

GOVERNMENT OF RAJASTHAN
BOARD OF TECHNICAL EDUCATION RAJASTHAN JODHPUR

SEMESTER SCHEME-2020-21



V SEMESTER
(SESSION 2021-2022 & ONWARDS)

INTRODUCTION TO E-GOVERNANCE

Course Code	CS 5001(Same as IT 5001)
Course Title	Introduction to e-Governance
Number of Credits	3(L: 2, T: 1, P: 0)
Prerequisites	-----
Course Category	PC

COURSE LEARNING OBJECTIVES:

To cover the concepts of e-Governance and to understand how technologies and business models shape the contours of government for improving citizen services and bringing in transparency.

COURSE OUTCOMES:

Through exposure to introductory ideas and practices followed in a selected number of e-Governance initiatives in India, the course will help students to understand and appreciate the essence of e-Governance.

COURSE CONTENT:**UNIT 1:**

- 1.1 Exposure to emerging trends in ICT for development
- 1.2 Understanding of design and implementation of
 - 1.2.1 e-Government projects,
 - 1.2.2 e-governance lifecycle.

UNIT 2:

- 2.1 Need for Government Process Re-engineering (GPR)
National e-Governance Plan(NeGP) for India
- 2.2 SMART Governments & Thumb Rules

UNIT 3:

- 3.1 Architecture and models of e-Governance, including Public Private Partnership (PPP)
- 3.2 Need for Innovation and Change Management in e-Governance
- 3.3 Critical Success Factors
- 3.4 Major issue including corruption, resistance for change, e-Security and Cyber laws

UNIT 4:

- 4.1 Focusing on Indian initiatives and their impact on citizens;
- 4.2 Sharing of case studies to highlight best practices in managing e-Governance projects in Indian context.
- 4.3 Visits to local e-governance sites (CSC, eSeva, Post Office, Passport Seva Kendra, etc) as part of Tutorials.

UNIT 5:

- 5.1 Mini Projects by students in groups – primarily evaluation of various e-governance projects

REFERENCE BOOKS:

1. Managing Transformation –Objectives to Outcomes. J Satyanarayana, Prentice Hall India
2. The State, IT and Development. Kenneth Kenniston, RK Bagga and Rohit Raj Mathur, Sage Publications India Pvt Ltd.
3. e-Government -The Science of the Possible. J Satyanarayana, Prentice Hall, India
4. <http://www.csi-sigegov.org/publications.php>
5. <https://negd.gov.in>
6. <https://www.nisg.org/case-studies-on-e-governance-in-india>

INTERNET OF THINGS

Course Code	CS 5002(Same as CI/ IT 5002)
Course Title	Internet of Things
Number of Credits	3(L: 2, T: 1, P: 0)
Prerequisites	-----
Course Category	PC

COURSE LEARNING OBJECTIVES:

Internet of Things (IoT) is presently an important technology with wide ranging interest from Government, academia and industry. IoT cuts across different application domain verticals ranging from civilian to defence sectors which includes agriculture, space, health care, manufacturing, construction, water, mining, etc. Today it is possible to build different IoT solutions such as shopping system, infrastructure management in both urban and rural areas, remote health monitoring and emergency notification systems, and transportation systems. Therefore, it is very important to learn the fundamentals of this emerging technology.

COURSE OUTCOMES:

Students will have good understanding of various aspect of IoT, know some tools and have basic implementation skills.

COURSE CONTENTS:

UNIT 1:

- 1.1 Introduction to IoT;
- 1.2 Sensing;
- 1.3 Actuation

UNIT 2 :

- 2.1 Basics of IoT Networking,
- 2.2 Communication Protocols,
- 2.3 Sensor networks

UNIT 3:

- 3.1 Introduction to Arduino programming,
- 3.2 Integration of Sensors/Actuators to Arduino

UNIT 4:

- 4.1 Implementation of IoT with Raspberry Pi;
- 4.2 Data Handling Analytics

UNIT 5:

- 5.1 Case Studies: Agriculture, Healthcare, Activity Monitoring

REFERENCE BOOKS:

