K.E. Society's

Rajarambapu Institute of Technology, Sakharale

(An Empowered Autonomous Institute, affiliated to Shivaji University, Kolhapur)

Final Year B. Tech. Syllabus

To be implemented for 2022-26 Batch

Department of Computer Science and Information Technology

Class: **Final Year B. Tech**	Semester: **VII**
Course Code: **CI4012**	Course Name : **Information Security**

L	T	P	Credits
3	--	--	3

Course Description:

Information security is a rapidly evolving field in today's date. This course establishes the foundation for understanding the broader field of information security. It introduces the basic concepts and principles of information security and the fundamental approaches to secure computers and networks. It covers main security topics including security basics, threats and defenses, cryptography algorithms, access control, authentication, network security, operating system security, web security, Intrusion Detection and Prevention, etc. It also presents several legal and ethical issues that are commonly found in today's organizations.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Describe the key components of information security.
2. Analyze different threats & attack modes.
3. Apply cipher techniques and cryptographic algorithms & tools.
4. Identify the ways to provide access control like authorization and authentication.
5. Compare the security provisions in network, operating systems and web applications.
6. Explain the purpose and the need for intrusion detection systems (IDS) and intrusion prevention systems (IPS).

Prerequisite: Basics of Computer Networks

Course Content

Unit No.	Description	Hrs
1.	**Introduction** The History and Evolution of Information Security, Confidentiality, Integrity, and Availability – The CIA Triad, Threats, Vulnerabilities, and Risks, The Risk Management Process, Security Frameworks.	05
2.	**Threats and Attacks** Threat Terminology, Types of Attacks, Spoofing Attacks, Social Engineering, Application Attacks, Web Application Attacks, Malware attacks, Denial of Service (DoS), and Distributed Denial of Service.	06

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3.	**Cryptography** Cryptographic History, Goals of Cryptography, Symmetric Key Algorithms: DES, 3DES, AES, Asymmetric Key Algorithms: RSA, DSA, Diffie-Hellman, Hashing Algorithms: Digital Certificates, Message Digest 5 (MD5), Secure Hash Algorithms (SHA-0, SHA-1, SHA-2, and SHA-3), HMAC.	**07**
4.	**Access Control, Identification, and Authentication** Access Control, Access Control Terminology, Access Control Models: MAC, DAC, RBAC, RB RBAC, Identification Authentication Types, Human Authentication Factors, Authentication Forms, Authentication Protocols, Single Sign-On (SSO), Public-Key Infrastructure (PKI).	**05**
5.	**Network & Operating System Security** Network Security Design, Firewalls, Wireless Networks, Network Protection, Web Security, Operating System Security: OS Hardening, OS Protection Methods, OS Firewalls, OS Security Tools. Web Application Security (through Burp suite): File upload vulnerabilities, Cross-site scripting, Cross-site request forgery (CSRF), Server-side request forgery (SSRF), DOM-based vulnerabilities, Intercepting mobile device traffics.	**07**
6.	**Intrusion Detection and Prevention Systems** Intrusion Detection Systems (IDS), Network Intrusion Detection Systems (NIDS), Host-based Intrusion Detection Systems (HIDS), Intrusion Prevention Systems (IPS), System Information and Event Management (SIEM). Electronic Data Privacy Protection, Global Privacy Laws.	**06**

References -

Text Books:

- William Stallings; "Cryptography and Network Security: Principles and Practice" ,s Pearson.
- Michael E. Whitman and Herbert J. Mattord, "Principles of Information Security", Course Technology Cengage Learning.

Reference Books:

- Goldreich, "Foundations of Cryptography - Basic Applications", Cambridge University Press
- Atul Kahate, "Cryptography and Network Security", McGraw Hill Education.

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Class: **Final Year B. Tech**	Semester: **VII**
Course Code: **CI4032**	Course Name : **Cloud Computing**

L	T	P	Credits
2	--	--	2

Course Description:
Cloud computing is a scalable services consumption and delivery platform that provides on-demand computing service for shared pool of resources, namely servers, storage, networking, software, database, applications etc., over the Internet. It is a model for enabling ubiquitous, on-demand access to a shared pool of configurable computing resources, which can be rapidly provisioned and released with minimal management effort. This course will introduce various aspects of cloud computing, including fundamentals, management issues, security challenges and future research trends. This will help students to use and explore cloud computing platforms.

Course Learning Outcomes:
After successful completion of the course, students will be able to,

1. Illustrate the technological changes in computing technologies.
2. Compare the architectures and service & deployment models of cloud computing
3. Explore the need and importance of virtualization technologies
4. Practice various cloud applications to obtain the cloud platform services.
5. Examine cloud computing service and application adoption issues in different sectors by considering business issues.
6. Elaborate advanced applications in different sectors of cloud computing market.

Prerequisite: Basics of Computer Networks

Course Content

Unit No.	Description	Hrs
1.	**Journey to cloud computing** Definition, cloud computing reference model, Characteristics and benefits, Challenges ahead, Historical developments - Distributed systems, virtualization, Web 2.0, Service-oriented computing, Utility-oriented computing, Elements of distributed computing, Technologies for distributed computing.	04

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2.	**Cloud Computing Models and architecture** NIST architecture, SOA architecture, service models, deployment models, Economics of the cloud, Open challenges	**04**
3.	**Virtualization** Characteristics of virtualized environments, Taxonomy of virtualization techniques, Virtualization and cloud computing, Pros and cons of virtualization, Technology examples- Xen: paravirtualization, VMware: full virtualization, Microsoft Hyper-V.	**04**
4.	**Cloud Platforms in Industry** Amazon web services, Google AppEngine, Microsoft Azure, Aneka platform.	**04**
5.	**Business related issues** Service level Agreements, licensing strategies, total cost of ownership, adoption framework.	**04**
6.	**Cloud Applications and Advanced Topics** Scientific applications, Business and consumer applications, Energy efficiency in clouds, Market-based management of clouds.	**04**

References -

Text Books:

- Rajkumar Buyya, Australia Christian Vecchiola, Australia S. Thamarai Selvi "Mastering Cloud Computing Foundations and Applications Programming", Elsevier Incorporation.

Reference Books:

- Rajkumar Buyya, James Broberg, Andrzej Goscinski "Cloud Computing: Principles and Paradigms", John Wiley & Sons, Inc.
- Judith Hurwitz, R.Bloor, M.Kanfman, F.Halper, "Cloud Computing for Dummies", Wiley India Edition

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Class: **Final Year B. Tech**	Semester: **VII**
Course Code: **CI437**	Course Name: **High Performance Computing**

L	T	P	Credits
2	--	--	2

Course Description:

This course introduces the fundamental concepts, techniques, and methodologies of parallel computing and high-performance computing (HPC). Students will learn parallel programming models and tools used in designing and developing scalable and efficient parallel software solutions for modern computing platforms.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Designate different parallel paradigms, inter connection networks, and tools for parallel programming.
2. Illustrate the design methodology and relevant parallel programming techniques to be used for parallelization of a given problem.
3. Analyze a given problem for possibilities of parallel computations.
4. Evaluate different parallel algorithms using performance metrics

Prerequisite: Computer Architecture, C/C++ programming language

Course Content

Unit No.	Description	Hrs
1.	**Introduction** Parallel Computing, Scope and issues in parallel computing. Taxonomy of parallel architecture, Memory bound vs Compute bound problems, Dynamic interconnection networks, static interconnection networks, Routing mechanism for static network. Communication cost in static interconnection network.	04
2.	**Parallel programming models and paradigms** Introduction, parallel applications and development, code granularity and level of parallelism, parallel programming models and tools, methodical design of parallel algorithm, parallel program paradigm, programming skeleton and templates.	04
3.	**Parallel programming libraries** OpenMP, MPI, Thread basics, Work Sharing constructs, Scheduling, Reduction, Mutual Exclusion Synchronization & Barriers, MPI Programming Model, MPI Basics, Global Operations, Asynchronous	05

