VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY HYDERABAD
B.TECH. III YEAR
(COMPUTER SCIENCE AND BUSINESS SYSTEMS SYLLABUS)

V SEMESTER   **R19**

Course Code	Title of the Course	L	T	P	Contact Hours/ Week	Credits
19PC1CB09	Design and Analysis of Algorithms	2	1	0	3	3
19PC1CB10	Computer Networks	2	1	0	3	3
19HS1MG05	Fundamentals of Management	3	0	0	3	3
19PC1CB11	Design Thinking	3	0	0	3	3
	Professional Elective – I					
19PE1CB01	Conversational Systems					
19PE1CB02	Cloud, Microservices and Applications	3	0	0	3	3
19PE1CB03	Machine Learning					
	Open Elective – I					
19OE1CB01	Business Strategy					
19OE1CB02	Scripting Languages	3	0	0	3	3
19OE1CB03	Mobile Application Development					
	Professional Electives-1 Laboratory					
19PE2CB01	Conversational Systems Laboratory					
19PE2CB02	Cloud, Microservices and Applications Laboratory	0	0	2	2	1
19PE2CB03	Machine Learning Laboratory					
19PC2CB07	Design and Analysis of Algorithms Laboratory	0	0	2	2	1
19PC2CB08	Computer Networks Laboratory	0	0	2	2	1
19PW4CB01	Internship	0	0	0	0	1
Total		**16**	**2**	**6**	**24**	**22**

Course Code	Title of the Course	L	T	P	Contact Hours/ Week	Credits
19PC1CB12	Compiler Design	2	1	0	3	3
19PC1CB13	Artificial Intelligence	2	1	0	3	3
19PC1CB14	Information Security	2	1	0	3	3
	Professional Elective – II					
19PE1CB04	Modern Day Robotics and Its Industrial Applications	3	0	0	3	3
19PE1CB05	Modern Web Applications					
19PE1CB06	Data Mining and Analytics					
	Open Elective – II					
19OE1CB04	Financial and Cost Accounting	3	0	0	3	3
19OE1CB05	Augmented Reality and Virtual Reality					
19OE1CB06	Distributed Systems					
	Professional Electives - II Laboratory					
19PE2CB04	Modern Day Robotics and Its Industrial Applications Laboratory	0	0	2	2	1
19PE2CB05	Modern Web Applications Laboratory					
19PE2CB06	Data Mining and Analytics Laboratory					
19PC2CB09	Compiler Design and Information Security Laboratory	0	0	2	2	1
19PC2CB10	Artificial Intelligence Laboratory	0	0	2	2	1
19HS2EN06	Business Communication and Value Science – IV	1	0	2	3	2
	Total	**13**	**3**	**8**	**24**	**20**
19MN6HS03	Gender Sensitization	2	0	0	2	0

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. V Semester	**L**	**T/P/D**	**C**
	2	**1**	**3**

(19PC1CB09) DESIGN AND ANALYSIS OF ALGORITHMS

COURSE OBJECTIVES:
- To analyze the asymptotic performance of algorithms
- To demonstrate a relationship between major algorithms and data structures
- To understand different algorithm design strategies
- To apply important algorithmic design paradigms and methods of analysis

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Analyze the performance of algorithms
CO-2: Understand how the choice of data structures and the algorithm design methods impact the performance of an algorithm
CO-3: Develop efficient algorithms for computational tasks
CO-4: Computing complexity measures of algorithms

UNIT – I:
Introduction: Characteristics of Algorithm. Analysis of Algorithm: Asymptotic analysis of Complexity Bounds – Best, Average and Worst-Case behavior; Performance Measurements of Algorithm, Time and Space Trade-Offs, Analysis of Recursive Algorithms through Recurrence Relations: Substitution Method, Recursion Tree Method and Masters' Theorem.

UNIT – II:
Fundamental Algorithmic Strategies: Brute-Force, Heuristics, Greedy, Shortest path algorithms, Minimum Spanning Tree, Dynamic Programming.

UNIT – III:
Branch and Bound and Backtracking methodologies: Illustrations of these techniques for Problem-Solving, Bin Packing, Knapsack, Travelling Salesman Problem.

UNIT – IV:
Graph and Tree Algorithms: Traversal algorithms: Depth First Search (DFS) and Breadth First Search (BFS); Transitive closure, Topological sorting, Network Flow Algorithm.

UNIT – V:
Tractable and Intractable Problems: Computability of Algorithms, Computability classes – P, NP, NP-complete and NP-hard. Cook's theorem, Standard NP-complete problems and Reduction techniques.

UNIT – VI:
Advanced Topics: Approximation algorithms, Randomized algorithms, Class of problems beyond NP – P SPACE, Introduction to Quantum Algorithms.

TEXT BOOKS:
1. Fundamental of Computer Algorithms, E. Horowitz and S. Sahni
2. The Design and Analysis of Computer Algorithms, A. Aho, J. Hopcroft and J. Ullman

REFERENCES:
1. Introduction to Algorithms, T. H. Cormen, C. E. Leiserson and R. L. Rivest
2. Computer Algorithms: Introduction to Design and Analysis, S. Baase
3. The Art of Computer Programming, Vol. 1, Vol. 2 and Vol. 3, D. E. Knuth
4. Quantum Computation and Quantum Information, Michael A. Nielsen and Isaac L. Chuang

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. V Semester	**L**	**T/P/D**	**C**
	2	**1**	**3**

(19PC1CB10) COMPUTER NETWORKS

COURSE OBJECTIVES:
- To develop an understanding of modern network architectures from a design and performance perspective
- To introduce the student to the major concepts, principles involved in Data Link Layer and Network Layer
- To provide an opportunity to learn how to maintain QoS in Network & maintaining of Congestion Control
- To get an idea of Application Layer functionalities and importance of Security in the Network

COURSE OUTCOMES: After completion of the course, the student should be able to

CO-1: Understand modern network architectures from a design and performance perspective

CO-2: Learn major concepts, principals involved in Data Link Layer and Network Layer

CO-3: Analyze how to maintain QoS in Network and maintaining of Congestion Control

CO-4: Get an idea of Application Layer functionalities and importance of Security in the Network

UNIT – I:

Introduction: Computer networks and distributed systems, Classifications of computer networks, Preliminaries of layered network structures.

Data communication Components: Representation of data and its flow, Various Connection Topology, Protocols and Standards, OSI model, Transmission Media.

UNIT – II:

LAN: Wired LAN, Wireless LAN, Virtual LAN.

Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division, Concepts on spread spectrum.

UNIT – III:

Data Link Layer and Medium Access Sub Layer: Fundamentals of Error Detection and Error Correction, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go-back–N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multiple access protocols - Pure ALOHA, Slotted ALOHA, CSMA/CD, CDMA/CA

UNIT – IV:

Network Layer: Switching, Logical addressing – IPV4, IPV6; Address mapping – ARP, RARP, BOOTP and DHCP–Delivery, Forwarding and Unicast Routing protocols.

UNIT – V:

Transport Layer: Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), SCTP Congestion Control; Quality of Service (QoS), QoS improving techniques - Leaky Bucket and Token Bucket algorithms.

UNIT – VI:

Application Layer: DNS, DDNS, TELNET, EMAIL, FTP, WWW, HTTP, SNMP, Bluetooth, Firewalls.

Network Security: Electronic mail, directory services and network management, Basic concepts of Cryptography.

TEXT BOOKS:

1. Computer Networks, A. Tannenbaum
2. Data and Computer Communication, William Stallings
3. Data communications and networking, Forouzan, 4th Edition, Mc Graw Hill Education

REFERENCES:

1. Network Security, Kaufman, R. Perlman and M. Speciner
2. UNIX Network Programming, Vol. 1,2 & 3, W. Richard Stevens

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. V Semester	**L**	**T/P/D**	**C**
	3	**0**	**3**

(19HS1MG05) FUNDAMENTALS OF MANAGEMENT

COURSE OBJECTIVES:
- To understand the theories, functions, and practices of management and to provide them with practical exposure to cases of success/failure in business
- To expose with a systematic and critical understanding of organizational theory, structures, and design
- To comprehend the conceptual knowledge relating to Organizational Behavior and to provide a basic understanding of the behavior of individuals and groups in the organizations
- To apply business ethics and corporate social responsibility for business success and growth

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Apply theories to improve the practice of management
CO-2: Describe and assess the basic design elements of organizational structure and design
CO-3: analyze the behavior of individuals and groups in organizations in terms of the key factors that influence organizational behavior
CO-4: Evaluate ethical issues that face organizations in the fields finance, sales, and marketing

UNIT – I:
Management Theories: Concept and Foundations of Management, Evolution of Management Thoughts [Pre-Scientific Management Era (before 1880), Classical management Era (1880-1930), Neo-classical Management Era (1930-1950), Modern Management era (1950-on word). Contribution of Management Thinkers: Taylor, Fayol, Elton Mayo etc.

UNIT – II:
Functions of Management- Planning, Organizing, Staffing, Directing, Controlling

UNIT – III:
Organizational Design: Classical, Neoclassical and Contingency approaches to organizational design; Organizational theory and design, Organizational structure (Simple Structure, Functional Structure, Divisional Structure, Matrix Structure)

UNIT – IV:
Organization Behavior: Introduction, Personality, Perception, Learning and Reinforcement, Motivation, Group Dynamics, Power & Influence, Work Stress and Stress Management, Decision Making, Problems in Decision Making, Decision Making, Organizational Culture, Managing Cultural Diversity

UNIT – V:
Leadership: Concept, Nature, Importance, Attributes of a leader, developing leaders across the organization, Leadership Grid

UNIT – VI:

Managerial Ethics: Ethics and Business, Ethics of Marketing & advertising, Ethics of Finance & Accounting, Decision – making frameworks, Business and Social Responsibility, International Standards, Corporate Governance, Corporate Citizenship, Corporate Social Responsibility

TEXT BOOKS:

1. Understanding the Theory and Design of Organizations by Richard L. Daft, 11e, Cengage, 2020
2. Management by James Arthur, Finch Stoner, R. Edward Freeman, and Daniel R Gilbert 6th Ed; Publisher: Pearson Education/Prentice Hall
3. Organizational Behaviour by Stephen P. Robbins, Prentice Hall, 2013

REFERENCES:

1. Organizational Behaviour by Fred Luthans, Mc Graw-Hill, 2013
2. Organizational Behavior by Stephen P. Robbins, Timothy A. Judge, Neharika ohra, 16e, Pearson Education, 2016
3. Business Ethics: Ethical Decision Making & Cases, by O. C. Ferrell, John Fraedrich, Linda Ferrell, 12th edition, Cengage,2017

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. V Semester	**L**	**T/P/D**	**C**
	3	**0**	**3**

(19PC1CB11) DESIGN THINKING

COURSE OBJECTIVES:
- To create awareness of design thinking among students of engineering
- To teach a systematic approach for identifying and applying design thinking process
- To enable the use of doodling and storytelling as a means of presenting ideas and prototypes
- To motivate students to create value proposition statements for identified problems

