GEETHANJALI INSTITUTE OF SCIENCE & TECHNOLOGY
(Autonomous)
Unit of USHODAYA EDUCATIONAL SOCIETY
An ISO 9001:2015 certified Institution: Recognized under Sec. 2(f)& 12(B) of UGC Act, 1956
3rd Mile, Bombay Highway, Gangavaram (V), Kovur(M), SPSR Nellore (Dt), Andhra Pradesh, India- 524137
E-Mail: geethanjali@gist.edu.in, Website: www.gist.edu.in

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Vision

To evolve as a leading computer science and engineering centre producing competent technocrats to meet the demands of ever-changing industry and society.

Mission

DM1: Imparting quality education through innovative teaching learning processes.

DM2: Motivating students to upgrade their technical expertise by promoting learner centric activities.

DM3: Inculcating ethical values and interpersonal skills in the learners.

DM4: upgrading knowledge in cutting edge technologies keeping pace with industrial standards.

Program Educational Outcomes

PEO1: Outperform in professional career or higher learning by upgrading skills in Computer Science and Engineering stream

PEO2: Provide computing solutions for complex problems to meet industry demands and societal needs.

PEO3: Offer ethical, socially sensitive solutions as professionals and as entrepreneurs in Computer Science and other engineering disciplines.

PEO4: Leverage new computing technologies by engaging themselves in perpetual learning.

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

PO1: **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: **Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6: **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes

PSO1: Apply the expertise in adaptive algorithms to develop quality software applications.

PSO2: Get employed or become an entrepreneur through their capabilities in basic and advanced technologies.

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I Year I Semester (Theory-4, Lab-2, MC-2)							
Sl. No.	**Category**	**Course Code**	**Course Title**	**Hours per week**			**Credits**
				L	**T**	**P**	**C**
1	PC	25D5801T	Advanced Data Structures & Algorithms	3	0	0	3
2	PC	25D5802T	Distributed Operating Systems	3	0	0	3
3	PE	25D5803Ta 25D5803Tb 25D5803Tc	**Program Elective-I** 1.Advanced Computer Architecture 2. Enterprise Cloud Concepts 3.Applied Machine Learning	3	0	0	3
4	PE	25D5804Ta 25D5804Tb 25D5804Tc	**Program Elective-II** 1.Natural Language Processing 2.Smart Sensor Networks &IoT 3.Computing for Data Analytics	3	0	0	3
5	PC	25D5805P	Advanced Data Structures & Algorithms Lab	0	0	4	2
6	PC	25D5806P	Distributed Operating Systems Lab	0	0	4	2
7	MC	25MMC01	Research Methodology and IPR	2	0	0	2
8	SE	25D5807P	Full stack Development Using MERN	0	1	2	2
9	AC	25MAC01 25MAC02 25MAC03	**Audit Course – I** English for Research Paper Writing Disaster Management Essence of Indian Traditional Knowledge	2	0	0	0
Total				**16**	**1**	**10**	**20**

Category	**Credits**
Professional Core Courses(PC)	10
Professional Elective Courses(PE)	6
Skill Enhancement Course(SE)	2
Mandatory Course(MC)	2
Audit Course (AC)	0
Total	20

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I Year II Semester (Theory-4, Lab-2, MC-1)							
Sl. No.	**Category**	**Course Code**	**Course Title**	**Hours per week**			**Credits**
				L	**T**	**P**	**C**
1	PC	25D5808T	Advances in Software Engineering	3	0	0	3
2	PC	25D5809T	Advanced Databases	3	0	0	3
3	PE	25D5810Ta 25D5810Tb 25D5810Tc	**Program Elective – III** 1. Block Chain Technology 2. Advanced Computer Networks 3. Deep Learning and Applications	3	0	0	3
4	PE	25D5811Ta 25D5811Tb 25D5811Tc	**Program Elective – IV** 1. Generative AI 2. Digital Forensics 3. Robotic Process Automation	3	0	0	3
5	PC	25D5812P	Advance in Software Engineering Lab	0	0	4	2
6	PC	25D5813P	Advanced Databases Lab	0	0	4	2
7	MC	25D5814	Quantum Technologies And Applications	2	0	0	2
8	PC	25D5815	Comprehensive Viva Voce	0	0	0	2
9	AC	25MAC04 25MAC05 25MAC06	**Audit Course – II** Pedagogy Studies Personality Development Through Life Enlightenment Skills Yoga For Stress Management	2	0	0	0
Total				**16**	**0**	**8**	**20**
****Students have to undergo an Industry Internship after I Year II Semester for a duration of 6 to 8 weeks**							

Category	**Credits**
Professional Core Courses(PC)	12
Professional Elective Courses(PE)	6
Mandatory Course(MC)	2
Audit Course(AC)	0
Total	20

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M.Tech I Year II Semester

ADVANCES IN SOFTWARE ENGINEERING
(Common to M.Tech CSE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
25D5808T	3:0:0:0	3	CIE: 30 SEE:70	3 Hours	PC

Course Objectives:

This course will enable students:

- To understand software engineering principles, process models, and project management techniques for effective software development.
- To analyze, model, design, and develop software systems using modern methodologies, UML, and design principles.
- To apply quality assurance, testing, maintenance practices, and emerging trends such as DevOps, AI, and cloud-based software engineering.

Course Outcomes(CO):

On completion of this course, student will be able to:

- Demonstrate understanding of advanced software process models and project management practices.
- Apply requirement engineering and advanced modeling techniques to software system design.
- Develop robust designs using object-oriented, component-based, and aspect-oriented approaches.
- Evaluate software quality through systematic testing, reviews, and maintenance strategies.
- Analyze emerging research challenges and apply metrics, configuration management, and agile practices in modern software engineering.

Syllabus		Total Hours:48
Unit-I	**Software Process and Project Management**	**10Hrs**

Software Engineering – A Layered Technology, Process Models: Waterfall, Incremental, Evolutionary, Spiral, Agile Development, Unified Process Framework.
Software Project Management Concepts: Estimation, Scheduling, Risk Analysis, Process Improvement and Capability Maturity (CMMI, ISO Standards).

Unit-II	**Requirements Engineering and Modeling**	**9Hrs**

Requirement Engineering Tasks: Inception, Elicitation, Elaboration, Negotiation, Specification, Validation. System Modeling with UML, Scenario-based, Flow-oriented, Behavioral and Class-based modelling, Design Concepts and Principles, Architectural Design – Styles and Patterns

Unit-III	**Advanced Design and Development Concepts**	**10Hrs**

Component-level Design, Object-Oriented Design using UML, Design Patterns and Frameworks, Aspect-Oriented Software Engineering, Reuse-oriented Software Engineering.