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	Communication, Modularity, Other MPI Features, Performance Issues, Thread programming C++11 Threads, OpenMP, MPI - two-sided communication, one side communication-based programming model aka PGAS (Partitioned Global Address Space) eg: OpenSHMEM/NVSHMEM	
4.	**Performance and scalability of parallel systems** Performance Metrics for parallel systems. The effect of Granularity and Data Mapping on Performance. The Scalability of parallel systems, Isoefficiency metric of scalability, sources of parallel overhead, Minimum execution time and minimum cost-optimal execution time, parallel work efficiency, Amdahl limiters, communication-computation overlap/pipelining.	**04**
5.	**Parallel programming using accelerators** Introduction of CUDA/OpenCL, Chapel, etc. Basics of GPGPU, CUDA Programming model, CUDA memory type, CUDA and/or OpenCL for GPGPU hardware, case study.	**04**
6.	**Algorithms** Dense matrix algorithms, sorting, graph algorithms, prefix sum with decoupled lookback, parallel radix sort/batcher's sort	**03**

References -

Text Books:

- Ananth Grama, Anshul Gupta, George Karypis and Vipin Kumar, "Introduction to Parallel Computing", Addison Wesley.
- Rajkumar Buyya, "High Performance Cluster Computing: Programming and Applications", Prentice Hall.
- Shane cook, "CUDA Programming: A Developer's Guide to Parallel Computing with GPUs (Applications of Gpu Computing)", Morgan Kaufmann.

Reference Books:

- Michael J. Quinn, "Parallel Programming in C with MPI and OpenMP", McGraw-Hill.
- Peter Pacheco, "Introduction to Parallel Programming", Morgan Kaufmann.

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Class: **Final Year B. Tech**	Semester: **VII**
Course Code: **CI4052**	Course Name: **Big Data** (Program Elective-III)

L	T	P	Credits
3	--	--	3

Course Description:

Big data is a field that treats ways to analyze, systematically extract information from, or otherwise deal with data sets that are too large or complex to be dealt with by traditional data-processing application software. Data with many cases (rows) offer greater statistical power, while data with higher complexity (more attributes or columns) may lead to a higher false discovery rate. Big data challenges include capturing data, data storage, data analysis, search, sharing, transfer, visualization, querying, updating, information privacy and data source.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Describe the need of Big Data Technologies.
2. Analyze the big data framework like Hadoop and HBase to efficiently store and process big data to generate analytics.
3. Design algorithm to solve data intensive problems using Map Reduce framework.
4. Construct the queries using HIVEQL.
5. Implement big data activities using Hive and Pig.

Prerequisite: Knowledge of Database Engineering

Course Content

Unit No.	Description	Hrs
1.	**Introduction to Big data** Distributed Systems: Characteristics, Design Goals, A model of distributed computations-A distributed Program, Introduction to distributed file system. Big Data: Characteristics of Data, Evolution of Big Data, Definition of Big Data, Challenges with Big Data, Big data analytics, Importance and challenges facing big data,, Terminologies used in Big data environment.	06
2.	**Introduction to Hadoop and Architecture** RDBMS versus Hadoop, Distributed Computing Challenges, History and overview of Hadoop, Use Case of Hadoop, Hadoop Distributors, Processing Data with Hadoop, Interacting with Hadoop Ecosystem.	06

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3.	**Hadoop Storage and MapReduce** Hadoop Storage: HDFS, Common Hadoop Shell commands, Anatomy of File Write and Read, NameNode, Secondary Name Node, and Data Node, Hadoop MapReduce paradigm, Introduction , Mapper, Reducer, Combiner, Partitioner, Searching, Sorting, Compression, Real time applications using MapReduce.	**06**
4.	**Hadoop Ecosystem and YARN** Hadoop Ecosystem, Hadoop ecosystem components, Schedulers, Fair and Capacity, Hadoop 2.0 New Features, Name Node, High Availability, HDFS Federation, MRv2, YARN, Running MRv1 in YARN.	**06**
5.	**HIVE and HIVEQL** Introduction to Hive, Hive architecture, Hive data types, Hive file format, Hive Query Language (HIVEQL), User-Defined Function (UDF) in Hive.	**06**
6.	**Pig and HBase** HBase concepts, Advanced Usage, Schema Design, Advanced Indexing - PIG, Zookeeper - how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications with Zookeeper. Spark - Features, Components, Spark stream processing, Streaming systems, Applications.	**06**

References -

Text Books:

- Boris Lublinsky, Kevin T. Smith, Alexey Yakubovich, "Professional Hadoop Solutions", Wiley.
- Seema Acharya, Subhashini Chellappan, "Big Data and Analytics", Wiley.

Reference Books:

- Chris Eaton, Dirk Deroos et al., "Understanding Big data", McGraw Hill.
- Tom White, "HADOOP: The definitive Guide", O Reilly.

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Class: **Final Year B. Tech**	Semester: **VII**
Course Code: **CI441**	Course Name: **Generative AI** (Program Elective-III)

L	T	P	Credits
3	--	--	3

Course Description:
Generative AI refers to a class of artificial intelligence systems that are designed to generate new, original content. These systems use machine learning techniques, particularly generative models, to produce data that is like, but not an exact copy of, the input data they were trained on. Generative models are a type of unsupervised learning algorithm that aims to learn the underlying patterns and structure of the training data, allowing them to generate new, coherent data samples. One prominent type of generative model is the Generative Adversarial Network (GAN) GANs consist of two neural networks, a generator, and a discriminator, which are trained simultaneously through adversarial training. In this course, we cover generative AI concepts, its models, applications, challenges, development, and deployment of generative models.

Course Learning Outcomes:
After successful completion of the course, students will be able to,

1. Explain the Generative AI concepts and models.
2. Analyze different generative models.
3. Describe the architecture and operational mechanisms of Large Language Models (LLMs).
4. Apply generative AI tools and techniques including prompt engineering.
5. Design, build, and deploy generative models.

Prerequisite: Basics of Artificial Intelligence

Course Content

Unit No	Description	Hrs
1.	**Introduction to Generative AI** Introduction, Structure, Objectives, Defining generative AI and its evolution Key components and mechanisms, Generative models, Autoregressive models, Evaluation. Evolutionary Breakthroughs in generative models,	06

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	Applications in the real world, Challenges and advancements, Anticipated future trajectory.	
2.	**Fundamentals of Generative Models** Overview of generative models, Generative Adversarial Networks (GANs), Google Brain, Facebook AI, IBM, Using generative adversarial networks, Autoencoders, Variational autoencoders, CycleGAN, Bidirectional Encoder Representations from Transformers (BERTs), DeepDream, Underlying principles of generative models, Fundamental differences between generative and discriminative models.	**06**
3.	**Introduction to Large Language Models** LLM – LLM Architecture, LLM Operations – Concept of Embedding, Tokenization, Attention Mechanism. LLM Specifications, Overview of Multimodal Generative Models. Responsible AI principles – Bias, Fairness, and Explainability, Exploring GPT, BERT, LLaMA, and Claude, Fine-Tuning Pretrained LLMs for Domain-Specific Tasks.	**06**
4.	**GPT: Generative Pre-trained Transformer** Introduction to GPT and its significance, Pre-training and fine-tuning processes in GPT, Architecture and working of GPT models, Overview of GPT variants and their use cases, ChatGPT: Introduction to ChatGPT and its purpose. Training data and techniques for ChatGPT, Handling user queries and generating responses.	**06**
5.	**Generative AI Tools and Applications** Generative AI Tools: Prompt Engineering – Role-Task-Output Format, Zero & Few shot learning, Chain of Thoughts, Chunking. Retrieval Augmented Generation (RAG) – Vector Embeddings, Semantic and Similarity Search. Basics of fine-tuning. Generative AI in different sectors, Case studies showcasing real-world applications, Collaborations between humans and AI, Ethical considerations in creative AI, Future trends and potential disruptions.	**05**
6.	**Building and Deploying Generative Models** Practical guide to developing generative models, Deploying generative models, Deploying a variational autoencoder on AWS AI platform, Deploying a generative adversarial network, AI services and tools, Google Cloud Platform: AI Platform, Deployment considerations and best practices, Overcoming common challenges in implementation.	**07**

References -

Text Books:

- Divit Gupta, Anushree Srivastava, "The Potential of Generative AI", BPB Online.
- Pamela Baker, "ChatGPT for dummies", John Wiley & Sons, Inc.

