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

V SEMESTER **R22**

Course Code	Title of the Course	L	T	P/D	CH	C
22HS1MG302	Fundamentals of Economics	3	0	0	3	3
22PC1CB301	Computer Networks	3	0	0	3	3
22PC1CB302	Machine Learning	3	0	0	3	3
	PROFESSIONAL ELECTIVE – I					
22PE1CB301	Conversational Systems	3	0	0	3	3
22PE1CB302	Cloud, Micro services and Applications					
22PE1CB303	Data Mining and Analytics					
	OPEN ELECTIVE – I					
22OE1CB301	Introduction to IOT	3	0	0	3	3
22OE1CB302	Scripting Languages					
22OE1CB303	Augmented Reality and Virtual Reality					
22PC2CB301	Computer Networks Laboratory	0	0	2	2	1
22PC2CB302	Machine Learning Lab	0	0	2	2	1
22SD5CB301	Data Visualization Lab Through Power BI	0	0	2	2	1
22PW4CB301	Design Thinking	1	0	2	3	2
22MN6HS302	Gender Sensitization	2	0	0	2	0
Total		**18**	**0**	**8**	**26**	**20**

L – Lecture T – Tutorial P – Practical D – Drawing CH – Contact Hours/Week
C – Credits SE – Sessional Examination CA – Class Assessment ELA – Experiential Learning Assessment
SEE – Semester End Examination D-D – Day to Day Evaluation LR – Lab Record
CP – Course Project PE – Practical Examination

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

VI SEMESTER **R22**

Course Code	Title of the Course	L	T	P/D	CH	C
22PC1CB303	Automata and Compiler Design	3	0	0	3	3
22PC1CB304	Artificial Intelligence	3	0	0	3	3
22HS1MG303	Financial and Cost Accounting	3	0	0	3	3
	PROFESSIONAL ELECTIVE – II					
22PE1CB304	Modern Day Robotics and Its Industrial Applications	3	0	0	3	3
22PE1CB305	Modern Web Applications					
22PE1CB306	Natural Language Processing					
	OPEN ELECTIVE – II					
22OE1CB304	Business Strategy	3	0	0	3	3
22OE1CB305	Distributed Systems					
22OE1CB306	Advanced Operating Systems					
22PC2CB303	Automata and Compiler Design Laboratory	0	0	2	2	1
22HS2EN302	Business Communication and Value Science – IV	0	1	2	3	2
22PW4CB302	Internship	0	0	4	4	2
22MN6HS301	Ancient Wisdom	2	0	0	2	0
Total		**17**	**1**	**8**	**26**	**20**

L – Lecture T – Tutorial P – Practical D – Drawing CH – Contact Hours/Week
C – Credits SE – Sessional Examination CA – Class Assessment ELA – Experiential Learning Assessment
SEE – Semester End Examination D-D – Day to Day Evaluation LR – Lab Record
CP – Course Project PE – Practical Examination

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. V Semester

(22HS1MG302) FUNDAMENTALS OF ECONOMICS

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE OBJECTIVES:

- To provide a knowledge on economics and managerial economics which helps unifying theme of decision making in an organisation by introducing tools such as demand and supply analysis and to analyse consumer and supplier behaviour with respect to, select, buy, use and dispose goods, services and ideas based on the changes in various factors or determinants
- To gain knowledge on indifference curves and consumer behaviour with reference to changes in price, income and substitute
- To get acquainted with various production theories, various costs and their role in cost minimization and various market structures such as perfect and imperfect competition
- To gain knowledge on important elements of Nation's economic environment (National Income, National Product, Exports, Imports, Taxes, Subsidies, etc.)
- To get acquainted with concepts of taxes, subsidy and its impact on government sector, and monetary and fiscal policies' effect on economy

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

CO-1: Explain the theory of the firm and various micro-economics tools such as demand, supply and consumer analysis that would help in forward planning and decision making

CO-2: Describe consumer behaviour and effect of various determinants on consumer behaviour

CO-3: Analyse various production functions and describe various cost concepts and also differentiate between perfect and imperfect market

CO-4: Explain the various components of National income with the help of income determination tools

CO-5: Examine the policies and procedures of taxes and subsidies Government sector and able to explain monetary and fiscal policies

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	-	-	-	-	-	3	2	3	3	-	-	2	3
CO-2	-	-	-	-	-	-	-	2	1	3	3	-	-	2	3
CO-3	-	-	-	-	-	-	-	3	1	2	3	-	-	2	3
CO-4	-	-	-	-	-	-	-	2	2	3	3	-	-	2	3

CO-5	-	-	-	-	-	-	-	3	1	2	3	-	-	2	3

UNIT-I:

Introduction to Economics: Nature and Scope, Principles of Demand and Supply — Supply Curves of Firms — Elasticity of Supply; Demand Curves of Households — Elasticity of Demand; Equilibrium and Comparative Statics (Shift of a Curve and Movement along the Curve); Welfare Analysis — Consumers' and Producers' Surplus — Price Ceilings and Price Floors

UNIT-II:

Consumer Behaviour: Axioms of Choice - Budget Constraints and Indifference Curves; Consumer's Equilibrium — Effects of a Price Change, Income and Substitution Effects

UNIT-III:

Theory of Production: Production Function and Iso-quants — Cost Minimization; Cost Curves — Total, Average and Marginal Costs — Long Run and Short Run Costs; Markets- Types – Features of Perfect Competition; Monopoly and Monopolistic Competition

UNIT-IV:

National Income and its Components: GNP, NNP, GDP, NDP; Consumption Function; Investment; Simple Keynesian Model of Income Determination and the Keynesian Multiplier

UNIT-V:

Government Sector: Taxes and Subsidies; Money — Definitions; Demand for Money — Transitionary and Speculative Demand; Supply of Money — Bank's Credit Creation Multiplier; Integrating Money and Commodity Markets — IS, LM Model
Business Cycles and Stabilization — Monetary and Fiscal Policy —Functions of Central Bank and Commercial banks

TEXT BOOKS:

1. Microeconomics, Pindyck Robert S., and Daniel L. Rubinfeld, 8th Edition, Pearson Education, 2017
2. Macroeconomics, Dornbusch, Fischer and Startz, 13th Edition, McGraw-Hill, 2018
3. Economics, Paul Anthony Samuelson, William D. Nordhaus, 19th Edition, Mc Graw Hill, 2012

REFERENCES:

1. Intermediate Microeconomics: A Modern Approach, Hal R. Varian, 9th Edition, Springer, 2014
2. Principles of Macroeconomics, N. Gregory Mankiw, 7th Edition, Cengage, 2012

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. V Semester

(22PC1CB301) COMPUTER NETWORKS

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE OBJECTIVES:

- To develop an understanding of modern network architectures from a design and Performance perspective
- To introduce the student to the major concepts, principals 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

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	1	3	1	-	-	-	-	1	-	-	-	1	1	1	-
CO-2	2	3	2	1	-	-	3	1	1	2	2	2	2	2	1
CO-3	3	3	3	2	2	2	3	1	2	3	3	2	2	2	1
CO-4	3	3	3	2	2	2	3	1	2	3	3	2	2	2	1

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.

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

UNIT-II:

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

LAN: Wired LAN, Wireless LAN, Virtual LAN.

