ShriShankaracharya Technical Campus,

ShriShankaracharya Group of Institutions

(An Autonomous Institute affiliated to Chhattisgarh Swami Vivekananda Technical University Bhilai)

SCHEME OF EXAMINATION AND SYLLABUS

First Year (2nd semester) M. Tech

S.N.	Subject Name	Subject Code	Periods per week			Scheme of Exam			Total Marks	Credit L+(T+P)/2
						Theory/Practical				
			L	T	P	ESE	CT	TA		
1	Machine Learning	CS221201	3	1	-	100	20	20	140	4
2	Advanced Database Management System	CS221202	3	1	-	100	20	20	140	4
3	Software Engineering Techniques	CS221203	3	1	-	100	20	20	140	4
4	Big data Analytics	CS221204	3	1	-	100	20	20	140	4
5	Elective –II Cryptography & Network Security	CS221222	3	1	-	100	20	20	140	4
6	Advanced Database Management System Lab	CS221291	-	-	3	75		75	150	2
7	Machine Learning Lab	CS221292	-	-	3	75		75	150	2
Total			**15**	**5**	**6**	**650**	**100**	**250**	**1000**	**24**

Elective –II (Professional Elective)			
S.No	**Board of Study**	**Subject Code**	**Subject**
1	Computer Science Engineering	CS221221	Neural Networks
2	Computer Science Engineering	CS221222	Cryptography & Network Security
3	Computer Science Engineering	CS221223	Distributed Computing
4	Computer Science Engineering	CS221224	Cellular mobile Communication (Prerequisite Advanced Digital Communication)
5	Computer Science Engineering	CS221225	Digital Image Processing (Prerequisite Digital Signal Processing)

Subject Code (CS221201)	Machine Learning	L = 3	T = 1	P = 0	Credits =L+(T+P)/2 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3

Course Objective	Course Outcomes
The objective is to make the students 1. To learn the concept of how to learn patterns and concepts from data without being explicitly programmed in various IOT nodes. 2. To design and analyse various machine learning algorithms and techniques with a modern Outlook focusing on recent advances. 3. Explore supervised and unsupervised learning paradigms of machine learning. 4. To explore Deep learning technique and various feature extraction strategies.	On successful completion of the course, the student will be able to: **CO1:-**Extract features that can be used for a particular machine learning approach in various IOT Applications. **CO2:-**. To compare and contrast pros and cons of various machine learning techniques and to get an Insight of when to apply a particular machine learning approach. **CO3:-** To mathematically analyse various machine learning approaches and paradigms.

UNIT – I **[CO1]**

Supervised Learning (Regression/Classification)Introduction to AI & ML Basic methods: Distance-based methods, Nearest- Neighbors, Decision Trees, Naive Bayes. Linear models: Linear Regression, Logistic Regression, Generalized Linear Models. Support Vector Machines, Nonlinearity and Kernel Methods. Beyond Binary Classification: Multi-class/Structured Outputs, Ranking. [**12 Hours]**

UNIT –II **[CO1, CO2]**

Unsupervised Learning: Clustering: K-means/Kernel K-means. Dimensionality Reduction: PCA and kernel PCA. Matrix Factorization and Matrix Completion. Generative Models (mixture models and latent factor models). [**12 Hours]**

UNIT – III **[CO2, CO3]**

Evaluating Machine Learning algorithms and Model Selection, Introduction to Statistical Learning Theory, Ensemble Methods (Boosting, Bagging, Random Forests) [**08 Hours]**

UNIT – IV **[CO1,CO3]**

Sparse Modeling and Estimation, Modeling Sequence/Time-Series Data, Deep Learning and Feature Representation Learning. [**08 Hours]**

UNIT – V **[CO1,CO2,CO3]**

Scalable Machine Learning (Online and Distributed Learning) A selection from some other advanced topics, e.g., Semi-supervised Learning, Active Learning, Reinforcement Learning, Inference in Graphical Models, Introduction to Bayesian Learning and Inference .Recent trends in various learning techniques of machine learning and classification methods for IOT Applications. Various models for IOT applications. [**12 Hours]**

Text Books:

S.No.	Title	Authors	Edition	Publisher
1	AI, a modern approach	Russel and Norvig		PearsonEducation
2	"AI" by Rich and Knight			Tata McGrawHill

3	Neural Networks in Computer Intelligence	KM Fu		McGrawHill

Reference Books:

S. No.	Title	Authors	Edition	Publisher
1	Machine Learning: A Probabilistic Perspective	Kevin Murphy		MIT Press, 2012
2	The Elements of Statistical Learning	Trevor Hastie, Robert Tibshirani, Jerome Friedman		Springer 2009 (freely available online)
3	Pattern Recognition and Machine Learning	Christopher Bishop		Springer, 2007

Subject Code (CS221202)	Advanced Database Management System	L = 3	T = 1	P = 0	Credits =L+(T+P)/2 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3

Course Objective	Course Outcomes
The objective is to make the students 1. To understand the role of a database management system and its users in an organization. 2. To understand database concepts, including the structure and operation of the relational data model. 3. Can successfully apply logical database design principles, including E-R diagrams and database normalization. 4. Construct simple and moderately advanced database queries using Structured Query Language (SQL). 5. To understand the concept of transaction, its properties and how to persist the data in complex concurrent users environment.	On successful completion of the course, the student will be able to: CO1 Will be able to design database using the concept of relational model and Be familiar with the relational database Query Processing and its optimization Techniques CO2 Will be able to design deductive database system that can make deductions based on rules and facts stored in the database and Be familiar with the concerto of Object oriented and Object Relational Model CO3 Will be able to design the Parallel and Distributed Database. CO4 Will Be familiar with Nested and Multilevel transaction Processing in Relational Model **CO5** Be familiar with Active Database and Real Time Databases, WEB Database, Data Warehousing

UNIT I : Relational Databases **[CO1]**

Integrity Constraint revisited: Functional, Muiltivalued and Join Dependency, Template Algebraic, Inclusion and Generalized Functional Dependency, Chase Algorithms. **[8 Hrs.]**

Query Processing and Optimization: Valuation of Relational Operations, Transformation of Relational Expressions, Indexing and Query Optimization, Limitations of Relational Data Model, Nuill Values and Partial Information

UNIT – II **[CO2]**

Deductive Databases: Datalog and Recursion, Evaluation of Datalog program, Recursive queries with negation.

Objected Oriented and Object Relational Databases: Modeling Complex Data Semantics, Specialization, Generalization, Aggregation and Association, Objects, Object Identity, Equality and Object Reference, Architecture of Object Oriented and Object Relational Databases. **[8Hrs]**

Case Studies: Gemstone, O_2, Object Store, SQL3, Oracle xxi, DB2

UNIT – III **[CO3]**

Parallel and Distributed Databases: Distributed Data Storage – Fragmentation & Replication, Location and Fragment Transparency Distributed Query Processing and Optimization, Distributed Transaction Modeling and concurrency Control, Distributed Deadlock, Commit Protocols, Design of Parallel Databases, Parallel Query Evaluation. **[8 Hrs.]**

UNIT – IV **[CO4]**

Advanced Transaction Processing: Nested and Multilevel Transactions, Compensating Transactions and Saga, Long Duration Transactions, Weak Levels of Consistency, Transaction Work Flows, Transaction Processing Monitors. **[8Hrs]**

UNIT – V **[CO5]**

Active Database and Real Time Databases: Triggers in SQL, Event Constraint and Action: ECA Rules,, Compensation and Databases Recovery

WEB Database: Accessing Databases through WEB, WEB Servers, XML Databases, Commercial Systems–Oracle xxi, DB2.

Data Warehousing: Data Warehousing Architecture, Multidimensional Data Model, Update Propagation OLAP Queries. **[8Hrs]**

Text Books:

S.No.	Title	Authors	Edition	Publisher
1	Fundamentals of Database Systems	Elmarsi Navate	4th Edition	Pearson Education
2	Database Management Systems	R. Rama krishnan		1998, McGraw Hill International Editions

ReferenceBooks:

S. No.	Title	Authors	Edition	Publisher
1	Introduction to Database System	C. J. Date	7th Edition	
2	Foundations of Databases	S. Abiteboul, R. hull and V. Vianu		1995, Addison – Wesley Publishing Co., Reading Massachutts
3	Modern Database Systems	W.Kim		1995,ACMPress,Addision–Wesley
4	The Theory of Relational Databases	D.Maier		1993,ComputerSciencePress, Rokville,Maryland

Subject Code (CS221203)	Software Engineering Techniques	L = 3	T = 1	P = 0	Credits =L+(T+P)/2 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3

Course Objective	Course Outcomes
The objective is to make the students learn the fundamental principles and practices associated with each of the agile development methods. To apply the principles and practices of agile software development on a project of interest and relevance to the student.	On successful completion of the course, the student will be able to: CO1 Analyze existing problems with the team, development process and wider organization. CO2 Apply a thorough understanding of Agile principles and specific practices CO3 Select the most appropriate way to improve results for a specific circumstance or need. CO4 Judge and craft appropriate adaptations to existing practices or processes depending upon analysis of typical problems. **CO5** Evaluate likely successes and formulate plans to manage likely risks or problems.