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Reference Books:

- Martin Musiol, "Generative AI: Navigating the Course to the Artificial General Intelligence Future", Wiley Publication.

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Class: **Final Year B. Tech**	Semester: **VII**
Course Code: **CI4072**	Course Name: **Augmented Reality and Virtual Reality** (Program Elective-III)

L	T	P	Credits
3	--	--	3

Course Description:
This course presents an introduction to virtual and augmented reality technologies, with an emphasis on designing and developing interactive virtual and augmented reality experiences. The course will cover the history of the area, fundamental theory, and interaction techniques. Students are provided with hands-on experience developing applications for modern virtual and augmented reality systems. In the course, students will also explore libraries and tools for creating AR/VR experiences such as Vuforia and UNITY.

Course Learning Outcomes:
After successful completion of the course, students will be able to,

1. Describe characteristics and usage of various graphic devices.
2. Explain the basic concepts of Virtual and Augmented Reality.
3. Apply Interaction design for AR/VR applications.
4. Apply basic 2D and 3D transformations.
5. Design and prototype simple AR/VR applications using UNITY platform for various application.

Prerequisite: Basic Mathematics, Basic Physics.

Course Content

Unit No	Description	Hrs
1.	**Introduction to graphics devices** Display Devices and Adapters, Working of Printers, LCD Display. Input and Output Devices for virtual Reality, Three-Dimensional Position Trackers, Navigation and Manipulation Interfaces, Gesture Interfaces, Graphical Display, Sound displays, Haptic Feedback.	06
2.	**Introduction to Augmented Reality** Definition and Scope, Brief History of Augmented Reality, Displays (Multimodal Displays, Spatial Display Model, and Visual Displays), Strong vs Weak AR, Applications of AR, Challenges in AR.	05
3.	**Introduction to Virtual Reality** Definition and Scope, Types of VR Characteristics, Basic VR environments, Limitations of VR environments, Immersion Vs Presence. VR hardware : VR	07

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	input hardware: tracking systems, motion capture systems, data gloves, VR output hardware: visual displays.	
4.	**Interaction design for AR/VR environments** Interaction design process Identifying user needs, AR/VR design considerations, Typical AR/VR Interface Metaphors, User experience (UX) guidelines for AR/VR, Evaluation of the developed AR/VR prototype.	**05**
5.	**Transformations: Basic 2D & 3D transformations** –Translation, Scaling, Rotation, Reflection, Shearing, Multiple Transformations, Rotation about an axis parallel to a coordinate axis, Rotation about an arbitrary axis in space, Affine and Perspective Geometry.	**06**
6.	**Introduction to UNITY** Unity Overview: Windows, Interface, Navigation, Terminology, Game Objects, Hierarchy, Parenting Objects, Asset Store, Importing Plug-ins, Creating a Terrain, Materials, Colors, Transparency, Introduction to Monobehaviors: Awake, Start, Update.	**07**

References -

Text Books:

- Vince, "Virtual Reality Systems", Pearson Education.
- Grigore Burdea, Philippe Coiffet, "Virtual Reality Technology", Wiley.
- Angel, Edward, "Computer graphics", Addison-Wesley Pub. Co.

Reference Books:

- Schmalstieg, D., & Hollerer, T. "Augmented reality: principles and practice", Addison-Wesley Professional.

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Class: **Final Year B. Tech**	Semester: **VII**
Course Code: **CI443**	Course Name: **Cloud Security** (Program Elective-III)

L	T	P	Credits
3	--	--	3

Course Description:
The Cloud Security course provides students with knowledge of securing cloud infrastructure, applications, and services in a cloud computing environment. It covers security threats, vulnerabilities, and defense mechanisms to protect data and services in public, private, and hybrid clouds. Students will gain practical skills in cloud security techniques such as access control, encryption, identity management, and securing virtualized environments.

Course Learning Outcomes:
After successful completion of the course, students will be able to,
1. Describe regulatory frameworks and standards for cloud security.
2. Identify common threats and vulnerabilities in cloud environments.
3. Design secure cloud architectures and implement security policies.
4. Apply encryption, authentication, and authorization techniques in the cloud.
5. Implement security solutions for data protection, disaster recovery, and compliance.
6. Analyze security challenges in multi-tenant and virtualized environments.

Prerequisite: Basics of Networking

Course Content

Unit No.	Description	Hrs
1.	**Introduction to Cloud Computing and Cloud Security** Cloud Computing Overview, Cloud Deployment Models (Public, Private, Hybrid), Cloud Service Models (IaaS, PaaS, SaaS), Cloud Architecture & Components, Importance of Security in Cloud Computing.	05
2.	**Cloud Computing Software Security Fundamentals** Cloud Information Security Objectives, Cloud Security Services, Cloud Security Design Principles, Secure Development Practices, Approaches to Cloud Software Requirements Engineering.	07
3.	**Cloud Computing Risk Issues** The CIA Triad, Privacy and Compliance Risks, Threats to Infrastructure, Data, and Access Control, Cloud Access Control Issues, Database Integrity Issues, Cloud Service Provider Risks.	06

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4.	**Cloud Computing Security Challenges** Security Policy Implementation, Computer Security Incident Response Team (CSIRT), Virtualization Security Management, VM Security Recommendations, VM-Specific Security Techniques.	**05**
5.	**Cloud Computing Security Architecture** Architectural Considerations, Trusted Cloud Computing, Secure Execution Environments and Communications, Identity Management and Access Control, Autonomic Security, Systems, Protection and Self-Healing.	**07**
6.	**Cloud Computing Life Cycle Issues** Standards, The Distributed Management Task Force (DMTF), The International Organization for Standardization (ISO), The Open Web Application Security Project (OWASP), Layered Security and IDS, Computer Security and Incident Response Teams.	**06**

References –

Text Books:

- Ronald L. Krutz, Russell Dean Vines, "Cloud Security: A Comprehensive Guide to Secure Cloud Computing", Wiley (ISBN: 978-0470870597)
- Debashis Saha, Abhishek Dutta, "Cloud Computing Security Issues and Challenges: A Survey", Springer (ISBN: 978-3642249346)

Reference Books:

- Nikos Antonopoulos, Lee Gillam, "Cloud Computing: Principles, Systems and Applications" , Springer (ISBN: 978-1849964870)
- P. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Pearson (ISBN: 978-0134079228)
- Thomas Erl, "Cloud Computing: Concepts, Technology & Architecture", Prentice Hall (ISBN: 978-0133387520)

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Class: **Final Year B. Tech**	Semester: **VII**
Course Code: **CI445**	Course Name: **Data Visualization with PowerBI Lab** (Program Elective-IV)

L	T	P	Credits
3	--	2	4

Course Description:

Data Visualization with PowerBI Lab based course introduces students to the fundamentals of data visualization using Microsoft Power BI. Participants will learn the skills required to navigate the complexities of data visualization, reporting, and analytics. Students gain hands-on experience with Power BI's powerful features, including data modeling, DAX (Data Analysis Expressions), and creating interactive dashboards.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Apply data visualization tools to describe data and generate insights from it.
2. Analyze large volume of data, discover trends, communicate effectively with all stakeholders and influence decisions.
3. Build the solutions for various real world problems.
4. Develop a comprehensive design for the results and create detailed written documents.

