SCHEME OF EXAMINATION

B. Tech- 3rd Year	Semester: 6th

Branch: Computer Science and Business Systems

S.N.	Subject Name	Subject Code	Periods per week			Scheme of Exam Theory/Practical			Total Marks	Credit L+(T+P)/2
			L	T	P	ESE	CT	TA		
1	Computer Networks	CS112601	3	1	-	80	20	25	125	3
2	Artificial Intelligence	CS112602	3	1	-	80	20	25	125	3
3	Business Strategy	CS112603	3	1	-	80	20	25	125	3
4	Financial & Cost Accounting	CS112604	3	1	-	80	20	25	125	3
5	Business Communication & Value Science – IV	CS112605	3	0	-	80	20	25	125	2
6	Elective – II	Refer Table	3	0	-	80	20	25	125	2
7	Computer Networks Lab	CS112691		-	2	40	-	20	60	1
8	Artificial Intelligence Lab	CS112692		-	2	40	-	20	60	1
9	Elective – II Lab	CS112693		-	2	40	-	20	60	1
10	Mini Projcet – II	CS112694		-	2	50		20	70	1
	Total		**18**	**4**	**8**	**650**	**120**	**230**	**1000**	**20**

Note:

L-Lecture T-Tutorial P-Practical
CT-Class Test TA-Teachers Assessment ESE-End Semester Exam

Elective -II	
Subject Code	**Name of Subject**
CS112641	Data Mining And Analytics
CS112642	Modern Day Robotics And Its Industrial Applications
CS112643	Modern Web Applications

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Subject Code CS112601	Computer Networks		L = 3	T = 0	P = 0	Credits = 3
Examination Scheme	ESE		CT	TA	Total	ESE Duration
	80		20	25	125	3 Hours
	Minimum number of class tests to be conducted=02				**Minimum Assignments=02**	

Course Objectives	Course Outcomes

Unit 1 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. **LAN:** Wired LAN, Wireless LAN, Virtual LAN.

Unit 2 Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division, Concepts on spread spectrum. **Network Layer:** Switching, Logical addressing – IPV4, IPV6; Address mapping – ARP, RARP, BOOTP and DHCP–Delivery, Forwarding and Unicast Routing protocols.

Unit 3 Data Link Layer and Medium Access Sub Layer: Fundamentals of Error Detection and Error Correction, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go-back–N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multiple access protocols - Pure ALOHA, Slotted ALOHA, CSMA/CD, CDMA/CA

Unit 4 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 5 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.

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Text Books:

S. No.	Title	Author(s)	Publisher
1.	Computer Networks	A. Tannenbaum	
2.	Data and Computer Communication	William Stallings	

Reference Books:

S. No.	Title	Author(s)	Publisher
1.	Network Security	Kaufman, R. Perlman and M. Speciner	
2.	UNIX Network Programming	Vol. 1,2 & 3, W. Richard Stevens	

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Subject Code CS112602	ARTIFICIAL INTELLIGENCE	L = 3	T = 0	P = 0	Credits = 3
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	80	20	25	125	3 Hours
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes
	This course introduces students to the basic knowledge representation, problem solving, and learning methods of artificial intelligence.

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 best-first search, A* search, AO* search, memory bounded heuristic search: local search algorithms & optimization problems: Hill climbing search, simulated annealing search, local beam search

UNIT – 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

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system, Goal stack planning, Hierarchical planning, other planning techniques.**Expert Systems:** Representing and using domain knowledge, expert system shells, and knowledge acquisition.

Home Assignments:

Assignments should include problems related to the topics covered in lectures, like heuristics, optimal search, and graph heuristics. Constraint satisfaction problems, k-nearest neighbors, decision trees, etc. can be included in home assignments.

