SCHEME OF EXAMINATION

B. Tech- 3rd Year | **Semester: 5th**

Branch: Computer Science and Business Systems

S.N.	Subject Name	Subject Code	Periods per week			Scheme of Exam			Total Marks	Credit L+(T+P)/2
						Theory/Practical				
			L	T	P	ESE	CT	TA		
1	Software Design with UML	CS112501	3	1	-	80	20	25	125	3
2	Information Security	CS112502	3	1	-	80	20	25	125	3
3	Design Thinking	CS112503	3	1	-	80	20	25	125	3
4	Fundamentals of Management	CS112504	3	1	-	80	20	25	125	3
5	Business Communication & Value Science – III	CS112505	3	0	-	80	20	25	125	2
6	Elective - I	Refer Table	3	0	-	80	20	25	125	2
7	Software Design with UML Lab	CS112591		-	2	40	-	20	60	1
8	Information Security Lab	CS112592		-	2	40	-	20	60	1
9	Elective – I Lab	CS112593		-	2	40	-	20	60	1
10	Mini Project	CS112594		-	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 -1	
Subject Code	**Name of Subject**
CS112541	Conversational Systems
CS112542	Cloud, Micro services & Application
CS112543	Machine Learning

Subject Code CS112501	SOFTWARE DESIGN WITH UML	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
• Express the software design concepts with UML diagram. • Construct the domain model and design model to various use case scenarios. • Design software applications using object oriented concepts. • Identify various scenarios based on software requirements. • Transform UML based software design into pattern based design using design patterns. • Explain the various testing methodologies for object oriented software	• Will be able to Construct the domain model and design model to various use case scenarios. • Will be able to Design software applications using object oriented concepts. • Will Identify various scenarios based on software requirements. • Will be able to Transform UML based software design into pattern based design using design patterns. • Will be able to Explain the various testing methodologies for object oriented software

Unit 1 : Introduction to on Object Oriented Technologies and the UML Method. Software development process: The Waterfall Model vs. The Spiral Model. The Software Crisis, description of the real world using the Objects Model. Classes, inheritance and multiple configurations. Quality software characteristics. Description of the Object Oriented Analysis process vs. the Structure Analysis Model. **Introduction to the UML Language.** Standards. Elements of the language. General description of various models. The process of Object Oriented software development. Description of Design Patterns. Technological Description of Distributed Systems.

Unit 2 : Requirements Analysis Using Case Modeling : Analysis of system requirements. Actor definitions. Writing a case goal. Use Case Diagrams. Use Case Relationships. **Transfer from Analysis to Design in the Characterization Stage: Interaction Diagrams.** Description of goal. Defining UML Method, Operation, Object Interface, Class. Sequence Diagram. Finding objects from Flow of Events. Describing the process of finding objects using a Sequence Diagram. Describing the process of finding objects using a Collaboration Diagram.

Unit 3: The Logical View Design Stage: The Static Structure Diagrams. The Class Diagram Model. Attributes descriptions. Operations descriptions. Connections descriptions in the Static Model. Association, Generalization, Aggregation, Dependency, Interfacing, Multiplicity.

Unit 4: Package Diagram Model. Description of the model. White box, black box. Connections between packagers. Interfaces. Create Package Diagram. Drill Down. **Dynamic Model: State**

Diagram / Activity Diagram. Description of the State Diagram. Events Handling. Description of the Activity Diagram. Exercise in State Machines.

Unit 5: Component Diagram Model. Physical Aspect. Logical Aspect. Connections and Dependencies. User face. Initial DB design in a UML environment. **Deployment Model.** Processors. Connections. Components. Tasks. Threads. Signals and Events.