1. https://nptel.ac.in/noc/individual_course.php?id=noc17-cs22
2. "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman (CRC Press)
3. Internet of Things by Dr. Jeeva Jose, Khanna Publishing House (Edition 2017)
4. "Internet of Things: A Hands-on Approach", by ArshdeepBahga and Vijay Madiseti (Universities Press)
5. *Internet of Things: Architecture and Design Principles*, Raj Kamal, McGraw Hill
6. Research papers

ECONOMIC POLICIES IN INDIA

Course Code	CS 51001(Same in All Branches of Engg.)
Course Title	Economic Policies in India
Number of Credits	3 (L:3,T:0,P:0)
Prerequisites	NIL
CourseCategory	OE

COURSE LEARNING OBJECTIVES:

The objective of this course is to familiarize the students of different streams with the basic concepts, structure, problems and issues concerning Indian economy.

CO1	Understand Indian economics policy, planning strategies
CO2	It will enable to students to comprehend theoretical and empirical development across countries and region for policy purposes
CO3	Development Economics as a discipline encompasses different approach estotheproblemsofunemployment,poverty,incomegeneration,industrializationfromdifferentperspec-tives
CO4	Abletoidentifytheproblemsandcapabletodecidetheapplicationforfuturedevelopment
CO5	Analyzeeconomicissuesandfindsolutionstocomplexeconomicproblemsandtakecor-recteconomicjudgment

COURSE CONTENTS:**1. BASIC FEATURES AND PROBLEMS OF INDIAN ECONOMY:**

- 1.1. Economic History of India;
- 1.2. Nature of Indian Economy
- 1.3. Demographic features and Human Development Index,
- 1.4. Problems of Poverty, Unemployment, Inflation, income inequality, Blackmoney in India.

2. SECTORAL COMPOSITION OF INDIAN ECONOMY:

- 2.1. Issues in Agriculture sector in India,
- 2.2. land reforms
- 2.3. Green Revolution
- 2.4. agriculture policies of India,

3. INDUSTRIAL DEVELOPMENT,

- 3.1. Small scale and cottage industries,
- 3.2. Industrial Policy,
- 3.3. Public sector in India,
- 3.4. Service sector in India.

4. ECONOMIC POLICIES:

- 4.1. Economic Planning in India,
- 4.2. Planning commission v/s NITI Aayog,
- 4.3. Five Year Plans,
- 4.4. Monetary policy in India,
- 4.5. Fiscal Policy in India,
- 4.6. Centre state Finance Relations,
- 4.7. Finance commission in India
- 4.8. LPG policy in India

5. EXTERNAL SECTOR IN INDIA

- 5.1. India's foreign trade value composition and direction,
- 5.2. India Balance of payment since 1991,
- 5.3. FDI in India,
- 5.4. Impact of Globalization on Indian Economy,
- 5.5. WTO and India.

REFERENCE BOOKS:

1. Dutt Rudder and K.P.M Sunderam (2017). Indian Economy .S Chand & Co.Ltd. New Delhi.
2. Mishra S. K & V. K Puri (2017). Indian Economy and Its Development Experience. Himalaya Publishing House.
3. Singh, Ramesh, (2016): Indian Economy, Tata-McGraw Hill Publications, New Delhi.
4. Dhingra, I.C., (2017): March of the Indian Economy, Heed Publications Pvt. Ltd.
5. Karam Singh Gill, (1978): Evolution of the Indian Economy, NCERT, NewDelhi
6. Kaushik Basu (2007): The Oxford Companion to Economics of India ,Oxford University Press.

SEMESTER SCHEME 2020-2021

ENGINEERING ECONOMICS & ACCOUNTANCY

Course Code	CS 51002 (Same in All Branches of Engg.)
Course Title	Engineering Economics & Accountancy
Number of Credits	3 (L:3,T:0,P:0)
Prerequisites	NIL
Course Category	OE

COURSE OBJECTIVES

- To acquire knowledge of basic economic of a ciliate the process of economic decision making.
- To acquire knowledge on basic financial management aspects.
- To develop the basic skills to analyze financial statements.