Text Books:

S. No.	Title	Author(s)	Publisher
1.	Artificial Intelligence A Modern Approach	Stuart Russell and Peter Norvig	
2.	Artificial Intelligence	Russel	Pearson

Reference Books:

S. No.	Title	Author(s)	Publisher
1	Artificial Intelligence	Ritch & Knight	TMH
2	Introduction to Artificial Intelligence & Expert Systems	Patterson	PHI
3	Logic & Prolog Programming,	Saroj Kaushik	New Age International
4	Expert Systems	Giarranto	VIKAS

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Subject Code CS112603	Business Strategy		L = 3	T = 0	P = 0	Credits = 3
Examination Scheme	ESE		CT	TA	Total	ESE Duration
	80		20	25	125	3 Hours
	Minimum number of class tests to be conducted=02				Minimum Assignments=02	

Course Objectives	Course Outcomes
This course intends to introduce the concepts of strategic management and understand its nature in competitive and institutional landscape and to provide an underpinning of a Strategy formulation process and frameworks, tools and techniques of strategic analysis and its application.	**On successful completion of the course, the student will be able to:** CO1: Explain process and levels ofstrategic decision Making. CO2: Develop the critical thinking skills needed to perform external and internal analysis of organizations and their competitive environment CO3: Predict the various levels ofstrategic operations in Organizations. CO4: Assess the issues in strategic implementation CO5: Analyze and Evaluate challenges Faced by managers in implementing and evaluating strategies
COURSE CONTENTS	

UNIT1: Introduction to Strategic Management   **CO1**

Strategic decision-making. Process of strategic management and levels at which strategy operates. Role of strategists. General vocabulary of SM :Vision, Mission, Objectives and Purpose

UNIT2: Internal and External Analysis   **CO2**

Environmental scanning techniques-ETOP and SWOT (TOWS), Internal Appraisal–The internal environment, organizational capabilities in various functional areas andStrategicAdvantageProfile,Methodsandtechniquesusedfororganisationalappraisal(Valu e chain analysis, Financial and non-financial analysis, historical analysis, Industry standards and benchmarking, Strategic step application: Drucker's theory of business, Blue ocean strategy, resource based view and dynamic view

UNIT3: Levels at which Strategy Operates   **CO3**

Corporate level strategies-Stability, Expansion, Retrenchment and Combination strategies, Corporate restructuring, Mergers & Acquisitions, Business level strategies—Porter's framework of competitive strategies, Conditions, risks and benefits of Cost leadership, Differentiation and Focus strategies, Strategic Analysis and choice, Corporate level analysis (BCG, GENine cell, Hofers Matrix) Industry level analysis; Porter's five forces model, Qualitative factors in strategic choice

UNIT4: Strategy implementation: **CO4**

Strategy implementation: Resource allocation, Projects and Procedural issues Organization structure and systems in strategy implementation.

UNIT5: Strategic Control and Evaluation: **CO5**

Strategic control and operational Control, Techniques of strategic evaluation.

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Text Books:

S.No.	Title	Author	Publisher
1	Business Policy & Strategic Management –4 th edition	Kazmi, Azhar	Tata Mc Graw Hill

Reference Books:

S.No.	Title	Author	Publisher
1.	Concepts in Strategic Management and Business Policy –6 th edition	Wheeler, T. & Rangarajan, K.	Pearson Education
2.	Strategic Management	F.R.David	Pearson Education

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Subject Code CS112604	Financial & Cost Accounting	L = 3	T = 0	P = 0	Credits = 3
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	80	20	25	125	3 Hours
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes
1. To acquaint the students with the fundamentals principles of Financial, Cost and Management Accounting. 2. To enable the students to prepare, analyze and Interpret Financial Statements. 3. To enable the students to prepare, analyze and interpret cash flow statement. 4. To understand the concept of cost accounting system. 5. To maintain company accounts and annual reports.	**This course will help students:** **CO1:** To create awareness about the importance and usefulness of the accounting concepts and their managerial implications. **CO2:** To develop an understanding of the financial statements and the underlying principles and learn to interpret financial statements. **CO3:** To create an understanding about cash flow management. **CO4:** To create an awareness about cost accounting, different types of costing and cost management. **CO5:** To impart knowledge about maintaining company accounts and its annual reports.

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

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

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

UNIT – III : Cash Flow Statement: Introduction, How to prepare, Cash Flow Analysis – Cash From Operation – Preparation of Cash Flow Statement – Uses and Limitations – Distinction between Funds flow and Cash Flow – only simple problems.