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Identify design thinking phases from an engineering perspective
CO-2: Validate problem statements through user empathization with societal and environmental consciousness
CO-3: Devise visual design and documentation to communicate more effectively
CO-4: Develop prototypes to catering to the needs of users

UNIT – I:
Design Thinking Overview and Motivation: Design Thinking for business – Stories, Examples and Case Studies; Design Thinking for Students; Introduction to Design Thinking – Stanford's 5-step model;
*Activities to understand Design Thinking and its applications

UNIT – II:
Doing Design: Empathize Phase: Empathy; Importance of Empathy; Empathy Tools; Introduction to Immersion Activity; Persona, Importance of Persona Creation; Data collection and Inferences
*Activities for Empathize Phase

UNIT – III:
Doing Design: Define Phase: Problem Statements – Introduction, Definition, Validation; Need Analysis: Types of Users, Types of Needs; Addressable Needs and Touchpoints; Structuring Need Statements;
*Activities for Define Phase

UNIT – IV:
Doing Design: Ideate Phase
Ideation tools: Six Thinking Hats; Ideate to generate solutions; Doodling and Storytelling to present ideas;
*Activities for Ideate Phase

UNIT – V:
Doing Design: Prototype Phase
Introduction to Prototype; Methods of Prototyping; Value proposition for the solution;
*Activities for Prototype Phase

UNIT – VI:

Doing Design: Test Phase

Importance of testing; Feedback Collection; Documentation of Feedback; Inference from Feedback; Looping of Design Thinking; Agile and Design Thinking to deliver customer satisfaction;

*Activities for Test Phase

TEXT BOOKS:
1. There are no prescribed texts for Semester 5 – there will be handouts and reference links shared

REFERENCES:
1. Nir Eval, Hooked. How to Build Habit-Forming Products, Penguin Publishing Group
2. Rod Judkins, The Art of Creative Thinking, Hodder & Stoughton
3. Dan Senor and Saul Singer, Start-up Nation. The Story of Israel's Economic Miracle, Grand Central Publishing
4. Simon Sinek, Start with Why. How Great Leaders Inspire Everyone to Take Action, Penguin Books Limited

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. V Semester	L	T/P/D	C
	3	0	3

(19PE1CB01) CONVERSATIONAL SYSTEMS

COURSE OBJECTIVES -
* To enable attendees to acquire knowledge on chatbots and its terminologies
* To work with ML Concepts and different algorithms to build custom ML Model
* To better understand on Conversational experiences and provide better customer experiences

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Review, critically analyse and synthesize conversational systems and natural language processing
CO-2: Apply appropriate methodologies for developing and evaluating conversational systems
CO-3: Carry out testing of an implemented conversational system
CO-4: Explain the purpose of virtual assistant agents effect on the development, deployment, and evaluation of conversational Systems

UNIT – I:
Fundamentals of Conversational Systems:
Introduction: Overview, Case studies, Explanation about different modes of engagement for a human being, History and impact of AI.
Underlying Technologies: Natural Language Processing, Artificial Intelligence and Machine Learning, NLG, Speech-To-Text, Text-To-Speech, Computer Vision etc.
Introduction to Top players in Market – Google, MS, Amazon &Market trends.
Messaging Platforms (Facebook, WhatsApp) and Smart speakers – Alexa, Google Home and other new channels.
Ethical and Legal Considerations in AI Overview

UNIT – II:
Foundational Blocks for Programming: Basic Python programming concepts, Node Basics.
Natural Language Processing: Introduction: Brief history, Basic Concepts, Phases of NLP, Application of chatbots etc.
General chatbot architecture, Basic concepts in chatbots: Intents, Entities, Utterances, Variables and Slots, Fulfillment. Lexical Knowledge Networks (WordNet, Verbnet, PropBank, etc). Lexical Analysis, Part-of-Speech Tagging, Parsing/Syntactic analysis, Semantic Analysis, Word Sense Disambiguation. Information Extraction, Sentiment Analysis), Affective NLG

UNIT – III:
Building a chatbot/Conversational AI system: Fundamentals of Conversational Systems (NLU, DM and NLG), Chatbot framework & Architecture, Conversational Flow & Design, Intent Classification (ML and DL based techniques), Dialogue Management

Strategies, Natural Language Generation, UX design, APIs and SDKs, Usage of Conversational Design Tools.

Introduction to popular chatbot frameworks – Google Dialog flow, Microsoft Bot Framework, Amazon Lex, RASA Channels: Facebook Messenger, Google Home, Alexa, WhatsApp, Custom Apps.   Overview of CE Testing techniques, A/B Testing, Introduction to Testing Frameworks - Botium /Mocha ,Chai. Security & Compliance – Data Management, Storage, GDPR, PCI.

UNIT – IV:
Role of ML/AI in Conversational Technologies –Brief Understanding on how Conversational Systems uses ML technologies in ASR, NLP, Advanced Dialog management, Language Translation, Emotion/Sentiment Analysis, Information extraction, etc. to effectively converse

UNIT – V:
Contact Centers: Introduction to Contact centers – Impact & Terminologies. Case studies & Trends, How does a Virtual Agent/Assistant fit in here?

UNIT – VI:
Overview on Conversational Analytics:
Conversation Analytics: The need of it, Introduction to Conversational Metrics.
Future – Where are we headed? Summary, Robots and Sensory Applications overview, XR Technologies in Conversational Systems, XR-Commerce, What to expect next? – Future technologies and market innovations overview.

TEXT BOOKS:
1. Designing Voice User Interfaces: Principles of Conversational Experiences 1st Edition by Cathy Pearl, O'Reilly
2. Conversational Interfaces: Principles of Successful Bots, Chatbots & Messaging Apps By Mariya Yao

REFERENCES:
1. Bot Business 101: How to start, run & grow your Bot / AI business By Ekim Kaya
2. Designing Bots: Creating Conversational Experiences By Amir Shevat O'Reilly
3. Designing Conversational Interfaces By Alper Çuğun

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. V Semester

	L	T/P/D	C
	3	0	3

(19PE1CB02) CLOUD, MICROSERVICES AND APPLICATIONS

COURSE OBJECTIVES
The course intends to introduce students to the fundamentals of developing application on Cloud, specifically public clouds such as AWS, AZURE and Google Students would be able to appreciate
- Design applications for Cloud
- Develop applications using various services
- Deploy applications on Cloud by using cloud native services
- Introduction to Devops, Security and Monitoring Tools

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Understand the main concepts, Cloud service/Deployment Models Application of Cloud Computing
CO-2: Describe the Monolithic & Distributed Architecture, Microservice fundamental and design approach
CO-3: Analyze the API Fundamental, API management, API tools & fundamentals of Devops
CO-4: Design and developing solution steps using containers & containerization of application

UNIT – I:
Cloud Fundamentals: Cloud Service Components, Cloud service/Deployment Models. Application of Cloud Computing Cloud Components Guiding Principle with respect to utilization/Security/Pricing. and the applications of Cloud. Public Cloud Platforms overview and their usage.

UNIT – II:
Application architectures-Monolithic & Distributed Architecture, Microservice fundamental and design approach, Spring Boot fundamentals and Design of Microservices, Cloud Native applications-12 Factors App.

UNIT – III:
Application integration process/Application Process, API Fundamental, API management, API tools. Developer Portal. Applications of APIFICATION.

UNIT – IV:
Devops fundamentals: Tools and Applications Containerization Process and application.

UNIT – V:
Python- Refresher, Use cases for cloud application development.

UNIT – VI:
Design and developing solution steps using containers & containerization of application and deployment using Kubernetes, Cloud Security and Monitoring Tools.

TEXT BOOKS:
1. Cloud Computing: Principles and Paradigms by RajkumarBuyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011
2. Cloud Computing Virtualization Specialist Complete Certification Kit - Study Guide Book, Ivanka Menken Gerard Blokdijk, 2009
3. Cloud Security: A Comprehensive Guide to Secure Cloud Computing By Ronald L. Krutz, Russell Dean Vines

REFERENCES:
1. Cloud Computing: A Practical Aprroach, Anthony T.Velte, TobeJ.Velte, Robert Elsenpeter, Publication Person Education, 2009
2. Storage Virtualization: Technologies for Simplifying Data Storage and Management, Tom Clark,Addison-Wesley, 2005
3. Cloud Computing Technologies and Strategies of the Ubiquitous Data Center, Curtis Franklin Jr.Brian J.S. Chee, 2010
4. Introduction to Cloud Computing: Business & Technology, Timothy Chou,2009

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. V Semester	**L**	**T/P/D**	**C**
	3	**0**	**3**

(19PE1CB03) MACHINE LEARNING

COURSE OBJECTIVES:
- To introduce students to the basic concepts and techniques of Machine Learning
- To have a thorough understanding of the Supervised and Unsupervised learning techniques
- To study the various probability-based and Generalized learning techniques
- To understand ensemble models of machine learning algorithms

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Distinguish between, supervised, unsupervised and semi-supervised learning
CO-2: Apply the appropriate machine learning strategy for any given problem
CO-3: Ability to get the skill to apply machine learning techniques to address the real time problems in different areas
CO-4: Modify existing machine learning algorithms to improve classification efficiency

UNIT – I:
Introduction to Machine Learning (ML); Relationship between ML and human learning; A quick survey of major models of how machines learn; Example applications of ML.

UNIT – II:
Classification: Supervised Learning; The problem of classification; Feature Engineering; Training and testing classifier models; Cross-validation; Model evaluation (precision, recall, F1-mesure, accuracy, area under curve); Statistical decision theory including discriminant functions and decision surfaces; Naive Bayes classification; Bayesian networks; Decision Tree and Random Forests; k-Nearest neighbor classification; Support Vector Machines; Artificial neural networks including backpropagation; Applications of classifications; Ensembles of classifiers including bagging and boosting.

UNIT – III:
Hidden Markov Models (HMM) with forward-backward and Vierbi algorithms; Sequence classification using HMM; Conditional random fields; Applications of sequence classification such as part-of-speech tagging.