Prerequisite: Fundamental knowledge of MS Excel

Course Content

Unit No.	Description	Hrs
1.	**Introduction to Power BI** Introduction to Power BI, Traditional BI vs. Power BI, Uses of Power BI, The Flow of Work in Power BI, Working with Power BI, Basic Components of Power BI, Data model and importance of Data Modelling.	05
2.	**Data Preparation and Transformation** Data Sources in Power BI Desktop, Loading Data in Power BI Desktop, Views in Power BI Desktop, Query Editor in Power BI, Transform, Clean, Shape, and Model Data, Manage Data Relationship, Editing a Relationship, Cross Filter Direction, Saving Work File, Measures.	06

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3.	**Data Analysis Expression (DAX)** Introduction to DAX, Importance of DAX, Data Types in DAX, DAX Calculation Types, Steps to Create Calculated Columns, Measures in DAX, DAX Syntax, DAX Functions, DAX Operators, DAX Tables and Filtering	07
4.	**Data Visualization** Introduction to Visuals in Power BI, Visualization Charts in Power BI, Matrixes and Tables, Slicers and Map Visualizations, Gauges and Single Number Cards, Modifying Colors in Charts and Visuals, Shapes, Text Boxes, and Images, Custom Visuals, Page Layout and Formatting, Bookmarks and Selection Pane, KPI Visuals, Z-order, Grouping and Binning.	07
5.	**Creating Reports and Dashboards** Introduction to Power BI Service, Creating a Dashboard, Quick Insights in Power BI, Configuring a Dashboard, Power BI Q&A, Ask Questions about your Data, Power BI Embedded, Bookmarks and Button	04
6.	**Connecting Data Sources** Data Sources Supported in Power BI, Exploring Live Connections to Data Sources, Connecting Directly to SQL Azure, Connecting Directly to SQL Server Analysis Services/MySQL, Import Power View and Power Pivot, Data Gateways, Direct Query vs. Import Connectivity Modes, Connecting Power BI in Excel.	07

Experiment No.	Description	Hrs
1	Installation of Power BI	02
2	Import data from Excel and CSV files into Power BI. Explore data loading options and visualize the data in Power Query Editor.	02
3	Data Cleaning using Power BI query editor, Creating Measures, Transform, Clean, Shape, and Model Data for further analysis	02
4	Load two datasets and create relationships using primary and foreign keys. Analyze the effect of cross-filter directions.	02
5	Use DAX to create calculated columns (e.g. Age) and measures (e.g. Total Sales). Performing Data Analysis using DAX or Demonstrate their difference in visualizations	02
6	Apply DAX functions like SUM, AVERAGE, COUNT, IF, and RANK to analyze sales data. Visualize top 5 products and regions.	02
7	Use DAX functions (ALL, RELATED, FILTER) to aggregate and filter data. Create department-wise employee distribution visuals.	02

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8	Visualize data using bar, line, and pie charts. Add slicers to filter dynamically by year and region.	**02**
9	Modify chart colors, add shapes, text boxes, and KPIs like Total Revenue and Profit Margin in a report.	**02**
10	Create a dashboard with visuals (cards, gauges, line charts) to track business KPIs. Use bookmarks and buttons for navigation.	**04**
11	Use Power BI Q&A to ask questions about datasets. Explore Power BI Embedded by integrating a dashboard into a web application.	**02**

References -

Text Books:

- Devin Knight, Brian Knight, Mitchell Pearson, and Manuel Quintana , "Microsoft Power BI Quick Start Guide",Packt Publishing
- Brett Powell. "Microsoft Power BI Cookbook" , Packt Publishing
- Dan Clark "Beginning Microsoft Power BI: A Practical Guide to Self-Service Data Analytics" , Apress publisher

Reference Books:

- Gil Raviv ,"Collect, Combine, and Transform Data Using Power Query in Excel and Power BI", Microsoft Press
- Philip Seamark ,"Beginning DAX with Power BI: The SQL Pro's Guide to Better Business Intelligence" , Apress
- by Alberto Ferrari and Marco Russo ,"Analyzing Data with Power BI and Power Pivot for Excel", Microsoft Press
- Marco Russo and Alberto Ferrari , "The Definitive Guide to DAX", Microsoft Press
- Power BI Step by Step: A Comprehensive Guide to Visualizing Your Data by CSG Tutorials

Online Resources:

- https://learn.microsoft.com/en-us/power-bi/
- https://powerbi.microsoft.com/en-us/blog/
- Microsoft Power BI for Data Science (Coursera or Udemy courses)

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Class: **Final Year B. Tech.**	Semester: **VII**
Course Code: **CI447**	Course Name: **Deep Learning Lab** (Program Elective-IV)

L	T	P	Credits
3	--	2	4

Course Description:
Deep learning is a subfield of machine learning (ML) that focuses on the development and application of artificial neural networks to solve complex problems. Deep learning has achieved remarkable success in various tasks, including image and speech recognition, natural language processing, and playing games. Deep neural networks, particularly convolutional neural networks (CNNs) for image-related tasks and recurrent neural networks (RNNs) for sequential data, have been instrumental in pushing the boundaries of AI performance in recent years. This course explores the fundamentals of deep learning, libraries required like Keras, TensorFlow, PyTorch. Deep learning networks like ANN, CNN, RNN can be implemented using Python programming and can be applied to applications.

Course Learning Outcomes:
After successful completion of the course, students will be able to,

1. Setup the environment for deep learning using Keras and Tensorflow.
2. Implement deep learning using Neural Network.
3. Apply CNN, RNN, sequence models for problem solving.
4. Analyze the performance of the deep learning models.
5. Implement Autoencoders and GAN.

Prerequisite: Machine Learning, Python Programming

Course Content

Unit No	Description	Hrs
1.	**Introduction to Deep Learning** Artificial intelligence, Machine learning, Deep learning, Building the fundamentals, Neural Networks, Setup of deep learning frameworks, Introduction to TensorFlow, Introduction and setup of Keras, Preparing data, Learning from data, Classification and regression.	06

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2.	**Introduction to Neural Networks** Introduction to neural networks, Training a single neuron, Perceptron model, Multilayer perceptron model, Deep networks, Loss function, Gradient descent, Backpropagation, Optimizers, Building ANN models.	**06**
3.	**Convolutional Neural Networks** Introduction to Convolutional Neural Networks, Types of convolutions, Convolution, Pooling, Padding, spatial arrangement, Improving performance of CNNs, Implementation of CNN.	**06**
4.	**Recurrent Neural Networks** Working with sequences, Language Modles, Introduction to Recurrent Neural Networks, Long short-term memory (LSTM), Introducing gated recurrent units, Implementing text classification.	**06**
5.	**Sequence-to-Sequence Models and Attention** Introducing seq2seq models, Seq2seq with attention, Understanding transformers, The transformer model, Transformer language models.	**06**
6.	**Generative deep learning** A brief history of generative deep learning for sequence generation, DeepDream, Neural style transfer, Generating images with variational autoencoders, Introduction to generative adversarial networks, A schematic GAN implementation.	**06**

Lab experiments:		
Experiment No	**Description**	**Hrs**
1.	Setting up the Python environment for Deep Learning.	**02**
2.	Deep learning Using TensorFlow	**02**
3.	Deep learning Using Keras	**02**
4.	Implement Neural Network model	**02**
5.	Implement Deep Neural Network model	**02**
6.	Build CNN Model	**04**
7.	Build RNN Model	**02**
8.	Build seq2seq Model	**04**
9.	Implement Generative deep learning	**04**

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References -

Text Books:

- Dr. Pablo Rivas, "Deep Learning for Beginners", Packt Publication
- Aston Zhang, Zachary C. Lipton , Mu Li, Alexander J. Smola, "Dive into Deep Learning", Cambridge University Press

Reference Books:

- Ian Goodfellow, Yoshua Bengio, Aaron Courville, "Deep Learning", MIT Press.
- Ivan Vasilev, "Advanced Deep Learning with Python", Packt Publication.
- Francois Chollet, "Deep Learning with Python", MANNING SHELTER ISLAND.

