KVR GOVT. COLLEGE FOR WOMEN (AUTONOMOUS), KURNOOL.
Re-Accredited by NAAC with Grade "A".
CHOICE BASED CREDIT SYSTEM (w.e.f. 2020-21)
I M.Sc Computer Science II Semester
DATABASE MANAGEMENT SYSTEMS

Theory: 4 Periods | Max Marks: 80
Exam: 3 Hrs | Credits: 4

UNIT I

Database Management Systems: Introduction to different types of databases -
Database and Database Users: Data models, schemas, and instances, three-schemas architecture and data independence, database languages and interfaces, the database system environment, Centralized and client/server architectures for DBMSs, Classification of database management system.
Data Modelling Using the Entity-Relationship Model: Using High—Level Conceptual data model, Entity types, entity sets Attributes and keys, Relationships types, relationship sets, roles and structural constraints, Weak Entity types, ER diagrams Meaning conventions and design issues, Enhance Entity Relationship model.
Relational data model and relational database constraints: Relational model constraints and relational schemas, update operations.

UNIT II

Relational Algebra and Relational Calculus: Unary Relational operations, Relational Algebra operations, Binary Relational operation, Additional Relational operation, Examples of Queries in Relational Algebra, Domain Relational Calculus.
Relational database design by ER and EER Relational Mapping: Relational database design using ER to Relational Mapping, Mapping EER Model Construct to Relations
Schema Definition, Basic Constraints and Queries: SQL Data definition, Specifying basic constraints in SQl, Schema change Statements in SQL, Basic queries in SQL, More complex SQL queries, INSERT DELETE UPDATE queries in SQL, Views in SQL, Data base stored Procedures.

UNIT III

Relational Database Design: Informal design Guide lines for Relation Schema, Functional Dependences, Normal forms based on Primary keys, General definitions of Second and Third Normal form, BOYCE-CODE Normal form, Algorithm for Relational database schema design, Multi-valued dependencies and fourth Normal forms- Join Dependencies and Fifth Normal Form.
Algorithm for query processing and Optimization: Translating SQL Queries into Relational Algebra, Algorithms for SELECT and JOIN Operations, Algorithms for PROJECT and SET Operations

UNIT IV

Introduction to Transaction Processing Concepts and Theory: Introduction to Transaction Process, Transaction and System Concepts, Characterizing Schedules, Concurrency Control Techniques, Database Recovery Concepts, Recovery Techniques.
Database Security and Authorization - Introduction to Database Security Issues – Discertionary Access Control Based on Granting and Revoking Privileges – Mandetory Access Control and Role - Base Access Control for Multilevel Secturity.

Text Book:

1. Fundamentals of Database System , Elmasri, Navathe, Pearson Educaiton.

References Books:

1. Database Management Systems, Raghu Ramakrishnan, Johannes Gehrke,McGrawHill.

2. Database Concepts, Abraham Silberschatz, Henry F Korth, S Sudarshan, McGraw-Hill

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CHOICE BASED CREDIT SYSTEM (w.e.f. 2020-21)
I M.Sc Computer Science II Semester
DATA SCIENCE WITH R

Theory: 4 Periods | Max Marks: 80
Exam: 3 Hrs | Credits: 4

Unit – I

Basics of R: Introduction, R-Environment Setup, Programming with R, Basic Data Types, Vectors**:** Creating and Naming Vectors, Vector Arithmetic, Vector Subsetting, Matrices**:** Creating and Naming Matrices, Matrix Subsetting, Arrays, Class.

Factors and Data Frames : Introduction to Factors: Factor Levels, Summarizing a Factor, Ordered Factors, Comparing Ordered Factors, Introduction to Data Frame, Subsetting of Data Frames, Extending Data Frames, Sorting Data Frames.

Unit – II

Lists: Introduction, Creating a List: Creating a Named List, Accessing List Elements, Manipulating List Elements, Merging Lists, Converting Lists to Vectors, Conditionals and Control Flow: Relational Operators, Relational Operators and Vectors, Logical Operators, Logical Operators and Vectors, Conditional Statements, Scalars.

Iterative Programming in R: Introduction, While Loop, For Loop, Looping Over List.