Text Books:

S. No.	Title	Author(s)	Publisher
1	The Unified Modelling Language User Guide	Grady Booch, James Rumbaugh, Ivar Jacobson	Pearson Education
2	Object-Oriented Software Engineering: using UML, Patterns, and Java	Bernd Bruegge and Allen H. Dutoit	Pearson Education

Reference Books:

S. No.	Title	Author(s)	Publisher
1	Design Patterns: Elements of Reusable Object-Oriented Software	Erich Gamma, Richard Helm, Ralph Johnson, and John M. Vlissides	Pearson Education

Subject Code CS112502	INFORMATION SECURITY	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
• Describe the fundamentals of networks security, security architecture, threats and vulnerabilities • Discuss the mathematical support for both symmetric and asymmetric key cryptography • Make use of symmetric key cryptographic algorithms to perform cryptographic operations • Solve cryptographic operations using public key cryptographic algorithms • Apply the various Authentication schemes to simulate different applications. • Explain various Security practices and System security standards	• Will be able to Describe the fundamentals of networks security, security architecture, threats and vulnerabilities • Will Make use of symmetric key cryptographic algorithms to perform cryptographic operations • Solve cryptographic operations using public key cryptographic algorithms • Will Apply the various Authentication schemes to simulate different applications. • Will be able to Explain various Security practices and System security standards

Unit 1: Overview of Security Parameters: Confidentiality, integrity and availability; Security violation and threats; Security policy and procedure; Assumptions and Trust; Security Assurance, Implementation and Operational Issues; Security Life Cycle.

Unit 2 : Access Control Models: Discretionary, mandatory, roll-based and task-based models, unified models, access control algebra, temporal and spatio-temporal models. **Security Policies:** Confidentiality policies, integrity policies, hybrid policies, non-interference and policy composition, international standards.

Unit 3 : Systems Design : Design principles, representing identity, control of access and information flow, confinement problem. Assurance: Building systems with assurance, formal methods, evaluating systems.

Unit 4 : Logic-based System: Malicious logic, vulnerability analysis, auditing, intrusion detection. Applications: Network security, operating system security, user security, program security.
Special Topics: Data privacy, introduction to digital forensics, enterprise security specification.

Unit 5 : Operating Systems Security: Security Architecture, Analysis of Security in Linux/Windows. **Database Security:** Security Architecture, Enterprise security, Database auditing.

Text Books:

S. No.	Title	Author(s)	Publisher
1.	Security Engineering	Ross Anderson	TMH
2.	Computer Security: Art and Science	M. Bishop	Pearson Education
3.	Information Security: Principles and Practice	M. Stamp	Wheeler

Reference Books:

S. No.	Title	Author(s)	Publisher
1	Security in Computing	C.P. Pfleeger, S.L. Pfleeger, J. Margulies	TMH
2	Secure Programming HOWTO	David	Wheeler
3	Browser Security Handbook	Michael Zalewski	TMH
4	Handbook of Database Security	M. Gertz, S. Jajodia	Pearson Education

Subject Code CS112503	Design Thinking	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
• Recognize the importance of DT • Explain the phases in the DT process • List the steps required to complete each phase in DT process • Apply each phase in the DT process • Recognize how DT can help in functional work	• Recognize the importance of Design Thinking • Identify the steps in the DT process • Recognize how doodling can help to express ideas • Recognize the importance storytelling in presenting ideas and prototypes • Recognize how DT can help in functional work • Recognize how Agile and DT complement each other to deliver customer satisfaction.

Unit 1: Overview of Design Thinking: What is Design Thinking? Design Thinking History and Theory. Design Thinking framework. Problems that Design Thinking helps solve.

Unit 2 : Empathize with Users : Design Thinking five-stage process. Understanding Users through Empathy. Empathy Map – What and How to Use It. Engaging with Extreme Users. Personas

Unit 3: Discover and Interpret Challenges: Defining the Real Problem. Forming A Good Problem Statement. Analysis and Synthesis. Interpret the Results. A Holistic Approach to Challenges. Stories of What Works

Unit 4 : Generating Big Ideas with Design Thinking: Feature vs. Idea. Qualities That Set Big Ideas Apart. How to Generate Big Ideas. Ideation Methods. How to Develop Prototypes of a Big Idea. Types of Prototyping. Evaluating Ideas Based On Importance and Feasibility. Scaling Design Thinking

Unit 5 : Test and Track Success: How to Maintain Momentum. Generate User Feedback. Test for Desirability, Feasibility and Viability. Design Thinking and Agile. Steps to Success with Design Thinking. Measure Results From Design Thinking.