UNIT – IV:
Regression: Multi-variable regression; Model evaluation; Least squares regression; Regularization; LASSO; Applications of regression

UNIT – V:
Association rule mining algorithms including apriori, Expectation-Maximization (EM) algorithm for unsupervised learning

UNIT – VI:
Clustering: Average linkage; Ward's algorithm; Minimum spanning tree clustering;

K- nearest neighbors clustering; BIRCH; CURE; DBSCAN, Anomaly and outlier detection methods

TEXT BOOKS:
1. Machine Learning, Tom M. Mitchell, vMcGraw-Hill
2. Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press, 2012
3. Christopher Bishop, Pattern Recognition and Machine Learning, Springer, 2007

REFERENCES:
1. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis
2. Machine Learning: The art and science of algorithms that make sense of data, Peter Flash, Cambridge. University press
3. Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer 2009

PUBLICATIONS:
1. R.O. Duda, P.E. Hart, D.G. Stork, Pattern Classification, 2/e, Wiley, 2001
2. C. Bishop, Pattern Recognition and Machine Learning, Springer, 2007
3. E. Alpaydin, Introduction to Machine Learning, 3/e, Prentice-Hall, 2014
4. A.Rostamizadeh, A. Talwalkar, M. Mohri, Foundations of Machine Learning, MIT Press
5. A. Webb, Statistical Pattern Recognition, 3/e, Wiley, 2011

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. V Semester	L	T/P/D	C
	3	0	3

(19OE1CB01) BUSINESS STRATEGY

COURSE OBJECTIVES:
- To explain the basic concepts, principles, and practices of Strategic Management
- To identify the internal and external environment of
- To describe the various growth strategies available for the corporates
- To understand the stages in strategy implementation and evaluation

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Apply the fundamental concepts and principles of strategic management to analyse business situations
CO-2: analyze interrelationships among business functions such as: R&D, production, marketing, finance, HR and information technology
CO-3: Evaluate the inter-relationships of business to individuals, other organizations, government, and society
CO-4: analyze complex, unstructured qualitative and quantitative problems, using appropriate tools

UNIT – I:
Introduction to Strategic Management: Importance of Strategic Management, Vision and Objectives, Schools of thought in Strategic Management, Strategy Content, Process and Practice, Fit Concept and Configuration Perspective in Strategic Management

UNIT – II:
Internal Environment of Firm- Recognizing a Firm's Intellectual Assets: Core Competence as the Root of Competitive Advantage, Sources of Sustained Competitive Advantage, Business Processes and Capabilities-based Approach to Strategy

UNIT – III:
External Environments of Firm- Competitive Strategy: Five Forces of Industry Attractiveness that Shape Strategy, The concept of Strategic Groups, and Industry Life Cycle, Generic Strategies and the Value Chain

UNIT – IV:
Corporate Strategy and Growth Strategies: The Motive for Diversification, Related and Unrelated Diversification, Business Portfolio Analysis, Expansion, Integration and Diversification, Strategic Alliances, Joint Ventures and Mergers & Acquisitions

UNIT – V:
Strategy Implementation: Structure and Systems: The 7S Framework, Corporate Governance

UNIT – VI:
Strategy Evaluation and Control: An overview, Strategic Control, Operational Control and Techniques

TEXT BOOKS:
1. Contemporary Strategic Management by Robert M. Grant, 7th Edition, Blackwell, 2012
2. Competitive Strategy by Michael E. Porter, The Free Press, 1980
3. Competitive Advantage by Michael E. Porter, The Free Press, 1985

REFERENCES:
1. Good Strategy Bad Strategy: The Difference and Why It Matters by Richard Rumelt, Profile Books Ltd, 2013
2. Strategic Management by Francis Cherunilam, 4th Edition, HPH, 2016
3. Strategic Management and Business Policy by Azhar Kazmi, McGraw Hill Education, 2018

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. V Semester **L   T/P/D   C**
                        3   0   3

(19OE1CB02) SCRIPTING LANGUAGES

COURSE OBJECTIVES:
- To appreciate the nature of scripting and the role of scripting languages
- To effectively apply knowledge of scripting to new situations and learn from the experience
- To analyze requirements of software systems for the purpose of determining the suitability of implementation of PERL and Ruby
- To design and implement software solutions that accommodate specified requirements and constraints, based on analysis or modeling or requirements specification

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Distinguish between typical Scripting Languages & system and application programming languages
CO-2: Apply the syntax and semantics of languages such as PERL and Ruby for effective scripting
CO-3: Develop a Web applications to help in businesses and decision making
CO-4: Design and implement the appropriate software solutions using Scripting Languages such as e-commerce, content management, custom database solutions, and prototyping

UNIT – I:
Introduction to Scripting Language: Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages.

UNIT – II:
Fundamentals of Perl: PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

UNIT – III:
Advanced Perl: Finer points of looping, pack and unpack, filesystem, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues.

UNIT – IV:
Facets of Ruby: Ruby new, Classes, Objects and Variables, Containers, Blocks and Iterators, Standard Types, Methods, Expressions, Exceptions, Catch, And Through, Modules, Basic Input and Output.

UNIT – V:
Ruby in its Setting: Ruby and Its World, Interactive Ruby Shell, Documenting Ruby, Package Management with RUBYGEMS, Ruby and web. Ruby Tk.

UNIT – VI:
Ruby Crystallized: The Ruby Language, Duck Typing, Classes and Objects, Locking Ruby in the Safe, Reflection, Object Space and Distributed Ruby

TEXT BOOKS:
1. The World of Scripting Languages, David Barren, Wiley Publications
2. "Programming Ruby" The Pramatic Progammers guide by Dabve Thomas 2nd Edition

REFERENCES:
1. Perl by Example, E. Quigley, Pearson Education
2. Programming Perl, Larry Wall, T. Christiansen and J. Orwant, O'Reilly, SPD
3. Ruby Progamming language by David Flanagan and Yukihiro Matsumoto O'Reilly

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. V Semester	**L**	**T/P/D**	**C**
	3	**0**	**3**

(19OE1CB03) MOBILE APPLICATION DEVELOPMENT

COURSE OBJECTIVES:
* To understand system requirements for mobile applications
* To generate suitable design using specific mobile development frameworks
* To implement the design using specific mobile development frameworks
* To deploy the mobile applications in marketplace for distribution

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Describe the requirements for mobile applications
CO-2: Develop design for mobile applications for specific requirements
CO-3: Implement the design using Android SDK, Objective C and iOS
CO-4: Deploy mobile applications in Android and iPhone marketplace for distribution

UNIT – I:
Introduction: Introduction to mobile applications – Embedded systems - Market and business drivers for mobile applications – Publishing and delivery of mobile applications – Requirements gathering and validation for mobile applications.

UNIT – II:
Basic Design: Introduction – Basics of embedded systems design – Embedded OS - Design constraints for mobile applications, both hardware and software related – Architecting mobile applications

UNIT – III:
User Interfaces: User interfaces for mobile applications – touch events and gestures – Achieving quality constraints – performance, usability, security, availability and modifiability.

UNIT – IV:
Advanced Design: Designing applications with multimedia and web access capabilities – Integration with GPS and social media networking applications – Accessing applications hosted in a cloud computing environment – Design patterns for mobile applications.

UNIT – V:
Android: Introduction – Establishing the development environment – Android architecture – Activities and views – Interacting with UI – Persisting data using SQLite – Packaging and deployment – Interaction with server side applications – Using Google Maps, GPS and Wifi – Integration with social media applications.

UNIT – VI:
IOS: Introduction to Objective C – iOS features – UI implementation – Touch frameworks – Data persistence using Core Data and SQLite – Location aware applications using Core Location and Map Kit – Integrating calendar and address book with social media application – Using Wifi - iPhone marketplace.

TEXT BOOKS:
1. Professional android Development, Reto Meier, Wiley-India Edition, 2012
2. Professional Android 2 Application Development, Reto Meier, Wiley India Pvt Ltd
3. Charlie Collins, Michael Galpin and Matthias Kappler, Android in Practice, DreamTech, 2012

REFERENCES:
1. Beginning iOS 6 Development: Exploring the iOS SDK, David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, Apress, 2013
2. Jeff McWherter and Scott Gowell, Professional Mobile Application Development, Wrox, 2012
3. Beginning Android, Mark L Murphy, Wiley India Pvt Ltd
4. Pro Android, Sayed Y Hashimi and Satya Komatineni, Wiley India Pvt Ltd
5. Teach Yourself Android Application Development In 24 Hours, Edition:I, Publication: SAMS

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. V Semester	L	T/P/D	C
	0	2	1

(19PE2CB01) CONVERSATIONAL SYSTEMS LABORATORY
(Professional Elective-I Lab)

COURSE OBJECTIVES:
- To introduce basic concepts of NLP libraries
- To enable attendees to acquire knowledge on chatbots and its terminologies
- To work with ML Concepts and different algorithms to build custom ML Model
- To better understand on Conversational experiences and provide better customer experiences related to real time

COURSE OUTCOMES: After completion of the course, the student should be able to
CO – 1: Understand and apply various libraries required for building conversational system
CO – 2: Implement a conversational system using appropriate software and tools
CO – 3: Apply appropriate methodologies for testing conversational systems
CO – 4: Build real time case studies for conversational systems

Week 1 & 2:
Programs on NODE BASICS in python

Week 3 &4:
NLP using Python - Make use of any of the NLP libraries like NLTK, spaCy, StanfordNLP

Week 5 & 6:
Case study to build a Text Chat Bot

Week 7 & 8:
Case study to build a Voice Chat Bot

Week 9 & 10:
Case study to build a learning Chat Bot

Week 11 & 12:
Case study to build virtual assistant

Week 13 & 14:
Case Study to build a ML Model using LSTM/any RNN and integrate with chatbot

TEXT BOOKS:
1. Designing Voice User Interfaces: Principles of Conversational Experiences 1st Edition by Cathy Pearl, O'Reilly
2. Bot Business 101: How to start, run & grow your Bot / AI business By Ekim Kaya
3. Designing Bots: Creating Conversational Experiences By Amir Shevat O'Reilly
4. Conversational Interfaces: Principles of Successful Bots, Chatbots & Messaging Apps By Mariya Yao
5. Designing Conversational Interfaces By Alper Çuğun

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. V Semester

L	T/P/D	C
0	2	1

(19PE2CB02) CLOUD, MICROSERVICES AND APPLICATIONS LABORATORY
(Professional Elective-1 Lab)

COURSE OBJECTIVES:
- To develop web applications in cloud
- To learn the design and development process involved in creating a cloud based application
- To learn to implement and use parallel programming using Hadoop
- To Manipulate large data sets in a parallel environment

COURSE OUTCOMES: After completion of the course, the student should be able to
CO – 1: Configure various virtualization tools such as Virtual Box, VMware workstation
CO – 2: Design and deploy a web application in a PaaS environment
CO – 3: Learn how to simulate a cloud environment to implement new schedulers
CO – 4: Install and use a generic cloud environment that can be used as a private cloud. Manipulate large data sets in a parallel environment

WEEK 1 & 2:
Install Virtualbox/VMware Workstation with different flavours of linux or windows OS on top of windows7 or 8.

WEEK 3:
Install a C compiler in the virtual machine created using virtual box and execute Simple Programs

WEEK 4:
Install Google App Engine. Create hello world app and other simple web applications using python/java.

WEEK 5:
Use GAE launcher to launch the web applications.

WEEK 6 & 7:
Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.

WEEK 8 & 9:
Find a procedure to transfer the files from one virtual machine to another virtual machine.

WEEK 10 & 11:
Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version)

WEEK 12 & 13:
Install Hadoop single node cluster and run simple applications like wordcount.