Unit-IV	**Software Quality, Testing and Maintenance**	**10Hrs**

Quality Concepts and Quality Assurance, Software Reviews, Formal Technical Reviews, Software Testing Strategies: Unit, Integration, System, Regression Testing, Black-box and White-box Testing, Software Maintenance and Reengineering.

Unit-V	Advanced Topics and Emerging Trends	9Hrs
Software Configuration Management (SCM) and Version Control, Software Reliability and Safety Engineering, Agile Software Development and DevOps, Software Metrics and Measurement. Emerging Areas: AI in Software Engineering, Cloud-based SE, Secure Software Development.		

Text Books:

1. Software Engineering A Practitioner's Approach, Roger S. Pressman, 9th Edition McGrawHill International Edition.
2. Fundamentals of Software Engineering, Rajib Mall, Fifth Edition, PHI.

Reference Books:

1. Software Engineering, Ian Sommerville, Tenth Edition, Pearson education.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India,2010.
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.

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M.Tech I Year II Semester

ADVANCED DATABASES
(Common to M.Tech CSE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
25D5809T	3:0:0:0	3	CIE: 30 SEE:70	3 Hours	PC

Course Objectives:

- Knowledge on concepts of Distributed Databases, Object-Based Databases, advanced database models

Course Outcomes(CO):

On completion of this course, student will be able to:

1. Understand Database system Architectures and parallel databases
2. Analyze transactions, Concurrency Control in Distributed Databases
3. Understand the importance of Data Warehousing and Mining
4. Illustrate concepts of object based databases

Syllabus	Total Hours:48
Unit-I	**10Hrs**
Database System Architectures Centralized and Client –Server Architectures, Server System Architectures, Parallel Systems, Distributed Systems, Network Types Parallel Databases: Introduction, I/O Parallelism, Interquery Parallelism, Intra Query Parallelism, Intraoperation Parallelism, Interoperation Parallelism, Query Optimization, Design of Parallel Systems, Parallelism on Multicore Processors	
Unit-II	**10Hrs**
Distributed Databases Homogeneous and Heterogeneous Databases, Distributed Data Storage, Distributed Transactions, Commit Protocols, Concurrency Control in Distributed Databases, Availability, Distributed Query Processing, Heterogeneous Distributed Databases, Cloud-Based Databases, Directory Systems	
Unit-III	**10Hrs**
Data Warehousing and Mining Decision-Support Systems, Data Warehousing, Data Mining, Classification, Association Rules, Other Types of Associations, Clustering, Other Forms of Data Mining	
Unit-IV	**9Hrs**
Object-Based Databases Introduction, Complex Data Types, Structured Types and Inheritance in SQL, Table Inheritance, Array and Multiset Types in SQL, Object-Identity and Reference Types in SQL, Implementing O-R Features, Persistent Programming Languages, Object-Relational Mapping, Object-Oriented versus Object-Relational.	
Unit-V	**9Hrs**
Motivation, Structure of XML Data, XML Document Schema, Querying and Transformation, Application Program Interfaces to XML, Storage of XML Data, XML Applications Applications Advanced database models and applications: Active Database Concepts and Triggers, Temporal database concepts, Spatial database concepts, Multimedia database concepts, Deductive databases	

Text Books:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan Database System Concepts, Sixth Edition
2. RamezElmasri, Shamkant B. Navathe, Database systems- Models, Languages, Design and Application Programming

Reference Books :

1. **Raghu Ramakrishnan, Johannes Gehrke**, *Database Management Systems*, McGraw-Hill Education.
2. **M. Tamer Özsu, Patrick Valduriez**, *Principles of Distributed Database Systems*, Springer.

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M.Tech I Year II Semester

BLOCKCHAIN TECHNOLOGY
(Common to M.Tech CSE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
25D5810aT	3:0:0:0	3	CIE: 30 SEE:70	3 Hours	PE

Course Objectives:

This course will enable students:

- To learn the fundamentals of Blockchain and various types of block chain and consensus mechanisms.
- To understand the public block chain system, Private block chain system and consortium blockchain.
- Able to know the security issues of blockchain technology

Course Outcomes(CO):

On completion of this course, student will be able to:

1. Understanding concepts behind crypto currency
2. Applications of smart contracts in decentralized application development
3. Understand frameworks related to public, private and hybrid blockchain
4. Create blockchain for different application case studies.

Syllabus	Total Hours:48
Unit-I	**10Hrs**

Fundamentals of Blockchain: Introduction, Origin of Blockchain, Blockchain Solution, Components of Blockchain, Block in a Blockchain,The Technology and the Future. Blockchain Types and Consensus Mechanism: Introduction, Decentralization and Distribution, Types of Blockchain, Consensus Protocol. Cryptocurrency – Bitcoin, Altcoin and Token: Introduction, Bitcoin and the Cryptocurrency, Cryptocurrency Basics, Types of Cryptocurrencies, Cryptocurrency Usage.

Unit-II	9Hrs

Public Blockchain System: Introduction, Public Blockchain, Popular Public Blockchains, The Bitcoin Blockchain, Ethereum Blockchain. Smart Contracts: Introduction, Smart Contract, Characteristics of a Smart Contract, Types of Smart Contracts, Types of Oracles, Smart Contracts in Ethereum, Smart Contracts in Industry.

Unit-III	9Hrs

Private Blockchain System: Introduction, Key Characteristics of Private Blockchain, Why We Need Private Blockchain, Private Blockchain Examples, Private Blockchain and Open Source, E- commerce Site Example, Various Commands (Instructions) in E-commerce Blockchain, Smart Contract in Private Environment, State Machine, Different Algorithms of Permissioned Blockchain, Byzantine Fault, Multichain.

Consortium Blockchain: Introduction, Key Characteristics of Consortium Blockchain, Why We Need Consortium Blockchain, Hyperledger Platform, Overview of Ripple, Overview of Corda. Initial Coin Offering: Introduction, Blockchain Fundraising Methods, Launching an ICO, Investing in an ICO, Pros and Cons of Initial Coin Offering, Successful Initial Coin Offerings, Evolution of ICO, ICO Platforms.

