SCHEME FOR EXAMINATION
B.TECH (FOUR YEAR) DEGREE COURSE
THIRD YEAR, INFORMATION TECHNOLOGY
SEMESTER VII
EFFECTIVE FROM SESSION 2020-21

SL. NO.	SUBJECT CODE	SUBJECTS	PERIODS/ WEEK			EVALUATION SCHEME			CREDITS
			L	T	P	IA	ESE	TOTAL	
THEORY									
1	IT07TPC01	CYBER SECURITY	3	0	0	30	70	100	3
2	IT07TPE4X	ELECTIVE – IV	3	0	0	30	70	100	3
3	IT07TPE5X	ELECTIVE – V	3	0	0	30	70	100	3
4	IT07TOE2X	OPEN ELECTIVE – II	3	0	0	30	70	100	3
PRACTICAL									
1	IT07PPC21	PROJECT-II	0	0	12	60	40	100	6
TOTAL CREDITS									**18**
IA- INTERNAL ASSESSMENT, ESE-END SEMESTER EXAMINATION, L-LECTURE, T-TUTORIAL, P-PRACTICAL									

LIST OF ELECTIVE-IV

1	IT07TPE41	ADVANCE DATABASE DESIGN
2	IT07TPE42	DATA MINING
3.	IT07TPE43	GAME THEORY
4.	IT07TPE44	GLOBAL STRATEGY AND TECHNOLOGY

LIST OF ELECTIVE-V

1	IT07TPE51	INTERNET OF THINGS
2	IT07TPE52	ADVANCE OPERATING SYSTEM
3.	IT07TPE53	COMPUTER VISION
4.	IT07TPE54	OPEN SOURCE SYSTEM & PROGRAMMING

LIST OF OPEN ELECTIVE-II

1	IT207TOE21	SOFT COMPUTING
2	IT207TOE22	INTRODUCTION TO DOT NET TECHNOLOGY
3.	IT207TOE23	GIS & REMOTE SENSING
4.	IT207TOE24	SUPPLY CHAIN MANAGEMENT

SCHOOL OF STUDIES OF ENGINEERING & TECHNOLOGY
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.) (A CENTRAL UNIVERSITY)
B. TECH. INFORMATION TECHNOLOGY

Programme Outcomes: Graduates will be able to:

PO1: Fundamentals: Apply knowledge of mathematics, science and engineering.

PO2: Problem analysis: Identify, formulate and solve real time engineering problems using first principles.

PO3: Design: Design engineering systems complying with public health, safety, cultural, societal and environmental considerations

PO4: Investigation: Investigate complex problems by analysis and interpreting the data to synthesize valid solution.

PO5: Tools: Predict and model by using creative techniques, skills and IT tools necessary for modern engineering practice.

PO6: Society: Apply the knowledge to assess societal, health, safety, legal and cultural issues for practicing engineering profession.

PO7: Environment: Understand the importance of the environment for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics, and responsibilities and norms of the engineering practice.

PO9: Teamwork: Function effectively as an individual and as a member or leader in diverse teams and multidisciplinary settings.

PO10: Communication: Communicate effectively by presentations and writing reports.

PO11: Management: Manage projects in multidisciplinary environments as member or a team leader.

PO12: Life-long learning: Engage in independent lifelong learning in the broadest context of technological change.

Programme Specific Outcomes:

PSO1: To apply knowledge of recent computing technologies, skills and current tools of Information Technology Engineering.

PSO2: To design software systems, components or processes to meet identified needs within economic, environmental and social constraints.

PSO3: To explore research gaps, analyze and carry out research in the specialized/emerging areas.

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT07TPC01	3	0	0	3 HOURS	30	70	3

CYBER SECURITY

Course Objectives:

1. Identify the technical foundations of Cyber security.
2. Apply principles of cryptography for design of block ciphers.
3. Analyze the principles of public –Key Cryptosystemsand applications.
4. Explore the importance of Cyber Security and Secure financial transactions.
5. Explore the concepts of Firewall, and intrusion detection.

UNIT I

A Model for Network Security Services, Mechanisms, and Attacks, Viruses & Worms, The OSI Security Architecture, symmetric cipher model, substitution techniques Transposition techniques, Steganography.

UNIT II

Block ciphers and the data encryption standard , simplified DES , Block cipher principles , The data Encryption Standard , Differential and Linear Cryptanalysis ,Block Cipher Design principles , The AES cipher , Triple DES , blowfish , RC5, Rc4 Stream Cipher

UNIT III

principles of public –Key Cryptosystems , public –Key cryptosystems , Requirements for public –Key Cryptosystems, The RSA Algorithm , Key management , key Distribution ,Hash Functions SHA, MD5. Diffie-Hellman Key Exchange Algorithm

UNIT IV

WEB & IP Security: Web Security Threats, SSL Architecture, SSL Record Protocol, Alert Protocol , Handshake Protocol , Transport Layer Security , Secure Electronic Transaction , IP Security

UNIT V

Intruders : Intrusion Techniques , Firewall Design principles , Block Chain Technology, BitCoin, Types of Firewalls .

List of Books:

1. Cryptography and Network Security, Principles and Practice Third edition , William Stallings .
2. Atul Kahate, " Cryptography and Network Security," TMH
3. Introduction to network security, Krawetz, Cengage

Course Outcomes :

1. Understand the fundamental network security mechanism and threats.
2. Understand the concept of Block cipher and cryptanalyis .
3. Learn the Concept of Public key cryptography systems.
4. Understand the concept of Web security and secure electronic transaction.
5. Understand the Firewall design principles and Block-chain technology .

