## Integral University
### STUDY & EVALUATION SCHEME
#### B.Tech Computer Science Engineering

<table>
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<tr>
<th>S. No</th>
<th>Course Code</th>
<th>Subject</th>
<th>Periods</th>
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<td>Data Warehousing &amp; Data Mining</td>
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<td>2.</td>
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Integral University
STUDY & EVALUATION SCHEME
B.Tech Computer Science Engineering

List of Electives

Elective-3

1. Mobile Computing (ICS-031)
2. Expert Systems (IIT-032)
3. Advanced Concepts of TCP/IP (ICS-032)
4. Cloud Computing (IIT-031)

Elective-4

1. Robotic System (IIT-041)
2. Real Time Systems (ICS-041)
3. Parallel Algorithms (ICS-042)

Elective-5

1. Advance Concepts in Database system (ICS-051)
2. Pattern Recognition (IIT-051)
3. Natural Language Processing (IIT-052)
UNIT 1
**Overview & Concepts** - The Compelling Need for Data Warehousing: Introduction to Data Warehousing, Failures of Past Decision Support System, **Data Warehouse Building Blocks**: Nature of data in data warehouse, **OLAP in the Data Warehouse**: Major Features and Functions, OLAP Models, Comparison between operational Data Base Systems & Data warehouse.

UNIT 2
Data Warehouses and Data Marts, Overview of Components, Meta data & its types, **Multidimensional Data Model**: Data cubes, Schemas for multidimensional databases, concept hierarchies, OLAP operations in multidimensional data models, **Data Warehouse Architecture**: 3-tier architecture, Data Extraction, Transformation, and Loading, **Data Quality**: Why is data Quality Critical? Data Quality Challenges.

UNIT 3
**Data Mining**: Introduction, Data Mining Functionalities, Classification of Data Mining System; Major Issues in Data Mining, **Data Preprocessing**: Preprocess, Descriptive Data Summarization, Data Cleaning, Data Integration & Transformation, Data Reduction, **Mining Frequent Patterns**, Association, and Correlations, Basic Concept, Efficient & Scalable Frequent Item set Mining Methods, Mining Various Kinds of Association Rules.

UNIT 4
**Classification & Prediction**: Issues, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back Propagation, Associative Classification, nearest neighbor classification, Prediction.

UNIT 5
**Cluster Analysis**: What is Cluster Analysis, Types, Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods: cure and chameleon, Density-Based Methods: DBSCAN & OPTICS, Wave Cluster, CLIQUE. **Current trends**: Text mining, web mining.

REFERENCES
1. “Data Warehousing Fundamental” by Paulraj Ponniah, John Wiley & Sons INC.
2. Data Mining, Second Edition; Concepts & Techniques by Jiawei Han & Michline Kamber.
4. M.H.Dunham, “Data Mining: Introductory and Advanced Topics” Pearson Education
UNIT 1

UNIT 2
**Adaptive Multilayers Networks:** Network Pruning Algorithms, Marchands Algorithm, Upstart Algorithm, Cascade Correlation. **Prediction Networks:** Feed Forward Networks for Forecasting, Recurrent Networks (Partially, Fully), Radial Basis Functions and Probabilistic Neural Networks.

UNIT 3
**Unsupervised Learning:** Winner-Take-All Networks: Hamming Networks, Maxnet; Learning Vector Quantization, Counter Propagation Networks(Forward Only Counter Propagation networks), Adaptive Resonance Theory(ART1), K-Means Clustering Algorithms, Kohonen Self Organization Maps, Principle Component Analysis.

UNIT 4
**Fuzzy Logic:** Fuzzy Sets, Properties, Operation on Fuzzy Sets, Fuzzy Relations, Operation on Fuzzy Relations, Fuzzy IF-THEN Rules, Variable Inference Techniques, Fuzzification and Defuzzification Methods, Fuzzy System Design.

UNIT 5

REFERENCES:
2. Simon Haykin, Neural Network a comprehensive Foundation, Macmillan College, proc, Con, Inc.
UNIT 1

UNIT 2
Channel Allocation: Motivation for a specialized MAC, Hidden and exposed terminals, Near and far terminals, SDMA, FDMA, TDMA, Fixed TDM, Classical Aloha, Slotted Aloha, Carrier sense multiple access, Carrier sense multiple access with collision detection, Multiple access with collision avoidance.

UNIT 3

UNIT 4

UNIT 5
Mobile network layer: Mobile IP: Goals, assumptions and requirements, Entities and terminology, IP packet delivery, Agent discovery, Registration, Tunneling and encapsulation, Optimizations, Reverse tunneling, IPv6, Dynamic host configuration protocol.

Reference ::
4. Ron Olexa, “Implementing 802.11, 802.16 and 802.20 Wireless Networks, Elsevier
UNIT 1 [7]

UNIT 2 [7]

UNIT 3 [8]

UNIT 4 [10]

UNIT 5 [8]

REFERENCES:
2. Introduction to Expert System, Jackson, P, International Computer Science Series
UNIT 1

UNIT 2
IP Addresses: Introduction: Address Space, Notation, Classful Addressing: Recognizing Classes, Netid and Hostid, Classes and Blocks, Network Addresses, Mask, Address Depletion. Other Issues, Multihomed Devices, Location, Special Addresses, Private Addresses, Unicast, Multicast and Broadcast, Addresses, Sub Netting, Super Netting, Subnet Mask, Supernet Mask and Classless Addressing.