Unit-IV		**10Hrs**
Security in Blockchain: Introduction, Security Aspects in Bitcoin, Security and Privacy Challenges of Blockchain in General, Performance and Scalability, Identity Management and Authentication, Regulatory Compliance and Assurance, Safeguarding Blockchain Smart Contract (DApp), Security Aspects in Hyperledger Fabric. Applications of Blockchain: Introduction, Blockchain in Banking and Finance, Blockchain in Education, Blockchain in Energy, Blockchain in Healthcare, Blockchain in Real-estate, Blockchain In Supply Chain, The Blockchain and IoT. Limitations and Challenges of Blockchain		
Unit-V		**10Hrs**
Blockchain Case Studies: Case Study 1 – Retail, Case Study 2 – Banking and Financial Services, Case Study 3 – Healthcare, Case Study 4 – Energy and Utilities Blockchain Platform using Python: Introduction, Learn How to Use Python Online Editor, Basic Programming Using Python, Python Packages for Blockchain. Blockchain platform using Hyperledger Fabric: Introduction, Components of Hyperledger Fabric Network, Chain codes from Developer.ibm.com, Blockchain Application Using Fabric Java SDK.		

Text Books:

1. Blockchain Technology‖, Chandramouli Subramanian, Asha A.George, Abhilasj K A and Meena Karthikeyan , Universities Press.

Reference Books:

1. Michael Juntao Yuan, Building Blockchain Apps, Pearson, India.
2. Blockchain Blueprint for Economy, Melanie Swan, SPD O'reilly.
3. Blockchain for Business, Jai Singh Arun, Jerry Cuomo, Nitin Gaur, Pearson.

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M.Tech I Year II Semester

ADVANCED COMPUTER NETWORKS
(Common to M.Tech CSE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
25D5810bT	3:0:0:0	3	CIE: 30 SEE:70	3 Hours	PC

Course Objectives:

- This course aims to provide advanced background on relevant computer networking topics to have a comprehensive and deep knowledge in computer networks.

Course Outcomes(CO):

On completion of this course, student will be able to:

1. Understanding of holistic approach to computer networking
2. Ability to understand the computer network protocols and their applications
3. Ability to design simulation concepts related to packet forwarding in networks.

Syllabus		Total Hours:48
Unit-I		**10Hrs**

Data-link protocols: Ethernet, Token Ring and Wireless (802.11). Wireless Networks and Mobile IP: Infrastructure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standard, Cellular Networks, Mobile IP, Wireless Mesh Networks (WMNs), Multiple access schemes Routing and Internetworking: Network–Layer Routing, Least-Cost-Path algorithms, Non-Least-Cost-Path algorithms, Intra-domain Routing Protocols, Inter-domain Routing Protocols, Congestion Control at Network Layer.

Unit-II		**10Hrs**

Transport and Application Layer Protocols: Client-Server and Peer-To-Peer Application Communication, Protocols on the transport layer, reliable communication. Routing packets through a LAN and WAN. Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Mobile Transport Protocols, TCP Congestion Control. Principles of Network Applications.

Unit-III		**10Hrs**

The Web and HTTP, File Transfer: FTP, Electronic Mail in the Internet, Domain Name System (DNS), P2P File Sharing, Socket Programming with TCP and UDP, building a Simple Web Server Creating simulated networks and passing packets through them using different routing techniques. Installing and using network monitoring tools.

Unit-IV		**9Hrs**

Wireless and Mobile Networks: Introduction, Wireless links and Network Characteristics - CDMA, Wifi: 802.11 Wireless LANS, Cellular internet access, Mobility management: Principles.

Unit-V		**9Hrs**

Multimedia networking: Multimedia networking applications, streaming stored video, Voice-over-IP, Protocols for real-time conversational applications.

Text Books:

1. Computer Networking: A Top-Down Approach, James F. Kuros and Keith W. Ross, Pearson, 6th Edition, 2012.
2. Computer Networks and Internets, Duglas E. Comer, 6th Edition, Pearson.

Reference Books:

1. A Practical Guide to Advanced Networking, Jeffrey S. Beasley and PiyasatNilkaew, Pearson, 3rd Edition, 2012
2. Computer Networks, Andrew S. Tanenbaum, David J. Wetherall, Prentice Hall.

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M.Tech I Year II Semester

DEEP LEARNING AND APPLICATIONS
(Common to M.Tech CSE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
25D5810cT	3:0:0:0	3	CIE: 30 SEE:70	3 Hours	PE

Course Objectives:

This course will enable students:

- To understand complexity of Deep Learning algorithms and their limitations
- To be capable of performing experiments in Deep Learning using real-world data.

Course Outcomes(CO):

On completion of this course, student will be able to:

1. Implement deep learning algorithms, understand neural networks and traverse the layers of data
2. Learn topics such as convolutional neural networks, recurrent neural networks, training deep networks and high-level interfaces
3. Understand applications of Deep Learning to Computer Vision
4. Understand and analyze Applications of Deep Learning to NLP

Syllabus	Total Hours:48
Unit-I	**10Hrs**
Introduction: Feed forward Neural networks, Gradient descent and the back propagation algorithm, Unit saturation, the vanishing gradient problem, and ways to mitigate it. RelU Heuristics for avoiding bad local minima, Heuristics for faster training, Nestors accelerated gradient descent, Regularization, Dropout.	
Unit-II	**9Hrs**
Convolutional Neural Networks: Architectures, convolution/pooling layers, Recurrent Neural Networks: LSTM, GRU, Encoder Decoder architectures. Deep Unsupervised Learning: Auto encoders, Variational Auto-encoders, Adversarial Generative Networks, Auto-encoder and DBM Attention and memory models, Dynamic Memory Models	
Unit-III	**12Hrs**
Applications of Deep Learning to Computer Vision: Image segmentation, object detection, automatic image captioning, Image generation with Generative adversarial networks, video to text with LSTM models, Attention Models for computer vision tasks	
Unit-IV	**9Hrs**
Applications of Deep Learning to NLP: Introduction to NLP and Vector Space Model of Semantics, Word Vector Representations: Continuous Skip-Gram Model, Continuous Bag-of-Words model (CBOW), Glove, Evaluations and Applications in word similarity	
Unit-V	**8Hrs**
Analogy reasoning: Named Entity Recognition, Opinion Mining using Recurrent Neural Networks: Parsing and Sentiment Analysis using Recursive Neural Networks: Sentence Classification using Convolutional Neural Networks, Dialogue Generation with LSTMs	

Text Books:

1. Deep Learning by Ian Goodfellow, YoshuaBengio and Aaron Courville, MIT Press.
2. The Elements of Statistical Learning by T. Hastie, R. Tibshirani, and J. Friedman, Springer.
3. Probabilistic Graphical Models. Koller, and N. Friedman, MIT Press.

Reference Books:

1. Bishop, C, M., Pattern Recognition and Machine Learning, Springer, 2006.
2. Yegnanarayana, B., Artificial Neural Networks PHI Learning Pvt. Ltd, 2009.
3. Golub, G.,H., and Van Loan, C.,F., Matrix Computations, JHU Press,2013.
4. Satish Kumar, Neural Networks: A Classroom Approach, Tata McGraw-Hill Education, 2004.