COURSE OUTCOMES:

At the end of the course, the student will be able to:

CO1	Understand the macro-economic environment of the business and its impact on enterprise
CO2	Understand cost elements of the product and its effect on decision making
CO3	Prepare accounting records and summarize and interpret the accounting data for managerial decisions
CO4	Understand accounting systems and analyze financial statements using ratio analysis
CO5	Understand the concepts of financial management and investment

COURSE CONTENTS**1. INTRODUCTION:**

- 1.1. Managerial Economics;
- 1.2. Relationship with other disciplines;
- 1.3. Firms: Types, objectives and goals;
- 1.4. Managerial decisions;
- 1.5. Decision analysis.

2. DEMAND & SUPPLY ANALYSIS:

- 2.1. Demand;
 - 2.1.1. Types of demand;
 - 2.1.2. Determinants of demand;
 - 2.1.3. Demand function;
 - 2.1.4. Demand elasticity;
 - 2.1.5. Demand forecasting;
- 2.2. Supply;
 - 2.2.1. Determinants of supply;
 - 2.2.2. Supply function;
 - 2.2.3. Supply elasticity.

3. PRODUCTION AND COST ANALYSIS:

- 3.1. Production function;
- 3.2. Returns to scale;
- 3.3. Production optimization;
- 3.4. Least cost input; Iso quants;
- 3.5. Managerial uses of production function;
- 3.6. Cost Concepts;
 - 3.6.1. Cost function;
 - 3.6.2. Types of Cost;
 - 3.6.3. Determinants of cost;
 - 3.6.4. Short run and Long run cost curves;
 - 3.6.5. Cost Output Decision;
 - 3.6.6. Estimation of Cost.

4. PRICING:

- 4.1. Determinants of Price;
- 4.2. Pricing under different objectives and different market structures;
- 4.3. Price discrimination;
- 4.4. Pricing methods in practice;
- 4.5. Role of Government in pricing control.

5. FINANCIAL ACCOUNTING (ELEMENTARY TREATMENT):

- 5.1. Balance sheet and related concepts;
- 5.2. Profit & Loss Statement and related concepts;
- 5.3. Financial Ratio Analysis;
- 5.4. Cash flow analysis;
- 5.5. Funds flow analysis;
- 5.6. Comparative financial statements;
- 5.7. Analysis & Interpretation of financial statements;
- 5.8. Investments;
- 5.9. Risks and return evaluation of investment decision;
- 5.10. Average rate of return;
- 5.11. Payback Period;
- 5.12. Net Present Value;
- 5.13. Internal rate of return,

REFERENCE BOOKS:

1. Mc Guigan, Moyer and Harris, 'Managerial Economics; Applications, Strategy and Tactics', Thomson South Western, 10th Edition, 2005.
2. Prasanna Chandra. 'Fundamentals of Financial Management', Tata McGraw Hill Publishing Ltd., 4th edition, 2005.
3. Samuelson. Paul A and Nordhaus W. D., 'Economics', Tata McGraw Hill Publishing Company Limited, New Delhi, 2004.
4. Paresah Shah, 'Basic Financial Accounting for Management', Oxford University Press, New Delhi, 2007.
5. Salvatore Dominick, 'Managerial Economics in a global economy'. Thomson South Western, 4th Edition, 2001.

SEMESTER SCHEME 2020-2021

DATA SCIENCES: DATA WAREHOUSING AND DATA MINING

Course Code	CS 50031(Same as CI/IT 50031)
Course Title	Data Sciences: Data Warehousing and Data Mining
Number of Credits	3(L: 3, T: 0, P: 0)
Prerequisites	-----
Course Category	PE

COURSE LEARNING OBJECTIVES:

Introduce students to the domain of Data Warehousing and Data Mining

COURSE OUTCOMES:

Student will have general idea about Data Warehousing and Data Mining techniques, will be able to explore further and effectively use related tools.