UNIT – I **[CO1, CO2]**

Introduction to Software Engineering:

Introduction, Total Effort devoted to Software, Distribution of Effort, Project size Categories, Quality and Productivity Factors, Managerial Issues.

Planning a Software Project:[CO2,CO3]

Goals and Requirements, Developing a Solution Strategy, The Phased Life-Cycle Model, Milestones, Documents, and Reviews, The Cost Model, The Prototype Life-Cycle Model, Successive Versions, Planning an Organizational Structure, Planning for Configuration Management and Quality Assurance, Planning for Independent Verification and Validation, Planning Phase-Dependent Tools and Techniques. **[14HRS]**

UNIT – II **[CO3, CO4]**

Software Cost Estimation:

Software Cost Factors, Software Cost Estimation Techniques, Expert Judgment, Delphi Cost Estimation, Work Breakdown Structure, Algorithmic Cost Models, Staffing Level Estimation, Estimating Software Maintenance Costs.

Software Requirements Definition:

The Software Requirements Specification, Formal Specification Techniques : Relational Notations - Implicit Equations/Recurrence Relations/Agebraic Axioms/ Regular Expressions; State Oriented Notations - Decision Tables/ Event Tables / Transition Tables /Finite-state Mechanisms/Petri Nets.

[14HRS]

UNIT- III **[CO4]**

Agile Processes:

Lean Production – SCRUM, Crystal, Feature Driven Development- Adaptive Software Development – Extreme Programming: Method Overview – Lifecycle – Work Products, Roles and Practices. **[10HRS]**

UNIT –IV **[CO4, CO5]**

Agility and Knowledge Management:
Agile Information Systems – Agile Decision Making –Evolution Cycle – Leveraging – KM in Software Engineering – Managing Software Knowledge – Challenges of Migrating to Agile Methodologies – Agile Knowledge Sharing – Role of Story-Cards – Story-Card Maturity Model (SMM).

Agility and Quality Assurance:
Agile Product Development – Agile Metrics – Feature Driven Development (FDD) – Financial and Production Metrics in FDD – Agile Approach to Quality Assurance – Test Driven Development - Agile Approach in Global Software Development. **[14HRS]**

UNIT - V **[CO4,CO5]**

Verification and Validation Techniques:
Quality Assurance, Walkthroughs and Inspections, Unit Testing and Debugging, System Testing.

Agile Testing:
Agile Testing Techniques, Test-Driven Development, User Acceptance Test

Agile Review:
Agile Metrics and Measurements, The Agile approach to estimating and project variables,Agile Measurement, Agile Control: the 7 control parameters. Agile approach to Risk, TheAgile approach to Configuration Management, The AternPrinciples,AternPhilosophy,Therationale for using Atern, Refactoring, Continuous integration, Automated Build Tools. **[14HRS]**

Text Books:

S.No.	Title	Authors	Edition	Publisher
1	Software Engineering Concepts	R. Fairley		Tata McGraw Hill, 1997
2	Software Engineering	R. S. Pressman	5th ed	McGraw Hill Int. Ed., 2001
3	Software Engineering	K.K. Agrawal &Yogesh Singh		New Age International, 2001
4	Agile Management for Software Engineering	David J. Anderson and Eli Schragenheim		Prentice Hall, 2003
5.	Agile Software Engineering	Hazza and Dubinsky		Springer, 2009.

References:

S. No.	Title	Authors	Edition	Publisher
1	An Integrated approach to Software Engineering	P. Jalote		Narosa, 1991.
2	Classical & Object Oriented Software Engineering	Stephen R. Schach		IRWIN, 1996
3	Software Engineering	James PeterWPedrycz		John Wiley & Sons
4	Software Engineering	John Wiley & Sons	6th ed	Pearson Education, 2002

Subject Code (CS221204)	Big Data Analytics	L = 3	T = 1	P = 0	Credits =L+(T+P)/2 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3

Course Objective	Course Outcomes
The objective: 1. To provide an overview of an exciting growing field of big data analytics. 2. To introduce the tools required to manage and analyze big data like Hadoop, NoSql MapReduce. 3. To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability. 4. To enable students to have skills that will help them to solve complex real-world problems in for decision support.	On successful completion of the course, the student will be able to: CO1 Understand the key issues in big data management and its associated applications in intelligent business and scientific computing. CO2 Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce, Hive, Hiveql, Hbase In Big Data Analytics. CO3 Interpret business models and scientific computing paradigms, and apply software tools for big data analytics. **CO4** Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc.