Online Resources::

1. http://www.deeplearning.net
2. https://www.deeplearningbook.org/
3. https://developers.google.com/machine-learning/crash-course/ml-intro
4. www.cs.toronto.edu/~fritz/absps/imagenet.pdf
5. http://neuralnetworksanddeeplearning.com/

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M.Tech I Year II Semester

GENERATIVE AI
(Common to M.Tech CSE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
25D5811aT	3:0:0:0	3	CIE: 30 SEE:70	3 Hours	PE

Course Objectives:

This course will enable students:

- To introduce the foundations, evolution, and core concepts of AI, ML, DL, NLP, and Generative AI.
- To develop understanding of advanced neural architectures and generative models such as GANs, VAEs, and Transformers.
- To explore Large Language Models, prompt engineering, and their real-world applications.
- To familiarize learners with frameworks, multimodal applications, and ethical considerations in Generative AI.

Course Outcomes(CO):

On completion of this course, student will be able to:

1. Demonstrate knowledge of AI foundations, generative models, and advanced neural architectures.
2. Apply generative AI techniques to create solutions for text, image, video, and multimodal tasks.
3. Design, fine-tune, and optimize Large Language Models for specific applications.
4. Evaluate ethical, social, and legal implications of Generative AI deployments and propose mitigation strategies.

Syllabus		Total Hours:48
Unit-I	**Foundations of AI and Generative Models**	**9Hrs**

Introduction and historical evolution to Artificial Intelligence (AI), Machine Learning (ML), Natural Language Processing (NLP)and Deep Learning (DL), Structure of Artificial Neural Networks (ANNs), Mathematical and computational foundations of generative modeling, Overview of generative models and their applications across various domains; Importance of Generative AI in modern applications, Transfer learning and in advancing Generative AI.

Unit-II	**Advanced Neural Architectures for Generative AI**	**10Hrs**

Variational Autoencoders (VAEs): principles and applications, Generative Adversarial Networks (GANs): architecture and working principles; Transformer architecture and attention mechanisms (in detail); Long Short-Term Memory Networks (LSTMs) and the limitations of traditional RNNs/LSTMs, Advanced Transformer architectures and techniques, Pre-training and transfer learning strategies for generative models

Unit-III	**Large Language Models and Prompt Engineering**	**10Hrs**

Overview of Large Language Models (LLMs), GPT architecture, variants, and working principles, Prétraining and fine-tuning GPT models for applications (e.g., chatbots, text generation), Case study: GPT-based customer support chatbot, BERT architecture, pre-training objectives, and fine-tuning, Prompt Engineering: Designing effective prompts, controlling model behavior, and improving output quality, Fine-tuning language models for creative writing and chatbot development.

Unit-IV	**Multi-Agent Systems and Generative AI Applications**	**10Hrs**
Introduction to Multi-Agent Systems (MAS),Types of agents: reactive, deliberative, hybrid, and learning agents, Multi-agent collaboration and orchestration for generative tasks, Use cases: autonomous research assistants, cooperative creative generation, distributed problem-solving, Frameworks and tools: AutoGen, CrewAI, Hugging GPT for LLM-powered multi-agent systems, Generative AI applications: Art, Creativity, Image/Video generation, Music composition, Healthcare, Finance, Real-world case studies and deployment challenges		
Unit-V		**9Hrs**
Frameworks, Multimodal Applications, and Ethics LangChain framework: components and LLM application development, Retrieval-Augmented Generation (RAG), Embeddings, Indexing networks, and Vector databases, Generative AI across modalities: Text, Code, Image, and Video generation, Image and Video generation using GANs and VAEs, Multimodal Generative AI: integration and training strategies, Ethical considerations: bias, fairness, trust, and responsible AI deployment, Social and legal implications of Generative AI, Risk mitigation strategies and real-world ethical case studies.		

Text Books:

1. AltafRehmani, Generative AI for Everyone: Understanding the Essentials and Applications of This Breakthrough Technology.
2. Charu C. Aggarwal, Neural Networks and Deep Learning: A Textbook. Joseph Babcock, Raghav Bali, Generative AI with Python and TensorFlow 2, 2024.

Reference Books:

1. Josh Kalin, Generative Adversarial Networks Cookbook. 2. Jesse Sprinter, Generative AI in Software Development: Beyond the Limitations of Traditional Coding, 2024.

Online Resources:

1. Fabian Gloeckle et al., Better & Faster Large Language Models via Multi-token Prediction, arXiv:2404.19737v1, 2024.Vaswani et al., Attention Is All You Need, NeurIPS 2017

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Unit of USHODAYA EDUCATIONAL SOCIETY
An ISO 9001:2015 certified Institution: Recognized under Sec. 2(f)& 12(B) of UGC Act, 1956
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M.Tech I Year II Semester

DIGITAL FORENSICS
(Common to M.Tech CSE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
25D5811bT	3:0:0:0	3	CIE: 30 SEE:70	3 Hours	PE

Course Objectives:

This course will enable students:

- provides an in-depth study of the rapidly changing and fascinating field of computer forensics.
- Combines both the technical expertise and the knowledge required to investigate, detect and prevent digital crimes.
- Knowledge on digital forensics legislations, digital crime, forensics processes and procedures, data acquisition and validation, e-discovery tools
- E-evidence collection and preservation, investigating operating systems and file systems, network forensics, art of steganography and mobile device forensics

Course Outcomes(CO):

On completion of this course, student will be able to:

1. Understand relevant legislation and codes of ethics.
2. Computer forensics and digital detective and various processes, policies and procedures.
3. E-discovery, guidelines and standards, E-evidence, tools and environment.
4. Email and web forensics and network forensics.

Syllabus		Total Hours:48
Unit-I		**9Hrs**
Digital Forensics Science: Forensics science, computer forensics, and digital forensics. Computer Crime: Criminalistics as it relates to the investigative process, analysis of cyber criminalistics area, holistic approach to cyber-forensics.		
Unit-II		**9Hrs**
Cyber Crime Scene Analysis: Discuss the various court orders etc., methods to search and seizure electronic evidence, retrieved and un-retrieved communications, Discuss the importance of understanding what court documents would be required for a criminal investigation.		
Unit-III		**10Hrs**
Evidence Management & Presentation: Create and manage shared folders using operating system, importance of the forensic mindset, define the workload of law enforcement, Explain what the normal case would look like, Define who should be notified of a crime, parts of gathering evidence, Define and apply probable cause		
Unit-IV	**Priority queues**	**10Hrs**
Computer Forensics: Prepare a case, Begin an investigation, Understand computer forensics workstations and software, Conduct an investigation, Complete a case, Critique a case, Network Forensics: open-source security tools for network forensic analysis, requirements for preservation of network data.		