WEEK 14:
Internal Exam

TEXT BOOKS:
1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011
2. Cloud Computing Virtualization Specialist Complete Certification Kit - Study Guide Book, Ivanka Menken Gerard Blokdijk, 2009
3. Cloud Security: A Comprehensive Guide to Secure Cloud Computing By Ronald L. Krutz, Russell Dean Vines

REFERENCES:
1. Cloud Computing: A Practical Aprroach, Anthony T.Velte, TobeJ.Velte, Robert Elsenpeter, Publication Person Education, 2009
2. Storage Virtualization: Technologies for Simplifying Data Storage and Management, Tom Clark,Addison-Wesley, 2005
3. Cloud Computing Technologies and Strategies of the Ubiquitous Data Center, Curtis Franklin Jr.Brian J.S. Chee, 2010
4. Introduction to Cloud Computing: Business & Technology, Timothy Chou,2009

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. V Semester	L	T/P/D	C
	0	2	1

(19PE2CB03) MACHINE LEARNING LABORATORY
(Professional Elective-1 Lab)

COURSE OBJECTIVES:
- To introduce students to the basic concepts and techniques of Machine Learning
- To have a thorough understanding of the Supervised and Unsupervised learning techniques
- To study the various probability-based and Generalized learning techniques
- To understand ensemble models of machine learning algorithms

COURSE OUTCOMES: After completion of the course, the student should be able to:
CO-1: Distinguish between, supervised, unsupervised and semi-supervised learning
CO-2: Apply the appropriate machine learning strategy for any given problem
CO-3: Ability to get the skill to apply machine learning techniques to address the real time problems in different areas
CO-4: Modify existing machine learning algorithms to improve classification efficiency

WEEK 1:
Introduction to WEKA

WEEK 2:
Introduction to Python and Python Libraries- NumPy, Pandas, Matplotlib, Scikit

WEEK 3:
Perform Data exploration and pre-processing in Python
Perform Feature Engineering and Feature Selection Methods.

WEEK 4:
Implement regularized Linear regression
Implement regularized logistic regression

WEEK 5:
Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample

WEEK 6:
Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets

WEEK 7:
Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.

Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task.

WEEK 8:
Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set.

WEEK 9:
Build model using SVM with different kernels
Implement Perceptron Learning Algorithm.
Build models using different Ensemble techniques

WEEK 10:
Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library lasses/API in the program.

WEEK 11:
Write a program to implement k-Nearest Neighbor algorithm to classify the iris data set. Print both correct and wrong predictions. Python ML library classes can be used for this problem.

WEEK 13:
Build model to perform Clustering using K-means after applying PCA and determining the value of K using Elbow method.
Build a model to perform hierarchical Clustering.

WEEK 14:
Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs
Mini projects in the Lab:
(1)   Implementation of one clustering algorithm
(1)   Implementation of one association rule mining algorithm
(2)   Implementation of one anomaly detection algorithms
(3)   Implementation of EM algorithm for some specific problem

TEXT BOOKS:
1. Machine Learning, Tom M. Mitchell, vMcGraw-Hill
2. Kevin Murphy, Machine Learning: A Probabilistic Perspective, MIT Press, 2012
3. Christopher Bishop, Pattern Recognition and Machine Learning, Springer, 2007

REFERENCES:
1. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis
2. Machine Learning: The art and science of algorithms that make sense of data, Peter Flash, Cambridge, University press
3. Trevor Hastie, Robert Tibshirani, Jerome Friedman, The Elements of Statistical Learning, Springer 2009

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. V Semester	**L**	**T/P/D**	**C**
	0	**2**	**1**

(19PC2CB07) DESIGN AND ANALYSIS OF ALGORITHMS LABORATORY

COURSE OBJECTIVES:
- To analyse the asymptotic performance of algorithms
- To demonstrate a relationship between major algorithms and data structures
- To apply important algorithmic design paradigms and methods of analysis
- To implement problems using different algorithm design paradigms

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Ability to analyze the performance of algorithms
CO-2: Ability to understand how the choice of data structures and the algorithm design methods impact the performance of programs
CO-3: Implement efficient algorithms for a specified application
CO-4: Strengthen the ability to identify and apply the suitable algorithm for the given real-world problem

WEEK 1:
Implement and analyze time complexity in best & worst case for Binary Search, Quick Sort

WEEK 2:
Implement and analyze time complexity in best & worst case for
Merge Sort, Stassen Matrix Multiplication

WEEK 3:
Implement and analyze time complexity of Greedy Application Problems.

WEEK 4:
Implement and analyze time complexity of Dynamic Programming Application Problems.

WEEK 5:
Implement and analyze time complexity of Greedy Application Problems, Prims & Kruskal's Algorithms

WEEK 6:
Implement and analyze time complexity of Backtracking Application Problems.

WEEK 7:
Implement and analyze time complexity of Branch & Bound Application Problems.

WEEK 8:
Implement and analyze time complexity of BFS and DFS and their applications.

WEEK 9:
Implement and analyze time complexity of Dijkstra and Floyd Warshall Algorithms.

WEEK 10:
Implement and analyze time complexity of Topological sorting, Network Flow Problems.

WEEK 11&12:
Implement sample problem on P, NP, NP complete and NP hard

WEEK 13&14:
Implement and analyze time complexity of Randomized Quick Sort.

TEXT BOOKS:
1. Fundamental of Computer Algorithms, E. Horowitz and S. Sahni
2. The Design and Analysis of Computer Algorithms, A. Aho, J. Hopcroft and J. Ullman

REFERENCES:
1. Introduction to Algorithms, T. H. Cormen, C. E. Leiserson and R. L. Rivest
2. Computer Algorithms: Introduction to Design and Analysis, S. Baase
3. The Art of Computer Programming, Vol. 1, Vol. 2 and Vol. 3, D. E. Knuth

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. V Semester	**L**	**T/P/D**	**C**
	0	**2**	**1**

(19PC2CB08) COMPUTER NETWORKS LABORATORY

COURSE OBJECTIVES:
- To learn and use network commands
- To learn and understand various error correction and detection mechanisms, socket programming
- To implement and analyze various network protocols
- To learn and use simulation tools

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Implement error correction and error detection mechanisms
CO-2: Acquire the required skill to design simple computer networks
CO-3: Implement socket programming
CO-4: Use simulation tools to analyze the performance of various network protocols

WEEK 1:
Basic Networking commands

WEEK 2:
Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16

WEEK 3:
Implement the data link layer framing methods such as character stuffing and bit stuffing.

WEEK 4:
Establishing a network between computers.

WEEK 5:
Configuring FTP Server for file sharing.

WEEK 6:
Implement Dijkstra's algorithm to compute the Shortest path through a graph.

WEEK 7:
Study of Socket Programming and Client – Server model

WEEK 8:
Write a HTTP web client program to download a web page using TCP sockets.

WEEK 9:
 Implementation of Subnetting

WEEK 10:
Study of Network Simulators

WEEK 11:
Applications using TCP and UDP Sockets like a. DNS b. SNMP c. File Transfer

WEEK 12:
Write a program to implement RPC (Remote Procedure Call)

WEEK 13:
Study of TCP/UDP performance using Simulation tool.

WEEK 14:
Simulation of Distance Vector/ Link State Routing algorithm.

WEEK 15:
Lab internal

TEXT BOOKS:
1. Computer Networks, A. Tannenbaum
2. Data and Computer Communication, William Stallings

REFERENCES:
1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
2. Data Communications and Networking – Behrouz A. Forouzan, 4thEdition TMH, 2006

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. VI Semester	L	T/P/D	C
	2	1	3

(19PC1CB12) COMPILER DESIGN

COURSE OBJECTIVES
- To illustrate different phases of compilation and its uses
- To describe various steps and techniques involved in parsing
- To learn compiler optimization methods to improve the intermediate code
- To generate code for the optimized code

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Understand the major phases of compilation
CO-2: Construct the parse tree for checking the grammatical errors
CO-3: Construct the intermediate code representations and apply the code optimization techniques on intermediate code for its improvement
CO-4: Construct the target code on improved intermediate code

UNIT – I:
Introduction: Phases of compilation and overview. Lexical Analysis (scanner): Regular languages, finite automata, regular expressions, relating regular expressions and finite automata, scanner generator (lex, flex).

UNIT – II:
Syntax Analysis (Parser): Context-free languages and grammars, push-down automata, LL(1) grammars and top-down parsing, operator grammars, LR(O), SLR(1), LR(1), LALR(1) grammars and bottom-up parsing, ambiguity and LR parsing, LALR(1) parser generator (yacc, bison)

UNIT – III:
Semantic Analysis: Attribute grammars, syntax directed definition, evaluation and flow of attribute in a syntax tree.

UNIT – IV:
Symbol Table: Basic structure, symbol attributes and management.
Run-time environment: Procedure activation, parameter passing, value return, memory allocation, scope.
Intermediate Code Generation: Translation of different language features, different types of intermediate forms.

UNIT – V:
Code Improvement (optimization): control-flow, data-flow dependence etc.; local optimization, global optimization, loop optimization, peep-hole optimization etc.
Architecture dependent code improvement: instruction scheduling (for pipeline), loop optimization (for cache memory) etc. Register allocation and target code generation.

UNIT – VI:
Advanced topics: Type systems, data abstraction, compilation of Object-Oriented features and non-imperative programming languages.

TEXT BOOKS:
1. Compilers: Principles, Techniques and Tools, V. Aho, R. Sethi and J. Ullman
2. Lex & Yacc, Levine R. John, Tony Mason and Doug Brown

REFERENCES:
1. The Design and Evolution of C++, Bjarne Stroustrup
2. Modern Compiler Design- Dick Grune, Henry E. Bal, Cariel T. H. Jacobs, Wiley dreamtech

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. VI Semester

L	T/P/D	C
2	1	3

(19PC1CB13) ARTIFICIAL INTELLIGENCE

COURSE OBJECTIVES:
- To understand the major areas and challenges of AI
- To introduce basic AI algorithms to solve problems for a given case study
- To describe various knowledge representation techniques
- To understand the concepts of planning techniques

COURSE OUTCOMES: After completion of the course, the student should be able to

CO-1: Provide a strong foundation of fundamental concepts in Artificial Intelligence

CO-2: Implement different search strategies and solve problems by applying a suitable search method

CO-3: Design, implement and apply various knowledge representation techniques for a suitable case study

CO-4: Explore various concepts of reasoning, learning, and planning techniques for real time applications

UNIT – I:
Introduction, Overview of Artificial intelligence: Problems of AI, AI technique, Tic - Tac - Toe problem. Intelligent Agents, Agents & environment, nature of environment, structure of agents, goal based agents, utility based agents, learning agents.

UNIT – II:
Problem Solving, Problems, Problem Space & search: Defining the problem as state space search, production system, problem characteristics, issues in the design of search programs.

UNIT – III:
Search techniques: Problem solving agents, searching for solutions; uniform search strategies: breadth first search, depth first search, depth limited search, bidirectional search, comparing uniform search strategies. Heuristic search strategies Greedy best-first search, A* search, AO* search, memory bounded heuristic search: local search algorithms & optimization problems: Hill climbing search, simulated annealing search, local beam search.

UNIT – IV:
Constraint satisfaction problems: Local search for constraint satisfaction problems. Adversarial search, Games, optimal decisions & strategies in games, the minimax search procedure, alpha-beta pruning, additional refinements, iterative deepening.

UNIT – V:
Knowledge & reasoning: Knowledge representation issues, representation & mapping, approaches to knowledge representation. Using predicate logic, representing simple fact in logic, representing instant & ISA relationship, computable functions & predicates, resolution, natural deduction. Representing knowledge using rules, Procedural verses declarative knowledge, logic programming, forward verses backward reasoning, matching, control knowledge.