UNIT I – INTRODUCTION TO BIG DATA [CO1]

Introduction – distributed file system – Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce. **[6 Hours]**

UNIT II – INTRODUCTION HADOOP [CO2]

Big Data – Apache Hadoop & Hadoop Eco System – Moving Data in and out of Hadoop – Understanding inputs and outputs of Map Reduce - Data Serialization. **[6 Hours]**

UNIT- III HADOOP ARCHITECTURE [CO2,CO3]

Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands , Anatomy of File Write and Read., Name Node, Secondary Name Node, and Data Node, Hadoop Map Reduce paradigm, Map and Reduce tasks, Job, Task trackers - Cluster Setup – SSH & Hadoop Configuration – HDFS Administering –Monitoring & Maintenance. **[6 Hours]**

UNIT-IV HADOOP ECOSYSTEM AND YARN [CO3]

Hadoop ecosystem components - Schedulers - Fair and Capacity, Hadoop 2.0 New Features- Name Node High Availability, HDFS Federation, MRv2, YARN, Running MRv1 in YARN. **[6 Hours]**

UNIT-V HIVE AND HIVEQL, HBASE [CO3, CO4]

Hive Architecture and Installation, Comparison with Traditional Database, HiveQL - Querying Data - Sorting And Aggregating, Map Reduce Scripts, Joins & Subqueries, HBase concepts- Advanced Usage, Schema Design, Advance Indexing - PIG, Zookeeper - how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications with Zookeeper. **[6 Hours]**

Text Books/ Reference Books

S.No.	Title	Authors	Edition	Publisher
1	Professional Hadoop Solutions	Boris lublinsky, Kevin t. Smith, Alexey Yakubovich	2015	Wiley
2	Understanding Big data	Chris Eaton, Dirk deroos	2012	McGraw Hill,
3	HADOOP: The definitive Guide	Tom White	2012	O Reilly
4	Big Data Analytics with R and Haoop	Vignesh Prajapati	2013	Packet Publishing
5.	Oracle Big Data Handbook	Tom Plunkett, Brian Macdonald	2014	Oracle Press
6.	Big Data and Business analytics	Jy Liebowitz	2013	CRC press

Elective –II

Subject Code (CS221221)	Neural Networks	L = 3	T = 1	P = 0	Credits =L+(T+P)/2 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3

Course Objective	Course Outcomes
1. Understand the context of neural networks 2. Know how to use a neural network 3. Have a working knowledge of neural networks and deep learning 4. Explore the parameters for neural network	After this course, we should be able to CO1 Grasp the neural networks for pattern classification and association. Know the main types of neural networks CO2 Know and apply the methods of training neural networks CO3 Know the application of artificial neural networks CO4 Formalize the problem, to solve it by using a neural network. CO5 Know how to use neural networks for solving different problems related to pattern recognition, function approximation, data visualization.

Unit-1 **[CO1]**

Introduction:

History, overview of biological Neuro-System, Mathematical Models of Neurons, ANNarchitecture, Learning rules, Learning Paradigms-Supervised, Unsupervised and reinforcement Learning.

[8HRS]

Unit-2 **[CO2]**

Supervised Learning and Neuro dynamics:

Perceptron training rules, Delta, Back propagation training algorithm, HopfieldNetworks, Associative Memories. **[8HRS]**

Unit-3 **[CO2, CO3]**

Unsupervised and Hybrid Learning:

Principal Component Analysis, Self-organizing Feature Maps, ART networks, LVQ, **[8HRS]**

Unit-4 **[CO4,CO5]**

Applications:

Applications of Artificial Neural Networks to Function Approximation, Regression, Classification, Blind Source Separation, Time Series and Forecasting. **[8HRS]**

Unit-5 **[CO5]**

Radial-Basis function networks

Radial-Basis function (RBF) networks and their application in function interpolation, approximation and modeling probability distributions. **[8HRS]**

Recurrent networks

Hopfield networks.