Unit-V	**Search Trees**	**10Hrs**

Mobile Forensics: mobile forensics techniques, mobile forensics tools. Legal Aspects of Digital Forensics: IT Act 2000, amendment of IT Act 2008. Recent trends in mobile forensic technique and methods to search and seizure electronic evidence.

Text Books:

1. John Sammons, The Basics of Digital Forensics, Elsevier
2. John Vacca, Computer Forensics: Computer Crime Scene Investigation, Laxmi Publications.

Reference Books:

1. William Oettinger, Learn Computer Forensics: A beginner's guide to searching, analyzing, and securing digital evidence, Packt Publishing; 1st edition (30 April 2020), ISBN : 1838648178.
2. Thomas J. Holt, Adam M. Bossler, Kathryn C. Seigfried-Spellar, Cybercrime and Digital Forensics: An Introduction, Routledge..

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M.Tech I Year II Semester

ROBOTIC PROCESS AUTOMATION
(Common to M.Tech CSE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
25D5811cT	3:0:0:0	3	CIE: 30 SEE:70	3 Hours	PE

Course Objectives:

- Aim of the course is to make learners familiar with the concepts of Robotic Process Automation

Course Outcomes(CO):

On completion of this course, student will be able to:

- Describe RPA, where it can be applied and how it's implemented.
- Identify and understand Web Control Room and Client Introduction
- Understand how to handle various devices and the workload

5. Understand Bot creators, Web recorders and task editors

Syllabus	Total Hours:48
Unit-I	**10Hrs**
Introduction to Robotic Process Automation & Bot Creation Introduction to RPA and Use cases – Automation Anywhere Enterprise Platform – Advanced features and capabilities – Ways to create Bots	
Unit-II	**9Hrs**
Web Control Room and Client Introduction - Features Panel - Dashboard (Home, Bots, Devices, Audit, Workload, Insights) - Features Panel – Activity (View Tasks in Progress and Scheduled Tasks) - Bots (View Bots Uploaded and Credentials)	
Unit-III	**10Hrs**
Devices (View Development and Runtime Clients and Device Pools) - Workload (Queues and SLA Calculator) - Audit Log (View Activities Logged which are associated with Web CR) - Administration (Configure Settings, Users, Roles, License and Migration) - Demo of Exposed API's – Conclusion – Client introduction and Conclusion.	
Unit-IV	**10Hrs**
Bot Creator Introduction – Recorders – Smart Recorders – Web Recorders – Screen Recorders - Task Editor – Variables - Command Library – Loop Command – Excel Command – Database Command - String Operation Command - XML Command	
Unit-V	**9Hrs**
Terminal Emulator Command - PDF Integration Command - FTP Command - PGP Command - Object Cloning Command - Error Handling Command - Manage Windows Control Command - Workflow Designer - Report Designer	

Text Books:

1. Learning Robotic Process Automation: Create Software robots and automate business processes with the leading RPA tool - UiPath: Create Software robots. with the leading RPA tool – UiPath Kindle Edition.

Reference Books:

1. Robotic Process Automation A Complete Guide - 2020 Edition Kindle Edition

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M.Tech I Year II Semester

ADVANCES IN SOFTWARE ENGINEERING LAB
(Common to M.Tech CSE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
25D5812P	0:0:4:0	2	CIE: 30 SEE:70	3 Hours	PC

Course Objectives:

This course will enable students to:

- To apply software engineering methodologies, project management techniques, and UML modeling in the development of software projects.
- To design, implement, test, and maintain software systems using object-oriented principles, design patterns, version control, and DevOps practices.
- To evaluate software quality through testing, metrics, risk analysis, reuse strategies, and modern AI-based software engineering tools.

Course Outcomes(CO):

On completion of this course, student will be able to

1. CO1: Apply various software process models and project management techniques (estimation, scheduling, risk management) to plan and manage software development effectively.
2. CO2: Perform requirements elicitation, documentation, and system modeling using UML to capture, analyze, and validate software requirements.
3. CO3: Design software systems using object-oriented principles, design patterns, and component-based approaches for modularity, reusability, and maintainability.
4. CO4: Implement software testing strategies, maintenance techniques, and reengineering practices to ensure software quality, reliability, and evolution.
5. CO5: Utilize modern software engineering tools and practices such as version control, DevOps pipelines, software metrics, and AI-based analysis to enhance development efficiency and quality assurance

Syllabus	Total Hours:48

Experiment 1: Comparative Study of Process Models
Implement a simple project using **Waterfall** and **Incremental models**; compare effort, defects, and time taken.

Experiment 2: Agile Development Simulation
Develop a small software system using **Scrum methodology** with sprints, product backlog, sprint backlog, and daily scrums.

Experiment 3:
Project Estimation and Scheduling
Perform **Function Point Analysis (FPA)** or **Use Case Points (UCP)** to estimate size and effort, then prepare a Gantt chart and PERT chart.

Experiment 4: Risk Analysis in Software Projects
Conduct risk identification, qualitative/quantitative assessment, and develop a **risk mitigation plan** for a given case study.

Experiment 5: Requirement Elicitation and SRS Document
Conduct requirement gathering for a mini-project and prepare a **Software Requirement Specification (SRS)** document.

Experiment 6: UML Modeling (Scenario-based & Structural)
Create **Use Case diagrams, Activity diagrams, and Sequence diagrams** for a given problem domain.

Experiment 7: UML Modeling (Class &Behavioral)
Create **Class diagrams, State machine diagrams, and Component diagrams** to represent system architecture.

Experiment 8: Object-Oriented Design Using UML
Design a software module using **OO principles** (encapsulation, inheritance, polymorphism) and illustrate with UML diagrams.

Experiment 9: Design Patterns Implementation
Implement **at least three design patterns** (e.g., Singleton, Factory, Observer) in Java/Python.

Experiment 10: Reuse-Oriented Software Engineering
Use existing **open-source libraries/frameworks** to develop a component-based application (e.g., web app using Django/Flask).

Experiment 11: Black-box and White-box Testing
Perform **equivalence partitioning and boundary value analysis** (black-box) and **basis path testing** (white-box) for a given program.

Experiment 12: Software Maintenance and Reengineering
Take an **existing open-source project** (small module), analyze it, and perform **refactoring/reengineering** for improvement.

Experiment 13: Version Control and DevOps Pipeline
Use **Git & GitHub/GitLab** for version control and demonstrate **CI/CD pipeline** setup with Jenkins/GitHub Actions.