Class: **Final Year. B. Tech**	Semester: **VII**
Course Code: **CI449**	Course Name: **Cloud IoT Lab** (Program Elective-IV)

L	T	P	Credits
3	--	2	4

Course Description:

This course on Cloud IoT will introduce you to implementation of IoT on Cloud platforms like AWS and Azure. IoT or the Internet of Things as we know has made data sensing easy and with all the devices connected over the internet using sensors, we actually have smart devices that make our life easy. In this course we will see how cloud computing platforms like Amazon Web Services and Microsoft Azure provide variety of IoT Cloud services to implement IoT on top of these Cloud platforms. This course designed to introduce individuals to Cloud IoT concepts and provide hands-on experience with basic IoT devices and cloud platforms.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Explore the relationship between IoT, cloud computing.
2. Adapt the emerging cloud and IoT technologies informed by an appropriate evaluation process to support business applications.
3. Design secure cloud and IoT applications to support scalable online services using best practice.
4. Demonstrate knowledge of cloud computing and IoT concepts, components, architecture, frameworks and issues.
5. Analyze applications of IoT in real time scenario.

Prerequisite: Basic knowledge of Internet of Things (IoT) , Cloud Technology, Python programming

Course Content

Unit No	Description	Hrs
1.	**Introduction to Cloud IoT** Trends of computing, Factors That Led to the Creation of Cloud Computing, Benefits and Functions of IoT Cloud, Comparison of Internet of Things and Cloud Computing, The Role of Cloud Computing on the Internet of Things.	06

2.	**AWS IoT** The IoT Universe, Cloud Service, Communication, Device and Interface, AWS IoT service overview: Device software, control services and data services, Core Services: Core Messaging services, control and data services, Support Services	**06**
3.	**Getting Started with AWS IoT** Set up your AWS account, Connecting IoT devices, testing connectivity with your device data, Create AWS IoT resources: Create AWS IoT Policy, create a thing object, Configure your device, View MQTT messages with the AWS IoT MQTT client.	**06**
4.	**Managing Devices with AWS IoT** Managing things with registry, Thing types, Static and Dynamic thing group, Tagging AWS IoT Resources.	**06**
5.	**AWS Lambda with Amazon DynamoDB** Amazon DynamoDB: Working of DynamoDB, setting up and Accessing DynamoDB, AWS Lambda: Foundations, Configuring, Deploying, Invoking, Managing and Testing Lambda functions, AWS simple cloud storage(S3).	**06**
6.	**Security in AWS IoT** Authentication, Authorization, Data Protection, Identity and access management, Logging and Monitoring, Security Monitoring and infrastructure monitoring, Security best practices.	**06**

Lab experiments:

Experiment No	Description	Hrs
1.	Temperature Monitoring with IoT: Set up a simple IoT device (e.g., Raspberry Pi) with a temperature sensor. Send temperature readings to a cloud platform (e.g., AWS IoT, Google Cloud IoT) and visualize the data on a web dashboard.	**02**
2.	Smart Light Control: Use an IoT device (e.g., ESP8266) to control an LED light remotely. Connect the device to the cloud and create a basic web or mobile app to toggle the light on/off.	**02**
3.	Weather Station: Build a weather station using IoT sensors for temperature, humidity, and barometric pressure. Send sensor data to the cloud for storage and analysis. Create a basic dashboard to display weather trends.	**02**
4.	Home Security System: Develop a simple IoT-based home security system using a motion sensor. Send alerts to a cloud service when	**02**

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	motion is detected, and create a basic mobile app to receive notifications.	
5.	Soil Moisture Monitoring for Plants: Build an IoT device with a soil moisture sensor to monitor plant hydration levels. Send data to the cloud and set up alerts for when soil moisture levels are too low/high.	**04**
6.	Smart Doorbell: Create a basic IoT-enabled doorbell with a button and camera. When the button is pressed, the camera captures an image or video, which is sent to the cloud for storage. Receive notifications on a mobile app.	**02**
7.	Pet Feeder: Build an IoT-controlled pet feeder using a servo motor. Control the feeding schedule remotely via a cloud platform and track feeding times in a simple database in the cloud.	**02**
8.	Vehicle Tracking: Use an IoT device (e.g., Arduino with GPS module) to track the location of a vehicle. Send GPS coordinates to the cloud at regular intervals and visualize the vehicle's route on a map.	**02**
9.	Water Level Monitoring: Construct an IoT device with a water level sensor to monitor water levels in a tank or reservoir. Send data to the cloud and set up alerts for when water levels are too low/high.	**02**
10.	Remote Controlled Robot: Build a basic IoT-controlled robot using a microcontroller (e.g., Arduino) and motors. Control the movement of the robot remotely via a cloud-based dashboard or mobile app.	**04**

References -

Text Books:

- Verma, Jitendra Kumar , "Cloud IoT: Concepts, Paradigms and Applications", Taylor and Francis Ltd, 1st Edition 2022
- Monika Mangla , Suneeta Satpathy , Bhagirathi Nayak , Sachi Nandan Mohanty , "Integration of Cloud Computing with Internet of Things: Foundations, Analytics and Applications", Willy Publication, 2021

Reference Books:

- Muhammad Afzal , "Arduino IoT Cloud for Developers", Packt

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Class: **Final Year. B. Tech**	Semester: **VII**
Course Code: **CI451**	Course Name: **Cyber Security & Forensics Lab** (Program Elective-IV)

L	T	P	Credits
3	0	2	3

Course Description: Cybersecurity is the practice of protecting systems from cyber-attacks. It is important because effective cybersecurity reduces the risks of cyber-attacks. Cybersecurity is a high-demand but changing field. Since hackers are trying to find new ways to access, change, or delete sensitive information and extort money, users must be aware of cyber threats and comply with basic cybersecurity principles. This course will help in understanding cybercrimes and various techniques for investigating different cybercrimes. This course also focuses on the forensics required for the investigations.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Describe fundamental terms in cybercrime legislation.
2. Compare various cyber-attacks & offences.
3. Asses social networks and security issues related to social media platforms.
4. Analyze vulnerabilities in web applications & network systems
5. Apply forensic skills and perform investigations on operating systems.
6. Develop a high-level proficiency in mobile and web forensics.

Prerequisite: Basic Computer technology, Information Security, Computer Networks

Course Content

Unit No	Description	Hrs
1.	**Introduction to Cybersecurity** Defining Cyberspace and Overview of Computer and Technology, Architecture of cyberspace, Communication and web technology, Internet, World Wide Web, Internet infrastructure for data transfer and governance, Internet society, Regulation of cyberspace.	04
2.	**Cyber Crime and Offenses** Classification of cybercrimes, Common cybercrimes - cybercrime targeting computers and mobiles, cybercrime against women and children, financial frauds, social engineering attacks, malware and ransomware attacks, viruses	06

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	and worms, Cybercriminal's modus-operandi, Reporting of cybercrimes, Remedial and mitigation measures, Legal perspective of cybercrime.	
3.	**Social Media** Overview and Security, Introduction to Social Networks. Types of social media, social media platforms, social media monitoring, hashtags, Viral content, social media marketing, social media privacy, Challenges, opportunities and pitfalls in online social networks, Security issues related to social media, Flagging and reporting of inappropriate content.	**06**
4.	**Penetration Testing** Introduction to Penetration Systems, Networking Fundamentals, Web Application Basics, Penetration Testing Tolls Overview, Reporting and Documentation.	**06**
5.	**Cyber Forensics** A brief History of computer Forensics, Preparing for computer investigations, **Windows and Linux Forensics:** Windows Systems Artifacts: File Systems, Registry, Event logs, Shortcut files, Executables. Alternate Data Streams (ADS), Hidden files, Slack Space, Disk Encryption, Windows registry, startup tasks, jumplists, Volume Shadow, shell bags, LNK files, Recycle Bin Forensics (INFO, $i, $r files). Linux System Artifact: Ownership and permissions, Hidden files, User Accounts, and Logs.	**07**
6.	**Cell Phone and Mobile Device Forensics** Understanding mobile device forensics, Mobile phone basics, inside mobile devices, inside PDAs, Understanding acquisition procedures for cell phones and mobile devices, Mobile forensics equipment. **Web Browser Forensics:** History, Cache, Searches, Downloads, Understanding Browser Timestamps, Investigating Chrome & Firefox browsers, Private Browsing and Browser Artifact Recovery, Investigating the Tor Browser.	**07**