Text Book:

S.No.	Title	Authors	Edition	Publisher
1.	An Introduction to Neural Networks	Anderson J.A.,		PHI,1999

References:

S.No.	Title	Authors	Edition	Publisher
1.	Neural Networks-A Comprehensive Foundations	Haykin S.,		New Jersey,1999.
2	Neural Networks: Algorithms	Freeman J.A., D.M. Skapura		Addison-Wesley, Reading, Mass,(1992
3	Mathematical Methods for Neural Network Analysis and Design	Golden R.M.		MIT Press, Cambridge, MA,1996.
4	LearningfromData-Concepts,TheoryandMethods	CherkasskyV., F.Kulier		JohnWiley,New York,1998.
5	Neurocomputing: Foundatiions of Research	Anderson J.A., E. Rosenfield		MIT Press, Cambridge, MA, 1988.
6	Self-Organizing Maps	KohonenT.	2nd	Verlag, Berlin,1997
7	Artificial Neural Networks: Theory and Applications	Patterson D.W	1995	Prentice Hall, Singapore

Subject Code (CS221222)	Cryptography & Network Security	L = 3	T = 1	P = 0	Credits =L+(T+P)/2 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3

Course Objective	Course Outcomes
The objective is to make the students- 1. To understand basics of Cryptography and Network Security. 2. To be able to secure a message over insecure channel by various means. 3. To learn about how to maintain the Confidentiality, Integrity and Availability of a data. 4. To understand various protocols for network security to protect against the threats in the networks. 5. Acquire background on hash functions; authentication; firewalls; intrusion detection techniques	On successful completion of the course, the student will be able to: CO1 Conventional encryption algorithms for confidentiality and their design principles. CO2 Public key encryption algorithms and their design principles. CO3 Use of message authentication codes, hash functions, digital signature and public key certificates. CO4 Network security tools and applications. CO5 System-level security issues like threat of and countermeasures for intruders and viruses, and the use of firewalls and trusted systems. CO6 Wide area for research in the emerging trends of cryptography and network security is opened by implementing various networking protocols.

UNIT-1 **[CO1]**

Foundations of Cryptography and Security:

Ciphers and Secret Messages, Need for Security; Security Attack – Threats, Vulnerabilities, and Controls, Types of Threats (Attacks); Security Services – Confidentiality, Integrity, Availability; Information Security; Methods of Protection. , Mathematical Tools for Cryptography ,Substitutions and Permutations , FINITE FIELDS AND NUMBER THEORY: Groups, Rings, Fields-Modular arithmetic-Euclid's algorithm-Finite fields- Polynomial Arithmetic –Prime numbers-Fermat's and Euler's theorem-Testing for primality -The Chinese remainder theorem- Discrete logarithms. **[10HRS]**

UNIT-2 **[CO2, CO3]**

Conventional Symmetric Encryption Algorithms :

Theory of Block Cipher Design, Feistel Cipher Network Structures ,DES and Triple DES Modes of Operation (ECB,CBC, OFB,CFB) ,Strength (or Not) of DES , Modern Symmetric Encryption Algorithms ,IDEA, CAST, Blowfish, Twofish ,RC2, RC5, Rijndael (AES). **[10HRS]**

UNIT-3 **[CO3, CO4]**

Key Distribution Stream Ciphers and Pseudo Random Numbers:

Pseudo random sequences ,Linear Congruential generators ,Cryptographic Generators ,Design of Stream Cipher, One Time Pad , Public Key cryptography .Prime Numbers and Testing for Primality ,Factoring Large Numbers ,RSA, Diffie-Hellman, ElGamal Key Exchange Algorithms ,Public-Key Cryptography Standards, DSS, Zero-knowledge signatures. **[10HRS]**

UNIT-4 **[CO4]**

Hashes and Message Digests:

Authentication function – MAC , Hash function , Security of hash function and MAC ,MD5 , SHA , HMAC , CMAC , Digital Signatures, Certificates, User Authentication ,Digital Signature Standard (DSS and DSA) .Security Handshake Pitfalls ,Elliptic Curve Cryptosystems , Authentication of Systems ,Kerberos V4 and V5 ,X.509 Authentication Service. **[10HRS]**

UNIT-5 **[CO5,CO6]**

Electronic Mail Security:

Pretty Good Privacy (PGP) ,S/MIME, X.400 ,(3/30) IP and Web Security ,IPSec and Virtual Private Networks ,Secure Sockets and Transport Layer (SSL and TLS) ,Electronic Commerce Security, Firewalls – Types – Packet Filtering Gateway, Stateful Inspection Firewall, Application Proxy, Guard, Personal Firewalls; Comparison of Firewall Types; Firewall Configurations. **[12HRS]**

Text Book/Reference Books:

S.No.	Title	Authors	Edition	Publisher
1.	Cryptography And Network Security Principles And Practice	William Stallings		Pearson Education
2.	Cryptography and Network Security	AtulKahate		McGraw Hill
3.	Cryptography and Network Security	Behrouz A Forouzan		McGraw Hill