Experiment 14: Software Metrics and AI in SE
Compute **software metrics** (complexity, coupling, cohesion) for a given project and explore an **AI tool** (e.g., GitHub Copilot, SonarQube) for software quality analysis..

Text Books:

1. Software Engineering A Practitioner's Approach, Roger S. Pressman, 9th Edition McGrawHill International Edition.
2. 2. Fundamentals of Software Engineering, Rajib Mall, Fifth Edition, PHI.

Reference Books:

1. Software Engineering, Ian Sommerville, Tenth Edition, Pearson education.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India,2010.
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.

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M.Tech I Year II Semester

ADVANCED DATABASES LAB
(Common to M.Tech CSE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
25D5813P	0:0:4:0	2	CIE: 30 SEE:70	3 Hours	PC

Course Objectives:

This course will enable students to:

- Knowledge on concepts of Distributed Databases, Object-Based Databases, advanced database models

Course Outcomes(CO):

On completion of this course, student will be able to

- Understand Database system Architectures and parallel databases
- Analyze transactions, Concurrency Control in Distributed Databases
- Understand the importance of Data Warehousing and Mining
- Illustrate concepts of object based databases

Syllabus **Total Hours:48**

List of Experiments

1. Write a program to implement RDBMS - Cursors, Triggers
2. Write a Program to implement Range Partitioning sort.
3. Write a program to implement parallel hash join
4. Write a program to implement parallel nested join loop
5. Write a program to implement parallelize duplicate elimination by partitioning the tuples
6. Perform data fragmentation of distributed data(Horizontal, Vertical, Hybrid fragmentation)
7. Implement deadlock detection in distributed databases
8. Implement Semi Join algorithm.
9. DataCube Implementation - Aggregation
10. Perform data Integration - Extraction, Transformation, Loading
11. Implement any one classifier
12. Implement vector space models for Text corpus
13. Demonstrate type inheritance, table inheritance in object based databases
14. Write queries in XQueries on DTD 15. Write queries in SQL/XML to convert University data - XML Schema

Reference Books:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan Database System Concepts, Sixth Edition
2. RamezElmasri, Shamkant B. Navathe, Database systems- Models, Languages, Design and Application Programming..

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M.Tech I Year II Semester

QUANTUM TECHNOLOGIES AND APPLICATIONS
(Common to M.Tech CSE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
25D5814T	2:0:0:0	2	CIE: 30 SEE:70	3 Hours	MC

Course Objectives:

This course will enable students:

- Present core quantum principles such as superposition and entanglement without mathematical formalism.
- Develop conceptual clarity on qubits, quantum states, and information frameworks.
- Examine the theoretical challenges in realizing scalable quantum systems.
- Introduce foundational ideas in quantum communication and computing.
- Highlight applications, industrial adoption, and future research directions in quantum technologies.

Course Outcomes(CO):

On completion of this course, student will be able to:

1. Explain fundamental quantum concepts conceptually.
2. Distinguish classical information systems from quantum information frameworks.
3. Identify the principal theoretical limitations in building quantum computers.
4. Describe the conceptual basis of quantum communication and computation.
5. Discuss current applications, technological trajectories, and career opportunities in the quantum domain.

Syllabus		Total Hours:48
Unit-I	**Foundations of Quantum Theory and Technologies**	**10Hrs**

Transition from classical to quantum physics. Key conceptual principles: Superposition, Entanglement, Uncertainty, Wave-particle duality. Quantum states and measurement; the role of the observer. Representative quantum systems: electrons, photons, atoms. Concept of quantization and discrete energy levels. Strategic relevance of quantum technologies. Overview of major domains: Computing, Communication, Sensing. Global quantum initiatives: India's National Quantum Mission, EU Quantum Flagship, USA, China.

Unit-II	**Conceptual Structure of Quantum Information**	**9Hrs**

Qubits: qualitative understanding using spin and polarization. Classical bits vs quantum bits: distinctions and implications. Quantum systems (non-engineering perspective): trapped ions, superconducting qubits, photonics. Coherence and decoherence mechanisms. Abstract notions: quantum states, measurement operators, Hilbert space—interpretation without mathematics. Entanglement and non-locality as foundational resources. Quantum vs classical information principles; philosophical considerations.

Unit-III	**Building a Quantum Computer – Challenges and Requirements**	**10Hrs**

Conceptual prerequisites for functional quantum hardware. Fragility of quantum states: decoherence, noise, stability issues. Requirements: isolation, error resilience, scalability, control. Why maintaining entanglement is difficult; theoretical necessity of quantum error correction. Comparative overview of hardware platforms (superconducting circuits, trapped ions, photonics).Current progress vs scientific constraints; conceptual view of quantum software's role

Unit-IV	**Quantum Communication and Computing**	**9Hrs**
(Redundant explanations removed, retaining only unique themes.)Quantum vs classical communication paradigms. Essentials of Quantum Key Distribution (QKD) and its security rationale. Entanglement-enabled communication protocols. Concept of the Quantum Internet and secure global networking. Introduction to quantum computing and quantum parallelism. Conceptual comparison of classical and quantum gate operations. Challenges: decoherence, noise, and the necessity of error correction frameworks.		
Unit-V	**Applications, Industry, and Future Directions**	**10Hrs**
Application domains: Healthcare and drug discovery, Material science and chemistry, Optimization and logistics, Quantum sensing and precision timing. Case studies: IBM, Google, Microsoft, PsiQuantum. Ethical, societal, and policy considerations. Barriers to adoption: cost, skilled workforce, standards. Emerging research and career landscapes; India's strategic opportunity in the global quantum ecosystem.		

Text Books:

1. Nielsen & Chuang, Quantum Computation and Quantum Information, Cambridge University Press, 2010.
2. Rieffel & Polak, Quantum Computing: A Gentle Introduction, MIT Press, 2011. 3. Chris Bernhardt, Quantum Computing for Everyone, MIT Press, 2019.

Reference Books:

1. David McMahon, Quantum Computing Explained, Wiley, 2008.
2. Kaye, Laflamme, Mosca, An Introduction to Quantum Computing, OUP, 2007.
3. Scott Aaronson, Quantum Computing Since Democritus, CUP, 2013.
4. Susskind & Friedman, Quantum Mechanics: The Theoretical Minimum, Basic Books, 2014.
5. Rosenblum & Kuttner, Quantum Enigma, OUP, 2011.
6. Benenti et al., Principles of Quantum Computation and Information, World Scientific, 2004.
7. DST India and MeitY: Official Quantum Mission Reports, 2020 onwards.
8. Quantum Flagship EU: Roadmaps and Strategy Documents**.**

Online Resources:

1. IBM Quantum Experience & Qiskit Textbook
2. Coursera – Quantum Mechanics and Quantum Computation (UC Berkeley)
3. edX – Quantum Internet & Quantum Computers
4. YouTube – Quantum Computing for the Determined (Michael Nielsen).