UNIT-III:

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

UNIT-IV:

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-V:

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, McGraw-Hill Education

REFERENCES:

1. Network Security, Kaufman, R. Perlman and M. Speciner
2. UNIX Network Programming, Vol. 1,2 & 3, W. Richard Stevens
3. Computer Networking: A Top-Down Approach, James F. Kurose, Keith W. Ross Pearson Education
4. Cryptography and Network Security: Principles and Practice, William Stallings Pearson Education
5. Networking for Systems Administrators (IT Mastery), Michael W Lucas
6. The All-New Switch Book, Rich Seifert and James Edwards, 2nd Edition

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. V Semester

(22PC1CB302) MACHINE LEARNING

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE PRE-REQUISITES: Basic level of Statistics, Programming and Probability

COURSE OBJECTIVES:

- To introduce to the basic concepts and techniques of machine learning
- To have a thorough understanding of the supervised, unsupervised learning techniques and sequence classification tasks
- To study the fundamentals of neural networks and its applications
- To understand ensemble models for better model performance

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

CO-1: Distinguish between various types of machine learning

CO-2: Apply the appropriate machine learning strategy for any given problem

CO-3: 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 production performance

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	3	3	3	3	3	2	2	2	2	2	2	3	3	3	3
CO-2	2	3	3	3	3	3	3	3	3	2	3	3	3	3	3
CO-3	2	2	3	3	2	2	3	3	3	3	3	2	3	3	3
CO-4	3	2	3	2	3	3	2	3	2	3	2	3	3	3	3

UNIT-I:

Introduction: Relationship between ML and human learning; A quick survey of major models of how machines learn; Example applications of ML, Multi-variable regression; Model evaluation; Least squares regression; Regularization; LASSO; Applications of regression

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; Naive Bayes classification; Decision

Tree and Random Forests; k-Nearest neighbor classification; Support Vector Machines; Applications of classifications; Ensembles of classifiers including bagging and boosting.

UNIT-III:

Clustering: Average linkage; Ward's algorithm; Minimum spanning tree clustering; K-nearest neighbors clustering; BIRCH; CURE; DBSCAN, Anomaly and outlier detection methods

UNIT-IV:

Sequence Classification: 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-V:

Association Rule Mining Algorithms: apriori, FP Grwoth, Expectation-Maximization (EM) algorithm for unsupervised learning; Artificial neural networks including backpropagation.

TEXT BOOKS:

1. Machine Learning, Tom M. Mitchell, McGraw-Hill
2. Machine Learning: A Probabilistic Perspective, Kevin Murphy, MIT Press, 2012
3. Pattern Recognition and Machine Learning, Christopher Bishop, 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. The Elements of Statistical Learning, Trevor Hastie, Robert Tibshirani, Jerome Friedman, Springer, 2009
4. Machine learning with python and Scikit-learn, Sebastian Rascka, Packt

ONLINE RESOURCES:

1. https://www.coursera.org/learn/machine-learning
2. https://developers.google.com/machine-learning/crash-cours

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. V Semester

(22PE1CB301) CONVERSATIONAL SYSTEMS

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

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

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	2	3	2	2	-	-	1	-	1	-	-	-	3	2	2
CO-2	2	3	3	2	2	1	-	-	-	-	1	-	2	2	2
CO-3	1	3	3	3	2	1	-	-	-	1	1	1	2	3	3
CO-4	1	1	2	2	2	2	-	1	-	2	3	1	3	3	2

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

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

UNIT-V:

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, Cathy Pearl, 1st Edition, O'Reilly
2. Conversational Interfaces: Principles of Successful Bots, Chatbots & Messaging Apps, Mariya Yao

REFERENCES:

1. Bot Business 101: How to Start, Run & Grow Your Bot / AI Business, Ekim Kaya
2. Designing Bots: Creating Conversational Experiences, Amir Shevat, O'Reilly
3. Designing Conversational Interfaces, Alper Çuğu

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. V Semester

(22PE1CB302) CLOUD, MICROSERVICES AND APPLICATIONS

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE OBJECTIVES:

- To design applications for Cloud
- To develop applications using various services
- To deploy applications on Cloud by using cloud native services
- To introduce 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

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	2	2	-	-	-	-	1	-	-	-	1	2	1	-	2
CO-2	-	1	3	2	-	-	-	-	-	2	1	1	1	-	2
CO-3	-	-	-	1	2	-	-	-	-	-	-	-	1	3	-
CO-4	2	3	4	1	3	-	1	-	-	1	-	3	1	3	-

UNIT-I:

Cloudification: Strategy, The Allure of the Cloud, Financial Gains of Moving to Cloud, Business Opportunities in Moving to Cloud, Technological Gains of Moving to Cloud, Prerequisites to a Cloud Journey, Overall Setup for Microservices in Cloud, Networking and Regions and, Compute Integration, Databases and Traditional Datastores, Special-Purpose Datastores, Cost Analysis, Billing, Cost Factors, Energence on Cloud

Core Cloud Concepts: Compute, Containerization over Virtualization, Containerizing Microservices, Container Orchestration, Service Meshes ,Traffic Control, Traffic Management, and Traffic Shaping ,Establishing and Securing Communication, Building Overall Observability, Challenges and State of the Art of Service, FaaS aka Serverless, PaaS, Integration Services ,MaaS: Messaging Services ,Point-to-Point

Messaging, Publish-Subscribe Messaging ,Streaming and Distributed Commit Logs , Energence's Cloud Setup for Compute

Storage: DBaaS, Classifying DBaaS by Data Type, Classifying DBaaS by CAP, DataStores for OLAP, Data Warehouses on Cloud, Data Movement on Cloud

UNIT-II:

Energence: Managing Energy Production and Distribution, Hardware and Software Infrastructure, Monolithic Software Solutions, Growth Opportunities and Objectives Microservices-Native Architecture, The Approach in a Nutshell. Defining Top-Level Domains, Deciding Interdomain Communication, Toward Subdomains, Designing Microservices, Architectural Advantages and Gains, Scalability, Elasticity, Agility, Energence's Monoliths as Microservices

Architectural Challenges: Identifying and Classifying Challenges, AC1: Dispersed Business Logic, AC2: Lack of Distributed Transactions, Orchestrated Domains, **Choreographed Domains, AC3:** Inconsistent Dynamic Overall State, Challenges in Data Exchange, Problems with Sharding, AC4: Difficulty in Gathering Composite Data, AC5: Difficulty in Debugging Failures and Faults, AC6: The v2 Dread—Difficulty in Evolving

UNIT-III:

Securing Microservices on Cloud: Securing Microservices, Reducing the Attack Surface, Securing Services, Securing Outgoing Communication, Securing Microservices on Cloud Virtual Private Clouds, API Gateways and Load Balancers, IAM of CSPs, Securing Inter-Service Communication, Processing Integrity, Trusted Binaries, Trusted Execution, Availability, Disaster Recovery (DR), Multi-region Solutions

DevOps: The Dawn of DevOps, Nobody Understands DevOps, The Business Advantage, Infrastructure as Code, Learning Together, The Coming of Containers, The State of the Art, Thinking Inside the Box, Putting Software in Containers, Plug and Play Applications, Conducting the Container Orchestra, Kubernetes, From Borg to Kubernetes, What Makes Kubernetes So Valuable? Will Kubernetes Disappear? , Kubernetes Doesn't Do It All ,Cloud Native, The Future of Operations ,Distributed DevOps

UNIT-IV:

First Steps with Kubernetes: Running Your First Container, Installing Docker Desktop, What Is Docker? , Running a Container Image ,The Demo Application ,Looking at the Source Code ,Introducing Go ,How the Demo App Works ,Building a Container, Understanding Dockerfiles, Minimal Container Images, Running docker image build, Naming Your Images, Port Forwarding, Container Registries, Authenticating to the Registry, Naming and Pushing Your Image, Running Your Image, Hello, Kubernetes, Running the Demo App, If the Container Doesn't Start, Minikube

Getting Kubernetes: Cluster Architecture, The Control Plane, Node Components, High Availability ,The Costs of Self-Hosting Kubernetes ,It's More Work Than You Think ,It's Not Just About the Initial Setup ,Tools Don't Do All the Work for You ,Kubernetes Is Hard, Administration Overhead, Start with Managed Services, Managed Kubernetes Services, Google Kubernetes Engine (GKE) ,Cluster Autoscaling ,Amazon Elastic Container Service for Kubernetes (EKS) ,Azure Kubernetes Service (AKS) ,OpenShift ,IBM Cloud Kubernetes Service ,Heptio Kubernetes Subscription (HKS) ,Turnkey

Kubernetes Solutions ,Stackpoint ,Containership Kubernetes Engine (CKE) ,Kubernetes Installers ,kops ,Kubespray ,TK8 ,Kubernetes The Hard Way ,kubeadm, Tarmak ,Rancher Kubernetes Engine (RKE) ,Puppet Kubernetes Module, Kubeformation