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

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

Home Assignment:

Case study materials book will be given to students. Students are required to meet in groups before coming to class and prepare on the case for the day. Instructor may ask the student groups to present their analysis and findings to the class.

Further, the topic for class discussion will be mentioned beforehand and students should be prepared to discuss these topics in class. Few topics are mentioned below as examples. Instructor can add or change any topic as per requirement.

1. Topic: Corporate Accounting Fraud: A Case Study of Satyam
2. Topic: Application of costing concepts in the Service Sector

Text Books:

S. No.	Title	Author(s)	Publisher
1.	Accounting: Texts and Cases	Robert N Anthony, David Hawkins, Kenneth Marchant	McGraw-Hill
2.	Jain and Narang	Financial Accounting and Analysis	Kalyani Publishers
3.	Khan and Jain	Accounting for Management	TMH, 2001
4.	Case Study Materials	To be distributed for class discussion	

Reference Books:

S. No.	Title	Author(s)	Publisher
1.	Financial accounting	Narayanaswamy R	PHI, Delhi, 2011
2.	Accounting for Management: Text & Cases	Bhattacharya S.K and Dearden J	Vikas Publication, 2019
3.	Financial Accounting	P. C. Tulsian	Pearson, 2002

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Subject Code CS112605	Business Communication and Value Science IV	L = 3	T = 0	P = 0	Credits = 3
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	80	20	25	125	3 Hours
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes
1. To apply communicative writing in real life scenarios; 2. to identify the best practices of public speaking; recognizing the business idioms and corporate terms. 3. Understand emotional intelligence in personal and professional lives. 4. Impact of conflicts and stress on life & work and stress management. Recognize the importance of locus of control and to share and receive feedback. 5. Practice time management; diversity in workplace and CSR.	1. Apply the best practices of communicative writing 2. Identify the best practices of public speaking 3. Understand the importance of emotional intelligence in personal and professional lives 4. Use the basic guidelines required to manage conflicts and stress 5. Recognize importance of feedback and identify the best time management practices 6. Understand the importance diversity in workplace and corporate social responsibility (CSR)

Unit 1 Communicative Writing: Identify the key aspects of communicative writing; Apply communicative writing in real life scenarios; Using charts and graphs in communicative writing; Formal and Business letters; Proposal writing; telling a story with charts and graphs. Prepare a business Presentation .Group activities and videos.

Unit 2 Public Speaking: Understand the need of public speaking at your workplace; identify the best practices of public speaking; Apply public speaking in real life scenarios; Recognize and apply the business idioms and corporate terms. Practice public speaking and pitch a start-up idea. Quiz on business idioms and corporate terms. Attributes required for work and life ; Qualities of a good team member:

a) Resilience b) Flexibility c) Strategic thinking and planning d) Decision making e) Resolving

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conflicts

Unit 3 Emotional Intelligence: Introduce concept of EI; Importance of EI in personal and professional lives; Applying EI. Games and activities for applying Emotional Intelligence using scenarios and their analysis.

Unit 4 Impact of conflicts and stress on life & work: Understanding conflicts and tips to manage conflicts; Managing Stress and identify the best practices to manage stress. Reflection on lessons in empathy and active listening while managing conflicts, Videos and Poster presentation.

Unit 5 Feedback; Time Management; CSR: Recognize the importance of giving and receiving feedback; Importance of locus of control; Identify the best time management practices; understand the importance of diversity in workplace; recognize the importance of corporate social responsibility (CSR). Open house discussions, role plays, CSR stories and reference material.

