KVR GOVT. COLLEGE FOR WOMEN(A), KURNOOL.
DEPARTMENT OF COMPUTER SCIENCE

M.Sc(Computer Science) Syllabus

COURSE STRUCTURE FOR M.Sc(Computer Science)- III SEMESTER
(W.e.f. 2019 – 2020 Batch)

M.Sc 3T1:DATA WAREHOUSING AND DATA MINING

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UNIT I

Data Warehouse and OLAP Technology: An overview DataWarehouse Basic Concepts,Data Warehouse Modeling: Data Cube and OLAP, Data Warehouse Implementation

Data Preprocessing: An Overview,Data Cleaning,Data Integartion, DataReduction, DataTransformation and Data Discretization, From Data Warehousing to Data Mining

UNIT II

Introduction to Data Mining: Motivation and importance, What is Data Mining, Data Miningon what kind of data, What kinds of patterns can be mined, Which technologies are used,Which kinds of applications are targeted, Major issues in Data Mining.

Getting to know your Data: Data Objects and Attribute Types, Basic Statistical Descriptionsof Data, Data Visualization, Measuring data Similarity and Dissimilarity.

UNIT III

Concept Description: Characterization and comparison What is Concept Description,Data Generalization by Attribute-Oriented Induction(AOI), AOI for Data Characterization,Efficient Implementation of AOI, AOI for Class comparisons.

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, FrequentItemset Mining Methods: Apriori method, generating Association Rules, Improvingthe Efficiency of Apriori, Pattern-Growth Approach for mining Frequent Item sets,Mining Frequent Itemsets using vertical data format.

UNIT IV

Classification Basic Concepts: Basic Concepts, Decision Tree Induction: Decision TreeInduction, Attribute Selection Measures, Tree Pruning, Bayes Classification Methods,Classification by Back Propagation, Support Vector Machines.

Cluster Analysis: Cluster Analysis, Partitioning Methods, Hierarchical methods, Densitybased methods-DBSCAN and OPTICS.

Text Book:

1. Data Mining Concepts and Techniques—JiaweiHan, Micheline Kamber and Jian Pei,Morgan Kaufman Publications 3rd edition.

Reference Books:

1. Introduction to Data Mining –Pang-Ning Tan, Michael Steinbach, Vipin Kumar

2. Introduction to Data Mining, Adriaan, Addison Wesley Publication

3. Data MiningTechniques,A.K.Pujari,University Press

M.Sc 3T2: BIG DATA ANALYTICS

Theory: 4 Periods   Mid Marks: 30
Lab Hrs: 0 Periods   Ext. Marks: 70
Exam: 3 Hrs   Credits: 4

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UNIT I – INTRODUCTION TO BIG DATA

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.

UNIT II – INTRODUCTION HADOOP

Big Data – Apache Hadoop & Hadoop EcoSystem – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization.

UNIT- III HADOOP ARCHITECTURE

Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands , Anatomy of File Write and Read., NameNode, Secondary NameNode, and DataNode, Hadoop MapReduce paradigm, Map and Reduce tasks, Job, Task trackers - Cluster Setup – SSH & Hadoop Configuration – HDFS Administering –Monitoring & Maintenance.

UNIT-IV HADOOP ECOSYSTEM AND YARN

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

REFERENCES

1. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions", Wiley, ISBN: 9788126551071, 2015.
2. Chris Eaton, Dirk deroos et al. , "Understanding Big data ", McGraw Hill, 2012.
3. Tom White, "HADOOP: The definitive Guide" , O Reilly 2012.
4. Vignesh Prajapati, "Big Data Analytics with R and Haoop", Packet Publishing 2013.
5. Tom Plunkett, Brian Macdonald et al, "Oracle Big Data Handbook", Oracle Press, 2014.

M.Sc 3T3: PRINCIPLES OF COMPILER DESIGN

Theory: 4 Periods   Mid Marks: 30
Lab Hrs: 0 Periods   Ext. Marks: 70
Exam: 3 Hrs   Credits: 4

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UNIT-I

Lexical Analysis Compilers – Analysis of Source Program - Phases of Compiler – Compiler Construction Tools – Role of a Lexical Analyzer – Specification and Recognition of Tokens – Finite Automata – Regular Expression to Finite Automation.