Subject Code (CS221223)	Distributed Computing	L = 3	T = 1	P = 0	Credits =L+(T+P)/2 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3

Course Objective	Course Outcomes
The objective is to - 1. To provide students with contemporary knowledge distributed computing. 2. To focus on performance and flexibility issues related to systems design decisions. 3. Introduce a variety of methodologies and approaches for reasoning about concurrent and distributed programs 4. To introduce concepts related to distributed computing systems. 5. To focus on performance and flexibility issues related to systems design decisions	After successful completion of this course, student will be able to CO1 Understand the concepts and issues related to distributed systems. CO2 List the principles of distributed systems and describe the problems and challenges associated with these principles. CO3 Design and develop the programs for distributed environment. CO4 Manage performance, reliability and other issues while designing in distributed environment. CO5 Understand the importance of security in distributed systems

UNIT I: Fundamentals of Distributed Computing: **[CO1]**
Architectural models for distributed and mobile computing systems. Basic concepts in distributed computing such as clocks, message ordering, consistent global states, and consensus. **[06HRS]**

UNIT II: Basic Algorithms in Message: **[CO2,CO3]**
Passing Systems, Leader Election in Rings, and Mutual Exclusion in Shared Memory, Fault-Tolerant Consensus, Causality and Time. Message Passing: PVM and MPI. **[06HRS]**

UNIT III: Distributed Operating Systems: **[CO3]**
OS and network operating systems, Distributed File systems. Middleware, client/server model for computing, common layer application protocols (RPC, RMI, streams), distributed processes, network naming, distributed synchronization and distributed object-based systems. **[08HRS]**

UNIT IV: Simulation: **[CO4]**
A Formal Model for Simulations, Broadcast and Multicast, Distributed Shared Memory, Fault-Tolerant Simulations of Read/Write Objects Simulating Synchrony, Improving the Fault Tolerance of Algorithms, Fault-Tolerant Clock Synchronization. **[08HRS]**

UNIT V: Distributed Environments: **[CO5]**
Current systems and developments (DCE, CORBA, JAVA).

Advanced Topics:
Randomization, Wait-Free Simulations of Arbitrary Objects, Problems Solvable in Asynchronous Systems, Solving Consensus in Eventually Stable Systems, High Performance Computing-HPF, Distributed and mobile multimedia systems. Adaptability in Mobile Computing.Grid Computing and applications. Fault tolerant Computing Systems. **[08HRS]**

Text /Reference Books:

S.No.	Title	Authors	Edition	Publisher
1.	Distributed Computing: Fundamentals, Simulations ,and Advanced Topics	HagitAttiya, JenniferWelch	2nd Edition	March2004
2.	Distributed Systems	Mullendar S	2nd Edition	Addison, Wesley1994
3.	Distributed Operating Systems	Tannenbaum,		Wesley1994.
4.	Mobile Computing Concepts and Technology	Helal, Abdelsalam		Publishers1999.
5.	DistributedSystems:Conceptsand Design	George Coulouris, JeanDollimoreand	3rd Edition	Wesley, Pearson Education, 2001

Subject Code (CS221224)	Cellular Mobile Communication	L = 3	T = 1	P = 0	Credits =L+(T+P)/2 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3

Course Objective	Course Outcomes
The objective is to - 1. To understand the basic cellular system concepts. 2. To have an insight into the various propagation models and the speech coders used in mobile communication. 3. To understand the multiple access techniques and interference techniques in mobile communication.	After successful completion of this course, student will be able to CO1 Identify various propagation effects. CO2 To have knowledge of the mobile system specifications. CO3 Classify multiple access techniques in mobile communication. CO4 Outline cellular mobile communication standards.

NOTE: Prerequisite Advanced Digital Communication

Unit-1

Wireless and Mobile Network Architecture: **[CO1]**

Principle of Cellular Communication, Overview 1G, 2G, 2.5G and 3G and 4G technologies. GSM Architecture and Mobility management, hand off management, Network signalling. Mobile Computing fundamental challenges, Mobile Devices –PDA and mobile OS, PalmOs, Win CE and Symbian. **[8HRS]**

Unit-2 **[CO2]**

Mobile IP Protocol Architecture: Mobile IP and IPv6 and its application in mobile computing. Cellular Digital Packet Data CDPD, VOIP, GPRS Services, Wireless Local Loop-WLL system. **[8HRS]**

Unit-3 **[CO2, CO3]**

Wireless Application Protocol (WAP):

The Wireless Application Protocol application environment, wireless application protocol client software, hardware and websites, wireless application protocol gateways, implementing enterprise wireless application protocol strategy. **[10HRS]**