Unit-III

Introduction to Data Science - The data science process: The roles in a data science project, Stages of a data science project: Defining the goal, Data collection and management, Modeling, Model evaluation and critique, Presentation and documentation, Model deployment and maintenance, Setting expectations: Determining lower and upper bounds on model performance, Exploring data - Using summary statistics to spot problems: Typical problems revealed by data summaries, Spotting problems using graphics and visualization: Visually checking distributions for a single variable, Visually checking relationships between two variables, Managing data- Cleaning data: Treating missing values (NAs), Data transformations, Sampling for modeling and validation: Test and training splits, Creating a sample group Column, Record grouping, Data provenance

Unit-IV

Modeling Methods - Choosing and evaluating models - Mapping problems to machine learning tasks**:** Solving classification problems, Solving scoring, problems, Working without known targets, Problem-to-method mapping, Evaluating models: Evaluating classification models, Evaluating scoring Models, Evaluating probability models, Evaluating ranking models, Evaluating clustering models, Validating models: Identifying common model problems, Quantifying model soundness, Ensuring model quality, Memorization methods: Building single-variable models, Using categorical features, Using numeric features, Using cross-validation to estimate effects of overfitting

Text Books:

1. "Practical Data Science with R", Nina Zumel, John Mount, Manning Publications, 2014.

2. “Mining of Massive Datasets”, Jure Leskovec, Anand Rajaraman, Jeffrey D.Ullman, Cambridge University Press, 2014.
3. “Beginning R - The Statistical Programming Language”, Mark Gardener, John Wiley & Sons, Inc., 2012.
4. “An Introduction to R”, W. N. Venables, D. M. Smith and the R Core Team, 2013.

References:

1. “Practical Data Science Cookbook”, Tony Ojeda, Sean Patrick Murphy, Benjamin Bengfort, Abhijit Dasgupta, Packt Publishing Ltd., 2014.
2. “Visualize This: The FlowingData Guide to Design, Visualization, and Statistics”, Nathan Yau, Wiley, 2011.
3 “Professional Hadoop Solutions”, **.**Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, Wiley, ISBN: 9788126551071, 2015

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CHOICE BASED CREDIT SYSTEM (w.e.f. 2020-21)
I M.Sc Computer Science II Semester
OPERATING SYSTEMS

Theory: 4 Periods | Max Marks: 80
Exam: 3 Hrs | Credits: 4

UNIT -I

Introduction to Operating Systems: User view and System View. Brief introduction to Mainframe Systems, Desktop Systems, Multiprocessor Systems, Clustered Systems, Real-Time Systems and Handheld Systems. Different types of Operating Systems (Feature Migration. Computing Environments). **Computer-System Structures:** Computer-System Operation, I/O Structure, Storage Structure, Storage Hierarchy, Hardware protection, Network Structure. **Operating System Structures:** System Components, Operating System Services, System Calls, System Programs, System Structure, Virtual Machines, System Design and Implementation, System Generation (Chapter 1,2 & 3)

UNIT -II

Process Management: Process Concept, Process Scheduling, Operations on Processes. Cooperating Processes, Interprocess Communication in Client-Server Systems. **Threads:** Overview, Multithreading Models, Threading Issues, Pthreads, Solaris 2 threads, window 2000 threads, Linux Threads, Java Threads. **CPU Scheduling:** Basic concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Process Scheduling Models. (Chapters 4,5 & 6)

UNIT -III

Process Synchronization : Background, The Critical-Section Problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization. Critical Regions, Monitors, OS Synchronization. Atomic Transactions. **Deadlocks:** System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection. Recovery from Deadlock. (Chapters 7 & 8).

UNIT-IV

Memory Management: Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation. Segmentation with Paging. **Virtual Memory:** Background Demand Paging, Process Creation, Page Replacement, Allocation of Frames, Thrashing. **File System:** File Concept, Access Methods, Directory Structure, File-System Mounting, File Sharing. Protection. File – System Structure, File-System Implementation. Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and Performance, Recovery. Log-Structured File System. Network File System. (Chapters 9,10,11 & 12) Introduction to Android Operating System: Android OS design and Features – Types of Android applications

Text –Book:

"Operating System Concepts", Abraham Silberchartz, Peter Baer Galvin & Greg Gagne:. 10th Edition, (John Wiley & Sons)

Reference Books:

1. "Operating Systems", William Stallings 7th (PHI)
2. "Modern Operating Systems", A.S. Tannebaum (PHI 2002)

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CHOICE BASED CREDIT SYSTEM (w.e.f. 2020-21)
I M.Sc Computer Science II Semester
COMPUTER NETWORKS

Theory: 4 Periods | Max Marks: 80
Exam: 3 Hrs | Credits: 4

UNIT –I

COMPUTER NETWORKS AND THE INTERNET: What is the Internet?, What is a Protocol?, The Network Edge, The Network Core, Access Networks and Physical Media,Delay and Loss in Packet-Switched Networks, Protocol Layers and Their Service Models,Internet Backbones,NAPs and ISPs,Networks under Attack,A Brief History of Computer Networking and the Internet. **APPLICATION LAYER:** Principles of Application Layer Protocols, The World Wide Web: HTTP, File Transfer: FTP Electronic Mail in the Internet, DNS – The internet's Directcry Service.