Text Books:

S. No.	Title	Author(s)	Publisher

Reference Books:

S. No.	Title	Author(s)	Publisher
1.	Emotional Intelligence: Why it can Matter More Than IQ	Daniel Goleman	
2.	Putting Emotional Intelligence to Work	Ryback David	

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Subject Code CS112691	Computer Networks Lab		L = 3	T = 0	P = 0	Credits = 3
Examination Scheme	ESE		CT	TA	Total	ESE Duration
	40		-	20	60	3 Hours
					Minimum Assignments=02	

Course Objectives	Course Outcomes
1. Socket Programming using C/C++/Java 2. Network System Administration: Understanding switches and routers	

Text Books:

S. No.	Title	Author(s)	Publisher
1.	Computer Networks	A. Tannenbaum	
2.	Data and Computer Communication	William Stallings	

Reference Books:

S. No.	Title	Author(s)	Publisher
1.	Network Security	Kaufman, R. Perlman and M. Speciner	
2.	UNIX Network Programming	Vol. 1,2 & 3, W. Richard Stevens	

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Subject Code CS112692	Artificial Intelligence Lab	L = 3	T = 0	P = 0	Credits = 3
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	40	-	20	60	3 Hours
				Minimum Assignments=02	

Course Objectives	Course Outcomes

Text Books:

S. No.	Title	Author(s)	Publisher

Reference Books:

S. No.	Title	Author(s)	Publisher

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Subject Code CS112693	Robotics and Embedded Systems Lab	L = 3	T = 0	P = 0	Credits = 3
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	40	-	20	60	3 Hours
				Minimum Assignments=02	

Course Objectives	Course Outcomes

Text Books:

S. No.	Title	Author(s)	Publisher

Reference Books:

S. No.	Title	Author(s)	Publisher

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Subject Code CS112641	Data Mining And Analytics	L = 3	T = 0	P = 0	Credits = 3
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	80	20	25	125	3 Hours
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes
	Students will be able to 1. Understand basic concepts and techniques of Data Mining 2. Develop skills of using data mining software for solving practical problems 3. Understand and apply several statistical analysis techniques: regression, ANOVA, data reduction

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

UNIT – II : Data preprocessing: Data cleaning, Data transformation, Data reduction, Discretization and generating concept hierarchies, Installing Weka 3 Data Mining System, Experiments with Weka - filters, discretization

Data mining knowledge representation: Task relevant data, Background knowledge, Representing input data and output knowledge, Visualization techniques

Attribute-oriented analysis: Attribute generalization, Attribute relevance, Class comparison, Statistical measures

UNIT – III : Data mining algorithms - **Association rules:** Motivation and terminology, Example: mining weather data, Basic idea: item sets, Generating item sets and rules efficiently, Correlation analysis

Data mining algorithms - Classification: Basic learning/mining tasks, Inferring rudimentary rules: 1R, algorithm, Decision trees, covering rules

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

UNIT – IV : Descriptive analytics: Data Modeling, Trend Analysis, Simple Linear Regression Analysis

Forecasting models: Heuristic methods, predictive modeling and pattern discovery, Logistic Regression: Logit transform, ML estimation, Tests of hypotheses, Wald test, LR test, score test, test

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for overall regression, multiple logistic regression, forward, backward method, interpretation of parameters, relation with categorical data analysis. Interpreting Regression Models, Implementing Predictive Models

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

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

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

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

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

Home Assignments:

1. **Experiments with Weka** – Visualization Techniques, using filters and statistics, mining association rules, decision trees rules, Prediction
2. **Mining real data:** Preprocessing data from a real domain (Medical/ Retail/ Banking); Applying various data mining techniques to create a comprehensive and accurate model of the data
3. **Analytics Assignment 1:** Conduct and Present a summary report on an End to end statistical model building exercise using sample data – Data preprocessing, Descriptive Analysis (Exploratory Data Analysis), Hypothesis building, Model Fitting, Model Validation and Interpretation of results
4. **Analytics Assignment 2:** Build statistical models using any two linear and non-linear regression techniques: Simple Linear Regression; Multiple Regression; Variable Selection Problem; Multicollinearity and Ridge Regression; Nonlinear regression; Non-parametric regression; Logistic regression (binary and multiple); Poisson/Negative binomial regression (Use sample data sets)

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Text Books:

S. No.	Title	Author(s)	Publisher
1	Data Mining: Concepts and Techniques	Jiawei Han and Micheline Kamber	Morgan Kaufmann Publishers
2	Data Mining and Knowledge Discovery Handbook	Lior Rokach and Oded Maimon	Springer, 2nd edition
3	Box, G.E.P and Jenkins G.M. (1970) Time Series Analysis		Forecasting and Control, Holden-Day