Unit-4 **[CO3, CO4]**

Wireless Markup Language:

An Introduction to Wireless Technologies, Markup Languages , An Introduction to XML, Fundamentals of WML., Writing and Formatting Text , Navigating Between Cards and Decks, Displaying Images, Tables, Using Variables, Acquiring User Input

Wireless Markup Language Script:

An Introduction to WML Script, WML Script Control Structures, Events, Phone.com Extensions, Usability **[8HRS]**

Unit-5 **[CO4]**

Application of Mobile computing:

ASP and Dynamic WAP Sites, XML and XSLT, Dynamic WML Generation with ASP and XSLT, Developing WAP Applications using Emulators. **[8HRS]**

Text/Reference Books:

S.No.	Title	Authors	Edition	Publisher
1.	Wireless and Mobile Networks Architecture	Yi Bing Lin	-	JohnWiley.
2.	The Beginning WML and WML Script	Wrox	-	WroxPublication
3.	Mobile Computing	Tomasz Imielinski	-	Kluwer Academic Press1996
4.	Pervasive Computing Handbook	Uwe Hansmann	-	IEE publication2002
5.	Technology and Architecture of Mobile Internet Applications	JochenBurkhardt	-	Addison Wesley,2002

Subject Code (CS221225)	Digital Image Processing	L = 3	T = 1	P = 0	Credits =L+(T+P)/2 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3

Course Objective	Course Outcomes
The objective is to - 1. To study the image fundamentals and mathematical transforms necessary for image processing. 2. To study the image enhancement techniques 3. To study image restoration procedures. 4. To study the image compression procedures.	After successful completion of this course, student will be able to: CO1 Review the fundamental concepts of a digital image processing system. CO2 Analyse images in the frequency domain using various transforms. CO3 Evaluate the techniques for image enhancement and image restoration. CO4 Categorize various compression techniques. CO5 Interpret Image compression standards. CO6 Interpret image segmentation and representation techniques.

UNIT – I **[CO1]**

Digital image representation, elements of digital processing systems, sampling and quantization, simple image model, basic relationship between pixel and image geometry. **[8HRS]**

UNIT – II **[CO2]**

image transforms ,introduction to Fourier transform, DFT, properties of 2D DFT, FFT, other separable image transform, DCT, DST, Walsh, Harr transforms**.** **[8HRS]**

UNIT – III **[CO2, CO3]**

image enhancement: basic gray level transformation , histogram processing using arithmetic and logical operations, spatial filtering , smoothening and sharpening filters , smoothing and sharpening frequency domain filters.

[8HRS]

UNIT – IV **[CO4]**

Image compression-fundamentals, image compression models, information theory , free compression, lossy compression, image compression standards**.** **[8HRS]**

UNIT – V **[CO5, CO6]**

Image segmentation- detection of discontinuities, edge lending and boundary detection, region based segmentation representation and description: representation, boundary descriptor, regional descriptor.

[8HRS]

Text Books:

S.No.	Title	Authors	Edition	Publisher
1.	Digital image processing	R.C. Gonzalez	2nd editio n	wooden
2.	Fundament of DIP	A.K. Jain		PHI

Subject Code (CS221291)	Advanced Database Management System - Lab	L = 0	T = 0	P = 3	Credits =L+(T+P)/2 2
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	-	-	75	75	3 hrs

Course Objective	
This lab work will enhance database handling, data manipulation and data processing skills through SQL & PL/SQL, which will help them in developing data centric computer applications.	After undergoing this laboratory module, the students will be able to: CO1 Design and implement a database schema for a given problem-domain CO2 Normalize a database CO3 Populate and query a database using SQL DML/DDL commands. CO4 Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS CO5 Programming PL/SQL including stored procedures, stored functions, cursors, packages. CO6 Design and build a GUI application

Experiment to be performed

1. Introduction toOracle9i.
2. Introduction to DML commands.
3. Introduction to select command (including sub queries).
4. Consider the following table (ticket detail table):

Name of field	Data type
Ticket_no	Number(5)
Name	Varchar2(20)
Sex	Char(5)
Age	Number(3)
Fare	Number(5,2)

5. Write a PL/SQL block to give the details of passengers from ticket detail table.
   Consider the following table (item)

Name of field	Datatype
Order_id	Number(4)
Item_id	Number(4)
Detail_price	Number(5)
Qty	Number(5)
Prod_id	Number(4)

6. Write a PL/SQL block (using cursor), which will select only those rows where Order_id is zero from the item table.

7. Write a PL/SQL block (using cursor) that will select only those values from the item table where Item_id is 3000 and calculate the total price of all Item_id 3000 and print the total price of the same. If a value is not to be found then an appropriate message should be displayed.)