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3		2	3	3		3				3	3	2	3
CO2	3	3	3	3	3							3	3	3	3
CO3	3	3	3	3	3	1		3	3			3	3	3	3
CO4	1	3	3	3	3	3		3	3			3	3	3	3
CO5	1	3	3	3	3	1		3	3			3	3	3	3

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT07TPE41	3	0	0	3 HOURS	30	70	3

ADVANCE DATABASE DESIGN

Course Objectives:

1. To provide students with a comprehensive understanding of the fundamental concepts of database systems, including different architectures, design principles, and data models.
2. To develop students' skills in designing and managing parallel and distributed databases, using techniques such as I/O parallelism and query parallelism.
3. To introduce students to object-oriented and object-relational databases and their use in designing efficient database systems, including complex objects, inheritance, and class hierarchies.
4. To familiarize students with intelligent databases, including active databases, temporal databases, deductive databases, and spatial databases, and their applications in supporting complex applications.
5. To expose students to emerging technologies in the field of database systems, including XML databases, web databases, cloud-based databases, and big data storage and analysis.

UNIT I PARALLEL AND DISTRIBUTED DATABASES

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

UNIT II OBJECT AND OBJECT RELATIONAL DATABASES

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 INTELLIGENT DATABASES

Active Databases: Syntax and Semantics (Starburst, Oracle, DB2)- Taxonomy- Applications- Design Principles for Active Rules- Temporal Databases: Overview of Temporal Databases- TSQL2- Deductive Databases: Logic of Query Languages – Datalog- Recursive Rules- Syntax and Semantics of Datalog Languages- Implementation of Rules and Recursion- Recursive Queries in SQL- Spatial Databases- Spatial Data Types- Spatial Relationships- Spatial Data Structures-Spatial Access Methods- Spatial DB Implementation.

UNIT IV ADVANCED DATA MODELS

Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management -

Location Dependent Data Distribution - Mobile Transaction Models - Concurrency Control - Transaction Commit Protocols- Multimedia Databases- Information Retrieval- Data Warehousing- Data Mining- Text Mining.

UNIT V EMERGING TECHNOLOGIES

XML Databases: XML-Related Technologies-XML Schema- XML Query Languages- Storing XML in Databases-XML and SQL- Native XML Databases- Web Databases- Geographic Information Systems- Biological Data Management- Cloud Based Databases: Data Storage Systems on the Cloud- Cloud Storage Architectures-Cloud Data Models- Query Languages- Introduction to Big Data- Storage-Analysis.

1. R. Elmasri, S.B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education/Addison Wesley, 2007.
2. Thomas Cannolly and Carolyn Begg, “Database Systems, A Practical Approach to Design, Implementation and Management”, Third Edition, Pearson Education, 2007.
3. Henry F Korth, Abraham Silberschatz, S. Sudharshan, “Database System Concepts”, Fifth Edition, McGraw Hill, 2006.
4. C.J.Date, A.Kannan and S.Swamynathan, ”An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.
5. Raghu Ramakrishnan, Johannes Gehrke, “Database Management Systems”, McGraw Hill, Third Edition 2004

Course Outcomes:

1. Students will be able to explain the different database system architectures, their advantages and disadvantages, and their use in different applications.
2. Students will be able to design and manage parallel and distributed databases using I/O parallelism and query parallelism techniques, and evaluate their performance.
3. Students will be able to design object-oriented and object-relational databases, using different standards, languages, and design principles, and compare them with traditional relational databases.
4. Students will be able to design and manage intelligent databases, including active databases, temporal databases, deductive databases, and spatial databases, to support complex applications.
5. Students will be able to evaluate emerging technologies in the field of database systems, including XML databases, web databases, cloud-based databases, and big data storage and analysis, and select appropriate technologies for different applications.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	3	2								2	2	2
CO2	3	2	2	3	2								2	3	3
CO3	3	2	3	3	2								3	3	2
CO4	3	2	2	3	2								3	2	2
CO5	3	2	2	3	2								2	2	2

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT07TPE42	3	0	0	3 HOURS	30	70	3

DATA MINING

Course Objectives:

1. To introduce the concepts and principles of data warehousing, including multidimensional data models, OLAP operations, and data warehousing architecture.
2. To familiarize students with data mining and its related areas, including KDD, DBMS, and DM techniques, and the issues and challenges involved in data mining.
3. To enable students to understand association rules and the various methods to discover them, including the apriori algorithm and hierarchical association rules.
4. To introduce clustering techniques and their applications, including partitioning algorithms, hierarchical clustering, and categorical clustering algorithms.
5. To equip students with the knowledge and skills to design and develop decision trees and understand their construction principles, including the CART, ID3, and C4.5 algorithms.

UNIT I

Data ware Housing: What is a data warehouse?, definition, Multidimensional data model, OLAP operation, warehouse schema, data ware housing architecture, warehouse serve, metadata, OLAP, engine, Data warehousing backend process, other features.

Data Mining: what is data mining? KDD Vs. data mining, DBMS Vs DM other related areas, DM techniques, other mining problem, issues & challenges in DM, Dm application areas.

UNIT II

Association rules: Methods to discover association rules, apriori algorithm ,partition algorithm, pincer –search algorithm, Dynamic Item set counting algorithm, FP-tree Growth algorithm, Incremental algorithm, Border algorithm, hierarchical association rule, generalized association rules, Association rules with item constraints.