UNIT -II

TRANSPORT LAYER : Transport-Layer Services and Principles, Multiplexing and Demultiplexing Applications, Connectionless Transport: UDP, Principles of Reliable Data Transfer, Connection-Oriented Transport: TCP, Principles of Congestion Control ,TCP Congestion control

UNIT -III

NETWORK LAYER AND ROUTING: Introduction and Network Service Models, what's Inside a Router, , Internet Protocol, Routing Algorithms, Routing in the Internet.

UNIT -IV

LINK LAYER AND LOCAL AREA NETWORKS: The Data Link Layer: Introduction, Services, Error Detection and Correction Techniques, Multiple Access Protocols, Link Layer Addressing-MAC Addresses and ARP, Ethernet,Internet Connections:Hubs and Switches, PPP: The Point-to-Point Protocol, Asynchronous Transfer Mode Networks

Text Book:

COMPUTER NETWORKING A Top-Down Approach Featuring the Internet, James F. Kurose and KejthW.Ross : 3 rd & 7 th Edition, Pearson Education.

Reference Books:

1. "Computer Networks" : Tanenbaum 3rd Edition, PHI
2. "Computer Networks" Forouzan 2nd Edition, TMH
3. "Data Communication And Distributed Networks" Black : 3rd Edition, PHI

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CHOICE BASED CREDIT SYSTEM (w.e.f. 2020-21)
I M.Sc Computer Science II Semester
ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS

Theory: 4 Periods | Max Marks: 80
Exam: 3 Hrs | Credits: 4

UNIT I

What is AI, The Foundations of AI, The History of AI, Agents and Environments, The Concept of Rationality, The Nature of Environments, The Structure of Agents, Problem Solving Agents, Example Problems, Searching for Solutions, Uninformed Search Strategies: Breadth First, Depth First, Depth Limited; Informed Search Strategies: Greedy Best First, A*Algorithms.

UNIT II

Heuristic Functions, Local-Search Algorithms and Optimization Problems: Hill Climbing, Simulated Annealing, Genetic Algorithms; Constraint Satisfaction Problems, Backtracking Search For CSPs, Games, Optimal Decisions in Games Knowledge Based Agents, The Wumpus World, Logic, Propositional Logic, Reasoning Patterns in Propositional Logic, Syntax and Semantics of First Order Logic, Using First Order Logic, Inference in First-Order Logic: Unification, Resolution.

UNIT III

Acting Under Uncertainty, Basic Probability Notation, The Axioms of Probability, Inference Using Full Joint Distribution, Independence, Bayes Rule and Its Use, Other Approaches To Uncertain Reasoning: Dempster Shafer Theory, Fuzzy Sets and Fuzzy Logic Combining Beliefs Under Uncertainty, The Basis of Utility Theory, Utility Functions, Multi Attribute Utility Functions, Decision Theoretic Expert Systems

UNIT IV

Expert System, Concepts and Characteristics, Applications and Domains of Expert System, Elements Of an Expert System, Stages in the Development of an Expert System, Semantic Nets, Frames Speech Recognition, Forms of Learning, Inductive Learning, Learning Decision Trees, Single Layer Feed Forward, Multi Layer Feed Forward Neural Networks.

Text Books:

1. “Artificial Intelligence: A Modern Approach”. Stuart Russell, Peter Norvig, Pearson Education 2nd Edition.

2. “Expert Systems” : Principles and Programming. Joseph C Giarratano, Gary D RileyThomson Publication, 4th Edition.

Reference Books:

1. “Artificial Intelligence”, Elaine Rich and Kevin Knight, Tata McGraw Hill.

2. “Introduction to Artificial Intelligence and Expert Systems”, Dan W.Patterson, PrenticeHall of India.

3. “Principles of Artificial Intelligence and Expert System Development”, David W Rolston: McGrawHill