COURSE CONTENTS:**UNIT 1:INTRODUCTION**

- 1.1. Motivation,
- 1.2. Importance,
- 1.3. Definitions,
- 1.4. Kind of Data,
- 1.5. Data Mining Functionalities,
- 1.6. Kinds of Patterns,
- 1.7. Classification of Data Mining Systems,
- 1.8. Data Mining Task Primitives,
- 1.9. Integration of A Data Mining System with A Database or Data Warehouse System,
- 1.10. Major Issues in Data Mining,
- 1.11. Types of Data Sets and Attribute Values,
- 1.12. Basic Statistical Descriptions of
 - 1.12.1. Data,
 - 1.12.2. Data Visualization,
 - 1.12.3. Measuring Data Similarity
- 1.13. PREPROCESSING:
 - 1.13.1. Data Quality,
 - 1.13.2. Major Tasks in Data Preprocessing,
 - 1.13.3. Data Reduction,
 - 1.13.4. Data Transformation and Data Discretization,
 - 1.13.5. Data Cleaning and Data Integration.

UNIT 2:DATA WAREHOUSING AND ON-LINE ANALYTICAL PROCESSING

- 2.1. Data Warehouse basic concepts,
- 2.2. Data Warehouse Modeling - Data Cube and OLAP,
- 2.3. Data Warehouse Design and Usage,
- 2.4. Data Warehouse Implementation,
- 2.5. Data Generalization by Attribute-Oriented Induction,
- 2.6. Data Cube Computation.

UNIT 3:PATTERNS, ASSOCIATIONS AND CORRELATIONS

- 3.1. Mining Frequent Patterns,
- 3.2. Associations and Correlations:
 - 3.2.1. Basic Concepts,
 - 3.2.2. Efficient and Scalable Frequent Item set Mining Methods,
 - 3.2.3. Pattern Evaluation Methods,
 - 3.2.4. Applications of frequent pattern and associations.
- 3.3. Frequent Patterns and Association Mining:
 - 3.3.1. A Road Map,
 - 3.3.2. Mining Various Kinds of Association Rules,
 - 3.3.3. Constraint-Based Frequent Pattern Mining,
 - 3.3.4. Extended Applications of FrequentPatterns

UNIT 4:CLASSIFICATION

- 4.1. Basic Concepts,
- 4.2. Decision Tree Induction,
- 4.3. Bayesian Classification Methods,

- 4.4. Rule-Based Classification,
- 4.5. Model Evaluation and Selection,
- 4.6. Techniques to Improve Classification Accuracy:
 - 4.6.1. Ensemble Methods,
 - 4.6.2. Handling Different Kinds of Cases in Classification,
 - 4.6.3. Classification by Neural Networks,
 - 4.6.4. Support Vector Machines,
 - 4.6.5. Pattern-Based Classification,
 - 4.6.6. Lazy Learners (or Learning from Your Neighbors).

UNIT 5: CLUSTER ANALYSIS

- 5.1. Basic Concepts of Cluster Analysis,
- 5.2. Clustering Structures,
- 5.3. Major Clustering Approaches,
 - 5.3.1. Partitioning Methods,
 - 5.3.2. Hierarchical Methods,
 - 5.3.3. Density-Based Methods,
 - 5.3.4. Model-Based Clustering,
- 5.4. Why outlier analysis,
- 5.5. Identifying and handling of outliers,
- 5.6. Outlier Detection Techniques.
- 5.7. WEB MINING:
 - 5.7.1. Basic concepts of web mining,
 - 5.7.2. different types of web mining,
 - 5.7.3. PAGE RANK Algorithm,
 - 5.7.4. HITS Algorithm

REFERENCE BOOKS:

1. Jiawei Han, Micheline Kamber, Jian Pei, Data Mining: Concepts and Techniques, Elsevier
2. Margaret H Dunham, Data Mining Introductory and Advanced Topics, Pearson Education
3. Amitesh Sinha, Data Warehousing, Thomson Learning, India.
4. Xingdong Wu, Vipin Kumar, the Top Ten Algorithms in Data Mining, CRC Press, UK.

SEMESTER SCHEME 2020-2021

FUNDAMENTALS OF AI

Course Code	CS 50032
Course Title	Fundamentals of AI
Number of Credits	3(L: 3, T: 0, P: 0)
Prerequisites	-----
Course Category	PE

COURSE LEARNING OBJECTIVES:

To introduce students to the domain of Artificial Intelligence.

COURSE OUTCOMES:

Student will have general idea about Artificial Intelligence, will be able to explore AI tools effectively.