UNIT – VI:

Probabilistic reasoning: Representing knowledge in an uncertain domain, the semantics of Bayesian networks, Dempster-Shafer theory, Planning Overview, components of a planning system, Goal stack planning, Hierarchical planning, other planning techniques.

Expert Systems: Representing and using domain knowledge, expert system shells, and knowledge acquisition.

TEXT BOOKS:
1. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach
2. Artificial Intelligence, Russel, Pearson

REFERENCES:
1. Artificial Intelligence, Ritch & Knight, TMH
2. Introduction to Artificial Intelligence & Expert Systems, Patterson, PHI
3. Logic &Prolog Programming, Saroj Kaushik, New Age International
4. Expert Systems, Giarranto, VIKAS

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. VI Semester	L	T/P/D	C
	2	1	3

(19PC1CB14) INFORMATION SECURITY

COURSE OBJECTIVES
- To understanding of security parameters and access control mechanisms
- To introduce the student to the security polices & principals
- To provide an opportunity to learn system design and logic based system principles
- To get an idea of Operating system and Database security

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Develop of security parameters and access control mechanisms
CO-2: Learn major concepts, principals involved security Policy
CO-3: Analyze system design and logic based system principles
CO-4: Illustrate Operating system and Database security

UNIT – I:
Overview of Security Parameters: Confidentiality, integrity and availability; Security violation and threats; Security policy and procedure; Assumptions and Trust; Security Assurance, Implementation and Operational Issues; Security Life Cycle.

UNIT – II:
Access Control Models: Discretionary, mandatory, roll-based and task-based models, unified models, access control algebra, temporal and spatio-temporal models.

UNIT – III:
Security Policies: Confidentiality policies, integrity policies, hybrid policies, non-interference and policy composition, international standards.

UNIT – IV:
Systems Design: Design principles, representing identity, control of access and information flow, confinement problem. Assurance: Building systems with assurance, formal methods, evaluating systems.

UNIT – V:
Logic-based System: Malicious logic, vulnerability analysis, auditing, intrusion detection. Applications: Network security, operating system security, user security, program security. Special Topics: Data privacy, introduction to digital forensics, enterprise security specification.

UNIT – VI:
Operating Systems Security: Security Architecture, Analysis of Security in Linux/Windows.
Database Security: Security Architecture, Enterprise security, Database auditing.

TEXT BOOKS:
1. Security Engineering, Ross Anderson
2. Computer Security: Art and Science, M. Bishop, Pearson Education

3. Information Security: Principles and Practice, M. Stamp

REFERENCES:

1. Security in Computing, C.P. Pfleeger, S.L. Pfleeger, J. Margulies
2. Secure Programming HOWTO, David Wheeler
3. Browser Security Handbook, Michael Zalewski
4. Handbook of Database Security, M. Gertz, S. Jajodia

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. VI Semester

L	T/P/D	C
3	0	3

(19PE1CB04) MODERN DAY ROBOTICS AND ITS INDUSTRIAL APPLICATIONS

COURSE OBJECTIVES:
- To acquire Knowledge about the modern-day robotics
- To understand the computer vision in robotics
- To learn the basic knowledge of Artificial Intelligence
- To acquire Knowledge on cloud computing, big data, data science and python

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Understand basic concepts and technological advancements in AI and robotics
CO-2: Develop skills of using advanced software for solving practical problems in robotics pertaining to various industries
CO-3: Understand and apply several statistical analysis techniques and business analytics for cognitive robotics
CO-4: Understand and apply the programming of robots using python and R languages

UNIT – I:
Introduction to Modern Day Robotics and their Industrial Applications: Industry 4.0 Concept: Background and Overview-Industry 4.0 technologies: implementation patterns in manufacturing companies-Evolution of Industrial Robots and their Applications-Advancements in Robotics and Its Future Uses-Types of robotics in various fields for applications

UNIT – II:
Technologies essential for Cognitive Robotics: Computer systems and Technologies relevant to modern day robotics-Robotic Process Automation: Overview of RPA and its applications-RPA, AI, and Cognitive Technologies for Leaders-Introduction to Robotics: Analysis, Control, Applications

UNIT – III:
Introduction to computer vision and application of Vision Systems in Robotics: Concepts of computer vision and the how vision systems are becoming essential part of Robotics-Computer Vision: Models, Learning, and Inference -Mastering Computer Vision with TensorFlow 2.x: Build advanced computer vision applications using machine learning and deep learning techniques- Machine Vision Applications-Application areas for vision systems-Robot inspection case study-Autonomous driving using 3D imaging case study.

UNIT – IV:
AI in the context of Cognitive Robotics and Role of AI in Robotics: Foundation for Advanced Robotics and AI- A Concept for a Practical Robot Design Process- Demo to train A Robot Using AI - Deep learning core applications-Deep learning business applications

Data Science and Big Data in the context of Cognitive Robotics: Cognitive Technologies: The Next Step Up for Data and Analytics in robotics-Cognitive Deep Learning Technology for Big Data Cognitive Assistant Robots for Reducing Variability in Industrial Human-Robot Activities

Artificial Intelligence and Robotics - The Review of Reliability Factors Related to Industrial Robots -Failure analysis of mature robots in automated production- Data Analytics for Predictive Maintenance of Industrial Robots - Failure Is an Option: How the Severity of Robot Errors Affects Human-Robot Interaction

UNIT – V:

Concepts of Cloud computing, cloud platforms and it applications in Robotics: Learning Cloud Computing: Core Concepts - Cloud Computing: Private Cloud Platforms -Robot as a Service in Cloud Computing -Cloud Computing Technology and Its Application in Robot Control - A Comprehensive Survey of Recent Trends in Cloud

Robotics Architectures and Applications - Google's cloud robotics and high computing needs of industrial automation and systems-The role of cloud and opensource software in the future of robotics-The Power of Cloud Robotics by Robotics Industry Association

UNIT – VI:

Basics of Robotic operating System: ROS for beginners an overview- Introduction to the Robot Operating System (ROS) Middleware - Secure communication for the Robot Operating System - An Introduction to Robot Operating System: The Ultimate Robot Application Framework by Adnan

Quality of Service and Cybersecurity Communication Protocols -Analysis for the Robot Operating System

Robotics systems communication- Threat modelling using ROS

Towards cloud robotic system: A case study of online co-localization for fair resource competence-A Case Study on Model-Based Development of Robotic Systems using Monti Arc with Embedded Automata

Introduction to Python and R Programming in the context of Robotics: Introduction to Python - Python Functions for Data Science-Basic ROS Learning Python for robotics-An introduction to R -The R in Robotics rosR: A New Language Extension for the Robot Operating System-

TEXT BOOKS:

1. Introduction to Robotics: Analysis, Control, Applications, Saeed Benjamin Niku, 2nd Edition, Wiley Publishers, 2011
2. Computer Vision: Models, Learning, and Inference, Simon J. D. Prince, Cambridge University Press, 2012
3. Artificial Intelligence for Robotics: Build Intelligent Robots that Perform Human Tasks Using AI Techniques, Francis X. Govers, Packt publishing, 2018

REFERENCES:

1. Mastering Computer Vision with TensorFlow 2.x: Build Advanced Computer Vision Applications Using Machine Learning and Deep Learning Techniques, Krishnendu Kar, Packt publishing, 2020
2. Introduction to Deep Learning Business Applications for Developers from Conversational Bots in Customer Service to Medical Image processing, Armando Vieira, Bernardete Ribeiro, Apress,2018

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. VI Semester

L	T/P/D	C
3	0	3

(19PE1CB05) MODERN WEB APPLICATIONS

COURSE OBJECTIVES:
- To enable students to develop modern web application by leveraging latest technologies
- To build strong foundation in students making them job ready as per industry requirements
- To enable them to learn new technologies by applying foundation paradigms
- To building strong expertise to develop end to end application - web frontend and backend development

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Build static and dynamic web pages with HTML, XML, JSON
CO-2: Create Dynamic web pages using CSS and Java Script
CO-3: Understand the concepts, analyse and build interactive web applications
CO-4: Apply various frameworks of web technologies to optimize the applications

UNIT – I:
Introduction: Concept of website, its need and purpose, Types of websites: Static and dynamic website, Introduction to HTML, XML, JSON, Web Browsers, – Web Servers, Uniform Resource Locator, Tools and Web Programming Languages. Web Standards, Tiered Architecture: Client Server Model, Three Tier Model, Service Oriented Architectures, REST services

UNIT – II:
Hypertext Mark Up Language: Languages used for website development, HTML5: basic tags, formatting tags, Adding images, Lists, Embedding multimedia in Web pages, Inserting tables, Internal and External Linking, Frames, Forms

UNIT – III:
Cascading Style Sheets (CSS3): Basics of Cascading Style sheets, Advantages of CSS, External Style sheet, Internal style sheet, Inline style sheet, CSS Syntax, color, background, Font, images

UNIT – IV:
Java Script: Features of JavaScript, extension of JavaScript, Syntax of JavaScript: data types, operators, variables, tag, Document Object Model (DOM) with JavaScript, Selection Statement using if and Switch, Iterative statement: for, for/in, while, do while, break and continue

UNIT – V:
Front End Framework: Introduction to jQuery - Syntax, Selectors, Events, Traversing, AJAX; Introduction to Bootstrap – Basics, Grids, Themes; Angular JS – Expressions, Modules, Data Binding, Scopes, Directives & Events, Controllers, Filters, Services, Validation

UNIT – VI:

Back End Technologies: Introduction to RESTful services, Resources, Messages (Request, Response), Addressing, Methods – (GET, POST, PUT, DELETE)

TEXT BOOKS:
1. Internet and World Wide Web: How to Program, Deitel P. J., Deitel H. M. and Deitel A. 5th Edition, Pearson Prentice Hall, 2012
2. HTML & CSS: Design and Build Websites, Jon Duckett, John Wiley & Sons

REFERENCES:
1. Programming the World Wide Web, Sebesta R. W, 8th edition, Pearson, 2014
2. Web Engineering: a practitioner's approach, Pressman R. and Lowe D,1st Edition, Mc GrawHill, 2008
3. Web Engineering: The Discipline of systematic Development of Web Applications, Kappel G., et al, 1st Edition, John Wiley & Sons, 2006
4. Web Engineering: Principles and Techniques, Suh W,Idea Group Inc, 2005
5. PHP for the Web: Visual Quick Start Guide, Ullman L, 5th Edition, Peachpit Press, 2016

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. VI Semester	**L**	**T/P/D**	**C**
	3	**0**	**3**

(19PE1CB06) DATA MINING AND ANALYTICS

COURSE OBJECTIVES:
- To introduce the basic concepts and techniques Data Mining
- To apply pre-processing statistical methods for any given raw data
- To develop skills of using recent data mining software for solving practical problems
- To understand and apply several statistical analysis techniques: regression, ANOVA, data reduction

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Assess raw input data and process it to provide suitable input for a range of data mining algorithms.
CO-2: Discover and measure interesting patterns from different kinds of databases
CO-3: Evaluate and select appropriate data-mining algorithms and apply, interpret and report the output appropriately
CO-4: Perform statistical analysis on variety of data