Text Books:

S. No.	Title	Author(s)	Publisher
1	Hooked by Nir Eyal	Nir Eyal	Portfolio Penguin; Latest Edition
2	The Art of Creative Thinking	Rod Judkins	Hachette Book Publishing
3	Start Up nation	Dan Senor and Saul singer	Gildan Media, LLC
4	Start with Why	Simon Sinek	Penguin Books Ltd

Subject Code CS112504	Fundamentals of Management	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 will teach students the management theories, evolution of management over the years and few basic concepts without going into the details. After studying this course the students will develop an understanding about how organizations work and find it easier to grasp the intricacies of other management areas such as finance, marketing, strategy etc. which will be taken up in future terms.	• Discuss the evolution of management thoughts and the challenges of managerial activities in a global business environment. • Explain the types of Planning and Decision making methodologies in Organizations. • Summarize various types of Organization structure and associated Human Resources activities for man-power utilization. • Explain about motivation theories, behavior, leadership theories and communication for effective directing. • Explain various Controlling techniques to maintain standards in Organizations.

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

UNIT – II : Functions of Management- Planning, Organizing, Staffing, Directing, Controlling Leadership: Concept, Nature, Importance, Attributes of a leader, developing leaders across the organization, Leadership Grid

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

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

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

Home Assignment: The topic for class discussion will be mentioned beforehand and students should be ready to discuss these topics (in groups) in class. Students are required to meet in groups before coming to class and prepare on the topic. Few topics are mentioned below as examples. Instructor can add or change any topic as per requirement.

Topic: Corporate social responsibility (CSR) and HRM implications: What does it mean to be socially responsible within an increasingly financially driven market economy?

Topic: Leaders are Born, Not Made! The debate

Text Books:

S. No.	Title	Author(s)	Publisher
1	Understanding the Theory and Design of Organizations	Richard L. Daft	TMH

Reference Books:

S. No.	Title	Author(s)	Publisher
1	Organizational Behavior	Stephen P. Robbins,Timothy A. Judge, Neharika Vohra	TMH

Subject Code CS112505	Business Communication & Value Science – III	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
Apply &analyze the basic principles of SWOT & Life Positions, understand the power of motivation in real life Respect Pluralism in cultural spaces and differentiate between different cultures of India Role of science in Nation Building Apply the best Practices of Technical writing in real life scenarios. Recognize the importance of AI	On successful completion of the course, the student will be able to: CO1: Apply &analyze the basic principles of SWOT & Life Positions, understand the power of motivation in real life CO2: Respect Pluralism in cultural spaces and differentiate between different cultures of India CO3: Role of science in Nation Building CO4: Apply the best Practices of Technical writing in real life scenarios. CO5 : Recognize the importance of AI

Unit - 1 Summarize the basic principles of SWOT and Life Positions. Demystifying SWOT Apply SWOT in real life scenarios Create your SWOT, SWOT vs. TOWS: The Balancing Act Presentation on what are the strengths they have identified to survive in the VUCA World, Research on TOWS and find out how you can turn your threat into opportunity Motivation: Recognize how motivation helps real life. Motivation: Stories YouTube videos on Maslow's Theory Leverage motivation in Real-life Scenario based activity on identifying and leveraging motivation Apply SWOT in real life scenarios. Create your own SWOT. Motivation: Recognize how motivation helps in real life. Explain the idea of motivation with the Help of examples.

Unit - 2. Identify Pluralism in cultural spaces. Respect Pluralism in cultural spaces. Awareness and Respect for Pluralism in cultural space. Define the terms global, glocal and translocation culture.Cross –Cultural communication: Recognize the implications of cross- cultural Communication. Identify the common mistakes made in cross-cultural communication Gender Awareness: Differentiate between the roles and relations of different genders.