UNIT III

Clustering Techniques: Introduction, clustering paradigms, partitioning algorithms, k-Medoid Algorithm, CLARA, CLARANS, Hierarchical clustering, DBSCAN, BIRCH, CURE, Categorical clustering algorithms , STIRR, ROCK , CACTUS.

UNIT IV

Decision trees: Tree construction principal, Best spilt splitting indices, splitting criteria, Decision tree construction algorithm, CART, ID3, C4.5, CHAID, Decision tree construction with pre-sorting, rainforest, approximate method, CLOUDS, BOAT, pruning technique, integration of pruning & construction, Hierarchcal associtation rule.

UNIT V

Web Mining: Web mining ,web content mining ,web structure mining ,web usage mining ,text mining , unstructured text , Episode rule discovery for texts , Hierarchy of categories , text clustering , Paging algorithm.

List of Books:

1. Data Mining techniques – Arun K Pujari Universities press

2. Data Mining concepts & techniques – Jiawei han , Micheline kamber Morgan Kaufmann publisher Elsevier India –2001
3. Data Mining methods for knowledge Discovery –Cios , Pedrycz , swiniarski Kluwer academic publishers London –1998

Course Outcome:

1. Students will be able to understand the fundamental concepts and principles of data warehousing and its architecture, including OLAP and metadata.
2. Students will be able to understand data mining and its related areas, including KDD and DBMS, and apply DM techniques to real-world problems.
3. Students will be able to discover association rules and understand the methods used to discover them, including the apriori algorithm and hierarchical association rules.
4. Students will be able to apply clustering techniques to group similar data and understand partitioning algorithms, hierarchical clustering, and categorical clustering algorithms.
5. Students will be able to design and develop decision trees and understand their construction principles, including the CART, ID3, and C4.5 algorithms, and apply them to real-world problems.

Course Outcomes and their mapping with Programme Outcomes:

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	2	3	2								2	3	2
CO2	2	3	3	3	2								3	2	2
CO3	2	3	2	3	2								3	2	3
CO4	3	2	2	2	3								2	3	2
CO5	3	2	2	3	2								3	2	2

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT07TPE43	3	0	0	3 HOURS	30	70	3

GAME THEORY

Course objectives

1.To introduce Game theory in application and improving analytical and decision-making skills.

2.To learn about Game theory and different types of game

3.To learn the strategic way of thinking about behavior of repeated games.

4.To learn their strategies and decisions in an economy, business and life.

5.To learn bargaining Mechanism

Unit 1
Introduction to game theory, routing games and mechanism design, Strategies, cost and payoffs; prisoner's dilemma, nash equilibrium, Strategic games; Best response; dominant Strategies; pure Strategy v/s mixed Strategy.

Unit 2
Repeated games; Bayesian games Routing games; Selfish routing; Quantifying inefficiency of equilibria; Price of Anarchy

Unit 3
Social optimum; price of stability; Scheduling games.
Population games; Evolutionary game theory;

Unit 4

Evolutionary stable Strategy; Replicator dynamics. Non cooperative games , cooperative game theory

Unit 5

Nash bargaining Mechanism design,Algorithmic mechanism design, distributed algorithmic mechanism design

BOOK:

1.Game Theory,by D. Fudenberg and j.Tirole, MIT press 1991.
2.Algorithmic Game Theory, edited by N.nisan, T. Roughgarden, E. Tardos, and v.v. vazirani,Cambridge University press 2007**.**

Other References:

1.Auction Thoery, by v. Krishna, academic press,2002.
2.A course in Game theory, by M.J . Osborne,A.Rubinstein,MIT press,1994.
3.Dynamic Non cooperative Game Theory, byT Basar and G.J. Olsder,1999
4. Evolutionary Game Theory, Jorgen W.Weibull,The MIT presss 1997.

Course Outcomes

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

1 Identify strategic situations and represent them as games
2 Solve simple games using various techniques
3 Analyze economic situations using game theoretic techniques
4 Recommend and prescribe which strategies to implement
5 understand the concept of bargaining Mechanism

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	3	2	2	3							2	3	2
CO2	2	3	1	2	2	1							3	2	2
CO3	1	2	1	2	2	1							2	2	3
CO4	2	1	2	2	3	2							2	2	3
CO5	1	2	3	1	2	2							3	3	2

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT07TPE44	3	0	0	3 HOURS	30	70	3

GLOBAL STRATEGY AND TECHNOLOGY

Course objective

1. To understand global strategy and its importance
2. To understand Distance and Global strategy, Home-Country Effects
3. To understand International Corporate Governance
4. To understand Technology: Productivity and Diffusion
5. To understand Investing in R&D Capabilities

Course outcomes

1. Able to evaluate How Global are we
2. How to implement Strategy for Globalization and their Challenges
3. *Techniques for* Cross-cultural Negotiation
4. Managing Diffusion Science
5. R&D Investment Decisions

UNIT 1: Introduction to Global Strategy- What the motivations to expand abroad are and how firms can manage conflicting demands in terms of global integration, local responsiveness and worldwide learning. How Global are We? How global most MNCs are? The End of Corporate Capitalism Beyond Off shoring Distance Still Matters Going International.

