns mining in large datasets.
- compare and contrast the various classifiers.
- apply clustering techniques and methods to large datasets.

TEXT BOOKS

1. Jiawei Han and Micheline Kamber, ―Data Mining Concepts and Techniques, Third Edition, Elsevier, 2012.

REFERENCES

1. Alex Berson and Stephen J.Smith, ―Data Warehousing, Data Mining & OLAP‖, Tata McGraw – Hill Edition, 35th Reprint 2016.
2. K.P. Soman, Shyam Diwakar and V. Ajay, ―Insight into Data Mining Theory and Practice, Eastern Economy Edition, Prentice Hall of India, 2006.
3. Ian H.Witten and Eibe Frank, ―Data Mining: Practical Machine Learning Tools and Techniques, Elsevier, Second Edition.

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CO4	3	3	2	2	1	-	-	-	-	-	-	3	3	2
CO5	3	2	2	1	-	-	-	-	-	-	-	3	3	2

| IT20253 | USER INTERFACE DESIGN | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES

To enable the students to

- learn about graphical system.
- study about design standards.
- learn about the controls used in windows.
- understand the multimedia effects.
- study the performance of various test in windows layout.

UNIT I   INTRODUCTION   **9**

Human Computer Interface, Characteristics of Graphical and web user Interface, Direct Manipulation Graphical System, Web User Interface, Popularity, Characteristic and Principles.

UNIT II   HUMAN COMPUTER INTERACTION   **9**

User Interface Design Process - Obstacles, Usability, Human Characteristics in Design, Human Interaction Speed, Business Functions, Requirement Analysis, Direct - Indirect Methods, Basic Business Functions, Design Standards, System Timings; Human Consideration In Screen Design - Structures of Menus, Functions of Menus, Contents of Menu, Formatting, Phrasing the Menu, Selecting Menu Choice, Navigating Menus, Graphical Menus.

UNIT III   WINDOWS   **9**

Characteristics, Components, Presentation Styles, Types, Managements, Organizations, Operations; Web System - Device, Based Controls Characteristics, Screen, Based Control, Operate Control, Text Boxes, Selection Control, Combination Control, Custom Control, Presentation Control.

UNIT IV   MULTIMEDIA   **9**

Text For Web Pages, Effective Feedback, Guidance and Assistance, Internationalization, Accessibility, Types of disabilities, accessibility design, Icons; Multimedia - Graphics Images, video, Photographs/Pictures, Video, Coloring.

UNIT V   WINDOWS LAYOUT – TEST   **9**

Prototypes, Kinds of Tests, Retest, Information Search, Visualization, Hypermedia, WWW, Software Tools.

TOTAL PERIODS   45

COURSE OUTCOMES

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

- utilize the user interface.
- apply the design standards.
- explain the user interface design process.
- implement the multimedia effects.
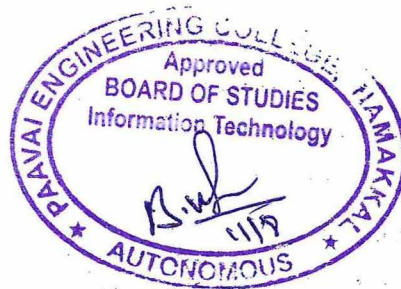- analyze the performance of various test in windows layout.

TEXT BOOKS

1. Wilbent. O. Galitz ,"The Essential Guide To User Interface Design", John Wiley & Sons, 2016.
2. Ben Sheiderman, "Design The User Interface", Pearson Education, 2016.

REFERENCES

1. Alan Cooper, "The Essential Of User Interface Design", Wiley -Dream Tech Ltd., 2002.
2. Theo Mandel, "The Elements of User Interface Design", John Wiley and Sons Ltd,2007.
3. Railean, Elena, "User Interface Design of Digital Textbooks",2014.
4. Wilbert O. Galitz, The Essential Guide to User Interface Design, Second Edition

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CO4	3	2	2	2	-	-	-	-	-	-	-	1	3	2
CO5	3	3	2	2	-	-	-	-	-	-	-	1	3	2

COURSE OBJECTIVES

To enable the students to

- study the websites using J2EE.
- understand the Java server page.
- gain the knowledge about Enterprise Bean.
- know about security provided by Java.
- understand the issues in securities.

UNIT I   J2EE OVERVIEW   9

Distributed Multi-tiered Applications - J2EE Containers, Web Services Support, Packaging Applications, Development Roles, J2EE APIs, Sun Java System Application, Server Platform Edition 8; Understanding XML - Introduction to XML, Generating XML Data.