UNIT-V:

Working with Kubernetes Objects: Deployments, Supervising and Scheduling, Restarting Containers, Querying Deployments, Pods, Replica Sets, Maintaining Desired State, The Kubernetes Scheduler, Resource Manifests in YAML Format, Resources Are Data, Deployment Manifests, Using kubectl apply ,Service Resources, Querying the Cluster with kubectl, Taking Resources to the Next Level, Helm: A Kubernetes Package Manager, Installing Helm, Installing a Helm Chart, Charts, Repositories, and Releases, Listing Helm Releases

Deploying Kubernetes Applications: Building Manifests with Helm, What's Inside a Helm Chart? Helm Templates, Interpolating Variables, Quoting Values in Templates, Specifying Dependencies, Deploying Helm Charts, Setting Variables, Specifying Values in a Helm Release, Updating an App with Helm, Rolling Back to Previous Versions, creating a Helm Chart Repo, Managing Helm Chart Secrets with Sops, Managing Multiple Charts with Helmfile, What's in a Helmfile? Chart Metadata, Applying the Helmfile, Advanced Manifest Management Tools, ksonnet, Kapitan, kustomize, kompose, Ansible, kubeval.

TEXT BOOKS:

1. Cloud-Based Microservices Techniques, Challenges, and Solutions Chandra Rajasekharaiah, APress, 2021
2. Cloud Native DevOps with Kubernetes Building, Deploying, and Scaling Modern Applications in the Cloud, John Arundel and Justin Domingus, 1st Edition, O'Reilly, 2019

REFERENCES:

1. Cloud Computing: A Practical Approach, Anthony T. Velte, Tobe J. 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, 2011

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. V Semester

(22PE1CB303) DATA MINING AND ANALYTICS

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

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

COURSE ARTICULATION MATRIX:
*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	3	2	2	2	2	-	-	-	-	1	1	1	3	3	3
CO-2	3	2	3	3	2	-	-	-	-	-	-	-	3	3	3
CO-3	3	3	2	3	3	-	-	-	-	1	-	-	3	3	3
CO-4	3	2	3	2	3	1	1	1	1	-	-	-	3	3	3

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,Data preprocessing: Data cleaning, Data transformation, Data reduction, Discretization and generating concept hierarchies.

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-II:

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, Prediction: The prediction task, Statistical (Bayesian) classification, Bayesian networks, Instance-based methods (nearest neighbor), linear models.

UNIT-III:

Descriptive Analytics: Data Modeling, Trend Analysis, Forecasting models: Heuristic methods, predictive modeling and pattern discovery.

Linear Regression and 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.

UNIT-IV:

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.

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.

UNIT-V:

Linear Time Series Models: Auto-regressive, Moving Average, Auto-regressive Moving Average and Auto-regressive 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.

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, 3rd Edition, Morgan Kaufmann, 2010
2. Data Mining and Knowledge Discovery Handbook, Lior Rokach and Oded Maimon, 2nd Edition, Springer, 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., 3rd Edition, Wiley, 1998
2. Applied Logistic Regression, Hosmer D. W. and Lemeshow S., Wiley, 1989

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. V Semester

(22OE1CB301) INTRODUCTION TO IOT

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE OBJECTIVES:

- To understand about the fundamentals of Internet of Things and its building blocks along with their characteristics
- To understand the recent application domains of IoT in everyday life
- To understand the protocols and standards designed for IoT and the current research on it

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

CO-1: Describe basic concepts of Internet-of-Things, use cases and architecture

CO-2: Relate sensor and industrial systems

CO-3: Analyze Networking and communication for IoT

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	3	3	1	3	2	2	1	1	2	3	2	3	1	3	3
CO-2	1	2	3	2	1	3	2	3	1	3	3	1	1	3	2
CO-3	3	3	3	1	3	1	3	2	3	1	3	2	3	1	3

UNIT-I:

Introduction to IoT and Use Cases: Understanding basic concepts of IoT, Consumer IoT vs Industrial Internet, Fundamental building blocks, Use Cases of IoT in various industry domains,

UNIT-II:

Architecture: IoT reference architectures, Industrial Internet Reference Architecture, Edge Computing, IoT Gateways, Data Ingestion and Data Processing Pipelines, Data Stream Processing

UNIT-III:

Sensors and Industrial Systems: Introduction to sensors and transducers, integrating sensors to sensor processing boards, introduction to industrial data acquisition systems, industrial control systems and their functions

UNIT-IV:

Networking for IoT: Recap of OSI 7 layer architecture and mapping to IoT architecture, Introduction to proximity networking technologies (ZigBee, Bluetooth, Serial Communication), Industrial network protocols (Modbus, CANbus),

UNIT-V:

Communication for IoT: Communicating with cloud applications (web services, REST, TCP/IP and UDP/IP sockets, MQTT, WebSockets, protocols. Message encoding (JSON, Protocol Buffers)

TEXT BOOKS:

1. The Internet of Things, Samuel Greengard, MIT Press Essential Knowledge Series,
2. The Internet of Things: Enabling Technologies, Platforms, and Use Cases, Pethuru Raj and Anupama C. Raman, CRC Press

REFERENCES:

1. Visualizing Data-Exploring and Explaining Data with the Processing Environment, Ben Fry, O'Reilly
2. Raspberry Pi Computer Architecture Essentials, Andrew K. Dennis
3. Getting Started with Arduino, M. Banzi, O Reilly

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. V Semester

(22OE1CB302) SCRIPTING LANGUAGES

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

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 analyse requirements of software systems for the purpose of determining the suitability of implementation of PERL and Ruby
- To implement software solutions that accommodate specified requirements and constraints, based on analysis or modelling 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: Implement the appropriate software solutions using Scripting Languages such as e-commerce, content management, custom database solutions, and prototyping

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	2	3	2	3	2	-	-	1	-	3	2	3	2	3	1
CO-2	3	3	3	2	2	-	-	1	-	2	3	2	3	2	3
CO-3	3	3	3	3	3	2	2	2	2	3	3	3	3	3	3
CO-4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

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, file system, eval, data structures, packages, modules, objects, interfacing to the operating system,

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: The structure and Execution of Ruby Programs, Package Management with RUBYGEMS, Ruby and web: Writing CGI scripts, cookies, Choice of Webservers, SOAP and webservices

RubyTk – Simple Tk Application, widgets, Binding events, Canvas, scrolling.

TEXT BOOKS:

1. The World of Scripting Languages, David Barren, Wiley
2. Programming Ruby, The Pramatic Progammers Guide, 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, David Flanagan and Yukihiro Matsumoto, O'Reilly

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. V Semester

(22OE1CB303) AUGMENTED REALITY AND VIRTUAL REALITY

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

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

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	3	3	1	-	-	-	2	1	-	-	2	3	1	3	-
CO-2	1	-	2	2	2	2	3	3	-	-	3	3	1	3	-
CO-3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-
CO-4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-

UNIT-I:

Introduction to Virtual Reality (VR) 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 and VR System Technologies:

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) and Tracking Technologies: Definition and Scope, A Brief History of AR, Examples, Related Fields, MR Continuum, Virtual Reality, Ubiquitous Computing. Tracking, Coordinate Systems, Characteristics of Tracking Technology, Stationary Tracking Systems, Mobile Sensors.

UNIT-IV:

Computer Vision for Augmented Reality: Computer Vision for AR: Marker Tracking, Multiple-Camera Infrared Tracking, Natural Feature Tracking by Detection.

UNIT-V:

The Future of VR and AR: 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

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
5. Augmented Reality: An Emerging Technologies Guide to AR, Greg Kipper and Joseph Rampolla, Syngress, 2012

ONLINE RESOURCES:

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

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. V Semester

(22PC2CB301) COMPUTER NETWORKS LABORATORY

TEACHING SCHEME		
L	T/P	C
0	2	1

EVALUATION SCHEME					
D-D	PE	LR	CP	SEE	TOTAL
10	10	10	10	60	100

COURSE OBJECTIVES:

- To learn and use network commands
- To learn and understand various error correction and detection mechanisms, Socket programming
- To implement and analyse 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

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	3	2	1	-	-	-	-	-	2	1	-	-	3	-	-
CO-2	3	2	1	1	2	-	-	2	2	1	-	2	3	1	2
CO-3	2	-	1	2	3	1	1	1	3	2	-	2	3	2	1
CO-4	2	-	3	3	3	2	1	-	3	3	1	3	3	3	3

LIST OF EXPERIMENTS:

WEEK 1:

Basic Networking commands, implement cross-wired cable and straight through cable clamping tool.