UNIT 3

UNIT 4

UNIT 5
IP Over ATM, ATM WANs, Carrying a Datagram in Cells, Routing the Cells, Mobile IP, Addressing, Agents, Data Transfer, Real-Time Traffic Over the Internet, Characteristics, Internet Security, Introduction, Privacy, Digital Signature, Firewalls, Private Networks, Virtual Private Networks (VPN), Network Address Transmission (NAT), IP Next Generation, IPv6 Addresses, IPv6 Packet Format.

REFERENCES
COURSE OBJECTIVES:
_ To understand the concept of cloud and utility computing.
_ To understand the various issues in cloud computing.
_ To familiarize themselves with the lead players in cloud.

UNIT 1 [8]

UNIT 2 [9]

UNIT 3 [9]

UNIT 4 [10]

UNIT 5 [9]

COURSE LEARNING OUTCOME:
Upon Completion of the course, the students should be able to: _ Articulate the main concepts, key technologies, strengths and limitations of cloud computing _ Identify the architecture, infrastructure and delivery models of cloud computing _ Explain the core issues of cloud computing such as security, privacy and interoperability _ Choose the appropriate technologies, algorithms and approaches for the related issues.
REFERENCES:
UNIT 1

UNIT 2

UNIT 3

UNIT 4

UNIT 5

REFERENCES
1. Introduction to Robotics, J.craig, Addision Wesley
3. Fundamental of Robotics analysis and control: Robert J. Schiling
REAL TIME SYSTEMS
ICS-041
w.e.f. Session 2015-16

UNIT 1

UNIT 2

UNIT 3
Real Time Database: Real Time vs. General purpose Database, Main Memory database, Concurrency Control Issues, Real Time OS- Threads and Tasks, Kernel, Case Study of QNX, VRTX, Vx Works.

UNIT 4

UNIT 5

REFERENCE
UNIT 1

UNIT 2
Sorting Network & Networking - Odd Even Merge Sort, Sorting On a One Dimension Network, Interconnection Network, Communication Model, the Unidirectional Ring (Case Study), Hypercube (Case Study), and Peer To Peer Computing.

UNIT 3

UNIT 4
Algorithms on Grid of Processor: Logical Two Dimensional Grid Topology, Communication on A Grid Processor, Matrix Multiplication On A Grid of Processor, Two Dimensional Block Cyclic Data Distribution,

UNIT 5
Parallel Graph Algorithms: Searching a Parallel Graph, Connected Components, All-pair Shortest Path, Single Source Shortest Path, Minimum Cost Spanning Tree, Algorithms for Parse Graphs.

REFERENCES
2. QUINN, “Parallel Computing” TMH.
4. V. Rajaraman, “Parallel Computers”, PHI.
5. Grama, “Introduction to Parallel Computing” Pearson Education.
ADVANCE CONCEPTS IN DATABASE SYSTEM
ICS-051
w.e.f. Session 2015-16

UNIT 1

UNIT 2
Database Tuning: Database Workloads, Tuning Decisions, DBMS Benchmarks, Multiple Attribute Search Keys, Extended Relational Model & Object Oriented Database System: Requirement, Properties, Structured Types, Object Identity, Containment, Class Hierarchy, Logic Based Data Model, Nested Relational model.

UNIT 3
Distributed Database System: Structure of Distributed Database, Data Fragmentation, Data Model, Query Processing, Semi Join, Parallel & Pipeline Join, Concurrency Control in Distributed Database System, Recovery in Distributed Database System, Distributed Deadlock Detection and Resolution, Commit Protocols.

UNIT 4

UNIT 5

REFERENCES
1. Majumdar & Bhattacharya, “Database Management System”, TMH.
UNIT-I

UNIT-II
Statistical Pattern Recognition: Bayesian Decision Theory, Classifiers, Normal density and discriminant functions.

UNIT – III
Parameter estimation methods: Maximum-Likelihood estimation, Bayesian Parameter estimation, Dimension reduction methods - Principal Component Analysis (PCA), Fisher Linear discriminant analysis, Expectation-maximization (EM), Hidden Markov Models (HMM), Gaussian mixture models.

UNIT - IV
Nonparametric Techniques: Density Estimation, Parzen Windows, K-Nearest Neighbour Estimation, Nearest Neighbour Rule, Fuzzy classification.

UNIT - V

REFERENCES:
UNIT 1

UNIT 2

UNIT 3
N-gram language models; smoothing; interpolation; backoff. POS Tagging; HMMs and POS. Viterbi Algorithm, techniques or algorithms for stemming, Porter stemmer, Evaluation of POS taggers. Concept of Stop words. Scope Ambiguity and Attachment Ambiguity resolution.

UNIT 4

UNIT 5
Applications of AI: Machine Translation, Sentiment Analysis, Query expansion, Information retrieval system, Word Sense Disambiguation.

REFERENCES
Students will complete the project identified in previous semester, coding, implementation etc of the project should be done in this semester. At the end of the semester, student will submit detail project report and soft copy of project work which will be evaluated by the expert from the University.