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M.Tech I Year II Semester

PEDAGOGY STUDIES
(Common to M.Tech CSE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
25MAC04	2:0:0:0	0	CIE: 30	-	AC

Course Objectives:

This course will enable students:

- To enable the students to understand the aims, rationale, policy background, and conceptual frameworks in pedagogy, curriculum, and teacher education research.
- To develop an understanding of diverse pedagogical practices
- To make them learn the methodologies for assessing the effectiveness of pedagogical practices and teacher education models.
- To enable them to learn professional development strategies, including peer support, community engagement, and alignment with curriculum and assessment.

Course Outcomes(CO):

On completion of this course, student will be able to:

1. Define and explain key concepts, frameworks, and methodologies in pedagogy and teacher education research.
2. Critically analyze pedagogical practices used in diverse classroom settings, with reference to teacher education and curriculum design.
3. Evaluate the effectiveness of pedagogical approaches using quality assessment tools and theory of change models.
4. Apply evidence-based strategies to improve classroom practices, curriculum alignment, and teacher professional development.
5. Identify and address barriers to learning through innovative pedagogical strategies.
6. Design and propose research studies that contribute to filling gaps in pedagogy, curriculum, and teacher education, with focus on dissemination and impact.

	Syllabus	Total Hours:32
Unit-I	**Foundations of Pedagogy**	**5Hrs**

Introduction to pedagogy and its importance in education - Historical and philosophical foundations of pedagogy - Theories of learning and teaching (behaviorist, cognitive, constructivist) - Role of pedagogy in shaping educational practices - Role of technology in modern pedagogy (ICT, e-learning, blended learning)

Unit-II	**Teaching-Learning Processes**	**6Hrs**

Understanding the teaching-learning process - Lesson planning and curriculum design - Strategies for effective teaching and learning (expository, collaborative, experiential) - Use of technology to enhance teaching-learning processes (multimedia, simulations, gamification)

Unit-III	**Technology Integration in Education**	**5Hrs**

Educational technology and system design - Instructional design models (ADDIE, ASSURE, Dick and Carey Model) - Emerging trends in e-learning (social learning, MOOCs, mobile learning) - ICT tools for teaching and learning (Learning Management Systems, online resources)

Unit-IV	Pedagogy and Assessment	5Hrs
Pedagogy, pedagogical analysis, and assessment - Types of assessment (placement, formative, diagnostic, summative) - Technology-based assessment tools (online quizzes, polls, discussions) - Rubrics for self and peer evaluation- Reflective Practices		
Unit-V	**Contemporary Issues and Trends**	**6Hrs**
Inclusive education and technology (assistive technology, accessibility) - Change management and innovation in education - Quality assurance and evaluation in education (TQM, Six Sigma) - Future trends in pedagogy and technology (AI, AR, VR in education) - Personalized learning and adaptive teaching		

Text Books:

1. Alexander, R. J. *Essays on Pedagogy*. Routledge, 2008.
2. Shulman, L. S. *The Wisdom of Practice: Essays on Teaching, Learning, and Learning to Teach*. Jossey-Bass, 2004

Reference Books:

1. *Teaching for the Future: Effective Teacher Education and Pedagogical Practices*. OECD Publishing., 2021
2. Fullan, M., & Edwards, M. *System Change in Education: Sustainability and Impact*. Routledge, 2022.
3. Coe, R., Rauch, C., Kime, S., & Singleton, D. *Great Teaching Toolkit: Evidence Review*. Evidence Based Education., 2020
4. Zeichner, K. M. *The Struggle for the Soul of Teacher Education*. Routledge, 2024
5. UNESCO. *Global Education Monitoring Report: Pedagogy, Teachers and Learning*. UNESCO Publishing, 2024
6. Hattie, J. *Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement*. Routledge., 2009
7. Darling-Hammond, L. *Teacher Education Around the World: What Can We Learn from International Practice?* Routledge, 2007

Online Resources:

1. **UNESCO Education Resources** – https://www.unesco.org/education
2. **OECD Education and Skills** – https://www.oecd.org/education
3. **ERIC (Education Resources Information Center)** – https://eric.ed.gov (peer-reviewed papers, reports).
4. **World Bank Education** – https://www.worldbank.org/en/topic/education (research reports on teacher development in developing countries).
5. **NPTEL/SWAYAM MOOCs** – Teacher education and pedagogy-focused courses.
6. **Google Scholar Alerts** – set alerts for "pedagogical practices", "teacher education", "curriculum research" for the latest academic papers.

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M.Tech I Year II Semester

ERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS
(Common to M.Tech CSE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
25MAC05	2:0:0:0	0	CIE: 30	-	AC

Course Objectives:

This course will enable students:

- To develop students' self-awareness by identifying their strengths, weaknesses, opportunities, and challenges (SWOC analysis).
- To enable students to understand and apply the principles of emotional intelligence and effective interpersonal communication.
- To cultivate positive thinking, resilience, mindfulness, and a growth-oriented mindset.
- To enhance verbal and non-verbal communication skills, including confidence in public speaking and professional presentations.
- To familiarize students with leadership styles, teamwork strategies, and collaborative problem-solving in personal and professional contexts.

Course Outcomes(CO):

On completion of this course, student will be able to:

1. Define and explain key concepts of self-awareness, personality, and personal growth.
2. Identify and apply strategies of emotional intelligence to regulate emotions and build effective interpersonal relationships
3. Demonstrate positive thinking, gratitude, and resilience to overcome personal and professional challenges
4. Analyze barriers to effective communication and apply verbal and non-verbal communication techniques in diverse contexts.
5. Prepare, deliver, and evaluate effective presentations and public speeches with confidence
6. Develop leadership and teamwork skills to collaborate, negotiate, and solve problems in group settings.