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:
Write a Program to implement RSA Algorithm.

WEEK 12:
Simulate different types of Network Topologies.

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
3. Data Communications and Networking, Forouzan, 4th Edition, McGraw-Hill Education

REFERENCES:

1. Network Security, Kaufman, R. Perlman and M. Speciner
2. UNIX Network Programming, Vol. 1, 2 & 3, W. Richard Stevens
3. Computer Networking: A Top-Down Approach, James F. Kurose, Keith W. Ross Pearson Education

4. Cryptography and Network Security: Principles and Practice, William Stallings Pearson Education
5. Networking for Systems Administrators (IT Mastery), Michael W. Lucas
6. The All-New Switch Book, Rich Seifert and James Edwards, 2nd Edition

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. V Semester

(22PC2CB302) MACHINE LEARNING LABORATORY

TEACHING SCHEME		
L	T/P	C
0	2	1

EVALUATION SCHEME					
D-D	PE	LR	CP	SEE	TOTAL
10	10	10	10	60	100

COURSE PRE-REQUISITES: Basic level programming in Python

COURSE OBJECTIVES:

- To introduce implementation of different Machine Learning algorithms
- To have a practical understanding of evaluating different machine learning models
- To experiment with probability-based algorithms, tree-based algorithms, association rule mining algorithms, and neural networks
- To understand ensemble models of machine learning algorithms

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

CO-1: Implement supervised and unsupervised, and data mining algorithms

CO-2: Apply the appropriate machine learning strategy for any given problem

CO-3: Evaluate the performance of different machine learning models

CO-4: Combine different models for ensemble learning

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	3	3	3	3	3	2	2	2	3	3	3	3	3	3	3
CO-2	3	3	3	3	3	2	3	2	3	3	3	3	3	3	3
CO-3	3	3	2	3	3	2	2	2	3	3	3	3	3	2	3
CO-4	2	3	3	3	3	3	2	2	3	3	2	2	3	3	3

LIST OF PROGRAMS / EXPERIMENTS / EXERCISES:

WEEK 1:

Introduction to Python and Python Libraries- NumPy, Pandas, Matplotlib, Scikit

WEEK 2:

Perform Summary Statistics

WEEK 3:

Perform pre-processing in Python

Perform Feature Engineering and Feature Selection Methods.

WEEK 4:
Implement simple Linear regression
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
(2) Implementation of one association rule mining algorithm
(3) Implementation of one anomaly detection algorithms
(4) Implementation of EM algorithm for some specific problem

TEXT BOOKS:

1. Machine Learning, Tom M. Mitchell, McGraw-Hill
2. Machine Learning: A Probabilistic Perspective, Kevin Murphy, MIT Press, 2012
3. Pattern Recognition and Machine Learning, Christopher Bishop, 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. The Elements of Statistical Learning, Trevor Hastie, Robert Tibshirani, Jerome Friedman, Springer, 2009

ONLINE RESOURCES:
1. Andrej Karpathy Interview - ML Strategy, Coursera
2. https://developers.google.com/machine-learning/crash-course

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. V Semester

(22SD5CB301) DATA VISUALIZATION LAB THROUGH POWERBI

TEACHING SCHEME		
L	T/P	C
0	2	1

EVALUATION SCHEME					
D-D	PE	LR	CP	SEE	TOTAL
10	10	10	10	60	100

COURSE PRE-REQUISITES: Basic level programming in R

COURSE OBJECTIVES:

- To visualize the data that can improve comprehension, communication, and decision making
- To have a practical understanding of plots using R
- To apply the real time data analysis with power BI
- To implement various tools and methods for easy interpretation of data

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

CO-1: Understand the importance and the principles of data visualization

CO-2: Apply the principles of data visualization on toy datasets using PowerBI

CO-3: Analyze data towards decision making using visualization

CO-4: Identify appropriate/suitable visualization for particular requirements imposed by the data type and analytics algorithms

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	3	3	3	3	3	2	2	2	3	3	3	3	3	3	3
CO-2	3	3	3	3	3	2	3	2	3	3	3	3	3	3	3
CO-3	3	3	2	3	3	2	2	2	3	3	3	3	3	2	3
CO-4	2	3	3	3	3	3	2	2	3	3	2	2	3	3	3

LIST OF PROGRAMS / EXPERIMENTS / EXERCISES:

WEEK 1:

Introduction to basic components and overview of visualization, datatypes, basics of plotting graphs, different types of graphs in analytics, Importance of visualizations

WEEK 2: Working with Excel, functions and formulas, creating and using CSV.

WEEK 3: Introducing Power BI: Uploading data , Visual Interactions, reports.

WEEK4: Power BI: natural-language queries

WEEK5: Using Power BI Desktop: Connecting to a database, loading from multiple sources, Using Query Editor.

WEEK6: Building a data model using power bi: calculated columns, Measures.

WEEK 7: Using DAX in data models, Create and manage relationships in Power BI

WEEK 8: Specify data categories, Import and display KPIs in Power BI

WEEK9: Set geographic filters in Power BI

WEEK10: Power BI reports: Custom and standard Visualizations.

WEEK11: Using text boxes, shapes, and smart narrative visuals, hyperlink to a text box, images in a table, matrix, or slicer in reports

WEEK12: Customize visualization titles, backgrounds, labels, and legends

WEEK13: Use report themes in Power BI Desktop

WEEK 14: Generate Sales and Marketing / Competitive Marketing Analysis sample Report.

TEXT BOOKS:

1. Microsoft Power BI, Marco Russo
2. R for everyone, Jarad P. Lander
3. Statistics: An Introduction using R, Michael J. Crawley

REFERENCES:

1. Introducing Power BI, Albert Ferrari and Marco Russo.
2. A Beginner's Guide to R (Use R), Alain F. Zuur, Elena N. Ieno, Erik H. W. G. Meesters, Springer, 2009

ONLINE RESOURCES:

1. https://learn.microsoft.com/en-us/power-bi/fundamentals/
2. https://learn.microsoft.com/en-us/power-bi/fundamentals/desktop-getting-started
3. The R Software-Fundamentals of Programming and Statistical Analysis, Pierre Lafaye de Micheaux, Rémy Drouilhet, Benoit Liquet, Springer, 2013

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. V Semester

(22PW4CB301) DESIGN THINKING

TEACHING SCHEME		
L	T/P	C
1	2	2

EVALUATION SCHEME		
CIE	SEE	TOTAL
40	60	100

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 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

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	1	1	2	3	2	2	1	1	3	3	2	2	1	2	3
CO-2	1	3	3	2	2	2	1	1	3	3	2	2	1	3	3
CO-3	1	2	3	3	2	2	1	1	3	2	2	2	1	2	3
CO-4	2	2	3	2	2	2	2	2	3	3	2	2	1	2	3

UNIT-I:

Introduction to Design Thinking: Design Thinking for business – Stories, Case Studies; Design Thinking for Students; – Stanford's 5-step model.

Empathize Phase: Empathy; Importance of Empathy; Empathy Tools; Applications of design thinking.

*Activities for Empathize Phase.

UNIT-II:

Doing Design: Discovery phase of Design Thinking

Introduction to Immersion Activity; Persona, Importance of Persona Creation; Data Collection and Inferences

Define Phase: Problem Statements – Introduction, Definition, and Validation.