UNIT 2: Location and Global Strategy: Home-Country Effects**:** Shifting global leadership in the watch industry Success of Swatch as a company in this industry Potential threat on the horizon that could once again cause the decline of the Swiss watch industry. Distance and Global trategy: Host Country Choices: The Globalization of CEMEX The benefits that CEMEX has derived from expanding across borders Challenges that CEMEX is likely to confront in the future How far can Cemex‟s competitive advantage travel. Industry Characteristics and Global Strategy: Host - country choices: Characteristics of the global large appliances industry Design of an effective competitive strategy Haier‟s current global strategy Good rationale for Haier to make global expansion its top strategic priority.

UNIT 3: International Corporate Governance: International Corporate Governance with Chinese Characteristics Corporate governance matters in China‟s capital market Corporate governance model in China differ from international standards Special problems associated with Petro China‟s corporate governance model Conditions required for further reforms in Petro China‟s corporate governance system. Cross-cultural Negotiation: Learn from the MOUSE negotiation Issues/factors affect positively or negatively & the negotiation outcome Issues crucial in aligning different parties interests. Negotiators attitudes and culture in reaching the agreement The role of information acquisition in reaching an agreement in this negotiation. Foreign Market Entry Strategies: Issues around geographic market diversification and different strategies of

internationalization Different entry modes into a foreign market Stages of internationalization International operations Tensions of a family owned enterprise going international.

UNIT 4: Technology: Productivity and Diffusion: Productivity Impact and Managing Diffusion Science, Technology and Productivity. Technology, Markets and Competition Incumbents and Entrants Commercialization Intellectual Property and Complementary Assets.

UNIT 5: Investing in R&D Capabilities: Incentives to Innovate Investing in basic/applied research; Real options and other approaches. Applying the Concepts and Frameworks: R&D Investment Decisions: Applying the NPV, Real Options and Scenario-Planning Frameworks.

Text/Reference Books:

1. Sumantra Ghoshal, "Global Strategy: an organizing framework." Strategic Management Journal (1987), pp.
425-440.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	3	2	1	2							3	2	3
CO2	2	1	2	3	1	2							3	3	2
CO3	2	1	2	2	2	3							3	3	3
CO4	2	1	2	2	2	2							3	3	3
CO5	1	2	2	2	2	3							2	3	3

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT07TPE51	3	0	0	3 HOURS	30	70	3

Subject : IOT

Course Objectives:

1. To understand the fundamental concepts of parallel and distributed databases, including the different architectures, parallelism techniques, and design principles.
2. To comprehend the concepts of object-oriented and object-relational databases, including object identity, structure, persistence, and inheritance, and learn how to use them to design efficient database systems.
3. To learn about intelligent databases and their applications, including active databases, temporal databases, deductive databases, and spatial databases.
4. To explore advanced data models, such as mobile databases, multimedia databases, data warehousing, data mining, and text mining, and learn how to use them to design and manage complex data structures.
5. To understand the emerging technologies in the field of database systems, such as XML databases, web databases, cloud-based databases, and big data storage and analysis.

UNIT I – OVERVIEW IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, Knowledge Management

UNIT II – REFERENCE ARCHITECTURE IoT Architecture-State of the Art – Introduction, State of the art, Reference Model and architecture, IoT reference Model - IoT Reference ArchitectureIntroduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. Real-World Design Constraints- Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control.

UNIT III – IOT DATA LINK LAYER & NETWORK LAYER PROTOCOLS PHY/MAC Layer(3GPP MTC, IEEE 802.11, IEEE 802.15), WirelessHART,Z-Wave,Bluetooth Low Energy, Zigbee Smart Energy, DASH7 - Network Layer-IPv4, IPv6, 6LoWPAN, 6TiSCH,ND, DHCP, ICMP, RPL, CORPL, CARP

UNIT IV – TRANSPORT & SESSION LAYER PROTOCOLS Transport Layer (TCP, MPTCP, UDP, DCCP, SCTP)-(TLS, DTLS) – Session Layer-HTTP, CoAP, XMPP, AMQP, MQTT

UNIT V – SERVICE LAYER PROTOCOLS & SECURITY Service Layer -oneM2M, ETSI M2M, OMA, BBF – Security in IoT Protocols – MAC 802.15.4 , 6LoWPAN, RPL, Application Layer

REFERENCES

1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, “From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”, 1 st Edition, Academic Press, 2014.

2. Peter Waher, “Learning Internet of Things”, PACKT publishing, BIRMINGHAM – MUMBAI

3. Bernd Scholz-Reiter, Florian Michahelles, “Architecting the Internet of Things”, ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer

4. Daniel Minoli, “Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications”, ISBN: 978-1-118- 47347-4, Willy Publications

5. Vijay Madisetti and ArshdeepBahga, “Internet of Things (A Hands-onApproach)”, 1 st Edition, VPT, 2014. 6. http://www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/index.htm

Course Outcomes:

1. Students will be able to compare and contrast different database system architectures, including centralized, client-server, parallel, and distributed architectures.
2. Students will be able to design object-oriented and object-relational databases using different standards, languages, and design principles, such as ODMG, ODL, OQL, and SQL/Oracle.
3. Students will be able to design intelligent databases that incorporate active rules, temporal databases, deductive databases, and spatial databases to support complex applications.
4. Students will be able to design advanced data models, including mobile databases, multimedia databases, data warehousing, data mining, and text mining, to efficiently manage complex data structures.
5. Students will be able to design and manage emerging technologies in the field of database systems, such as XML databases, web databases, cloud-based databases, and big data storage and analysis.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	1							1	3	3	1
CO2	3	3	3	2	2							1	3	2	1
CO3	3	2	1	3	3							1	3	2	1
CO4	3	3	2	2	3							1	3	3	1
CO5	3	2	2	3	3							1	3	2	1