UNIT II   GETTING STARTED WITH WEB APPLICATIONS   9

Web Application Life Cycle - Web modules, Web Application Examples; Java Servlet Technology - Servlet terminology, Servlet, Generic Servlet, Http Servlet, Session Tracking in Servlets, Servlet Life Cycle, Servlet Collaboration, JDBC in servlet, Servlet Pagination, Sharing Information, Creating and Initializing a Servlet, Writing Service Methods, Filtering Requests and Responses, Invoking Other Web Resources, Accessing the Web Context, Maintaining Client State, Finalizing a Servlet, The Example Servlet.

UNIT III   JAVA SERVER PAGES (JSP)   9

JSP Introduction - JSP with Life cycle, JSP API, Scripting elements, scriptlet tag, expression tag, declaration tag, Implicit Objects, Directive elements, page directive, include directive, taglib directive, Exception Handling, Action Elements, Expression Language, MVC in JSP, JSTL, Custom tags, JSP pagination, JDBC in JSP, Development in JSP.

UNIT IV   ENTERPRISE BEANS (EJB)   9

An Enterprise Bean - Session Bean, Entity Bean, Message, Driven Bean, Defining Client Access with Interfaces, The Contents of an Enterprise Bean, Naming Conventions for Enterprise Beans, The Life Cycles of Enterprise Beans Getting Started With Enterprise Beans, Benefits of Enterprise Beans, Types of Enterprise Beans, Creating the J2EE Application Creating the Enterprise Bean, Creating the Application Client, Creating the Web Client Specifying the Web Client_s Context Root, Deploying the J2EE Application, Running the Application Client, Running the Web Client.

UNIT V   SECURITY   9

Introduction to Security in the Java EE Platform - Understanding Login Authentication, Securing Web Applications HTTP basic authentication, Form based login authentication, Working with Digital certificates, Client Certificate authentication, Mutual authentication, Digest authentication, JDBC Realm for User Authentication; The Java Message service API - Overview, Basic JMS API concepts, The JMS API programming model; HTTP overview - HTTP Requests and HTTP Responses.

TOTAL PERIODS   45

COURSE OUTCOMES

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

- explain the Java platform and XML applications.
- integrate Servlets, JSP and JDBC and build a web application.
- develop web applications using Servlets and JSP.
- develop Enterprise Applications using Session Bean, Entity Bean and MDB.
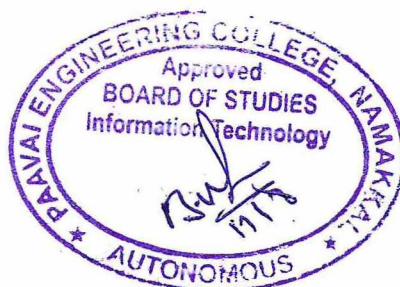- develop the security levels in Java.

TEXT BOOKS

1. Herbert Schildt, J2EE –The Complete Reference, Tata McGraw-Hill, Seventh Edition (2008).
2. Elliotte Rusty Harold, " Java Network Programming", O'Reilly publishers, 2000 (UNIT-II).

REFERENCES

1. Alur Deepak, Malks Dan and Crupi John, Core J2EE Patterns: Best Practices and Design Strategies, Prentice Hall India (2001).
2. Jim Keogh, J2EE-The Complete Reference; Tata Mcgraw-Hill, Edition(2002).
3. Austin and Pawlan, Advanced Programming for JAVA 2 Platform, Pearson Education (2004).
4. Geary M. David, Core JSTL Mastering the JSP standard Tag Library, Pearson Education(2007).

CO-PO MAPPING:

Cos	Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak													
	Programme Outcomes (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	3	-	-	-	-	-	-	1	3	2
CO2	3	3	2	1	3	-	-	-	-	-	-	1	3	2
CO3	3	2	3	2	3	-	-	-	-	-	-	1	3	2
CO4	3	2	2	2	3	-	-	-	-	-	-	1	3	2
CO5	3	3	2	2	3	-	-	-	-	-	-	1	3	2

| IT20901 | INFORMATION TECHNOLOGY ESSENTIALS | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES

To enable the students to

- understand the concept of Internet Technology.
- learn about scripting languages.
- acquire knowledge in Networks and its working principles.
- understand the cell phone communication technology.
- study the various applications related to Information Technology.

UNIT I   WEB ESSENTIALS   9

Creating a Website, Working principle of Website, Browser fundamentals, Authoring tools; Types of servers - Application Server, Web Server, Data base Server.

UNIT II   SCRIPTING ESSENTIALS   9

Need for Scripting languages, Types of scripting languages, Client side scripting, Server side scripting; PHP - Working principle of PHP, PHP Variables, Constants, Operators, Flow Control and Looping, Arrays, Strings, Functions, File Handling; PHP and MySQL - PHP and HTML.

UNIT III   NETWORKING ESSENTIALS   9

Fundamental computer network concepts - Types of computer networks, Network layers, TCP/IP model, Wireless Local Area Network, Ethernet, WiFi, Network Routing, Switching, Network components.