Need Analysis: Types of Users, Types of Needs; Addressable Needs and Touchpoints; Structuring Need Statements;
*Activities for Define Phase

UNIT-III:
Doing Design: Ideate Phase
Ideation Tools: Six Thinking Hats; Ideate to generate solutions; Doodling and Storytelling to present ideas;
*Activities for Ideate Phase

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

UNIT-V:
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. Change by Design, Tim Brown, Harper Business, 2012
2. The Design of Everyday Things, Donald A. Norman, MIT Press, 2013
3. Hooked. How to Build Habit-Forming Products, Nir Eval, Penguin Publishing
4. The Art of Creative Thinking, Rod Judkins, Hodder & Stoughton

REFERENCES:

1. Dan Senor and Saul Singer, Start-up Nation. The Story of Israel's Economic Miracle, Grand Central Publishing
2. Simon Sinek, Start with Why. How Great Leaders Inspire Everyone to Take Action, Penguin Books Limited
3. The Art of Innovation, Tom Kelly, Jonathan Littman, Harper Collins Business, 2002
4. Design Thinking: Integrating Innovation, Customer Experience, and Brand Value, Thomas Lockwood, Allworth Press, 2009
5. Design Thinking for Start-ups: A Handbook for Readers and Workbook for Practitioners, Jimmy Jain, Notion Press, 2018

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. V Semester

(22MN6HS302) GENDER SENSITIZATION

TEACHING SCHEME		
L	T/P	C
2	0	0

EVALUATION SCHEME			
SE-I	SE-II	SEE	TOTAL
50	50	-	100

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 programs 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
- Advertisement Gender
- Popular Literature
- Gender and the Structure of Knowledge
- 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. More than One Million Women are Missing, Sen, Amartya, 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. By the Numbers: Where Indian Women Work, Women's Studies Journal (14 November 2012), Tripti Lahiri, Available online at: http: // blogs.wsj.com/ India real time/2012/11/14/by-the-numbers-where-India-women-work/&gt
3. I Fought For My Life and Won, Abdulali Sohaila, Available online at: http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal
4. The Violence of Development: The Politics of Identity, Gender and Social Inequalities in India, K. Kapadia, London: Zed Books, 2002
5. Just Development: Beyond Adjustment with a Human Face, T. Banuri and M. Mahmood, Karachi: Oxford University Press, 1997

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. VI Semester

(22PC1CB303) AUTOMATA AND COMPILER DESIGN

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE OBJECTIVES:

- To explain the relationships between languages and machines, the inherent efficiency of solving problems using FA
- To convert among equivalently powerful notations for a language, including DFAs, NFAs, and regular expressions
- To Outline the usage of different phases of compiler and understand the various techniques of parsing in a compilation process
- To explain the Different Representations of Intermediate code
- To explain the code generator for the optimized code

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

CO-1: Design solutions for problems related to FA, RE, and CFG

CO-2: Construct the parse tree for checking the grammatical errors in programming Languages

CO-3: Design the Solutions for the Problems related to Different types of Parsing Techniques

CO-4: Analyze different representations of intermediate code

CO-5: Apply optimization techniques to optimize the code and generate object Code

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	3	3	3	3	3	2	-	-	1	-	1	1	3	2	3
CO-2	3	3	3	3	3	2	-	-	1	-	1	1	3	2	3
CO-3	3	3	3	3	3	2	-	-	1	-	1	1	2	2	-
CO-4	3	3	3	3	3	2	-	-	1	-	1	1	2	2	-
CO-5	3	3	3	3	3	2	-	-	1	-	1	1	3	2	-

UNIT-I:

Formal Languages and Regular Expressions: Definition of Languages, Finite Automata – DFA, NFA, regular expressions, Conversion of regular expression to NFA, NFA to DFA, Pumping Lemma for regular languages, lex tools.

UNIT-II:

Overview of Compilation: Phases of Compilation – Lexical Analysis, Pass and Phases of translation, interpretation, bootstrapping, data structures in compilation.

Context-free Grammars and Parsing: Context free grammars, derivation, parse trees, ambiguity, LL(K) grammars and LL (1) parsing, bottom-up parsing, handle pruning, LR Grammar Parsing, LALR parsing, YACC programming specification.

UNIT-III:

Semantics: Syntax directed translation, S-attributed and L-attributed grammars, Intermediate code – abstract syntax tree, translation of simple statements and control flow statements.

UNIT-IV:

Run Time Environments: Storage organization, storage allocation strategies, access to non-local names, language facilities for dynamics storage allocation.

Code Optimization: Principal sources of optimization, Optimization of basic blocks, peephole optimization, flow graphs, optimization techniques.

UNIT-V:

Code Generation: Machine dependent code generation, object code forms, generic code generation algorithm, Register allocation and assignment. Using DAG representation of Block.

TEXT BOOKS:

1. Introduction to Automata Theory Languages & Computation, John E. Hopcroft, Rajeev M. & J. D. Ullman, 3rd Edition, Pearson Education, 2007
2. Compilers: Principles, Techniques and Tools, A. V. Aho, Ravi Sethi, J. D. Ullman, 2nd Edition, Pearson Education, 2009

REFERENCES:

1. The Theory & Practice of Compiler Writing, Tremblay J. P., Sorenson G. P., 1st Edition, BSP Publication, 2010
2. Modern Compiler Implementation in C, Andrew W. Appel & G. M.,1st Edition, Cambridge University Press, 2003
3. Compiler Construction, Principles & Practice, Louden,1st Edition, Thomson Press, 2006
4. Introduction to Theory of Computation, Sipser Michael, 1st Edition, Thomson, 2009

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. VI Semester

(22PC1CB304) ARTIFICIAL INTELLIGENCE

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

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

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	3	2	1	-	-	1	2	1	-	1	2	3	3	2	-
CO-2	3	2	2	2	3	2	3	3	2	2	3	3	3	3	2
CO-3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO-4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

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. 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-II:

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

bestfirst search, A* search, AO* search, memory bounded heuristic search: local search algorithms & optimization problems: Hill climbing search, simulated annealing search, local beam search.

UNIT-III:

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-IV:

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-V:

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

REFERENCES:

1. Artificial Intelligence, Ritch & Knight, Tata McGraw-Hill
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 AND TECHNOLOGY

B.Tech. VI Semester

(22HS1MG303) FINANCIAL AND COST ACCOUNTING

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE OBJECTIVES:

- To apply the basic accounting concepts & conventions
- To enumerate with the preparation of books of accounts
- To analyze financial statements of business enterprise and importance of Auditing
- To understand the concept of funds flow statement and cash flow statements
- To acquaint with the different types of costing and cost management

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 conventions and their managerial implications

CO-2: Prepare and develop an understanding of the financial position

CO-3: Underlying principles and learn to interpret financial statements and know about audit reports

CO-4: Apply the concept of Fund and able to prepare funds flow and cash flow Statements

CO-5: Create awareness about cost accounting, different types of costing, cost management and Budgets.

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	-	-	-	-	-	-	2	3	-	-	-	1	2
CO-2	-	-	-	-	-	-	-	-	3	3	-	-	-	1	2
CO-3	-	-	-	-	-	-	-	-	3	1	-	-	-	1	2
CO-4	-	-	-	-	-	-	-	-	2	3	-	-	-	2	2
CO-5	-	-	-	-	-	-	-	-	3	2	-	-	-	1	3

UNIT-I:

Accounting Concept: Introduction, Functions and uses of Accounting, types of Accountings, Accounting principles: concepts and Conventions.

UNIT-II:

Accounting Process: Book Keeping and Record Maintenance, Journal, Ledger, Cash Book and Subsidiary Books, Trial Balance, Balance Sheet, Final Accounts with simple adjustments.

UNIT-III:

Financial Statements: Form and Contents of Financial Statements, Analyzing and Interpreting Financial Statements,

Class Discussion: Corporate Accounting Fraud- A Case Study of Satyam

Auditing: Definition, need, importance, types; Audit Reports.

UNIT-IV:

Cash Flow and Fund Flow Techniques: Introduction, Preparation of Funds flow statements; Cash flow statement; Simple adjustments; Difference between Funds flow statement and cash flow statement.

UNIT-V:

Costing Systems: Elements of Cost, Cost Behavior, Unit Costing, Job Costing, Cost Volume Profit Analysis; Budgets- Cash budget and Flexible budget.