COURSE CONTENTS:**UNIT 1: INTRODUCTION**

- 1.1. Overview and Historical Perspective,
- 1.2. Turing test,
- 1.3. Physical Symbol Systems and the scope of Symbolic AI,
- 1.4. Agents.

UNIT 2: SEARCH

- 2.1. Heuristic Search:
 - 2.1.1. Best First Search,
 - 2.1.2. Hill Climbing,
 - 2.1.3. Beam Search,
 - 2.1.4. Tabu Search
- 2.2. Randomized Search:
 - 2.2.1. Simulated Annealing,
 - 2.2.2. Genetic Algorithms,
 - 2.2.3. Ant Colony Optimization.

UNIT 3:

- 3.1. Finding Optimal Paths:
 - 3.1.1. Branch and Bound.
 - 3.1.2. A*.
 - 3.1.3. IDA*.
 - 3.1.4. Divide and Conquer approaches,
 - 3.1.5. Beam Stack Search.
- 3.2. Problem Decomposition:
 - 3.2.1. Goal Trees,
 - 3.2.2. AO*.
 - 3.2.3. Rule Based Systems,
 - 3.2.4. Rete Net.
- 3.3. Game Playing:
 - 3.3.1. Minimax Algorithm,
 - 3.3.2. AlphaBeta Algorithm,
 - 3.3.3. SSS*.

UNIT 4:

- 4.1. Planning and Constraint Satisfaction:
 - 4.1.1. Domains,
 - 4.1.2. Forward and Backward Search,
 - 4.1.3. Goal Stack Planning,
 - 4.1.4. Plan Space Planning,
 - 4.1.5. Graphplan,
 - 4.1.6. Constraint Propagation.

UNIT 5:

- 5.1 Logic and Inferences:
 - 5.1.1 Propositional Logic,

- 5.1.2 First Order Logic,
- 5.1.3 Soundness and Completeness,

5.1.4 Forward and Backward chaining.

REFERENCE BOOKS:

1. Deepak Khemani. A First Course in Artificial Intelligence, McGraw Hill Education (India)
2. <https://nptel.ac.in/courses/106106126/>
3. Stefan Edelkamp and Stefan Schroedl. Heuristic Search, Morgan Kaufmann.
4. Pamela McCorduck, Machines Who Think: A Personal Inquiry into the History and Prospects of Artificial Intelligence, A K Peters/CRC Press
5. Elaine Rich and Kevin Knight. Artificial Intelligence, Tata McGraw Hill.
6. Stuart Russell and Peter Norvig. Artificial Intelligence: A Modern Approach, Prentice Hall
7. M.C. Trivedi, A classical approach to Artificial Intelligence, Khanna Publishing House

SEMESTER SCHEME 2020-2021

ADVANCE COMPUTER NETWORKS

Course Code	CS 50041(Same as IT 50041)
Course Title	Advance Computer Networks
Number of Credits	3 (L: 3, T: 0, P: 0)
Prerequisites	-----
Course Category	PE

COURSE LEARNING OBJECTIVES:

Introduce Advance Networking Concepts, Theories and Tools

COURSE OUTCOMES:

- 1.Understanding core concepts/theories/algorithms of computer networks
- 2.Some hands-on capability on various network devices and tools
- 3 Capability to design and implement a computer network

COURSE CONTENT:**UNIT 1:**

- 1.1. Review of Networking Basics;
- 1.2. Advance Topics in IPv4 –
 - 1.2.1. Subnetting,
 - 1.2.2. Multicasting,
 - 1.2.3. Multicast Routing Protocols (IGMP, PIM, DVMRP);
- 1.3. Advance Topics in TCP –
 - 1.3.1. flow management,
 - 1.3.2. congestion avoidance,
 - 1.3.3. protocol spoofing;
- 1.4. IPv6

UNIT 2:

- 2.1. Telecom Networks,
- 2.2. Switching Techniques;
- 2.3. Introduction to
 - 2.3.1. Frame Relay,
 - 2.3.2. ATM,
 - 2.3.3. MPLS;
- 2.4. VSAT Communication –
 - 2.4.1. Star and Mesh architectures,
 - 2.4.2. bandwidth reservation;
- 2.5. Wireless Networks –
 - 2.5.1. WiFi,
 - 2.5.2. WiMax,
- 2.6. Cellular Phone Technologies –
 - 2.6.1. GSM,
 - 2.6.2. CDMA,
 - 2.6.3. 3G,
 - 2.6.4. 4G