8. Create a transparent audit system for a table Client_Master . The system must keep track of records that are being deleted or updated. The functionality being when a record is deleted or modified the original record details and the date of operation are stored in table audit_client, then the delete or update is allowed to go through.

Client master table	
Field name	**Datatype(size)**
Client_no	Varchar2(6)
Name	Varchar2(20)
Address1 Address2	Varchar2(30) Varchar2(30)
City	Varchar2(15)
State	Varchar2(15)
Pincode	Number(6)
Bal_due	Number(10,2)

Audit client table	
Field name	**Datatype**
Account_id	Varchar2(6)
Name	Varchar2(30)
Bal	Number(20)

9. Write a PL/SQL code block that will accept
   i) An Account_id, the type of transaction ,the amount involved and whether the amount to be debited to or credited to an account number.
   ii) The balance in accounts table for the corresponding account number is updated.
   iii) before the update is fired, the record is viewed in the 'for update no wait mode' so that a lock canbeacquiredontherecordtobeupdatedandnootheruserhasaccesstothesamerecordtill the transaction is completed.

Field name	Datatype
Account_id	Varchar2(6)
Name	Varchar2(30)
Bal	Number(20)

10. Write a procedure to process a select statement to pass values from database columns to the local variables, the columns or expressions must be associated with local variables.

11. Introduction to privileged commands.

Text Books:

S.No.	Title	Authors	Edition	Publisher
1	PL/SQL: The Programming Language of Oracle	Ivan Bayross	4th Edition	BPB Publication

Subject Code (CS221292)	Machine Learning Lab	L = 0	T = 0	P = 3	Credits =L+(T+P)/2 2
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	-	-	75	75	3 hrs

Course Objective	Course Outcomes
The objective of this lab is to get an overview of the various machine learning techniques and can able to demonstrate them using python.	After the completion of the "Machine Learning" lab, the student can able to**:** CO1 Understand complexity of Machine Learning algorithms and their limitations; CO2 Understand modern notions in data analysis-oriented computing; CO3 Be capable of confidently applying common Machine Learning algorithms in practice and implementing their own CO4 Be capable of performing experiments in Machine Learning using real-world data.

List of Experiments

1. The probability that it is Friday and that a student is absent is 3 %. Since there are 5 schooldays in a week, the probability that it is Friday is 20 %. What is the probability that a student is absent given that today is Friday? Apply Baye's rule in python to get the result. (Ans: 15%)
2. Extract the data from database using python
3. Implement k-nearest neighbors classification using python
4. Given the following data, which specify classifications for nine combinations of VAR1 and VAR2 predict a classification for a case where VAR1=0.906 and VAR2=0.606, using the result of k-means clustering with 3 means (i.e., 3 centroids)

VAR1	VAR2	CLASS
1.713	1.586	0
0.18	1.786	1
0.353	1.24	1
0.94	1.566	0
1.486	0.759	1
1.266	1.106	0
1.54	0.419	1
0.459	1.799	1
0.773	0.186	1

5. The following training examples map descriptions of individuals onto high, medium and low

Credit	Worthiness
medium	skiing design single twenties → no → high Risk
high	golf trading married forties → yes →low Risk
low	speedway transport married thirties→ yes →med Risk
medium	football banking single thirties→ yes →low Risk
high	flying media married fifties → yes →high Risk
low	football security single twenties → no →med Risk
medium	golf media single thirties → yes →med Risk

medium	golf transport married forties → yes →low Risk
high	skiing banking single thirties → yes →high Risk
low	golf unemployed married forties→ yes →high Risk

Input attributes are (from left to right) income, recreation, job, status, age-group, home-owner. Find the unconditional probability of '***golf***' and the conditional probability of '***single'*** given '***medium'*** Risk in the dataset?

6. Implement linear regression using python.
7. Implement Naïve Bayes theorem to classify the English text
8. Implement an algorithm to demonstrate the significance of genetic algorithm
9. Implement the finite words classification system using Back-propagation algorithm

Text Books:

S.No.	Title	Authors	Edition	Publisher
1.	Machine Learning	Tom M. Mitchell		MGH
2.	Fundamentals of Speech Recognition	Lawrence Rabiner and Biing		Hwang Juang

Reference Books:

S.No.	Title	Authors	Edition	Publisher
1.	Machine Learning: An Algorithmic Perspective,	Stephen Marsland		Taylor & Francis