UNIT – I:
Introduction to Data Mining: What is data mining? Related technologies - Machine Learning, DBMS, OLAP, Statistics, Stages of the Data Mining Process, Data Mining Techniques, Knowledge Representation Methods, Applications

UNIT – II:
Data preprocessing: Data cleaning, Data transformation, Data reduction, Discretization and generating concept hierarchies, Installing Weka 3 Data Mining System, Experiments with Weka - filters, discretization
Data Mining Knowledge Representation: Task relevant data, Background knowledge, Representing input data and output knowledge, Visualization techniques
Attribute-Oriented Analysis: Attribute generalization, Attribute relevance, Class comparison, Statistical measures

UNIT – III:
Data mining algorithms: Association rules: Motivation and terminology, Example: mining weather data, Basic idea: item sets, Generating item sets and rules efficiently, Correlation analysis
Data Mining Algorithms - Classification: Basic learning/mining tasks, Inferring rudimentary rules: 1R, algorithm, Decision trees, covering rules
Data Mining Algorithms – Prediction: The prediction task, Statistical (Bayesian) classification, Bayesian networks, Instance-based methods (nearest neighbor), linear models

UNIT – IV:
Descriptive analytics: Data Modeling, Trend Analysis, Simple Linear Regression Analysis
Forecasting models: Heuristic methods, predictive modeling and pattern discovery,
Logistic Regression: Logit transform, ML estimation, Tests of hypotheses, Wald test, LR test, score test, test for overall regression, multiple logistic regression, forward,

backward method, interpretation of parameters, relation with categorical data analysis. Interpreting Regression Models, Implementing Predictive Models

Generalized Linear model: link functions such as Poisson, binomial, inverse binomial, inverse Gaussian, Gamma.

Non-Linear Regression (NLS): Linearization transforms, their uses & limitations, examination of non-linearity, initial estimates, iterative procedures for NLS, grid search, Newton-Raphson, steepest descent, Marquardt's methods. Introduction to semiparametric regression models, additive regression models. Introduction to nonparametric regression methods

UNIT – V:

Time Series Analysis: Auto - Covariance, Auto-correlation and their properties. Exploratory time series analysis, Test for trend and seasonality, Exponential and moving average smoothing, Holt – Winter smoothing, forecasting based on smoothing

Linear time series models: Autoregressive, Moving Average, Autoregressive Moving Average and Autoregressive Integrated Moving Average models; Estimation of ARMA models such as Yule-Walker estimation for AR Processes, Maximum likelihood and least squares estimation for ARMA Processes, Forecasting using ARIMA models

UNIT – VI:

Prescriptive Analytics: Mathematical optimization, Networks modeling-Multi-objective optimization-Stochastic modeling, Decision and Risk analysis, Decision trees.

TEXT BOOKS:

1. Data Mining: Concepts and Techniques, Jiawei Han and Micheline Kamber, Morgan Kaufmann Publishers, 3rd Edition, 2010
2. Data Mining and Knowledge Discovery Handbook, Lior Rokach and Oded Maimon, Springer, 2nd Edition, 2010
3. Time Series Analysis, Forecasting and Control, Box, G.E.P and Jenkins G.M, Holden-Day, 1970

REFERENCES:

1. Applied Regression Analysis, Draper, N. R. and Smith, H, (John Wiley) 3rd Edition, 1998
2. Applied Logistic Regression, Hosmer, D. W. and Lemeshow, S, Wiley, 1989

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. VI Semester　　　　　　　　　　　　　　　**L　　T/P/D　C**
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　3　　0　　3

(19OE1CB04) FINANCIAL AND COST ACCOUNTING

COURSE OBJECTIVES:
- To apply the basic accounting concepts & conventions and to analyse financial position of business enterprise
- To enumerate with the preparation of books of accounts and application of important accounting standards
- To acquaint with the different types of costing and cost management
- To explain about company accounts and audit reports

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Create an awareness about the importance and usefulness of the accounting concepts and their managerial implications
CO-2: prepare and develop an understanding of the financial statements and the underlying principles and learn to interpret financial statements
CO-3: Create an awareness about cost accounting, different types of costing and cost management
CO-4: Analyse and interpret the company accounts and audit reports

UNIT – I:
Accounting Concept: Introduction, Techniques and Conventions, Financial Statements- Understanding & Interpreting Financial Statements

UNIT – II:
Accounting Process: Book Keeping and Record Maintenance, Fundamental Principles and Double Entry, Journal, Ledger, Trial Balance, Balance Sheet, Final Accounts, Cash Book and Subsidiary Books, Rectification of Errors

UNIT – III:
Financial Statements: Form and Contents of Financial Statements, Analyzing and Interpreting Financial Statements, Accounting Standards.
Class Discussion: Corporate Accounting Fraud- A Case Study of Satyam

UNIT – IV:
Cash Flow and Fund Flow Techniques: Introduction, How to prepare, Difference between them

UNIT – V:
Costing Systems: Elements of Cost, Cost Behavior, Cost Allocation, OH Allocation, Unit Costing, Process Costing, Job Costing, Absorption Costing, Marginal Costing, Cost Volume Profit Analysis, Budgets, ABC Analysis
Class Discussion: Application of costing concepts in the Service Sector

UNIT – VI:
Company Accounts and Annual Reports: Audit Reports and Statutory Requirements, Directors Report, Notes to Accounts, Pitfalls

TEXT BOOKS:
1. Accounting: Texts and Cases by Robert N Anthony, David Hawkins, Kenneth Marchant, 13e, McGraw-Hill, 2019
2. Financial Management: Text, Problems and Cases by M Y Khan and P K Jain, 8th Edition, McGraw Hill Education, 2018
3. Cost Accounting by M Y Khan and P K Jain, 2nd Edition, McGraw Hill Education, 2014

REFERENCES:
1. https://www.collegetutor.net/notes/Financial_Management_I_M_Pandey_Book_pdf
2. https://www.pdfdrive.com/cost-accounting-e34374053.html
3. https://www.tcs.com/content/dam/tcs/investor-relations/financial-statements/2019-20/ar/annual-report-2019-2020.pdf

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. VI Semester

	L	T/P/D	C
	3	0	3

(19OE1CB05) AUGMENTED REALITY AND VIRTUAL REALITY

COURSE OBJECTIVES:
- To understanding of the concepts of Virtual Reality (VR)
- To studying geometric modelling concepts
- To building VR applications
- To perception on future needs

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Understand geometric modelling and Virtual environment
CO-2: Study about Virtual Hardware and Software
CO-3: Develop Virtual Reality applications
CO-4: Exploring AR and VR Business Cases

UNIT – I:
Introduction to Virtual Reality (VR): Virtual Reality and Virtual Environment: Introduction, Computer graphics, Real time computer graphics, Flight Simulation, Virtual environment requirement, benefits of virtual reality, Historical development of VR

UNIT – II:
Geometric Modelling: Introduction, From 2D to 3D, 3D space curves, 3D boundary representation. Generic VR system: Introduction, Virtual environment, Computer environment, VR technology.

UNIT – III:
Introduction to Augmented Reality (AR), Definition and Scope A brief history of AR, Examples, Related Fields, MR continuum, Virtual Reality, Ubiquitous Computing

UNIT – IV:
Tracking, Coordinate Systems, Characteristics of Tracking technology, Stationary Tracking systems, Mobile Sensors.

UNIT – V:
Computer Vision for AR, Marker Tracking, Multiple-Camera Infrared Tracking, Natural Feature Tracking by Detection.

UNIT – VI:
The future-Driving forces of Business Cases, AR developer's Wish List, Tracking AR Outdoors, Interface with Smart Objects

TEXT BOOKS:
1. Virtual Reality Systems, John Vince, Pearson Education Asia, 2007
2. Augmented Reality, Principles and Practices, Dieter Schmalstieg, Tobias Hollerer, Pearson 2017
3. Augmented and Virtual Reality, Anand R., Khanna Publishing House, Delhi

REFERENCES:

1. Visualizations of Virtual Reality, Adams, Tata McGraw Hill, 2000
2. Virtual Reality Technology, Wiley Inter Science, Grigore C. Burdea, Philippe Coiffet, 2nd Edition, 2006
3. Understanding Virtual Reality: Interface, William R. Sherman, Alan B. Craig,
4. Application and Design, Morgan Kaufmann, 2008

WEBLINKS:

1. www.vresources.org
2. www.vresources.org
3. www.w3.org/MarkUp/VRM

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. VI Semester	**L**	**T/P/D**	**C**
	3	0	3

(19OE1CB06) DISTRIBUTED SYSTEMS

COURSE OBJECTIVES:
- To understand foundations of Distributed Systems
- To learn the characteristics of peer-to-peer and distributed shared memory systems
- To learn issues related to clock Synchronization and the need for global state in distributed systems
- To learn distributed mutual exclusion and deadlock detection algorithms and to design a distributed file system to share data and storage resources using a common file system

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Apply knowledge of distributed systems techniques and methodologies
CO-2: Understand the use of process migration and load balancing approaches
CO-3: Understand Inter process communication and scheduling in distributed systems
CO-4: Understand Distributed File Systems and Distributed Shared Memory

UNIT – I:
Introduction: Introduction to distributed systems Architecture for Distributed System, Goals of Distributed system, Hardware and Software concepts, Distributed Computing Model, Advantages& Disadvantage distributed system, Examples of Distributed Systems, Trends in Distributed Systems, Challenges.

UNIT – II:
Process & Resource Management: Process Management: Process Migration: Features, Mechanism - Threads: Models, Issues, Implementation. Resource Management: Introduction- Features of Scheduling Algorithms –Task Assignment Approach – Load Balancing Approach – Load Sharing Approach.

UNIT – III:
Memory Management in Distributed System: Basic Concept of Distributed Share Memory (DSM), DSM Architecture & its Types, Design & Implementations issues In DSM System, Structure of Share Memory Space, Consistency Model, and Thrashing.

UNIT – IV:
Inter Process Communication in Distributed System: Data Representation & Marshaling, Group Communication, Client Server Communication, RPC-Implementing RPC Mechanism, Stub Generation, RPC Messages, Synchronization: - Clock Synchronization, Mutual Exclusion, Election Algorithms, Bully & Ring Algorithms.

UNIT – V:
Distributed Scheduling and Deadlock Distributed Scheduling- Introduction - Clocks, events and process states, Logical time and logical clocks - Global states – Coordination and Agreement – Introduction - Distributed mutual exclusion. Deadlock-Issues in deadlock detection & Resolutions, Deadlock Handling Strategy, Distributed Deadlock Algorithms.

UNIT – VI:

File Management in Distributed System: Desirable features of good Distributed File System, Introduction File service architecture – Andrew File system, File Accessing Model, File Sharing semantics, File Catching Scheme, File Application   Naming: - Features, System Oriented Names, Object Locating Mechanism, Human Oriented Name.