UNIT 3:

- 3.1. Network Redundancy,
- 3.2. Load Balancers,
- 3.3. Caching,
- 3.4. Storage Networks;
- 3.5. QoS;
- 3.6. Network Monitoring –
 - 3.6.1. SNMP,
 - 3.6.2. RMON;

UNIT 4: ADVANCE SCRIPTING

- 4.1. Introduction to Network Security –

- 4.1.1. VLAN,
- 4.1.2. VPN,
- 4.1.3. Firewall,
- 4.1.4. IPS,
- 4.1.5. Proxy Servers

UNIT 5: PHP

- 5.1. Network Simulation,
- 5.2. Network design case studies and exercises,
- 5.3. IP Addressing schema,
- 5.4. Protocol Analysers (Wireshark, etc)

REFERENCE BOOKS:

1. RFCs and Standards Documents (www.ietf.org and other standard body websites)
2. Communication Networking – An Analytical Approach, Anurag-Manjunath-Joy
3. TCP/IP Illustrated (Vol.1,2), Stevens
4. Data Networks, Bertsekas-Gallager
5. An Engineering Approach to Computer Networking, S. Keshav

SEMESTER SCHEME 2020-2021

MOBILE COMPUTING

Course Code	CS 50042
Course Title	Mobile Computing
Number of Credits	3(L: 3, T: 0, P: 0)
Prerequisites	-----
Course Category	PE

COURSE LEARNING OBJECTIVES:

To teaches how to build mobile apps for Android. Students are expected to work on a project as part of the course.

COURSE OUTCOMES:

Will be able to develop and deploy basic mobile applications.

COURSE CONTENTS:**UNIT 1:**

- 1.1. A brief history of Mobile,
- 1.2. Types of mobile phone generations,
- 1.3. The Mobile Ecosystem,
- 1.4. Types of Mobile Applications,
- 1.5. Mobile Information Architecture Android Versions,
- 1.6. Features of Android,
- 1.7. Android Architecture,
- 1.8. Installing Android SDK Tools,
- 1.9. Configuring Android in Eclipse IDE,
- 1.10. Android Development Tools (ADT),
- 1.11. Creating Android Virtual Devices (AVD)

UNIT 2:

- 2.1. Creating first android application,
- 2.2. Anatomy of android application,
- 2.3. Deploying Android app on USB connected Android device,
- 2.4. Android application components,
- 2.5. Activity life cycle,
- 2.6. Understanding activities,
- 2.7. Exploring Intent objects,
- 2.8. Intent Types,
- 2.9. Linking activities using intents

UNIT 3:

- 3.1. Fragments life cycle,
- 3.2. Interaction between fragments,
- 3.3. Understanding the components of a screen (Layouts),
- 3.4. Adapting to display orientation,
- 3.5. Action Bar,
- 3.6. Views(UI Widgets)-Button,
- 3.7. Toast,
- 3.8. ToggleButton,
- 3.9. CheckBox,
- 3.10. RadioButton,
- 3.11. Spinner,
- 3.12. WebView,
- 3.13. EditText,
- 3.14. DatePicker,
- 3.15. TimePicker,
- 3.16. ListView,
- 3.17. ProgressBar,
- 3.18. Analog and Digital clock,

- 3.19. Handling UI events,
- 3.20. List fragment,
- 3.21. Dialog fragment

UNIT 4:

- 4.1. Menus-Option,
- 4.2. Context,
- 4.3. Popup,
- 4.4. Images-ImageView,
- 4.5. ImageSwitcher,
- 4.6. AlertDialog,
- 4.7. Alarm manager,
- 4.8. SMS,
- 4.9. E-mail,
- 4.10. Media Player,
- 4.11. Using camera,
- 4.12. recording video,
- 4.13. Handling Telephony Manage