UNIT-II

Syntax Analysis Role of a Parser – Context Free Grammars – Top-Down Parsing – Bottom-Up Parsing – LEX and YACC.

Intermediate Code Generation Intermediate Languages – Declaration – Assignment Statements – Boolean Expressions – Flow Control Statements – Back Patching.

UNIT-III

Code Optimization Introduction to Code Optimization – Principal Sources of Optimization – Basic Blocks and Flow Graphs – Optimization of Basic Blocks – Code Improving Transformations.

UNIT-IV

Code Generation Issues in the Design of a Code Generator – Run-Time Storage Management – Next Use Information – A Simple Code Generator – DAG Representation of Basic Blocks – Peephole Optimization – Code Generation from DAG.

Text Books:

A.V. Aho, Ravi Sethi, J. D. Ullman, "Compilers - Principles, Techniques and Tools", Addison-Wesley Publishing Company, 1988.

References Books:

1.Allen I. Holub, "Compiler Design in C", Prentice Hall of India, 1993.

2.Fischer Leblanc, "Crafting Compiler", Benjamin Cummings, Menlo Park, 1988.

3.Chattopadhyay,"Compiler Design", PHI.

4.Dasaradh,"Introduction to Automata and Compiler Design", PHI.

5.Holub,"Compiler Design in C", PHI.

Elective I

M.Sc 3T4-E1: INTERNET OF THINGS

Theory: 4 Periods   Mid Marks: 30
Lab Hrs: 0 Periods   Ext. Marks: 70
Exam: 3 Hrs   Credits: 4
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UNIT- I

The Internet of Things: An Overview of Internet of things, Internet of Things Technology, behind IoTs Sources of the IoTs, M2M Communication, Examples OF IoTs, Design Principles For Connected Devices Internet Connectivity Principles, Internet connectivity, Application Layer Protocols: HTTP, HTTPS, FTP, Telnet.

UNIT -II

Business Models for Business Processes in the Internet of Things ,IoT/M2M systems LAYERS AND designs standardizations ,Modified OSI Stack for the IoT/M2M Systems ,ETSI M2M domains and High-level capabilities ,Communication Technologies, Data Enrichment and Consolidation and Device Management Gateway Ease of designing and affordability

UNIT- III

Design Principles for the Web Connectivity for connected-Devices, Web Communication protocols for Connected Devices, Message Communication protocols for Connected Devices, Web Connectivity for connected-Devices.

UNIT -IV

Data Acquiring, Organizing and Analytics in IoT/M2M, Applications/Services/Business Processes, IOT/M2M Data Acquiring and Storage, Business Models for Business Processes in the Internet Of Things, Organizing Data, Transactions, Business Processes, Integration and Enterprise Systems.

UNIT- V

Data Collection, Storage and Computing Using a Cloud Platform for IoT/M2M Applications/Services, Data Collection, Storage and Computing Using cloud platform Everything as a service and Cloud Service Models, IOT cloud-based services using the Xively (Pachube/COSM), Nimbits and other platforms Sensor, Participatory Sensing, Actuator, Radio

Frequency Identification, and Wireless, Sensor Network Technology, Sensors Technology, Sensing the World.

TEXT BOOKS

1.Internet of Things: Architecture, Design Principles And Applications,Rajkamal, McGraw Hill Higher Education

2.Internet of Things, A.Bahgya and V.Madisetti, Univesity Press, 2015

REFERNCE BOOKS

1. Designing the Internet of Things, Adrian McEwen and Hakim Cassimally, Wiley

2. Getting Started with the Internet of Things CunoPfister , Oreilly.

M.Sc 3T4-E1:MACHINE LEARNING

Theory: 4 Periods   Mid Marks: 30
Lab Hrs: 0 Periods   Ext. Marks: 70
Exam: 3 Hrs   Credits: 4
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UNIT I

INTRODUCTION

Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

UNIT II

NEURAL NETWORKS AND GENETIC ALGORITHMS Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evalution and Learning.

UNIT III

BAYESIAN AND COMPUTATIONAL LEARNING Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

UNIT IV

INSTANCE BASED LEARNING

K- Nearest Neighbour Learning – Locally weighted Regression – Radial Bases Functions – Case Based Learning.