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT07TPE52	3	0	0	3 HOURS	30	70	3

ADVANCED OPERATING SYSTEM

Course Objective

1. To understand the general overview of UNIX Operating system
2. To understand the System Structures and operating system services
3. To understand the file structure
4. To understand Structure of process and process control.
5. To understand the distributed operating system

Course Outcomes

1. Create file and directory using commands and perform command based operations
2. Design and implement the I/O operation functions
3. Able to understand the operating system structure
4. Create distributed application sharing function
5. Understand the process concept

GENERAL OVERVIEW OF THE SYSTEM: Introduction to Multi user System, History of UNIX, features & Benefits, Variants, UNIX Commands - who, pwd, cd, mkdir, rm, rmdir, ls, mv, ln, chmod, cp, grep, tr, etc. Vi Editor: Command & edit Mode, Invoking Vi, deleting & inserting Line, Deleting & Replacing Character, Searching for Strings, Introduction to sed. Bourne Shell, C Shell, Shell Variables, Scripts, Meta Characters, If & CASE Statements, For, While and Until loops. AWK Pattern Scanning and Processing, AWK Arithmetic and Variables, built in functions and Operators, Arrays, Strings.

UNIT II

DESIGN OF OPERATING SYSTEM: System Structure, User Perspective, Operating System Services Assumption about Hardware, the Kernel and Buffer Cache Architecture of UNIX Operating System, System Concepts, Buffer Headers, Structure of the Buffer Pool, Scenarios for Retrieval of the Buffer, Reading and Writing Disk Blocks, Advantages and Disadvantages of Buffer Cache.

UNIT III

INTERNAL REPRESENTATION OF FILES: Overview of File system, System Calls for the File System,
INODES, Structure of Regular File, Directories, Conversions of a Path, name to an INODE, Super Block, INODE Assignment to a New File, Allocation of Disk Blocks. Open, Read, Write, File and Record Close, File Creation.

UNIT IV

STRUCTURES OF PROCESSES AND PROCESS CONTROL: Process States and Transitions Layout of System Memory, The Context of a Process, Manipulation of the Process Address Space, Sleep Process Creation/Termination, The User ID of a Process, Changing the Size of a Process.

UNIT V

DISTRIBUTED OPERATING SYSTEM: Design of distributed OS, Resource sharing, Distributed OS

architectures, software layers, Architectural Model, The Operating System Layer, Protection, Processes and
Threads, Communication and invocation, Distributed File System: File Service Architecture, Sun Network
File System, the Andrew File System, and Recent Advances.

List of Books:

1. The Design of Unix Operating System,Maurice J. Bach, Pearson Education
2. Advance UNIX, a Programmer's Guide, S. Prata, BPB Publications, New Delhi.
3. Shell Programming, Yashvant Kanitkar, BPB Publications, New Delhi.
4. UNIX Concepts and Applications, Sumitabh Das.
5. Distributed OS, A.S Tanenbaum, PHI.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	3	2	1	2							3	2	3
CO2	2	1	2	3	1	2							3	3	2
CO3	2	1	2	2	2	3							3	3	3
CO4	2	1	2	2	2	2							3	3	3
CO5	1	2	2	2	2	3							2	3	3

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT07TPE53	3	0	0	3 HOURS	30	70	3

Computer Vision

COURSE OBJECTIVES:

- To learn and understand the fundamentals of Computer Vision techniques.
- To provide basic understanding of applications of Computer Vision techniques.
- To understand the image formation process.
- To understand the basic techniques and issues in2-D and 3-D computer vision
- To apply Computer Vision techniques to solve real world applications.

Unit-1

Recognition Methodology: Conditioning, Labeling, Grouping,Extracting, Matching.
Morphological Image Processing: Introduction, Dilation, Erosion,Opening, Closing,Hit-or-Miss transformation, Morphologicalalgorithm operations on binary images, Morphological algorithm Operations on gray-scale images, Thinning, Thickining , Regiongrowing, region shrinking.

Unit-2

Image Representation and Description: Representation schemes,Boundary descriptors, Region descriptors
Binary Machine Vision: Thresholding, Segmentation, Connectedcomponent labeling, Hierarchal segmentation, Spatial clustering,Split & merge, Rule-based Segmentation, Motion-based segmentation.

Unit-3

Area Extraction: Concepts, Data-structures, Edge, Line-Linking,Hough transform, Line fitting, Curve fitting (Least-square fitting).
Region Analysis: Region properties, External points, Spatialmoments, Mixed spatial gray-level moments, Boundary analysis:Signature properties, Shape numbers.

Unit-4

Facet Model Recognition: Labeling lines, Understanding linedrawings,Classification of shapes by labeling of edges, Recognition ofshapes, Consisting labeling problem, Back-tracking AlgorithmPerspective Projective geometry, Inverse perspective
Projection, Photogrammetry - from 2D to 3D, Image matching:Intensity matching of ID signals, Matching of 2D image,Hierarchical image matching.

Unit-5

Object Models And Matching: 2D representation, Global vs. Localfeatures

General Frame Works For Matching: Distance relational approach,Orderedstructural matching, View class matching, Models database organization.

BOOKS

Text Books:

1.RobertHaralick and Linda Shapiro, "Computer and Robot Vision", Vol I, II, Addison-Wesley, 1993.