UNIT IV   MOBILE COMMUNICATION ESSENTIALS   9

Cell phone working fundamentals - Cell phone frequencies and channels, Digital cell phone components, Generations of cellular networks, Cell phone network technologies/architecture, Voice calls and SMS.

UNIT V   APPLICATIONESSENTIALS   9

Creation of simple interactive applications, Simple database applications, Multimedia applications, Design and development of information systems, Personal Information System, Information retrieval system, Social networking applications.

TOTAL PERIODS   45

COURSE OUTCOMES

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

- use the design and deployment techniques in web-sites.
- create a simple web-applications.
- develop a simple database applications.
- utilize the mobile communication for developing information system.
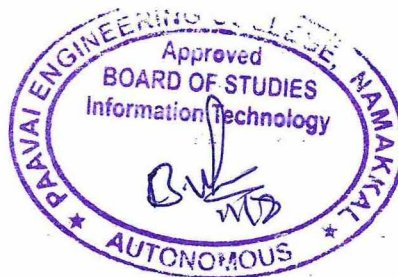- implement the basic soft networking and mobile communications.

TEXT BOOKS

1. Robin Nixon, "Learning PHP, MySQL, JavaScript, CSS& HTML5" Third Edition, 'REILLY, 2014.
2. James F.Kurose, "Computer Networking: ATop-Down Approach", Sixth Edition, Pearson, 2012.

REFERENCES

1. Gottapu Sasibhushana Rao, "Mobile Cellular Communication", Pearson, 2012
2. R. Kelly Rainer , Casey G. Cegielski , Brad Prince, Introduction to Information Systems, Fifth Edition, Wiley Publication, 2014.
3. it-ebooks.org

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes													
(3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak													
Cos	Programme Outcomes(POs)												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	-	-	-	-	-	-	-	1	3	2
CO2	3	3	2	1	-	-	-	-	-	-	-	1	3	2
CO3	3	2	3	2	-	-	-	-	-	-	-	1	3	2
CO4	3	2	2	2	-	-	-	-	-	-	-	1	3	2
CO5	3	3	2	2	-	-	-	-	-	-	-	1	3	2

OPEN ELECTIVE- I

IT20902   **GREEN COMPUTING**   3   0   0   3

COURSE OBJECTIVES

To enable the students to

- learn the fundamentals of Green Computing.
- study the Green computing Grid Framework.
- understand the issues related with Green compliance.
- study and develop various case studies.
- learn the fundamentals of Green Computing.

UNIT I.   FUNDAMENTALS   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.

UNIT II   GREEN ASSETS AND MODELING   9

Green Assets - Buildings, Data Centers, Networks, and Devices; Green Business Process Management - Modeling, Optimization, and Collaboration; Green Enterprise Architecture - Environmental Intelligence, Green Supply Chains, Green Information Systems, Design and Development Models.

UNIT III   GRID FRAMEWORK   9

Virtualization of IT systems - Role of electric utilities, Telecommuting, teleconferencing and teleporting; Materials recycling; Best ways for Green PC; Green Data center; Green Grid framework.

UNIT IV   GREEN COMPLIANCE   9

Socio-cultural aspects of Green IT; Green Enterprise Transformation Roadmap; Green Compliance - Protocols, Standards, and Audits; Emergent Carbon Issues - Technologies and Future.

UNIT V   CASE STUDIES   9

The Environmentally Responsible Business Strategies (ERBS) - Case Study Scenarios for Trial Runs; Case Studies - Applying Green IT Strategies and Applications to a Home, Hospital, Packaging Industry and Telecom Sector.

TOTAL PERIODS   **45**

COURSE OUTCOMES

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

- apply the knowledge to adopt green computing practices to minimize negative impacts on the environment.
- implement the skill in energy saving practices in their use of hardware.
- evaluate technology tools that can reduce paper waste and carbon footprint by the stakeholders.
- analyze the ways to minimize equipment disposal requirements.
- demonstrate the case studies to protect environment.

TEXT BOOKS

1. Bhuvan Unhelkar, —Green IT Strategies and Applications-Using Environmental Intelligence, CRC Press, June 2014.

2. Woody Leonhard, Katherine Murray, —Green Home computing for dummies, August 2012.

REFERENCES

1. Alin Gales, Michael Schaefer, Mike Ebbers, —Green Data Center: steps for the Journey, Shroff/IBM rebook, 2011.

2. John Lamb, —The Greening of IT, Pearson Education, 2009.

3. Jason Harris, —Green Computing and Green IT- Best Practices on regulations &industry, Lulu.com, 2008

4. Carl speshocky, —Empowering Green Initiatives with IT, John Wiley & Sons, 2010.

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CO3	3	2	3	2	1	1	-	-	-	-	-	2	3	2
CO4	3	2	2	2	1	-	-	-	-	-	-	2	3	2
CO5	3	2	2	1	-	-	-	-	-	-	-	2	2	2

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