Reference Books:

S. No.	Title	Author(s)	Publisher
1	Applied Regression Analysis	Draper, N. R. and Smith	John Wiley
2	Applied Logistic Regression	Hosmer, D. W. and Lemeshow, S.	Wiley

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Subject Code CS112642	Modern Day Robotics And Its Industrial Applications	L = 3	T = 0	P = 0	Credits = 3
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	80	20	25	125	3 Hours
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes
	Students will be able to 1. Understand basic concepts and technological advancements in AI and robotics 2. Develop skills of using advanced software for solving practical problems in robotics pertaining to various industries 3. Understand and apply several statistical analysis techniques and business analytics for cognitive robotics 4. Understand and apply the programming of robots using python and R languages.

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

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

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

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

UNIT – III : 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-

			1.00	Applicable for AY 2021-22 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	

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Robot Activities

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

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

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

UNIT – V : Basics of Robotic operating System: ROS for beginners an overview- Introduction to the Robot Operating System (ROS) Middleware - Secure communication for the Robot Operating System - An Introduction to Robot Operating System: The Ultimate Robot Application Framework by Adnan Quality of Service and Cybersecurity Communication Protocols -Analysis for the Robot Operating System Robotics systems communication- Threat modelling using ROS

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

Home Assignments:

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

DIY projects:

- **Program a Robot in a Code Free Environment with Machine Logic reference: https://www.youtube.com/watch?v=rjK7nHYeEwE**
- **Sloth Arduino DIY DOF Humanoid Robot Learning Kit with Programming reference: https://www.youtube.com/watch?v=-T0ylQ7CmUU**
- **DIY Raspberry Pi robot: Making of remote control/autonomous wandering 4WD robot reference: https://www.youtube.com/watch?v=i_y8J30bpUg**

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Text Books:

S. No.	Title	Author(s)	Publisher
1	Introduction to Robotics: Analysis, Control, Applications	Saeed Benjamin Niku	Wiley Publishers
2	Computer Vision: Models, Learning, and Inference	Simon J. D. Prince	Cambridge University Press
3	Artificial Intelligence for Robotics: Build Intelligent Robots that Perform Human Tasks Using AI Techniques	Francis X. Govers	Packt publishing

Reference Books:

S. No.	Title	Author(s)	Publisher
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

			1.00	Applicable for AY 2021-22 Onwards
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Subject Code CS112643	Modern Web Applications	L = 3	T = 0	P = 0	Credits = 3
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	80	20	25	125	3 Hours
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes
• Enable students to develop modern web application by leveraging latest technologies. • Build strong foundation in students making them job ready as per industry requirements. • Enable them to learn new technologies by applying foundation paradigms • Building strong expertise to develop end to end application - web frontend and backend development.	

Unit 1 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 2 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 3 Java Script: Features of JavaScript, extension of JavaScript, Syntax of JavaScript: data types, operators, variables, tag, Document Object Model (DOM) with JavaScript, Selection Statement using if and Switch, Iterative statement: for, for/in, while, do while, break and continue

Unit 4 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 5 Back End Technologies: Introduction to RESTful services, Resources, Messages (Request, Response), Addressing, Methods – (GET, POST, PUT, DELETE)

Modern Web Applications Laboratory

Instead of having Unit wise lab assignment suggest having, a single web application development exercise covering all the units. This exercise can be also done in group of 2-3 students.

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Assignment Guideline:

Student can define the suitable web application example to implement as per their choice. It should cover followings:

- Application should cover **C**reate, **R**ead, **U**pdate, **D**elete scenarios of data.
- Front end to be developed covering all the technologies (HTML5, CSS3, jQuery, AngularJS)
- Back end connectivity to be established through RESTful services and must have database connectivity.
- Student can choose any backend technologies and database for developing REST services required for the application development. RESTful services should be developed using technologies already familiar. E.g. Java OR C# OR Python etc.

Text Books:

S. No.	Title	Author(s)	Publisher

Reference Books:

S. No.	Title	Author(s)	Publisher