TEXT BOOKS:

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

B.Tech. VI Semester

(22PE1CB304) MODERN DAY ROBOTICS AND ITS INDUSTRIAL APPLICATIONS

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

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

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	3	2	2	1	3	2	1	2	3	2	1	2	3	3	1
CO-2	3	3	3	2	3	1	2	2	3	2	2	3	3	3	2
CO-3	3	3	3	3	1	2	2	2	3	2	1	3	3	2	2
CO-4	3	3	3	2	3	2	2	2	3	2	2	3	3	3	2

UNIT-I:

Introduction: 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. Types of robotics in various fields for applications Technologies essential for Cognitive Robotics: Computer systems and Technologies relevant to modern day robotics-Robotic Process Automation: Overview of RPA and its applications

UNIT-II:

Computer Vision: Introduction to computer vision and application of Vision Systems in 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 Application areas for vision systems-Robot inspection case study-Autonomous driving using 3D imaging case study.

UNIT-III:

AI & Deep Learning: 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

UNIT-IV:

Cloud Computing: Concepts of Cloud computing, cloud platforms and it applications in Robotics: Learning Cloud Computing: Core Concepts - Cloud Computing: Private Cloud Platforms -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-V:

Robotic Operating System: 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 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, 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 AND TECHNOLOGY

B.Tech. VI Semester

(22PE1CB305) MODERN WEB APPLICATIONS

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE OBJECTIVES:

- To develop modern web application by leveraging latest technologies
- To build strong foundation in students making them job ready as per industry requirements
- 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, analyze and build interactive web applications

CO-4: Apply various frameworks of web technologies to optimize the applications

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	2	3	2	3	2	3	2	3	2	3	2	3	2	3	2
CO-2	2	3	2	3	3	3	2	3	3	3	2	3	3	3	2
CO-3	3	3	2	3	3	3	2	3	3	3	3	3	3	3	3
CO-4	2	3	3	3	2	3	3	3	2	3	3	3	3	3	2

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

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-III:

Java Script: Features of JavaScript, extension of JavaScript, Syntax of JavaScript: data types, operators, variables, tag, Document Object Model (DOM) with JavaScript

UNIT-IV:

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-V:

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, McGraw-Hill, 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, 2005
5. PHP for the Web: Visual Quick Start Guide, Ullman L., 5th Edition, Peachpit Press, 2016

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. VI Semester

(22PE1CB306) NATURAL LANGUAGE PROCESSING

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE OBJECTIVES:

- To explain text normalization techniques and n-gram language model
- To discuss part of speech methods and naïve bayes classification techniques
- To understand word sense disambiguation techniques and process of building question answering system
- To introduce the concepts of chatbots, dialogue systems, speech recognition systems and text to speech recognition methods

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

CO-1: Apply normalization techniques on a document and evaluate a language model

CO-2: Implement parts of speech tagging and classification techniques on the words

CO-3: Establish relationships among words of a sentence using word net

CO-4: build the question answering system and models

CO-5: Analyze chatbots, dialogue systems, and automatic speech recognition systems

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	2	2	3	2	1	1	1	-	-	1	1	3	3	2	3
CO-2	2	3	3	2	2	2	2	1	-	-	2	2	2	3	2
CO-3	3	3	2	3	3	1	-	-	1	2	3	2	3	3	2
CO-4	1	2	3	2	2	1	2	-	-	2	2	3	2	3	2
CO-5	1	2	3	2	2	1	2	-	-	2	2	3	2	3	2

UNIT-I:

Introduction, Regular Expressions, Text Normalization, Edit Distance: Words, Corpora, Text Normalization, Word Normalization, Lemmatization and Stemming, Sentence Segmentation, The Minimum Edit Distance Algorithm.

UNIT-II:

N-gram Language Models: N-Grams, Evaluating Language Model, Sampling sentences from a language model, Sequence Labeling for Parts of Speech and Named Entities: Part-of-Speech Tagging, Named Entities and Named Entity Tagging

UNIT-III:

Naive Bayes and Sentiment Classification: Naive Bayes Classifiers, Training the Naive Bayes Classifier, Optimizing for Sentiment Analysis, Naive Bayes as a Language Model **Evaluation:** Precision, Recall, F-measure, Test sets and Cross-validation

UNIT-IV:

Word Senses and WordNet: Word Senses, Relations Between Senses, WordNet: A Database of Lexical Relations, Word Sense Disambiguation, WSD Algorithm: Contextual Embeddings

Question Answering: Information Retrieval, IR-based Factoid Question Answering, **IRbased QA:** Datasets, Entity Linking, Knowledge-based Question Answering, Using Language Models to do QA, Classic QA Models.

UNIT-V:

Chatbots & Dialogue Systems: Properties of Human Conversation, Chatbots, GUS: Simple Frame-based Dialogue Systems, The Dialogue-State Architecture, Evaluating Dialogue Systems, Dialogue System Design, Automatic Speech Recognition and Text-to-Speech: The Automatic Speech Recognition Task, Feature Extraction for ASR: Log Mel Spectrum, Speech Recognition Architecture.

TEXT BOOKS:

1. Speech and Language Processing, Dan Jurafsky and James H. Martin, 3rd Edition, Pearson
2. Natural Language Processing with Python, Analyzing Text with the Natural Language Toolkit, Steven Bird, Ewan Klein, and Edward Loper

REFERENCES:

1. Practical Natural Language Processing: A Comprehensive Guide to Building Real-World NLP Systems, Sowmya Vajjala, Bodhisattwa Majumder, Anuj Gupta, Harshit Surana
2. Foundations of Statistical Natural Language Processing, Christopher Manning and Hinrich Schütze
3. Natural Language Processing in Action, Understanding, Analysing, and Generating Text with Python, Hobson Lane, Cole Howard, Hannes Max Hapke
4. The Handbook of Computational Linguistics and Natural Language Processing, 1st Edition (Blackwell Handbooks in Linguistics)

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. VI Semester

(22OE1CB304) BUSINESS STRATEGY

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE OBJECTIVES:

- To explain the basic concepts, principles, and practices of strategic management
- To identify the internal and external environment of the firm
- To describe the various growth strategies available for the corporates
- To understand the stages in strategy implementation and evaluation
- To understand the stages in strategy 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 analyze 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

CO-5: Analyze operational and strategic controls for smooth running of the Organization

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	-	-	-	-	-	-	2	1	3	3	-	-	1	3
CO-2	-	-	-	-	-	-	-	2	3	2	1	-	-	2	3
CO-3	-	-	-	-	-	-	-	1	3	2	2	-	-	2	2
CO-4	-	-	-	-	-	-	-	1	2	3	2	-	-	2	3
CO-5	-	-	-	-	-	-	-	1	2	2	3	-	-	1	3

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.

Strategy Evaluation and Control: An overview, Strategic Control, Operational Control and Techniques

TEXT BOOKS:

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

REFERENCES:

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

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. VI Semester

(22OE1CB305) DISTRIBUTED SYSTEMS

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

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: Summarize the distributed systems techniques and methodologies

CO-2: Analyse the use of process migration and load balancing approaches

CO-3: Extract about Inter process communication and Memory management in distributed systems

CO-4: Explore about synchronization and distributed scheduling

CO-5: Understand distributed file systems and distributed shared memory

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	3	2	1	2	1	1	1	1	2	1	1	2	3	3	2
CO-2	2	2	1	2	1	1	1	1	2	1	1	2	3	3	2
CO-3	3	2	1	2	1	1	1	1	2	1	1	2	3	3	2
CO-4	2	2	1	2	1	1	1	1	2	1	1	2	3	3	2
CO-5	2	2	1	2	1	1	1	1	2	1	1	2	3	3	2

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.

Inter Process Communication in Distributed System: Data Representation & Marshaling, Group Communication, Client Server Communication, RPC Implementing RPC Mechanism, Stub Generation, RPC Messages

UNIT-IV:

Synchronization: Clock Synchronization, Mutual Exclusion, Election Algorithms, Bully & Ring Algorithms.