2. David A. Forsyth, Jean Ponce, "Computer Vision: A Modern Approach"

References:

3. 1. Milan Sonka,VaclavHlavac, Roger Boyle, "Image Processing, Analysis, and Machine Vision" Thomson Learning

COURSE OUTCOMES:

Students will try to learn:

1. Design and implement algorithms to perform image processing and feature extraction.
2. Design and implement algorithms for image segmentation.
3. Design and implement algorithms for representation of shape.
4. Design and demonstrate the 2D and 3D objects using
5. Design and build a real computer vision-based system.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	2	1	2	1							1	2	2
CO2	2	3	2	1	2	2							2	1	2
CO3	3	2	3	3	1	2							2	2	2
CO4	3	1	2	2	2	1							2	2	2
CO5	3	3	3	2	2	2							2	2	2

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT07TPE54	3	0	0	3 HOURS	30	70	3

OPEN SOURCE SYSTEMS AND PROGRAMMING

COURSE OBJECTIVES:

- General understanding of structure of modern computers.
- Explain the role of the operating system as a high level interface to the hardware.
- To understand purpose, structure and functions of operating systems.
- Understands the use of different process scheduling algorithm and synchronization techniques to avoid deadlock
- Explain the performance trade-offs inherent in OS implementation.

UNIT 1

Open Source System Fundamentals: Open Source Operating Systems, Linux, GNU, POSIX standards, open source software development, open source licenses.Kernel, shell, memory management, Inter-process communication, file system, device drivers, Networking, modules and debugging.

UNIT 2

System Programming: System Calls, Library Functions, GNU C library, error handling, File I/O handling, process, IDs, memory layout, virtual memory, stack, command line arguments, memory allocation, user and groups, time, system limits and options, system and process information,

UNIT 3

File Systems: File I/O buffering, devices, I-nodes, Virtual file system, Mount point, file attributes, access control list, directories and links, monitoring file events, file locking

UNIT 4

Process: creation, termination, monitoring, execution, signals, handlers, timers, threads, process control, priorities and scheduling, daemons, secure privileged programs, capabilities, login accounting, shared libraries, pipes,

UNIT 5

Security: Security Policies, SE Linux,GRsecurity, tripwire, firewalls, network access control, authorization control, SSH, openSSH, protecting files and emails, testing and monitoring,

References

1. "The Linux Programming Interface", Michael Kerrisk, nostarch press,
2. "Linux kernel programming", Michael Beck ET. Al., Pearson Education
3. "Linux Security Cookbook", Daniel j. Barrett ET. Al., O'Reilly publication,

COURSE OUTCOMES:

Students will try to learn:

- Describe the general architecture of computers and operating system.
- physical and virtual memory, scheduling, I/O and files.
- Use OS as a resource manager that supports multiprogramming
- Understands the different services provided by Operating System at different level.
- They learn real life applications of Operating System in every field.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	2	3	2							1	2	2
CO2	1	3	2	1	2	3							2	1	2
CO3	2	2	1	3	3	2							3	3	3
CO4	3	3	3	2	2	3							2	3	2
CO5	2	2	2	3	2	3							2	2	2

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT07TOE21	3	0	0	3 HOURS	30	70	3

SOFT COMPUTING

Course Objectives:

1. To introduce the fundamental concepts and techniques of neural networks, including learning rules, activation functions, feedforward and feedback network models, and their applications in various fields.

2. To provide an in-depth understanding of supervised learning, including the perceptron learning algorithm, multilayer neural networks, linear separability, Adaline, Madaline, backpropagation network, and their applications in forecasting, data compression, and image compression.

3. To explore unsupervised learning techniques, including Kohonen SOM, counter propagation, ART, and their applications in pattern and face recognition, intrusion detection, and robotic vision.

4. To provide a comprehensive overview of fuzzy sets and their application in solving engineering problems, including fuzzy rules, fuzzy reasoning, fuzzy relations, and fuzzy inference systems.

5. To introduce genetic algorithms and their basic terminology and operators, including individual, gene, fitness, population, encoding, selection, crossover, mutation, and convergence criteria, and their applications in solving optimization problems like JSPP, TSP, network design routing, and timetabling problem.

Unit I: IntroductiontoNeuralNetwork:
Concept, biological neural network, evolution of artificial neural network, McCulloch-Pitts neuron models, Learning (Supervise & Unsupervised) and activation function ,Models of ANNFeed forward network and feedback network, Learning Rules- Hebbian, Delta, Perceptron Learningand Windrow-Hoff,winnertakeall.

Unit II: SupervisedLearning:
Perceptron learning,- Single layer/multilayer, linear Separability, Adaline, Madaline, Back propagation network, RBFN. Application of Neural network in forecasting, data compression and image compression.

Unit III: Unsupervisedlearning:
Kohonen SOM (Theory, Architecture, Flow Chart, Training Algorithm)Counter Propagation (Theory , Full Counter Propagation NET and Forward only counter propagation net),ART (Theory, ART1, ART2). Application of Neural networks in pattern and face recognition, intrusion detection,roboticvision.

Unit IV: Fuzzy Set:
Basic Definition and Terminology, Set-theoretic Operations, Member Function ,Formulation and Parameterization, Fuzzy rules and fuzzy Reasoning, Extension Principal and Fuzzy Relations, Fuzzy if-then Rules, Fuzzy Inference Systems. Hybrid system including neuro fuzzy hybrid, neuro genetic hybrid and fuzzy genetic hybrid, fuzzy logic controlled GA. Application of Fuzzy logic in solving engineering problems.