Syllabus		Total Hours:48
Unit-I	**Self-Awareness and Personal Growth**	**5Hrs**

Understanding personality and its development- Identifying strengths, weaknesses, opportunities, and challenges (SWOC analysis)- Setting personal and professional goals- Practicing Self-Reflection and Journaling (Activities: Personalitya assessments, self reflection exercises, group discussions, SWOC analysis worksheet, Action Plan, SMART goal activities, Reflective journaling, Self-care Planning)

Unit-II	**Emotional Intelligence and Interpersonal Skills**	**6Hrs**

Understanding emotional intelligence and its importance - Developing self-awareness, self-regulation, and motivation - Building effective communication and interpersonal skills - Conflict resolution and negotiation strategies. (Activities: Emotional Intelligence Quiz, Self-Reflection exercises, feedback sessions, mindfulness exercises, Positive self-talk, Active Listening exercises, conflict-resolution Role-play, Case studies & Group activities)

Unit-III	Positive Thinking and Attitude	6Hrs
Understanding the power of positive thinking- Developing a growth mindset and resilience - Practicing gratitude and mindfulness- Overcoming negative thoughts and behaviors (Activities on positive thinking, growth mindset, mindfulness and self-care plan for overcoming negative thoughts)		
Unit-IV	**Effective Communication and Presentation Skills**	**5Hrs**
Understanding the importance of effective communication- Developing verbal and non-verbal communication skills- Preparing and delivering effective presentations- Building confidence and public speaking skills (Activities: Group discussions, Case studies, Role-Play, Non-verbal communication exercises, Practice presentations, Peer feedback, Public speaking exercises, Storytelling, Debates)		
Unit-V	**Leadership and Teamwork**	**5Hrs**
Understanding leadership styles and qualities - Developing leadership skills and qualities- Building effective teams and teamwork strategies- Practicing collaboration and problem-solving (Activities: Case studies, Group discussions, Debates, Leadership role-playing, team building activities, Group projects, Collaborative problem-solving exercies, feedback sessions)		

Text Books:

1. Daniel Goleman,*Emotional Intelligence: Why It Can Matter More Than IQ*, Bantam Books, 2017.
2. Stephen R. Covey, *The 7 Habits of Highly Effective People*, Simon & Schuster, 2020

Reference Books:

1. Dale Carnegie, *How to Win Friends and Influence People*, Simon & Schuster, 2020.
2. Brian Tracy, *Goals!: How to Get Everything You Want Faster Than You Ever Thought Possible*, Berrett-Koehler Publishers, 2021.
3. Robin Sharma, *The 5 AM Club: Own Your Morning, Elevate Your Life*, HarperCollins, 2020.
4. Carol S. Dweck, *Mindset: The New Psychology of Success*, Random House, 2016.
5. Daniel H. Pink,*Drive: The Surprising Truth About What Motivates Us*, Riverhead Books, 2018.
6. John C. Maxwell, *Leadershift: 11 Essential Changes Every Leader Must Embrace*, HarperCollins, 2019.

Online Resources:

1. **Coursera** – *Personal Development Specialization* (https://www.coursera.org)
2. **edX** – *Leadership and Emotional Intelligence Courses* (https://www.edx.org)
3. **FutureLearn** – *Mindfulness and Resilience Training* (https://www.futurelearn.com)
4. **MindTools** – Practical resources on leadership, communication, and emotional intelligence (https://www.mindtools.com)
5. **Positive Psychology** – Articles and tools on resilience, gratitude, and well-being (https://positivepsychology.com)
6. **TED Talks** – Inspirational talks on leadership, communication, and self-growth (https://www.ted.com)
7. **Harvard Business Review (HBR)** – Leadership, negotiation, and workplace communication (https://hbr.org)

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M.Tech I Year II Semester

YOGA FOR STRESS MANAGEMENT
(Common to M.Tech CSE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
25MAC06	2:0:0:0	0	CIE: 30	-	AC

Course Objectives:

This course will enable students:

- To make the students understand the foundational concepts of Yoga, including Ashtanga (eight limbs) as prescribed in classical texts.
- To enable them analyze the principles of Yama and Niyama, and their role in ethical, personal, and social development.
- To make them learn do's and don'ts of life through the practice of ahimsa, satya, astheya, brahmacharya, aparigraha, shaucha, santosh, tapa, swadhyaya, and ishwar-pranidhana.
- To make them practice asanas and pranayama techniques for physical fitness, mental balance, and spiritual awareness.
- To make them understand the holistic lifestyle through regular yoga practice, leading to personality development. .

Course Outcomes(CO):

On completion of this course, student will be able to:

1. Explain the eight limbs of Yoga (Ashtanga) and their interrelationship in holistic development.
2. Demonstrate understanding of Yama and Niyama as ethical guidelines and apply them in personal and professional life.
3. Differentiate between do's and don'ts in daily life with reference to Yogic principles like ahimsa, satya, and swadhyaya.
4. Perform selected asanas and pranayama techniques with correct posture, breathing, and awareness.
5. Evaluate the physical, mental, and emotional benefits of yoga practices in stress reduction, concentration, and self-discipline.
6. Integrate yoga philosophy and practices into a personal routine for sustainable health and inner growth.

Syllabus		Total Hours:48
Unit-I		**5Hrs**
Definitions of Eight parts of yoga.(Ashtanga)		
Unit-II		**5Hrs**
Yam and Niyam.		
Unit-III		**6Hrs**
Do's and Don'tsin life. i) Ahinsa,satya,astheya,bramhacharya and aparigraha ii)Shaucha,santosh,tapa,swadhyay,ishwarpranidhan		
Unit-IV		**5Hrs**
Asanand Pranayam		
Unit-V	**Contemporary Issues and Trends**	**6Hrs**
i) Various yoga poses and their benefits for mind and body ii) Regularization of breathing techniques and its effects-Types of pranayam		

Text Books:

1. Swami Prabhavananda and Christopher Isherwood (translation & commentary), *Patanjali Yoga Sutras,*Sri Ramakrishna Math, 1953.
2. B.K.S. Iyengar, *Light on Yoga*, Thorsons, 2003.

Reference Books:

1. T.K.V. Desikachar, *The Heart of Yoga: Developing a Personal Practice,* Inner Traditions 2nd Edition, 1999.
2. Acharya Yatendra, *Yoga & Stress Management*, Fingerprint Publishers, 2019
3. Yamini Muthanna, *The Power of Yoga,* Om Books International, 2015.
4. Nayaswami Devarshi, *Kriya Yoga: Spiritual Awakening for the New Age,* Ananda Sangha Publications, 2023.

Online Resources:

1. **NPTEL / SWAYAM Online Courses** – Yoga and Physical Education modules.
2. **AYUSH Ministry Website**: https://yoga.ayush.gov.in – official yoga resources, protocols, and research.
3. **Yoga Journal**: https://www.yogajournal.com – practical guides, research updates, asana tutorials.
4. **Art of Living Foundation**: https://www.artofliving.org – pranayama, meditation, and wellness practices.
5. **YouTube Channels** (scholarly & practice-based):
   - *Sivananda Yoga Vedanta Centre*
   - *Yoga with Adriene* (for practical asana guidance)