TEXT BOOKS:

1. Machine Learning – Tom M. Mitchell, - MGH

REFERENCE BOOKS

1. Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis

M.Sc 3T4-E1:SOFT COMPUTING

Theory: 4 Periods   Mid Marks: 30
Lab Hrs: 0 Periods   Ext. Marks: 70
Exam: 3 Hrs   Credits: 4
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UNIT-I

Fuzzy Sets and Fuzzy Logic: Introduction to Classical Sets and Fuzzy Sets. Classical set and Fuzzy sets – Operations and Properties. Fuzzy Relations – Equivalence & Tolerance. Membership Functions, Fuzzification, Membership Value Assignment. Fuzzy to Crisp Conversion. Lambda Cuts for Fuzzy Sets and Fuzzy Relations, Defuzzification Methods. Fuzzy Arithmetic. Fuzzy Logic and Approximate Reasoning. Rule Based Systems and Graphical Techniques of Inference. Fuzzy Associative Memories.

UNIT-II

Rough Sets and Granular Computation: Rough Sets – Definition, Upper and Lower Approximations, Boundary Region, Decision Tables and Decision Algorithms. Properties of Rough Sets. Rough Set Model based on Tolerance Relation. Introduction to Multi-Granulation Rough Set Models.

UNIT-III

Genetic Algorithms: Introduction to Genetic Algorithms, Basic Operators, Terminology and Mathematical Foundations. Computer Implementation of a Genetic Algorithm. Some Applications of Genetic Algorithms. Advanced Operators and Techniques in Genetic Search. Genetic Algorithms based Systems.

UNIT-IV

Artificial Neural Networks: Introduction, Learning Processes, Single Layer Perceptrons, Multilayer Perceptrons, Radial-Basis Function Networks, Support Vector Machines, SelfOrganizing Maps. Artificial Neural Networks based Systems.

TEXT BOOKS:

1. Timoty J. Ross, "Fuzzy Logic with Engineering Applications", McGraw Hill, 1997.
2. Zdzislaw Pawlak, "Rough Sets", Institute of Theoretical and Applied Informatics, Polish Academy of Sciences, University of Information Technology and Management, Poland. bcpw.bg.pw.edu.pl/Content/2026/RoughSetsRep29.pdf
3. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Pearson Education, 1989.

Elective II

M.Sc 3T5-E2:BLOCKCHAIN TECHNOLOGY

Theory: 4 Periods   Mid Marks: 30
Lab Hrs: 0 Periods   Ext. Marks: 70
Exam: 3 Hrs   Credits: 4

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Unit I

Introduction to Blockchain Distributed systems, History of blockchain, Introduction to blockchain, Types of blockchain, CAP theorem and blockchain, Benefits and limitations of blockchain.

Unit II

Decentralization and Cryptography Decentralization using blockchain, Methods of decentralization, Routes to decentralization, Decentralized organizations. Cryptography and Technical Foundations: Cryptographic primitives, Asymmetric cryptography, Public and private keys

Unit III

Bitcoin and Alternative Coins A: Bitcoin Transactions, Blockchain, Bitcoin payments B: Alternative Coins Theoretical foundations, Bitcoin limitations, Namecoin, Litecoin, Primecoin, Zcash

Unit IV

Smart Contracts Definition, Ricardian contracts: Smart contract templates, Deploying smart contracts on a blockchain.

TEXT BOOKS

1. Imran Bashir, "Mastering Blockchain - Distributed ledgers, decentralization and smart contracts explained", Packt Publishing Ltd., Second Edition, ISBN 978-1- 78712-544-5, 2017.

REFERENCES

1. Daniel Drescher, "Blockchain Basics: A Non-Technical Introduction in 25 Steps", Apress, First Edition, 2017.

2. Andreas M. Antonopoulos, "Mastering Bitcoin: Unlocking Digital Cryptocurrencies", O'Reilly Media, First Edition, 2014.