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Lab experiments:		
Experiment No.	**Title of Experiment**	**Hrs.**
1	**Installation and Initial Configuration of Kali Linux** Install Kali Linux, configure it for various security tasks, and troubleshoot common issues.	**02**
2	**Demonstration of attacks using the Kali Linux Platform** Demonstrate various cyberattack methodologies using Kali Linux, how attackers operate. The emphasis will be on understanding the tools and techniques used by security professionals in the context of penetration testing and ethical hacking.	**04**
3	**Social Media Security and Content Moderation** Demonstrate the various ways in which social media platforms can ensure the security of user data and effectively moderate content to protect users from harmful, inappropriate, or illegal material.	**02**
4	**Scanning for vulnerabilities in web applications** Identify, analyze, and mitigate security vulnerabilities in web applications.	**02**
5	**Exploiting network system vulnerabilities** Demonstrate how vulnerabilities in network systems can be exploited and to equip with the skills needed to defend against these attacks.	**02**
6	**Windows Forensics - Registry and File Systems** Analyze the Windows Registry and file system for forensic artifacts, focusing on user activity, deleted data recovery, and malware persistence mechanisms.	**04**
7	**Linux Forensics - Ownership, Permissions, and Logs** Investigate ownership, permissions, and log files in Linux for forensic analysis, focusing on identifying user activities, unauthorized access, and system changes.	**02**
8	**Mobile Device Basics and Acquisition Procedures** Identifying data storage locations, securing data integrity, and using tools to extract and preserve evidence from mobile devices effectively.	**02**
9	**Web Browser Forensics - Chrome and Firefox** Analyze forensic artifacts from web browsers like Chrome and Firefox, focusing on user activity, browsing history, downloads, cookies, and cached data.	**02**
10	**Private Browsing and Tor Browser Investigation** Investigate the forensic challenges of private browsing and the Tor browser, focusing on identifying residual artifacts, user activity, and potential traces left on the system.	**02**

References -

Text Books:

- Sumit Belapure and Nina Godbole, "Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Wiley India Pvt. Ltd.
- Henry A. Oliver, "Security in the Digital Age: Social Media Security Threats and Vulnerabilities ", Create Space Independent Publishing Platform. (Pearson , 13th November, 2001)
- Bill Nelson, Amelia Phillips, and Christopher Steuart; "Guide to Computer Forensics and Investigations" – 3rd Edition, Cengage, 2010 BBS.

Reference Books:

- James Graham, Ryan Olson, "Cyber Security Essentials", Rick Howard CRC Press, Taylor & Francis Group, 2011 Edition
- Cyber Crime Impact in the New Millennium, by R. C Mishra , Auther Press. Edition 2010.
- Kumar K, "Cyber Laws: Intellectual Property & E-Commerce Security" Dominant Publishers.
- LNJN National Institute of Criminology and Forensic Science, "A Forensic Guide for Crime Investigators: Standard Operating Procedures".

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Class: **Final Year B. Tech**	Semester: **VII**
Course Code: **CI4392**	Course Name: **Full Stack - Back End Web Technology Lab**

L	T	P	Credits
2	--	2	3

Course Description:

This course provides a comprehensive introduction to full-stack web development, focusing on the backend technologies like Node.js, Express.js, and MongoDB, complemented by the frontend library React.js. Students will learn to build dynamic, scalable, and interactive web applications, gaining hands-on experience in both server-side and client-side development.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Comprehend the fundamentals concepts of Node.js, Express.js, and MongoDB.
2. Develop RESTful APIs using Express.js and integrate them with MongoDB.
3. Create dynamic and responsive user interfaces using React.js.
4. Utilize state management in React.js for efficient data handling.
5. Perform the user authentication and authorization.
6. Deploy a full-stack web application on web server.

Prerequisite: HTML, CSS, JavaScript, React Js.

Course Content

Unit No.	Description	Hrs
1.	**Introduction to Node.js** Node.js overview, Node.js - basics and setup, Node.js console, Node.js command utilities, Node.js modules, Node.js events.	04
2.	**Introduction to Express.js** Basics of Express.js, Creating a simple Express.js server, Express.js Response, Express.js Get, Express.js Post, Express.js Routing, Express.js Cookies, Express.js File Upload, Express.js Middleware, Express.js Scaffolding, Express.js Template.	04
3.	**MongoDB and Database Integration** Introduction to MongoDB, setting up and connecting to MongoDB, CRUD operations with MongoDB and Express.js	04

4.	**Building RESTful APIs with Express.js** Designing RESTful routes, Middleware in Express.js, Handling request parameters and query strings.	**05**
5.	**Introduction to React.js** Basics of React.js, Creating components and managing state, JSX and component lifecycle, React Hooks for state management, Context API for global state, Data fetching in React.js applications.	**04**
6.	**Full Stack Integration and Deployment** Integrating React.js with Express.js, User authentication and authorization, Deployment strategies for full-stack applications	**03**

Experiment List:

Experiment No.	Description	Hrs
1.	**Demonstrate the Use of Node.js** Tasks: Install Node.js. Create and run a simple web application.	**02**
2.	**Implementation of Express.js** Tasks: Use Express.js to create and run a simple web application.	**02**
3.	**Connecting to MongoDB** Tasks: Implementation of CRUD operations (Create, Read, Update, Delete) using Mongoose (MongoDB), Node.js and Express.js.	**02**
4.	**Building RESTful APIs** Tasks: Create a RESTful API server in Express and Node.js. Implementation and Testing application using Postman/ Thunder client.	**02**
5.	**Integrating React.js** Tasks: Create a new React.js application using Create React App, display data fetched from a mock API in a React component.	**02**
6.	**User Authentication and Authorization** Tasks: Implement user authentication using JWT (JSON Web Tokens) in your Express.js application. Create protected routes that require authentication.	**02**
7.	**React State Management** Tasks: Implement state management in React using local state and React Hooks. Build a dynamic form that updates the component state.	**02**
8.	**Context API in React.js** Tasks: Use the Context API to manage global state in a React application. Share state between multiple components using context.	**02**

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9.	**Data Fetching in React.js** Tasks: Fetch data from an external API in a React component. Display the fetched data in a structured manner on the UI.	**02**
10.	**Integrating React with Express** Connect your React frontend with the Express backend. Perform API calls from React components to retrieve and display data from the backend.	**02**
11.	**Full Stack Application Deployment** Tasks: Deploy your full-stack application on a cloud platform (e.g., Heroku, AWS, or Firebase). Ensure that both the frontend and backend are accessible online.	**04**

References -

Text Books:

- Brad Traversy, "MERN Stack Front to Back: Full Stack React, Redux & Node.js", Publisher: Udemy.
- Anthony Alicea, "Learn and Understand Node.js", Publisher: Udemy.

Reference Books:

- Azat Mardan, "Pro Express.js: Master Express.js: The Node.js Framework For Your Web Development", Publisher: Apress.
- David Herron, "Node.js Web Development: Server-side development with Node 10 made easy ", Packt Publishing

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Class: **Final Year B. Tech**	Semester: **VII**
Course Code: **CI4092**	Course Name: **Capstone Project Phase II**

L	T	P	Credits
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Course Description:

The Capstone Project Phase-II, carrying 3 credits, is a key component of the final year curriculum in the Information Technology Department. This course allows students to apply their theoretical and practical knowledge to real-world projects. Students are required to continue working on the project selected in Phase-I, ensuring at least 50% tasks are completed during Phase-I. The project emphasizes developing problem-solving skills, teamwork, and effective communication. Students are expected to demonstrate innovation, quality work, and timely progress in their project, which will be assessed based on the project execution and the report submitted.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Apply theoretical and practical knowledge of CS/IT Engineering to develop products or services.
2. Identify and analyze engineering problems to provide IT-based solutions.
3. Utilize modern IT tools, techniques, and technologies effectively.
4. Design efficient algorithms to enhance product or service performance.
5. Develop research skills to investigate, analyze, and propose innovative solutions to real-world problems using appropriate methodologies and tools.
6. Adopt recent industry practices for project development.
7. Manage projects in terms of scope, cost, time, and quality as defined by stakeholders.
8. Enhance teamwork skills to collaborate effectively in group settings.
9. Develop effective presentation and communication skills through project work.