Unit V: GeneticAlgorithm:
Introduction to GA, Simple Genetic Algorithm, terminology and operators of GA (individual, gene, fitness, population, data structure, encoding, selection, crossover, mutation ,convergence criteria). Reasons for working of GA and Schema theorem, GA optimization problem s including JSPP (Job shop scheduling problem), TSP (Travelling salesman problem), Network design routing ,timetabling problem.

Text Book
1. S.N. Shivnandam, "Principle of soft computing", Wiley.
2. S. Rajshekaran and G.A.V. Pai, "Neural Network , Fuzzy logic And Genetic Algorithm", PHI.
References Book: -
1. Jack M. Zurada, "Introduction to Artificial Neural Network System" JAico Publication.
2. Simon Haykins, "Neural Network- A Comprehensive Foudation"
3. Timothy J.Ross, "Fuzzy logic with Engineering Applications", McGraw-Hills 1

Course Outcomes:

1. Students will be able to understand the fundamental concepts and techniques of neural networks and their applications in various fields.

2. Students will be able to design and implement supervised learning techniques such as the perceptron learning algorithm, multilayer neural networks, and backpropagation networks, and apply them in forecasting, data compression, and image compression.

3. Students will be able to implement unsupervised learning techniques such as Kohonen SOM, counter propagation, and ART, and apply them in pattern and face recognition, intrusion detection, and robotic vision.

4. Students will be able to apply fuzzy sets and their related concepts in solving engineering problems, including fuzzy rules, fuzzy reasoning, fuzzy relations, and fuzzy inference systems.

5. Students will be able to design and implement genetic algorithms and apply them in solving optimization problems like JSPP, TSP, network design routing, and timetabling problem.

Course Outcomes and their mapping with Programme Outcomes:

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	2	3								3	2	3

CO2	3	2	3	2	3								3	2	3
CO3	3	3	2	2	3								3	2	2
CO4	3	2	3	2	2								3	2	3
CO5	2	3	2	3	2								3	2	3

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT07TOE22	3	0	0	3 HOURS	30	70	3

COURSE OBJECTIVES:

1.) To learn about Microsoft framework architecture
2.) To learn about Development of console application
3.) To Build windows application
4.) To learn about OOPs using C#.NET
5.) To Learn data access mechanism provided .net
6.) To Create and consume libraries
7.) To Create a web application using .net
8.) Perform integration with asp.net
9.) To Develop the website & application along with security

INTRODUCTION TO .NET TECHNOLOGY

UNIT I

Introduction to .NET framework, Managed Code and the CLR- Intermediate Language, Metadata and JIT Compilation, Automatic Memory Management, CLR, The Framework Class Library, IDE of .Net, Introduction to C# Language

UNIT II

.Net Elements, Variables and constants, Data types, Operators , Loops and Program flow, Decision statements Type, Arrays with various types , Collections , Windows Forms , Windows controls – Button, Check box, Combo box, Label, List box, Radio Button, Text box, Various Events , Creating menus – menu items – context menu - Common dialog boxes & MDI

UNIT III

Architecture of ADO.NET – ADO.NET providers – Connection – Command – Data Adapter – Dataset. Connecting to Data Source, Accessing Data with Data set and Data Reader - Create an ADO.NET application - Using Stored Procedures.

UNIT IV

ASP.NET Features, IIS Configuration, ASP.Net Web Controls - HTML Controls, Using Intrinsic Controls, Using Input Validation Controls, Selecting Controls for Applications - Adding Web controls to a Page.

UNIT V

XML Serialization in the .NET Framework, Introduction to Web services and AJAX, Crystal Reports.

List of Books:

1. Introduction to Visual basic.NET - NIIT Prentice Hall of India,2005
2. Introducing Microsoft .NET- David S. Platt Microsoft Press", Saarc Edition, 2001
3. Introduction to Microsoft® ASP.NET Work Book - Microsoft- Microsoft Press
4. Developing XML Web Services Using Microsoft® ASP.NET -Microsoft- Microsoft Press
5. Designing Microsoft ASP.NET Applications-Douglas J. Reilly-Microsoft Press

ASP.NET-Danny Ryan and Tommy Ryan-Hungry Minds Maran Graphics

PROGRAM OBJECTIVES:

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

- Learners will be able to design web applications using VB.NET & ASP.NET
- Learners will be able to use ASP.NET controls in web applications
- Learners will be able to create database driven ASP.NET web applications and web services

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	2	3	3							3	2	3
CO2	3	2	3	3	3	2							3	2	3
CO3	3	2	2	3	3	3							2	3	3
CO4															
CO5															

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT207TOE23	3	0	0	3 HOURS	30	70	3

GIS & Remote Sensing

Objective:

1. Understand the basic concept of Remote Sensing and know about different types of satellite and sensors.
2. Illustrate Energy interactions with atmosphere and with earth surface features, Interpretation of satellite and top sheet maps.
3. Understand different components of GIS and Learning about map projection and coordinate system.
4. Develop knowledge on conversion of data from analogue to digital and working with GIS software.
5. Learn to work with Oracle spatial DBMS

Unit 1: Overview of Information System, GIS Definitions and Terminology , Spatial Data Modeling, Stages of GIS Data Modeling, Graphic Representation of Spatial Data , Raster GIS Models , Vector GIS Models, GIS Data Management, GIS Data File Management , Database Models , Storage of GIS Data, Object Based Data Models

Unit2: GIS Types and Available GIS Software,remote sensing:remote sensing, platforms, sensors, resolution, satellites, multispectral, thermal, hyper spectral and Microwave sensing, GPS and its various terminology.