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-V:

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

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. VI Semester

(22OE1CB306) ADVANCED OPERATING SYSTEMS

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE OBJECTIVES:

- To understand main components of real time operating system and their working
- To study the operations performed by OS as a resource manager
- To understand the scheduling policies of DOS
- To implement the working principles of OS

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

CO-1: Outline the basic terminology of real-time operating systems

CO-2: Explore about distributed operating system design issues

CO-3: Contrast about distributed operating system and distributed system

CO-4: Describe about network operating system features

CO-5: Understand kernel Issues and security issues and provide the solutions

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	3	2	1	1	1	2	1	1	2	1	1	2	3	3	2
CO-2	2	2	1	1	1	2	1	1	2	1	1	2	3	3	2
CO-3	3	2	1	1	1	2	1	1	2	1	1	2	3	3	2
CO-4	2	2	1	1	1	2	1	1	2	1	1	2	3	3	2
CO-5	2	2	1	1	1	2	1	1	2	1	1	2	3	3	2

UNIT-I:

Real-time Operating Systems: Introduction to Real-Time Operating Systems, Definitions, Role of an OS in Real Time Systems, Important Terminology and Concepts Example

UNIT-II:

Real-Time Applications: How Real-Time OSs Differ from General-Purpose OSs, Design issues, principles and case study.

UNIT-III:

Distributed Operating System: Introduction to Distributed Systems, Definitions, Goals, Advantages of Distributed Systems over Centralized Systems, Advantages of

Distributed Systems over Independent PCs, Disadvantages of Distributed Systems Design issues, features and principles of working, case study.

UNIT-IV:

Network Operating System: Introduction to Network operating system, Definitions, Different types of network operating systems, Function of Network operating systems, Design issues, working principles and characteristic features, case study.

UNIT-V:

Kernel Development: Introduction, Overview, Issues and development principles, case study. Protection, privacy, access control and security issues, solutions.

TEXT BOOKS:

1. Applied Operating System Concepts, A. Silberschatz, Wiley, 2000
2. Operating System Principles, Lubemir F. Bic and Alan C. Shaw, Pearson Education, 2003
3. Distributed Operating Systems, Andrew S. Tanenbaum, PHI

REFERENCES:

1. Operating Systems: Internal and Design Principles, Stallings, 6th Edition, Pearson Education
2. Modern Operating Systems, Andrew S. Tanenbaum, 3rd Edition, Pearson Education
3. Operating System Principles, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, 7th Edition, John Wiley
4. UNIX User Guide, Ritchie & Yates

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. VI Semester

(22PC2CB303) AUTOMATA AND COMPILER DESIGN LABORATORY

TEACHING SCHEME		
L	T/P	C
0	2	1

EVALUATION SCHEME					
D-D	PE	LR	CP	SEE	TOTAL
10	10	10	10	60	100

COURSE OBJECTIVES:

- To understand the various phases in the design of a compiler
- To understand the design of top-down and bottom-up parsers
- To understand syntax directed translation schemes
- To introduce lex and yacc tools

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

CO-1: Understand the concept of abstract machines and their power to recognize the languages

CO-2: Analyze phases of compilation, particularly lexical analysis, parsing, semantic analysis and code generation

CO-3: Construct parsing tables for different types of parsing techniques and syntax directed translations

CO-4: Apply code optimization techniques to different programming languages

CO-5: Generate object code for natural language representations

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	3	2	2	2	-	2	2	2	-	-	1	1	3	2	2
CO-2	2	2	3	2	1	-	-	1	-	-	2	1	2	1	2
CO-3	2	3	2	2	2	2	2	1	-	-	1	2	3	2	3
CO-4	2	3	2	2	1	-	-	-	-	-	1	2	2	3	2
CO-5	3	3	3	2	2	2	2	2	-	-	2	2	3	2	3

LIST OF PROGRAMS / EXPERIMENTS / EXERCISES:

WEEK 1-3:

- Closure of Epsilon-NFA
- Conversion of Epsilon-NFA to NFA
- Conversion of NFA to DFA

WEEK 4-8:

- Lexical Analyzer for a given language

- Lexical Analyzer Using Lex Tool
- Arithmetic Expression Validator using YACC
- Identifier Validator using YACC
- Calculator using YACC
- Convert the BNF rules into Yacc form and Write code to generate abstract syntax tree.

WEEK 9-12:

- First & Follow of Expression Grammar (Without Left Recursion)
- Custom Recursive Descent Parser for Grammar (Without Left Recursion)
- Predictive Parser for Expression Grammar
- Shift Reduce Parser

WEEK 13-14:

- Creating a Symbol Table
- Write program to generate machine code from the abstract syntax tree generated by the parser.

TEXT BOOKS:

1. Theory of Computer Science - Automata Languages and Computation, K. L. P Mishra, N. Chandrashekaran, 2nd Edition, Prentice Hall of India, 2003
2. Compilers Principles, Techniques and Tools, Aho Ullman, Ravi Sethi, Pearson Education

REFERENCES:

1. Introduction to Theory of Computation, Sipser, 2nd Edition, Thomson, 2009.
2. Modern Compiler Construction in C, Andrew W. Appel, Cambridge University Press
3. Compiler Construction–Principles and Practice, Kenneth C. Louden, 1st Edition, PWS Publishing, 1997
4. Elements of Compiler Design, A. Meduna, Auerbach Publications, Taylor and Francis Group
5. Principles of Compiler Design, V. Raghavan, Tata McGraw-Hill

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. VI Semester

(22HS2EN302) BUSINESS COMMUNICATION AND VALUE SCIENCE – IV

TEACHING SCHEME		
L	T/P	C
1	2	2

EVALUATION SCHEME					
D-D	PE	LR	CP	SEE	TOTAL
10	10	10	10	60	100

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

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	-	1	1	1	1	2	2	2	2	3	2	2	-	-	-
CO-2	1	1	2	1	1	2	2	2	2	3	3	3	-	-	-
CO-3	-	-	1	1	1	2	2	2	1	3	2	3	-	-	-
CO-4	-	1	1	1	-	2	2	2	3	2	2	3	-	-	-
CO-5	-	1	-	1	-	2	2	3	2	3	2	3	-	-	-

UNIT-I:

Communicative Writing

i) Principles of Communicative Writing
ii) Formal and Business letters
iii) Writing proposals
iv) Use charts and graphs in communicative writing

v) Apply 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) Apply emotional intelligence in real life scenarios- Activity

UNIT-III:

Public Speaking

i) Need public speaking
ii) Public speaking – best practices
iii) Apply public speaking in real life scenarios
iv) Sell 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) Need to conduct CSR activities
iii) Stories of corporate social responsibility
Diversity, Multiple Intelligences & Learner styles
iv) Awareness of multiple intelligences
v) Learning styles
vi) Apply multiple intelligences and Learning styles in communication

UNIT-V:

Interpersonal Skills

i) Attributes required for work and life, Strategic thinking, planning & Decision making
ii) Best practices to share and receive feedback
iii) Attributes needed to function and grow in a corporate environment- Image Management
iv) Stress management, Time Management & Corporate etiquette
v) Business idioms and Corporate Terms
vi) Impact of conflicts 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, Daniel Goleman
2. Putting Emotional Intelligence To Work, Ryback David
3. How to Develop Self Confidence and Improve Public Speaking - Time - Tested Methods of Persuasion, Dale Carnegie

4. TED Talks: The Official TED Guide to Public Speaking: Tips and Tricks for Giving Unforgettable Speeches and Presentations

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. VI Semester

(22PW4CB301) INTERNSHIP

TEACHING SCHEME		
L	T/P	C
0	4	2

EVALUATION SCHEME		
CIE	SEE	TOTAL
-	100	100

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Gain exposure to the current technological developments relevant to the subject area of training
CO-2: Apply the technical knowledge in real industrial situations
CO-3: Promote academic, professional and/or personal development
CO-4: Demonstrate effective communication skills through oral presentation
CO-5: Engage in effective written communication through internship report

COURSE OUTLINE:

- A student shall undergo an internship at a reputed industry/research organization/academic institution.
- Student shall register for this course immediately after IV semester (II year II semester) End Examinations and pursue it during summer vacation/semester break & during III year without affecting the regular course work.
- Evaluation shall be done by a committee consisting of an external examiner, Head of the Department, internal supervisor and a senior faculty member of the department.
- A student shall submit a detailed report and present it before the committee for evaluation.