Unit – 3. Summarize the role of Nation building: Discuss the role of scientists and Mathematician s from Ancient India. Role of Science Post –Independence: Groups to Present using multiple formats on any one of the four given topics: Inventions, Inventors, Institutes, Information and Technology

Unit - 4 Introduction to Technical writing. Basic Rules of Technical Writing through examples. Applying technical writing in Profession Theory with YouTube and Dr Bimal Ray's videos Apply technical writing in real - life scenarios. Scenario-based Assessment on Writing

Unit -5 Define AI, Communicating with Machines: Theory and Ted Talk Videos. "Voice of the Future" How will a voice assistant evolve in 25 years from now? AI in everyday Life Each group will present a skit. Visit rural area/ underprivileged parts of city to address some of the local issues; if relevant, suggest a practical technology solution to the issues.

Text Books:

S. No.	Title	Author(s)	Publisher
1	Basic communication skills for Technology	Andreja. J. Ruther Ford	Pearson Education
2	Communication skills	Sanjay Kumar, Pushpalata	Oxford Press

Reference Books:

S. No.	Title	Author(s)	Publisher
1	Organizational Behaviour	Stephen .P. Robbins	Pearson

Subject Code CS112591	SOFTWARE DESIGN WITH UML LAB	L = 3	T = 0	P = 0	Credits = 3
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	40	-	20	60	-
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes
• Express the software design concepts with UML diagram. • Construct the domain model and design model to various use case scenarios. • Design software applications using object oriented concepts. • Identify various scenarios based on software requirements. • Transform UML based software design into pattern based design using design patterns. • Explain the various testing methodologies for object oriented software	• Will be able to Construct the domain model and design model to various use case scenarios. • Will be able to Design software applications using object oriented concepts. • Will Identify various scenarios based on software requirements. • Will be able to Transform UML based software design into pattern based design using design patterns. • Will be able to Explain the various testing methodologies for object oriented software

UML include the following 9 diagrams:

1. Class Diagram
2. Object Diagram
3. Use Case Diagram
4. Sequence Diagram
5. Collaboration Diagram
6. State Chart Diagram
7. Activity Diagram
8. Component Diagram
9. Deployment Diagram

Draw the UMLS diagrams for the following Applications:

- ATM Systems
- Stock Maintenance System
- Remote Procedure Call Implementation

Text Books:

S. No.	Title	Author(s)	Publisher
1	The Unified Modelling Language User Guide	Grady Booch, James Rumbaugh, Ivar Jacobson	Pearson Education
2	Object-Oriented Software Engineering: using UML, Patterns, and Java	Bernd Bruegge and Allen H. Dutoit	TMH

Subject Code CS112592	INFORMATION SECURITY LAB	L = 3	T = 0	P = 0	Credits = 3
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	40	-	20	60	-
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes
• Describe the fundamentals of networks security, security architecture, threats and vulnerabilities • Discuss the mathematical support for both symmetric and asymmetric key cryptography • Make use of symmetric key cryptographic algorithms to perform cryptographic operations • Solve cryptographic operations using public key cryptographic algorithms	• Will be able to Describe the fundamentals of networks security, security architecture, threats and vulnerabilities • Will Make use of symmetric key cryptographic algorithms to perform cryptographic operations • Solve cryptographic operations using public key cryptographic algorithms • Will Apply the various Authentication schemes to simulate different applications. • Will be able to Explain various Security practices and System security standards

INFORMATION SECURITY LAB

1. Analysis of security in Unix/Linux.
2. Administration of users, password policies, privileges and roles

Text Books:

S. No.	Title	Author(s)	Publisher
1.	Security Engineering	Ross Anderson	TMH
2.	Computer Security: Art and Science	M. Bishop	Pearson Education
3.	Information Security: Principles and Practice	M. Stamp	TMH

Reference Books:

S. No.	Title	Author(s)	Publisher
1	Security in Computing	C.P. Pfleeger, S.L. Pfleeger, J. Margulies	
2	Secure Programming HOWTO	David	Wheeler

Subject Code CS112541	Conversational Systems	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
The objective of the course is to • Enable attendees to acquire knowledge on chatbots and its terminologies • Work with ML Concepts and different algorithms to build custom ML Model • Better understand on Conversational experiences and provide better customer experiences	• Will be Enable attendees to acquire knowledge on chatbots and its terminologies • Will be able to Work with ML Concepts and different algorithms to build custom ML Model • Will Better understand on Conversational experiences and provide better customer experiences

Unit 1: 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 2: Foundational Blocks for Programming : Basic Python programming concepts, Node Basics, Coding Best Practices, Evaluation Test (Hands On) **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, NLP using Python - Make use of any of the NLP libraries like NLTK, spaCy, StanfordNLP etc. (Practice session to use an NLP Tool -Hands on), Affective NLG

Unit 3 : Building a chatbot/Conversational AI Systems : 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, Building a Voice/Chat Bot - Hands on

Project 1: Case Study to build a learning chatbot

Unit 4 : 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

Project 2: Case Study to build a ML Model using LSTM/any RNN and integrate with chatbot

Unit 5: Contact Centers Introduction to Contact centers – Impact & Terminologies, Case studies & Trends, How does a Virtual Agent/Assistant fit in here? **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

Brief write-up about the course encapsulating the below points:

- **About the technology -** Ever increasing customer expectations (emotional connect, 24x7 availability, real-time responses, enterprise presence in their preferred platform or channel), changing preferences and demand for personalized services - Hence Conversational Experiences will use the right mix of multi-modal experience involving – NLP, Speech, Multi-media, Vision, Virtual reality – for better and personalized results of Customer acquisition, retention and revenue.
- **Current market demand -** According to the recently updated International Data Corporation (IDC) Worldwide Artificial Intelligence Systems Spending Guide, spending on AI systems will reach $97.9 billion in 2023, more than two and one half times the $37.5 billion that will be spent in 2019. The compound annual growth rate (CAGR) for the 2018-2023 forecast period will be 28.4. Globally vendors of Consumer devices – phones, speakers, displays, wearables – are competing and investing billions to make them feature-rich, more powerful, connected and affordable.

Text Books:

S. No.	Title	Author(s)	Publisher
1	Conversational AI: Dialogue Systems, Conversational Agents, and Chatbots	Michael McTear	Moran and Claypool Publishers
2	Designing Voice User Interfaces: Principles of Conversational Experiences	Cathy Pearl	O'REILLY, 2016

Subject Code CS112542	Cloud, Micro services & Application	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
The course intends to introduce students to the fundamentals of developing application on Cloud specifically public clouds such as AWS, AZURE and Google. Students would be able to appreciate • How to design applications for Cloud • Develop applications using various services • Deploy applications on Cloud by using cloud native services	To understand the principles of cloud architecture, models and infrastructure. • To understand the concepts of virtualization and virtual machines. • To gain knowledge about virtualization Infrastructure. • To explore and experiment with various Cloud deployment environments. • To learn about the security issues in the cloud environment.

Unit 1: Cloud Fundamentals; Cloud Service Components, Cloud service/Deployment Models. IaaS / PaaS / SaaS (NIST definition of Cloud) Cloud components Guiding Principle with respect to utilization/Security/Pricing. Application of Cloud Computing. Cloud components Guiding Principle with respect to utilization/Security/Pricing. Cloud advantages

Unit 2 : Application architectures-Monolithic & Distributed Architecture, Microservice fundamental and design approach, Spring Boot fundamentals and Design of Microservices, Cloud Native applications-12 Factors, API Fundamentals Microservice fundamentals, architecture, target system. Design approach.