Unit3: Digital Image Processing: Preprocessing , Image Registration, Image Enhancement Techniques, Spatial Filtering Techniques, Image Transformations, Image Classification,

Unit4 : Working with oracle spatial, Overview of Oracle Spatial, Basic Spatial, Loading, Transporting, and Validating Spatial Data,

Unit5: Oracle Spatial and Network Analysis, Visualization, Spatial in Applications.

TEXT BOOKS:

1. Remote sensing and GIS paperback by Basudeb Bhatta oxford university press.
2. Introduction to Geographic Information Technology, Sujit Choudhary, Deepankar Chakrabarti & Suchandra Choudhary.
3. Pro Oracle Spatial for Oracle Database 11g, Ravikant Kothuri.

REFERENCE BOOKS:

1. ArcPy and ArcGIS – Geopatial Analysis with Python, Packet Publishing Limited, Toms Silas.
2. Developing Mobile Web ArcGIS Applications, Sheehan Matthew.
3. Spatial Analysis, GIS and Remote Sensing, Gesler Albert.
4. Learning ArcGIS for Desktop, Docan Daniela Cristiana Applying and Extending Oracle Spatial, Greener Simon.

Outcome:

On completion of the course, the student should be able to:

1. Explain the basics of geographic information systems (GIS) and related areas such as geodesy and remote sensing.
2. Select and acquire both primary and secondary spatial data for use in GIS.
3. Manage, and analyze digital data in raster and vector formats.
4. Describe how common analytical methods and techniques work.

5. Create and present a GIS project.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO1	PSO1
CO1	3	3	3	2	1							3	3	3	1
CO2	3	3	2	2	1							3	3	3	2
CO3	3	3	2	2	1							3	3	3	2
CO4	3	3	2	2	3							3	3	3	2
CO5	3	3	2	2	3							3	3	3	2

Weightage: 1-Sightly, 2-Moderately, 3-Strongly

SUB CODE	L	T	P	DURATION	IA	ESE	CREDITS
IT07TOE24	3	0	0	3 HOURS	30	70	3

COURSE OBJECTIVES:

- Understand the fundamental of supply chain management.
- Learn concepts of supply chain strategies and performance.
- Learn concepts of planning and management and inventory theory models.
- Understand the steps and activities distribution management.
- Understand the strategic cost management in supply chain.

SUPPLY CHAIN MANAGEMENT

UNIT I FUNDAMENTALS OF SUPPLY CHAIN MANAGEMENT Supply chain networks, Integrated supply chain planning, Decision phases in s supply chain, process view of a supply chain, supply chain flows, Overview of supply chain models and modeling systems, Supply chain planning: Strategic, operational and tactical, Understanding supply chain through process mapping and process flow chart.

UNIT II SCM STRATEGIES, PERFORMANCE Supply chain strategies, achieving strategic fit, value chain, Supply chain drivers and obstacles, Strategic Alliances and Outsourcing, purchasing aspects of supply chain, Supply chain performance measurement: The balanced score card approach, Performance Metrics. Planning demand and supply: Demand forecasting in supply chain, Aggregate planning in supply chain, Predictable variability.

UNIT III PLANNING AND MANAGING INVENTORIES Introduction to Supply Chain Inventory Management. Inventory theory models: Economic Order Quantity Models, Reorder Point Models and Multiechelon Inventory Systems, Relevant deterministic and stochastic inventory models and Vendor managed inventory models.

UNIT IV DISTRIBUTION MANAGEMENT Role of transportation in a supply chain - direct shipment, warehousing, cross-docking; push vs. pull systems; transportation decisions (mode selection, fleet size), market channel structure, vehicle routing problem. Facilities decisions in a supply chain. Mathematical foundations of distribution management, Supply chain facility layout and capacity planning,

UNIT V STRATEGIC COST MANAGEMENT IN SUPPLY CHAIN The financial impacts, Volume leveraging and cross docking, global logistics and material positioning, global supplier development, target pricing, cost management enablers, Measuring service levels in supply chains, Customer Satisfaction/Value/Profitability/Differential Advantage.

REFERENCES

1. David Simchi-Levi, Philip Kaminsky, and Edith Simchi-Levi Designing and Managing the Supply Chain: Concepts, Strategies, and Case Studies, Second Edition, , McGraw-Hill/Irwin, New York, 2003. 31

2. Sunil Chopra and Peter Meindel. Supply Chain Management: Strategy, Planning, and Operation, Prentice Hall of India, 2002.
3. Sunil Chopra & Peter Meindl, Supply Chain Management , Prentice Hall Publisher, 2001
4. Robert Handfield & Ernest Nichols, Introduction to Supply Chain Management , Prentice hall Publishers, 1999.

COURSE OUTCOMES:
Students will try to learn:

- Describe the basic concepts and technologies used understanding supply chain through process mapping and process flow chart.
- Describe the process of developing and implementing planning demand and supply.
- Identify and describe typical functional inventory theory models.
- Describe mathematical foundations of distribution management, Supply chain facility layout and capacity planning
- Explain the different applications of global logistics and service levels in supply chains.

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	2	3	3							2	2	2
CO2	3	1	2	2	1	2							1	2	2
CO3	2	3	3	2	3	3							3	3	2
CO4	3	2	2	2	2	2							2	2	2
CO5	3	3	2	3	3	2							3	2	3

Weightage: 1-Sightly, 2-Moderately, 3-Strongly