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. VI Semester

(22MN6HS301) ANCIENT WISDOM

TEACHING SCHEME		
L	T/P	C
2	0	0

EVALUATION SCHEME			
SE-I	SE-II	SEE	TOTAL
50	50	-	100

COURSE OBJECTIVES:

- To provide students a fundamental understanding of ancient wisdom from various world civilizations and its relevance to STEAM fields about certain aspects of culture, heritage, and history as sources of knowledge and application for the present and future
- To explore the historical context and contributions of ancient Indian and other global civilizations to STEAM disciplines and to foster scientific temperament using the approaches that stood the tests of time
- To help students develop critical thinking and logical reasoning by understanding ancient texts, philosophies, and practices, and by exploring their applicability for responsible consumption and sustainable development
- To help students create a karmic, sustainable, humane, and responsible future for the world with scientific temperament and a sense of belongingness and ownership to our heritage as humans

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

CO-1: Describe important contributions of ancient Indian and other world civilisations to STEM disciplines, fostering a scientific temperament

CO-2: Conceptually analyse ancient texts and philosophies to identify aspects of sociocultural relevance to the present day with a focus on sustainable development

CO-3: Apply principles, concepts, approaches, and ideas of ancient wisdom to improve human life/ society through STEM professional activities and management

CO-4: Know the importance of learning from the past and developing systems thinking to look at the big picture, leading to interdependence that promotes interdisciplinary approaches to holistic development and ethical future

ACTIVITIES: Dialogue-based lectures, Videos, Debates and discussions, collaborative learning activities and group work including presentations and posters

MODULE 1:

Introduction and Motivation

Introduction: How ancient is ancient? Is all ancient wisdom fundamentally religious or spiritual? Does ancient wisdom still have anything important to remember and consider relevant today? Why should we look back while living in the present and building for the future? How can we separate religion, spirituality and philosophy?

The Indian Story: Was India really a great country in the past? What has changed in India since, and what has not? How is culture and heritage important or relevant for the future that is not like the past at all? Was knowledge really codified in literature? Is

Hinduism a way of life or a religion and should we care? Is the caste system or varna system divisive?

History of Sciences and History of Arts: What has humanity achieved so far in Sciences and in Arts? Understanding the geography of thought and pursuit of knowledge; Leading from the emerging future through the history of humanity

Definitions and classifications: Eastern, Arabic, and Western philosophical approaches; Epistemology, Phenomenology, Hermeneutics, Metaphysics, tarka, nyäya, mïmämsa, ikigai, oubaitori, eudaimonia, gestell

MODULE 2:

Deep Dive into the India Story

Ancient India: Indian Ethos, Concepts of dharma, karma, chaturvidha purushaartha (dharma, artha, käma, moksha), triguna (sattva, rajas, tamas) – relevance and interpretation for contemporary living; Major Indian contributions: To Education, Language, Governance, and Academic Disciplines with particular focus on STEAM (STEM and Arts)

Documented and Undocumented Knowledge: Vedas, Vedangas, Upanishats, Epics and Mythology: Ramayana, Mahabharata and Bhagavad-Gita, Puranas including Bhagavata; Examples of codified knowledge from various written verses: did they actually mean what we now interpret them to be?

Medieval India: Advancements and developments in education, governance, technology, and society

Modern India: Constitutional values of India influenced by Ancient and Medieval Indian history and culture

Summary of Values in Indian Ethos: Family system, the karma principle and the idea of nishkaama karma, practising and swadharma, protecting dharma, Endurance and Patience (sahanam), Motivation and Determination (sankalpam), Attention and Devotion (Sraddha), Industriousness and Exertion (Srama), Understanding the Self and Ego, Peace (Saanti), Proactive non-violence (ahimsa), Empathy, Altruism, Focus on the big picture, Inquisitiveness and Pursuit of Knowledge, Harmony, Oneness of Humanity (vasudhaika kutumbam), Learning from the Nature and concern towards other lifeforms

Looking beyond the "proud claims": Myths and facts about Indian ancient wisdom: Pursuing Truth, in the Indian way; Can India be the "Viswa Guru"? If yes, how? If not, can/shall we still work towards it?

MODULE 3:

Ancient Civilisations and Wisdom from other parts of the World

Overview: Indus Valley and other ancient cultures of the Indian subcontinent – their influence on Southeast Asia; Civilisations outside of Indian subcontinent: Mesopotamian, Egyptian, Far East, European, Middle East and African, North, Central and South American, Oceanic cultures and their indigenous peoples

Advancements of the Ancient World: Advances in governance, arts, medicine and health, architecture, metallurgy, weaponsmithy, mechanisation, cosmology, other science and technology, mathematics, astronomy, language, trade and travel, philosophy, other cultural aspects

Sources of Wisdom, Religion, and Spirituality: Overview of major Abrahamic religions and their holy books: The Holy Qur'an, Hadith, and Sharia for Islam; The Old and New

Testaments for Christians; Overview of other world religions and their tenets; Overview of Ancient Greek and Ancient Chinese philosophies; Philosophies of Abrahamic religions and non-Abrahamic religions of Indian origin

MODULE 4: Applicability of Ancient Wisdom

Understanding limitations of ancient wisdom; Examining ancient wisdom to find logical relevance and applicability to the present world; Applying tarka Sästra principles—dialectics, debates, analyses, discussions—and understanding the spirit of scholars of tarka Sästra, such as Adi Sankara, Aristotle, Ramanuja, Plato; Identifying core principles, approaches, and ideologies in formulation, design, strategy, and execution in various STEAM domains

MODULE 5: Lessons to Learn from Ancient Wisdom

Understanding Bhagavad Gita as a text of introspection and motivation, for personality development, team management, and organisational excellence; Exploring ancient books for strategy and management: The Art of War (Sun Tzu), Artha Sastra (Kautilya), parts of ämukta mälyada (Krishna Deva Raya) and Mahabharata (Vyasa/ Tikkana)

The Way Forward: Developing a systems thinking approach; Developing a humanitarian and scientific temperament based on cultural and constitutional values; Leveraging education to resolve societal problems and creating impact with focus on responsible consumption and sustainable development; reinstalling "human" at the centre of development and using technology for enablement instead of enslaving; Understanding the value of interdependence and Presencing

TEXT BOOKS:

1. The Wonder That Was India: Volume I, A. L. Basham, Picador India, 2019 (ISBN: 978-9389109344)
2. Indian Science and Technology in the Eighteenth Century, Dharampal, Rashtrotthana Sahitya, 2021 (ISBN: 978-8175310933)
3. A History of Science in World Cultures: Voices of Knowledge, Scott L. Montgomery and Alok Kumar, Routledge, 2015 (ISBN: 978-0415639842)
4. Sapiens: A Brief History of Humankind, Harper, Yuval Noah Harari, 2015 (ISBN: 978-0099590088)
5. Think on These Things, Jiddu Krishnamurti, Jaico Publishing House, 2024 (ISBN: 978-8119153794)

REFERENCES:

1. The Geography of Thought: How Asians and Westerners Think Differently and Why, Richard E. Nisbett, Nicholas Brealey Publishing, 2004 (ISBN: 978-1529309416)
2. The Question Concerning Technology, and Other Essays, Martin Heidegger, Harper Perennial Modern Classics, 2013 (ISBN: 978-0062290700)
3. Arise Awake & Don't Stop!, Swami Vivekananda, Namaskar Books, 2022 (ISBN: 978-9355717221)
4. The Hindu Way: An Introduction to Hinduism, Shashi Tharoor, Aleph Book Company, 2019 (ISBN: 978-9388292856)
5. Eastern Religions and Western Thought, Sarvepalli Radhakrishnan, Oxford University Press, 1997 (ISBN: 978-0195624564)