Unit 3 : Application integration process/Apification Process, API Fundamental, API management, API tools. Developer Portal. Applications of APIFICATION. Devops fundamentals. , Tools and Applications . Containerization Process and application. Microservice /API management, Spring boot Fundamental and design of microservice, API tools. Developer Portal. Applications of Microservice and APIFICATION. boot project. API/Microservice design and deployment.

Unit 4 : Python- Refresher, Use cases. Instructions briefing for steps involved in Cloud Application Development/Deployment/Execution. Using containers, Project use cases covering. Public Cloud Platforms overview and their usage. deployment Public cloud Platform features- AWS, Azure, Google.

Unit 5: Cloud Security and Monitoring Tools . Devops Tools and their usage in cloud application develop Docker and Containerization Process.

Technology areas for Projects

1. Chose a real life example of a Business application you have used and apply these technologies concepts to solution it.
2. Cloud Architecture Design
3. Microservice Architecture Design
4. API development use case and deployment .
5. Microservice development and deployment
6. Devops Tools usages for Automation in development/Testing/Deployment
7. AWS features use cases - ex, Lambda Function
8. Azure features use cases
9. GCP Features Use cases
10. Creating an API and API Documentation
11. Cloud scaling

Text Books:

S. No.	Title	Author(s)	Publisher
1	Distributed and Cloud Computing, From Parallel Processing to the Internet of Things	Kai Hwang, Geoffrey C Fox, Jack G Dongarra	Morgan Kaufmann Publishers
2	The Docker Book	James Turnbull	O'Reilly Publishers

Reference Books:

S. No.	Title	Author(s)	Publisher
1	Cloud security. A Comprehensive Guide to Secure Cloud Computing	Krutz, R. L., Vines, R. D	Wiley Publishing

Subject Code CS112543	Machine Learning	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
• To understand the basic concepts of machine learning. • To understand and build supervised learning models. • To understand and build unsupervised learning models. • To evaluate the algorithms based on corresponding metrics identified	• CO1: Explain the basic concepts of machine learning. • CO2 : Construct supervised learning models. • CO3 : Construct unsupervised learning algorithms. • CO4: Evaluate and compare different models

UNIT 1- Introduction to Machine Learning

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

UNIT-II ANN and Regression

Artificial neural networks including backpropagation; Applications of classifications Multi-variable regression; Model evaluation; Least squares regression; Regularization; LASSO; Applications of regression.

UNIT- III Classification:

Supervised Learning; The problem of classification; Feature engineering; Training and testing classifier models; Cross-validation; Model evaluation (precision, recall, F1-mesure, accuracy, area under curve); Statistical decision theory including discriminant functions and decision surfaces; Naive Bayes classification; Bayesian networks; Decision Tree; k-Nearest neighbour classification; Support Vector Machines.

UNIT- IV Clustering:

Average linkage; Ward's algorithm; Minimum spanning tree clustering; K-nearest neighbors clustering; BIRCH; CURE; DBSCAN, 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 Miscellaneous:

Random Forests; Ensembles of classifiers including bagging and boosting, Association rule mining

algorithms including apriori ,Expectation-Maximization (EM) algorithm for unsupervised learning, Anomaly and outlier detection methods.

Mini projects in the Lab:

(1) Introduction to WEKA and R
(2) Classification of some public domain datasets in UCI ML repository

(1) Implementation of one clustering algorithm
(3) Implementation of one association rule mining algorithm
(4) Implementation of one anomaly detection algorithms
(5) Implementation of EM algorithm for some specific problem

Text Books:

S. No.	Title	Author(s)	Publisher
1	Pattern Classification	R.O. Duda, P.E. Hart, D.G. Stork	Wiley
2	Pattern Recognition and Machine Learning	C. Bishop	Springer

Reference Books:

S. No.	Title	Author(s)	Publisher
1	Introduction to Machine Learning	E. Alpaydin	Prentice-Hall
2	Foundations of Machine Learning	A. Rostamizadeh, A. Talwalkar, M. Mohri	MIT Press
3	Statistical Pattern Recognition	A. Webb	Wiley