TEXT BOOKS:
1. Distributed Systems: Principles and Paradigms, Tanenbaum A.S., Van Steen M., Pearson Education, 2007
2. Distributed Systems Concepts and Design, George Coulouris, Jean Dollimore and Tim Kindberg, 5th Edition, Pearson Education, 2012

REFERENCES:
1. Distributed Operating Systems: Concepts and Design,Pradeep K Sinha, Prentice Hall of India, 2007
2. Distributed Computing, Principles and Applications, Liu M.L., Pearson Education, 2004
3. Advance Concept in Operating System, Singhal & Shivratari, McGraw Hill
4. Distributed Computing, Attiya & Welch, Wiley Pub

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. VI Semester	L	T/P/D	C
	0	2	1

(19PE2CB04) MODERN DAY ROBOTICS AND ITS INDUSTRIAL APPLICATIONS LABORATORY

COURSE OBJECTIVES:
- To give a novice understanding of robotics using R and Python
- To expose students to the different types of robot designing and how to analyze the process
- Understand the role of each virtual components in robot system
- Acquire knowledge in R, Python to designing the robot for different applications

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Explore basic, standard control techniques like mobile robot, path planning, etc
CO-2: Learn the robot design, control and analysis
CO-3: Design, develop and commissioning of robotic models for desired applications
CO-4: Understand the different types of robot design and analyzing methods

LIST OF EXPERIMENTS
1. Design of mobile robot
2. Design of 3 link robot model.
3. Design of obstacle avoiding robot
4. Design and Implementation of robot vision for shape identification.
5. Design of line following robot
6. Robot programming and simulation for pick and place.
7. Robot programming and simulation for machining (cutting, welding).
8. Robot programming and simulation for any industrial process (Packaging, Assembly)
9. Robot programming and simulation for multi process.
10. Robot Programming for path planning

TEXT BOOKS:
1. Introduction to Robotics: Analysis, Control, Applications, Saeed Benjamin Niku, Wiley Publishers, 2nd Edition,2011
2. Computer Vision: Models, Learning, and Inference, Simon J. D. Prince, Cambridge University Press, 2012

REFERENCES:
1. Artificial Intelligence for Robotics: Build Intelligent Robots that Perform Human Tasks Using AI Techniques, Francis X. Govers, Packt publishing, 2018
2. Mastering Computer Vision with TensorFlow 2.x: Build Advanced Computer Vision Applications Using Machine Learning and Deep Learning Techniques, Krishnendu Kar, Packt publishing, 2020
3. Introduction to Deep Learning Business Applications for Developers from Conversational Bots in Customer Service to Medical Image processing, Armando Vieira, Bernardete Ribeiro, Apress, 2018

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

	L	**T/P/D**	**C**
B.Tech. VI Semester	**0**	**2**	**1**

(19PE2CB05) MODERN WEB APPLICATIONS LABORATORY

COURSE OBJECTIVES:
- To learn various fundamental concepts for developing websites and web based applications
- To know about technology for data transportation among incompatible systems and applications
- To learn about java script, XML
- To design and deploy web application using AJAX

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Build static and dynamic web pages with HTML, java script and Cascading Styles sheets
CO-2: Analyse and Create XML documents and XML Schema
CO-3: Write static and dynamic web pages
CO-4: Understand the concepts, analyse and build interactive web applications using AJAX

Week 1,2 ,3, 4:
Front end to be developed covering all the technologies (HTML5, CSS3, jQuery, AngularJS)

Week 5,6,7,8:
Backend connectivity to be established through RESTful services and must have database connectivity. Sample Application should cover Create, Read, Update, Delete scenarios of data.

Week 9,10:
Develop sample web pages using AJAX

Week 11,12:
Student can choose any backend technologies and database for developing REST services required for the application development. RESTful services should be developed using technologies already familiar. E.g. Java OR C# OR Python etc.

Week 13,14:
Develop web application using all technologies covered in syllabus

TEXT BOOKS:
1. Web Programming, building internet applications, Chris Bates 2nd Edition, WILEY Dreamtech
2. HTML & CSS: Design and Build Websites, Jon Duckett, John Wiley & Sons

REFERENCES:
1. Programming the World Wide Web, Sebesta R. W,8th Edition, Pearson, 2014

2. Pressman R. and Lowe D. (2008) Web Engineering: a practitioner's approach, 1ˢᵗ Edition, Mc GrawHill
3. Web Engineering: The Discipline of systematic, Kappel G., et al, 2006
4. Development of Web Applications, First Edition, John Wiley & Sons
5. PHP for the Web: Visual Quick Start Guide, Ullman L 2016, 5ᵗʰ Edition, Peachpit Press

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. VI Semester   **L   T/P/D   C**
                                                           0   2   1
(19PE2CB06) DATA MINING AND ANALYTICS LABORATORY

COURSE OBJECTIVES:
- To demonstrate the basic concepts and techniques of Data Mining using WEKA machine learning toolkit
- To performing data preprocessing tasks for data mining in WEKA
- To applying various classification algorithms on data sets using the WEKA machine learning toolkit
- To exploring clustering and Association rule techniques using the WEKA

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Evaluate and implement a wide range of emerging and newly adopted methodologies and technologies to facilitate the knowledge discovery
CO-2: Assess raw input data and process it to provide suitable input for a range of data   mining algorithms
CO-3: Acquire skills to effectively apply data mining techniques to solve real business problems
CO-4: Design and implement data-mining applications using sample, realistic data sets   and modern tools

WEEK 1& 2:
Title: Introduction to the Weka machine learning toolkit
Aim: To learn to use the Weak machine learning toolkit
1. What options are available on main panel?
2. What is the purpose of the the following in Weka:
   i.   The Explorer
   ii.   The Knowledge Flow interface
   iii. The Experimenter
   iv.   The command-line interface
3. Describe the arfffile format.
4. Press the Explorer button on the main panel and load the weather dataset and answer the following questions
   a. How many instances are there in the dataset?
   b. State the names of the attributes along with their types and values.
   c. What is the class attribute?
   d. In the histogram on the bottom-right, which attributes are plotted on the X,Yaxes?
   e. How do you change the attributes plotted on the X,Y-axes?
   f. How will you determine how many instances of each class are present in the Data
   g. What happens with the Visualize All button is pressed?
   h. How will you view the instances in the dataset? How will you save the changes?

WEEK 3&4:
Task-2:
Load the weather dataset and perform the following tasks:
1. Use the unsupervised filter Remove With Values to remove all instances where the attribute 'humidity' has the value 'high'?
2. Undo the effect of the filter.
3. Answer the following questions:
   a. What is meant by filtering in Weka?
   b. Which panel is used for filtering a dataset?
   c. What are the two main types of filters in Weka?
   d. What is the difference between the two types of filters? What is the difference between and attribute filter and an instance filter?
4. Load the iris dataset and perform the following tasks:
   a. Press the Visualize tab to view the Visualizer panel.
   b. What is the purpose of the Visualizer?
   c. Select one panel in the Visualizer and experiment with the buttons on the panel.

WEEK 5 & 6:
Task-3 (a):
Title: Classification using the Weka toolkit
Aim: To perform classification on data sets using the Weka machine learning toolkit
Requirements
Load the 'weather.nominal.arff' dataset into Weka and run Id3 classification algorithm.
Answer the following questions
1. List the attributes of the given relation along with the type details
2. Create a table of the weather.nominal.arff data
3. Study the classifier output and answer the following questions
   a. Draw the decision tree generated by the classifier
   b. Compute the entropy values for each of the attributes
   c. What is the relationship between the attribute entropy values and the nodes of The Decision tree?
4. Draw the confusion matrix? What information does the confusion matrix provide?
5. Describe the following quantities:
1. TP Rate   2. FP Rate
3. Precision   4. Recall

WEEK 7 & 8:
Task-3 (b):
Perform the following preprocessing tasks and apply classification:
1. Load the 'sick.arff' dataset.
2. Apply the supervised discretization filter.
3. What is the effect of this filter on the attributes?
4. How many distinct ranges have been created for each attribute?
5. Apply the unsupervised discretization filter. Do this twice:
   • In this step, set 'bins'=5
   • In this step, set 'bins'=10
   • What is the effect of the unsupervised filter filter on the datset?
6. Run the the Naive Bayes classifier after apply the following filters
   • Unsupervised discretized with 'bins'=5

- Unsupervised discretized with 'bins'=10
- Unsupervised discretized with 'bins''=20.

7. Compare the accuracy of the following cases
- Naive Bayes without discretization filters
- Naive Bayes with a supervised discretization filter
- Naive Bayes with an unsupervised discretization filter with different values for the 'bins' attributes.

WEEK 9 & 10:
Task 4:
Title : Performing clustering using the data mining toolkit
Aim : To learn to use clustering techniques
Requirements Perform the following tasks:
1. Load the 'bank.arff' data set in Weka.
2. Run the Simple K-Means clustering algorithm on the dataset
   a. How many clusters are created?
   b. What are the number of instances and percentage figures in each cluster?
   c. What is the number of iterations that were required?
   d. What is the sum of squared errors? What does it represent?
   e. Tabulate the characteristics of the centroid of each cluster.
3. Visualize the results of this clustering (let the X-axis represent the cluster name, and the Y-axis represent the instance number)
   a. Is there a significant variation in age between clusters?
   b. Which clusters are predominated by males and which clusters are predominated by females?
   c. What can be said about the values of the region attribute in each cluster?
   d. What can be said about the variation of income between clusters?
   e. Which clusters are dominated by married people and which clusters are dominated by unmarried people?
   f. How do the clusters differ with respect to the number of children?
   g. Which cluster has the highest number of people with cars?
   h. Which clusters are predominated by people with savings accounts?
   i. What can be said about the variation of current accounts between clusters?
   j. Which clusters comprise mostly of people who buy the PEP product and which ones are comprised of people who do not buy the PEP product?
4. Run the Simple K Means algorithm for values of K (no. of clusters) ranging from 1 to12. Tabulate the sum of squared errors for each run. What do you observe about the trend of the sum of squared errors?
5. For the run with K=12, answer the following questions:
   a. Is there a significant variation in age between clusters?
   b. Which clusters are predominated by males and which clusters are predominated by females?
   c. How do the clusters differ with respect to the number of children?
   d. Which clusters comprise of people who buy the PEP product and which ones are comprised of people who do not buy the PEP product?
   e. Do you see any differences in your ability to evaluate the characteristics of clusters generated for K=6 versus K=12? Why does this difference arise?

WEEK 11 & 12:
Task 5:
Title: Using Weka to determine Association rules
Aim: To learn to use Association algorithms on datasets Requirements
Perform the following tasks:
1. Load the bank-data.csv file.
2. Apply the Apriori association rule algorithm. What is the result?
3. Apply the supervised discretization filter to the age and income attributes.
4. Run the Apriori rule algorithm
5. List the rules that were generated.