M.Sc 3T1: MOBILE APPLICATION DEVELOPMENT

Theory: 4 Periods   Mid Marks: 30
Lab Hrs: 0 Periods   Ext. Marks: 70
Exam: 3 Hrs   Credits: 4
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UNIT - I

Introduction to Android Operating System: Android OS design and Features – Android developmentframework, SDK features, Installing and running applications on Eclipse platform, Creating AVDs,Types of Android applications, Best practices in Android programming, Android tools

Android application components – Android Manifest file, Externalizing resources like values, themes,layouts, Menus etc, Resources for different devices and languages, Runtime Configuration ChangesAndroid Application Lifecycle – Activities, Activity lifecycle, activity states, monitoring state changes

UNIT - II

Android User Interface: Measurements – Device and pixel density independent measuring units
Layouts – Linear, Relative, Grid and Table Layouts
User Interface (UI) Components – Editable and non editable TextViews, Buttons, Radio and ToggleButtons, Checkboxes, Spinners, Dialog and pickers
Event Handling – Handling clicks or changes of various UI components
Fragments – Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments toActivity, adding, removing and replacing fragments with fragment transactions, interfacing betweenfragments and Activities, Multi-screen Activities

UNIT - III

Intents and Broadcasts: Intent – Using intents to launch Activities, Explicitly starting new Activity,Implicit Intents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent todial a number or to send SMS

Broadcast Receivers – Using Intent filters to service implicit Intents, Resolving Intent filters, findingand using Intents received within an Activity

Notifications – Creating and Displaying notifications, Displaying Toasts

UNIT - IV

Persistent Storage: Files – Using application specific folders and files, creating files, reading data fromfiles, listing contents of a directory Shared Preferences – Creating shared preferences, saving andretrieving data using Shared Preference

Database – Introduction to SQLite database, creating and opening a database, creating tables,inserting retrieving and deleting data, Registering Content Providers, Using content Providers (insert,delete, retrieve and update)

TEXT BOOKS:

1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox) , 2012

2. Android Application Development for Java Programmers, James C Sheusi, CengageLearning, 2013

REFERENCES:

1. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013

M.Sc 3T5-E2: CLOUD COMPUTING

Theory: 4 Periods   Mid Marks: 30
Lab Hrs: 0 Periods   Ext. Marks: 70
Exam: 3 Hrs   Credits: 4

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UNIT- I

Systems Modeling, Clustering and Virtualization: Distributed System Models and Enabling Technologies, Computer Clusters for Scalable Parallel Computing, Virtual Machines and Virtualization of Clusters and Data centers.

Foundations: Introduction to Cloud Computing, Migrating into a Cloud, Enriching the 'Integration as a Service' Paradigm for the Cloud Era, The Enterprise Cloud Computing Paradigm.

UNIT- II

Infrastructure as a Service (IAAS) & Platform and Software as a Service (PAAS / SAAS): Virtual machines provisioning and Migration services, On the Management of Virtual machines for Cloud Infrastructures, Enhancing Cloud Computing Environments using a cluster as a Service, Secure Distributed Data Storage in Cloud Computing.

Aneka, Comet Cloud, T-Systems', Workflow Engine for Clouds, Understanding Scientific Applications for Cloud Environments.

UNIT- III

Monitoring, Management and Applications: An Architecture for Federated Cloud Computing, SLA Management in Cloud Computing, Performance Prediction for HPC on Clouds, Best Practices in Architecting Cloud Applications in the AWS cloud, Building Content Delivery networks using Clouds, Resource Cloud Mashups.

UNIT- IV

Governance and Case Studies: Organizational Readiness and Change management in the Cloud age, Data Security in the Cloud, Legal Issues in Cloud computing, Achieving Production Readiness for Cloud Services.

TEXT BOOKS:

1. Cloud Computing: Principles and Paradigms by RajkumarBuyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing, Kai Hwang, GeofferyC.Fox, Jack J.Dongarra, Elsevier, 2012.

REFERENCE BOOKS:

1. Cloud Computing : A Practical Approach, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, Tata McGraw Hill, rp2011.
2. Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press, 2010.
3. Cloud Computing: Implementation, Management and Security, John W. Rittinghouse, James F.Ransome, CRC Press, rp2012.
4. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese, O'Reilly, SPD, rp2011.
5. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, SubraKumaraswamy, ShahedLatif, O'Reilly, SPD, rp2011.

M.Sc 3P1:DATA WAREHOUSING AND DATA MINING LAB

Theory: 0 Periods   Mid Marks: 30
Lab Hrs: 3 Periods   Ext. Marks: 70
Exam: 3 Hrs   Credits: 3

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M.Sc 3P2:BIG DATA ANALYTICS LAB

Theory: 0 Periods   Mid Marks: 30
Lab Hrs: 3 Periods   Ext. Marks: 70
Exam: 3 Hrs   Credits: 3
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