UNIT 5: PHP

- 5.1. Storing the data persistently-Data Storage Options:
 - 5.1.1. preferences,
 - 5.1.2. Internal Storage,
 - 5.1.3. External Storage,
- 5.2. Content Provider ,
- 5.3. The SQLite database,
- 5.4. Connecting with SQLite database and operations-
 - 5.4.1. Insert,
 - 5.4.2. Delete,
 - 5.4.3. Update,
 - 5.4.4. Fetch,
- 5.5. Publishing android applications,
- 5.6. Deploying APK files

REFERENCE BOOKS:

1. Wei-Meng Lee, Beginning Android 4 Application Development, Wiley Publishing, Inc.
2. Pradeep Kothari, "Android Application Development Black Book", DreamTech Press
3. James C.Sheusi, "Android Application Development for Java Programmers", Cengage Learning
4. Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd
5. Sayed Y Hashimi and Satyakomatineni(2009), "Pro Android", Wiley India Pvt Ltd
6. Reto Meier, Professional Android 4 Application Development, Wiley India Pvt Ltd

DATA SCIENCES: DATA WAREHOUSING AND DATA MINING LAB

Course Code	CS 50051(Same as IT 50051)
Course Title	Data Sciences: Data Warehousing and Data Mining Lab
Number of Credits	1(L: 0, T: 0, P: 2)
Prerequisites	-----
Course Category	PE

COURSE LEARNING OBJECTIVES:

Introduce students to the practical domain of Data Warehousing and Data Mining.

COURSE CONTENT:

S.No.	Topics for Practice
1	Study and explore WEKA environment.
2	Create .arff file using WEKA.
3	Demonstration of pre-processing of .arff file.
4	Demonstrate performing association rule mining on data sets.
5	Demonstrate performing classification on data sets.
6	Demonstrate performing clustering on data sets.
7	Demonstrate performing Regression on data sets.
8	Demonstration of association rule mining.
9	Perform classification using Bayesian classification algorithm.
10	Perform the cluster analysis by k-means method.

REFERENCE BOOKS:

5. Jiawei Han, Micheline Kamber, Jian Pei, Data Mining: Concepts and Techniques, Elsevier
6. Margaret H Dunham, Data Mining Introductory and Advanced Topics, Pearson Education
7. Amitesh Sinha, Data Warehousing, Thomson Learning, India.
8. Xingdong Wu, Vipin Kumar, the Top Ten Algorithms in Data Mining, CRC Press, UK.

COURSE OUTCOMES:

Student will have general idea about Data Warehousing and Data Mining tool (WEKA), will be able to explore further and effectively use related tools.

FUNDAMENTALS OF AI LAB

Course Code	CS 50052
Course Title	Fundamentals of AI Lab
Number of Credits	1(L: 0, T: 0, P: 2)
Prerequisites	-----
Course Category	PE

COURSE LEARNING OBJECTIVES:

To introduce students to the domain of Artificial Intelligence Programming

COURSE OUTCOMES:

Student will have general idea about Artificial Intelligence Programming; will be able to explore Prolog effectively.

COURSE CONTENT:

S.No.	Topics for Practice
1	Study of Prolog features and format
2	Write simple fact for the statements using Prolog.
3	Programs using variables in Prolog
4	Programs using rules in Prolog
5	Programs using Input, Output and fail predicates in Prolog
6	Programs using cut,not,fail predicates in Prolog
7	Write a program to solve 8 queens problem
8	Programs to demonstrate depth first search
9	Programs to demonstrate best first search
10	Write a program to solve traveling salesman problem.

REFERENCE BOOKS:

1. Deepak Khemani. A First Course in Artificial Intelligence, McGraw Hill Education (India)
2. <https://nptel.ac.in/courses/106106126/>
3. Stefan Edelkamp and Stefan Schroedl. Heuristic Search, Morgan Kaufmann.
4. Pamela McCorduck, Machines Who Think: A Personal Inquiry into the History and Prospects of Artificial Intelligence, A K Peters/CRC Press
5. Elaine Rich and Kevin Knight. Artificial Intelligence, Tata McGraw Hill.
6. Stuart Russell and Peter Norvig. Artificial Intelligence: A Modern Approach, PrenticeHall
7. M.C. Trivedi, A classical approach to Artificial Intelligence, Khanna Publishing House