Prerequisite: Phase-I must be properly completed, with a minimum of 50% tasks should be completed during Phase-I before proceeding to Phase-II.

General Guidelines: The capstone project phase-II of this semester carries 3 credits. The majority of project work has to be completed in this VII semester. The project group from project phase-I will continue to work on the project selected during the VI semester and will

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submit the completed project work to the department as per deadline given by department, usually two weeks before the end of the VII semester ,as mentioned below:

1.Capstone project summary (MPS sheet) sheet

2.Executed project

3.Project report

4.Project Diary

The Capstone Project Phase-II report has to be prepared properly, following the format provided by the department.

There are two main types of projects: application-level and research-level. Application-based projects focus on developing practical, real-world applications and follow a format suited to their implementation. These projects may also be sponsored by industries or organizations to address specific needs or challenges. Research-based projects focus on exploring innovative ideas, conducting experiments, and contributing to knowledge in a particular domain. Each type of project has a different project report format to ensure proper documentation and evaluation based on the requirements.

Students are required to maintain a project diary, document their progress regularly, and get approval from the project guide at least twice a month.

Evaluation:

The students will be evaluated both individually and as a group for their project, based on various factors such as the quality of work carried out, the novelty of the concept, the project work submitted, timely delivery of tasks, dedication in individual work, and the overall presentation. There will be a total of three reviews during the project duration. In the first review, students are expected to have completed 70% of the work. By the second review, 100% of the project work should be completed. In the final review, students must submit the completed project work for evaluation.

The ISE evaluation of capstone project phase-II will account for 50% of the total marks. Assessments will be conducted according to the rubrics provided to the guides. The evaluation will be carried out by project guide and a panel of faculty members appointed by the DPC.

The ESE evaluation will account for the remaining 50% and will follow the schedule provided by the COE. Students are required to present their entire project work from both

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Sem-VI and Sem-VII. The evaluation will be conducted by external examiners from the industry, including the project guide.

Department of Computer Science and Information Technology

Class: **Final Year B. Tech**	Semester: **VIII**
Course Code: **OE4382**	Course Name : **Finance for Engineers (Online Course)** (Model-I Industry Internship(II))

L	T	P	Credits
2	-	--	2

Course Description:

In today's workplace, it is nearly impossible for an engineer to perform without considering the financial impact of every action on the organization's bottom line. Engineers need to be aware of issues such as cost reduction and capital investment and how their decisions can affect the financial statements. This course introduces basic financial management to engineers and technical personnel who need this knowledge to manage a profit center effectively. The course aims at providing students with an in-depth coverage of the various aspects of financial management.

It covers the assessing the financial health of the organization through ratio and cash flow analysis, sources of long term as well as short term finance. Decisions concern with financing, working capital and long term investment. Class will focus on both the academic theories underlying the management of funds and the practical aspects of financial management.

Course Learning Outcomes:

After successful completion of this course, students will be able to,

1. Discuss the fundamental aspects of accounting and finance.
2. Apply theoretical knowledge and information for preparing various financial statements.
3. Analyze the financial information for solving managerial problems.
4. Evaluate financial performance of the organization for effective decision making.

Prerequisite: Basics of Mathematics

Course Contents

Unit No	Description	Hrs
1.	**Finance Terminologies & Financial Statement:** Key terms of Accounting and Finance, Accounting Principles underlying Preparation of Financial Statements	4
2.	**Analyzing Health of a Firm:** Techniques of Analyzing Health of a Firm, Classification of Ratios – Liquidity, Leverage, Activity, Profitability, Analysis of Cash Flows	4
3.	**The Management of Working Capital:**	4

	Need of Working Capital, Operating Cycle of Working Capital, Determinants of Working Capital, Preparation of Working capital statement	
4.	**Investment Decision Rules:** Investment Decision Rules, Evaluation Criteria for Investment Decision: Payback, ARR, NPV, PI & IRR, Decision Tree Analysis	4
5.	**Long Term Financing:** Long Term Financing: Shares, Debentures, Loan capital, foreign capital, FDI, Euro issues & external borrowings, Venture capital financing.	4
6.	**Financing Decisions and Cost of Capital:** Risk & Return, Cost of Capital, Cost of Equity, Cost of Debt, Weighted Average Cost of Capital	4

References -
Reference Books:

1. Paul Kimmel, J. Weygandt, D. Kieso, "Financial Accounting", Wiley Pub.
2. S.N. Maheshwari & S.K. Maheshwari, "Problems & Solutions in Advanced Accountancy", Vikas Publishing House Pvt. Ltd., New Delhi
3. M.C. Shukla, T.C. Grewal & S. C. Gupta, "Advanced Accounts", S. Chand
4. M. Y. Khan & P. K. Jain, "Financial Management", Tata McGraw-Hill Publishing Company Limited, New Delhi
5. Prasanna Chandra, "Financial Management", Tata McGraw-Hill Publishing Company Limited.

Note: - Being online course, lecture videos of each unit will be made available through college platform to the students. For each unit there will be separate assignment. Students need to submit all assignments within specified time.
Weightage: 25% weightage for unit wise assignments + 75% weightage for final exam.
Final exam will be held at college campus.

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Class: **Final Year B. Tech.**	Semester: **VIII**
Course Code: **OE4362**	Course Name : **Engineering Management & Economics (Online Course)** (Model-I Industry Internship(II))

L	T	P	Credits
2	-	-	2

Course Description:
Engineering management is the integration of management principles with engineering practices. It is a specialized field that focuses on effectively leading engineering teams and managing technical projects. This course is structured into two key modules: Engineering Management and Engineering Economics. The first module is centered on building the managerial skills necessary to guide, mentor, and inspire technical professionals in their engineering roles. The second module delves into engineering economics, a vital area for engineering firms to maintain their competitive advantage and market presence, focusing on economic decision-making.

Course Learning Outcomes:
After successful completion of the course, students will be able to,

1. Develop administrative, organizational, and planning skills to effectively manage and execute engineering projects.
2. Create bar charts and milestone charts to track and manage project progress.
3. Analyze profit and cost data, conducting economic evaluations to make informed, optimal decisions.
4. Calculate depreciation using various methods.

Prerequisite: Basics of Mathematics

Course Content

Unit No	Description	Hrs
1	**Managerial skills** Theories of Management Principles of Management (by Henry Fayol), Functions of Management, Planning, Organizing, Staffing, Directing, Co-Ordination, Communication, Motivation and Controlling	04
2	**Organizational skills** Levels of management, Organizations-elements, types and characteristics of organization, Management by Objectives (MBO)	04

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3	**Planning Tools** Methods of scientific management- Critical Path Method (CPM), Programme Evaluation & Review Techniques (PERT), Network Crashing, Bar Chart, Mile-Stone chart, Gant Chart	**04**
4	**Methods of Economic Analysis** Economic equivalence, Methods of comparison of alternatives- Present Worth Method, Rate of Return method, Benefit-Cost ratio method	**04**
5	**Make or Buy Decision** Approaches of make or buy decision-Simple cost analysis, Economic analysis, break-even analysis, Payback analysis	**04**
6	**Depreciation** Methods of Depreciation- Straight line method, Declining balance depreciation, Sum of years digits method, sinking fund method, service output method	**04**

References -

Text Books:

- Gilbert Daniel R, Freeman R. Edward and Stoner James A. F, "Management" Pearson Education.
- Harold Kerzner, "Project Management- A system approach to planning, scheduling and controlling", John Wiley & Sons Inc.
- Punmia B. C. and Khandelwal K. K, "Project Planning, Scheduling and controlling with PERT and CPM", Laxmi Publications Pvt. Ltd.
- Paneerselvam R, "Engineering Economics", Prentice Hall India Learning Private Limited.