WEEK 13 & 14:
Revision and Internal lab

TEXT BOOKS:
1. Data Mining: Concepts and Techniques, Jiawei Han and Micheline Kamber, Morgan Kaufmann Publishers, 3rd Edition, 2010
2. Data Mining and Knowledge Discovery Handbook, Lior Rokach and Oded Maimon, Springer, 2nd Edition, 2010
3. Time Series Analysis, Forecasting and Control, Box, G.E.P and Jenkins G.M. Holden-Day, 1970

REFERENCES:
1. Applied Regression Analysis,Draper, N. R. and Smith, H, (John Wiley) 3rd Edition, 1998
2. Applied Logistic Regression, Hosmer, D. W. and Lemeshow, S, Wiley, 1989

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. VI Semester   **L   T/P/D   C**
                            0   2   1

(19PC2CB09) COMIPER DESIGN AND INFORMATION SECURITY LABORATORY

COURSE OBJECTIVES:
- To understand and implement the principles, techniques and tools used in compiler construction process
- To understand the knowledge of Lex & Yaac
- To learn and understand various security polices, user roles and responsibilities
- To examine Analysis of security in Unix/Linux

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Understand the practical approach of how a compiler works
CO-2: Apply the knowledge of Lex & Yacc tools to develop various phases involved in compilation process
CO-3: Acquire the required skill to design and implement security polices, user roles and responsibilities
CO-4: Illustrate security in Unix/Linux

WEEK 1:
Design a Lexical analyzer for a mini language.

WEEK 2:
Introduction to lex tools.

WEEK 3:
Calculate first and follow for the given grammar using C language.
Design Predictive parser for the given grammar.

WEEK 4:
Introduction to YACC.

WEEK 5:
Design Predictive parser for the given language
Design LALR bottom up parser for the above language.

WEEK 6:
Convert the BNF rules into Yacc form and Write code to generate abstract syntax tree.

WEEK 7:
Write program to generate machine code from the abstract syntax tree generated by the parser

WEEK 8:
Study of Network Security fundamentals - Ethical Hacking, Social Engineering practices.
WEEK 9:
Study of System threat attacks - Denial of Services.

WEEK 10:
Study of Sniffing and Spoofing attacks

WEEK 11:
Study of Techniques uses for Web Based Password Capturing, Administration of users, password policies, privileges and roles

WEEK 12:
 Study of Different attacks causes by Virus and Trojans

WEEK 13:
Analysis of security in Unix/Linux.

WEEK 14:
Study of security Polices

WEEK 15:
Lab internal

TEXT BOOKS:
1. Principles of compiler design -A.V. Aho .J.D.Ullman; Pearson Education
2. Security Engineering, Ross Anderson
3. Engineering a Compiler-Cooper & Linda, Elsevier

REFERENCES:
1. Information Security: Principles and Practice, M. Stamp
2. lex&yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
3. Modern Compiler Design- Dick Grune, Henry E. Bal, Cariel T. H. Jacobs, Wiley dreamtech
4. Atual Kahate, Cryptography and Network Security, TMH
5. William Stalling, Cryptography and Network security, Pearson

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. VI Semester

L	T/P/D	C
0	2	1

(19PC2CB10) ARTIFICIAL INTELLIGENCE LABORATORY

COURSE OBJECTIVES:
- To understand the basic concepts in AI
- To apply basic principles of various AI search techniques
- To explore various knowledge representation techniques in AI
- To explore on expert systems

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Implement practical approach to solve and apply various search strategies
CO-2: Demonstrate the adversial search techniques
CO-3: Design the use cases for knowledge representation techniques and predicate logic
CO-4: Demonstrate expert systems by using domain knowledge

WEEK 1:
Write a program to solve any problem using depth first search.

WEEK 2:
Write a program to solve any problem using best first search algorithm.

WEEK 3:
Write a program to implement depth limit search.

WEEK 4:
Write a program to solve 4-Queen's problem.

WEEK 5:
Write a program to solve travelling salesman problem.

WEEK 6:
Write a program to implement A*algorithm.

WEEK 7:
Write a program to implement heuristic approach.

WEEK 8:
Write a program to implement tic_tac_toe with min_max algorithm.

WEEK 9:
Solve the logic programming for the mathematical expression using necessary libraries
Hint: pip install kanren, sympy

WEEK 10:
Demonstrate knowledge representation for the following using open source tools:

a. Ram likes mango.
b. Seema is a girl.
c. Bill likes Cindy.
d. Rose is red.
e. John owns gold

WEEK 11:
Simulate use cases in predicate logic by using open source tools.

WEEK 12:
Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.

WEEK 13:
Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions.

WEEK 14:
Write a program to implement   Bayesian network.

TEXT BOOKS:
1. Artificial Intelligence-A modern approach, Staurt Russel and peter Norvig, 1998, PHI
2. Artificial Intelligence, Elaine Rich & Kevin Knight, TMH Publication

REFERENCES:
1. Introduction to AI & Expert Systems, Dan W. Patterson, PHI Publication

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

B.Tech. VI Semester

L	T/P/D	C
1	2	2

(19HS2EN06) BUSINESS COMMUNICATION AND VALUE SCIENCE-IV

COURSE PRE-REQUISITES: Basic Knowledge of English (verbal and written)

COURSE OBJECTIVES:
- To understand the importance of Diversity in work place
- To recognize the importance of Emotional Intelligence, Multiple Intelligences and Learner Styles
- To develop communicative writing and apply public speaking in real life scenarios
- To recognize the importance of Corporate Social Responsibility, Corporate Etiquette, Stress Management, Time Management and Conflict Management

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Use tools of structured written communication and hone public speaking skills
CO-2: Apply emotional intelligence and knowledge of multiple intelligences and learning   styles in real life scenarios
CO-3: Understand the importance of diversity in workplace and corporate social responsibility
CO-4: Identify and practice best time management, stress management practices
CO-5: Recognize and cultivate the attributes needed to function and grow in a corporate environment

UNIT – I:
Communicative Writing
i)   Principles of Communicative Writing
ii)   Formal and Business letters
iii)   Writing proposals
iv)   Using charts and graphs in communicative writing
v)   Applying communicative writing in real life scenarios

UNIT – II:
Emotional Intelligence
i)   Emotional intelligence
ii)   Manifestations of Emotional intelligence
iii)   Importance of emotional intelligence in personal and professional lives
iv)   Ways to Build Emotional intelligence
v)   Applying emotional intelligence in real life scenarios- Activity

UNIT – III:
Public Speaking
i)   Need for public speaking
ii)   Public speaking – best practices
iii)   Applying public speaking in real life scenarios
iv)   Selling your start-up ideas (activity)
v)   Business Storytelling and Doodling methods

UNIT – IV:
Corporate Social Responsibility (CSR)
i)   Importance of corporate social responsibility (CSR)
ii)   The Need to conduct CSR activities
iii)   Stories of corporate social responsibility

Diversity, Multiple Intelligences & Learner styles
iv)   Multiple intelligences
v)   Learning styles
vi)   Applying multiple intelligences and Learning styles in communication

UNIT – V:
Employability Skills-1
i)   Attributes required for work and life
ii)   Strategic thinking and planning
iii)   Decision making
iv)   Best practices to share and receive feedback
v)   Attributes needed to function and grow in a corporate environment- Image Management

UNIT -VI:
Life Skills-1
i)   Stress management
ii)   Time Management
iii)   Corporate etiquette
vii)   Business idioms and Corporate Terms
viii) Conflict Resolution and Conflict Management

TEXT BOOKS:
1. There are no prescribed texts for Semester 6 – there will be handouts and reference links shared

REFERENCES:
1. Emotional Intelligence: Why it Can Matter More Than IQ by Daniel Goleman
2. Putting Emotional Intelligence To Work by Ryback David
3. How to Develop Self Confidence and Improve Public Speaking - Time - Tested Methods of Persuasion by Dale Carnegie
4. TED Talks: The official TED guide to public speaking: Tips and tricks for giving unforgettable speeches and presentations

	L	T/P/D	C
B.Tech. VI Semester - CSE, IT	0	2	0

(19MN6HS03) GENDER SENSITIZATION

COURSE DESCRIPTION:
This course offers an introduction to Gender Studies, an interdisciplinary field that asks critical questions about the meanings of sex and gender in society. The primary goal of this course is to familiarize students with key issues, questions and debates in Gender Studies, both historical and contemporary. It draws on multiple disciplines – such as literature, history, economics, psychology, sociology, philosophy, political science, anthropology and media studies – to examine cultural assumptions about sex, gender, and sexuality. This course integrates analysis of current events through student presentations, aiming to increase awareness of contemporary and historical experiences of women, and of the multiple ways that sex and gender interact with race, class, caste, nationality and other social identities. This course also seeks to build an understanding and initiate and strengthen programmes combating gender-based violence and discrimination. The course also features a number of exercises and reflective activities designed to examine the concepts of gender, gender-based violence, sexuality, and rights. It will further explore the impact of gender-based violence on education, health and development.

ACTIVITIES:
Classes will consist of a combination of activities: dialogue-based lectures, discussions, collaborative learning activities, group work and in-class assignments.

COURSE OBJECTIVES:
- To sensitize students on issues of gender in contemporary India
- To provide a critical perspective on the socialization of men and women
- To expose the students to debates on the politics and economics of work
- To enable students to reflect critically on gender violence
- To expose students to more egalitarian interactions between men and women

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Understand important issues related to gender in contemporary India
CO-2: Attain a finer grasp of how gender discrimination works in our society and how to counter it
CO-3: Acquire insight into the gendered division of labour and its relation to politics and economics
CO-4: Respond to put an end to gender violence
CO-5: Equipped to work with the other gender treating them as equals

MODULE 1: Introduction to Gender
- Definition of Gender
- Basic Gender Concepts and Terminology
- Exploring Attitudes towards Gender
- Social Construction of Gender

MODULE 2: Gender Roles and Relations
- Types of Gender Roles
-
-

Gender Roles and Relationships Matrix
Gender-based Division and Valuation of Labour

MODULE 3: Gender Development Issues
- Identifying Gender Issues
- Gender Sensitive Language
- Gender, Governance and Sustainable Development
- Gender and Human Rights
- Gender and Mainstreaming

MODULE 4: Gender-based Violence
- The concept of violence
- Types of Gender-based violence
- The relationship between gender, development and violence
- Gender-based violence from a human rights perspective

MODULE 5: Gender and Culture
- Gender and Film
- Gender and Electronic Media
- Gender and Advertisement
- Gender and Popular Literature

MODULE 6: Gender and Studies
- Knowledge: Through the Lens of Gender Point of View, Gender and the Structure of Knowledge
- Whose History: Questions for Historians and Others, Reclaiming a Past, Writing Other Histories

TEXT BOOK:
1. Towards a World of Equals: A Bilingual Textbook on Gender, A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu, Telugu Akademi, Telangana Government, 2015

REFERENCES:
1. Sen, Amartya, More than One Million Women are Missing, New York Review of Books 37.20 (20 December 1990). Print. 'We Were Making History' Life Stories of Women in the Telangana People's Struggle. New Delhi: Kali for Women, 1989
2. Tripti Lahiri, By the Numbers: Where Indian Women Work, Women's Studies Journal (14 November 2012) Available online at: http://blogs.wsj.com/India real time/2012/11/14/by-the-numbers-where-India-women-work/>
3. Abdulali Sohaila I Fought For My Life ...and Won Available online at:http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/
4. K. Kapadia, The Violence of Development: The Politics of Identity, Gender and Social Inequalities in India, London: Zed Books, 2002