Reference Books:

- Cannice Mark V, Koontz Harold and Weihrich Heinz, "Management", McGraw Hill Education (I) Pvt. Ltd.
- Blank Leland and Tarquin Anthony, "Basics of Engineering Economy", Tata McGraw-Hill.
- Mithani D. M, "Managerial Economics- Theory & Applications", Himalaya Publishing House-New Delhi.

Note:- Being online course, lecture videos of each unit will be made available through college platform to the students. For each unit there will be separate assignment. Students need to submit all assignments as per schedule.

Weightage: 25% weightage for unit wise assignments + 75% weightage for final examination.

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Class: **Final Year B. Tech.**	Semester: **VIII**
Course Code: **IP4024**	Course Name: **Industry Internship & Project** (Model-I Industry Internship(II))

L	T	P	Credits
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Course Description:

Internship is designed to expand the depth and breadth of academic learning of students in their particular areas of study. It is an opportunity for students to receive experience in applying theories learned from the classroom to specific experiences with the community and work world. An internship can also heighten awareness of community issues, motivate students to create opportunities, embrace new ideas, and give direction to positive change. A successful internship can give valuable information in making decisions about the direction of future studies or employment. An internship is an opportunity not only to use and develop industry-related knowledge and skills, but also to enhance some of the skills that are transferable to any professional work setting. Students from Final year B.Tech are eligible to do this internship. Selected candidates by college will be permitted for internship of minimum 20 weeks in 8th semester. During this Internship, it is expected that students should identify the problems arising in the industry related to Engineering, and they have to give the solution to the company.

Course Learning Outcomes:

1. **Internship**

After the successful completion of the IIP- II the student should be able to

1. Examine the functioning of the company on the terms of inputs, transformation process and the outputs (products and services)
2. Develop an attitude to adjust with the company culture, work norms, code of conduct.
3. Recognize and follow the safety norms, Code of conduct.
4. Demonstrate the ability to observe, analyse and document the details as per the industry practices.
5. Interpret the processes, systems and procedures and to relate to the theoretical concepts- studies.
6. Develop the leadership abilities, communication.
7. Demonstrate project management and finance sense

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2. Project

After the successful completion of the project, the student should be able to;

1. Identify the project/problem in the domain of a program relevant for the company.
2. Compile the information to the pertaining to the problem identified.
3. Analyse the information using the statistical tools/ techniques.
4. develop the feasible solution for given problem.
5. Analyse the impact of the project on the performance of company/department.

Course Content

I. Internship :

During Internship, Students should follow guidelines given below.

1. After joining the industry students should learn all the departments and their workings. Furthermore, student should understand how each department of industry is interlinked with one another.
2. Student should correlate the theoretical aspects learned in academics with industry practices.
3. Students should gain a knowledge of new technologies which industry follows.
4. Students should follow the professional codes and ethics.
5. Students should follow all rules and regulations of industry. Special care should be taken regarding safety.

- **Work Diary:**

  Work Diary will be provided to each student, which contains details regarding internship, do's and don'ts and evaluation scheme. Student is required to write the Diary regularly and get it signed by the industry guide periodically. During the visit of Mentor, assigned to the student should be able to go through the Diary to access the work done and write the remarks/ instruction. At the end of internship, student should submit the duly completed diary to the department.

- **Duration:**

  The internship duration is of one complete semester (approximately 20 weeks) between 1st January to 30th May of the respective academic year. Biometric attendance on working days is compulsory.

II. Project :

Students should select technical problems occurring within the industry as a project in consult with industry & Institute mentors.

- **Evaluation**

Faculty Mentor will be assigned to each student by the Institute who will monitor the progress of internship and project and help the student to sort-out any issues/ problems

arising. Mentor of student from college will visit the industry as per the schedule given below.

Sr.No.	Evaluation	Period
1.	At the beginning of the program for orienting Students to the company and finalize the project	During 2nd Week
2.	Review-I (ISE-1)	During10thweek
3.	Review-II (ISE-2)	During15thweek
4.	Review-III (ESE)	During20thweek

*Review-III is end semester examination (ESE), which will be conducted at institute.
*During ESE, students should submit, Project & internship report, Work diary, Internship & project completion certificate issued by industry etc. to respective departments.

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Class: **Final Year B. Tech.**	Semester: **VIII**
Course Code: **OE4382**	Course Name : **Finance for Engineers (Online Course)** (Model-II Research Internship(RI))

L	T	P	Credits
2	-	--	2

Course Description:
In today's workplace, it is nearly impossible for an engineer to perform without considering the financial impact of every action on the organization's bottom line. Engineers need to be aware of issues such as cost reduction and capital investment and how their decisions can affect the financial statements. This course introduces basic financial management to engineers and technical personnel who need this knowledge to manage a profit center effectively. The course aims at providing students with an in-depth coverage of the various aspects of financial management.
It covers the assessing the financial health of the organization through ratio and cash flow analysis, sources of long term as well as short term finance. Decisions concern with financing, working capital and long term investment. Class will focus on both the academic theories underlying the management of funds and the practical aspects of financial management.

Course Learning Outcomes:
After successful completion of this course, students will be able to,
1. Discuss the fundamental aspects of accounting and finance.
2. Apply theoretical knowledge and information for preparing various financial statements.
3. Analyze the financial information for solving managerial problems.
4. Evaluate financial performance of the organization for effective decision making.

Prerequisite: Basics of Mathematics

Course Contents

Unit No	Description	Hrs
1.	**Finance Terminologies & Financial Statement:** Key terms of Accounting and Finance, Accounting Principles underlying Preparation of Financial Statements	4
2.	**Analyzing Health of a Firm:** Techniques of Analyzing Health of a Firm, Classification of Ratios – Liquidity, Leverage, Activity, Profitability, Analysis of Cash Flows	4

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3.	**The Management of Working Capital:** Need of Working Capital, Operating Cycle of Working Capital, Determinants of Working Capital, Preparation of Working capital statement	4
4.	**Investment Decision Rules:** Investment Decision Rules, Evaluation Criteria for Investment Decision: Payback, ARR, NPV, PI & IRR, Decision Tree Analysis	4
5.	**Long Term Financing:** Long Term Financing: Shares, Debentures, Loan capital, foreign capital, FDI, Euro issues & external borrowings, Venture capital financing.	4
6.	**Financing Decisions and Cost of Capital:** Risk & Return, Cost of Capital, Cost of Equity, Cost of Debt, Weighted Average Cost of Capital	4

References -
Reference Books:

1. Paul Kimmel, J. Weygandt, D. Kieso, "Financial Accounting", Wiley Pub.
2. S.N. Maheshwari & S.K. Maheshwari, "Problems & Solutions in Advanced Accountancy", Vikas Publishing House Pvt. Ltd., New Delhi
3. M.C. Shukla, T.C. Grewal & S. C. Gupta, "Advanced Accounts", S. Chand
4. M. Y. Khan & P. K. Jain, "Financial Management", Tata McGraw-Hill Publishing Company Limited, New Delhi
5. Prasanna Chandra, "Financial Management", Tata McGraw-Hill Publishing Company Limited.

Note: - Being online course, lecture videos of each unit will be made available through college platform to the students. For each unit there will be separate assignment. Students need to submit all assignments within specified time.
Weightage: 25% weightage for unit wise assignments + 75% weightage for final exam.
Final exam will be held at college campus.

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Class: **Final Year B. Tech.**	Semester: **VIII**
Course Code: **OE4362**	Course Name : **Engineering Management & Economics (Online Course)** (Model-II Research Internship(RI))

L	T	P	Credits
2	-	-	2

Course Description:
Engineering management is the integration of management principles with engineering practices. It is a specialized field that focuses on effectively leading engineering teams and managing technical projects. This course is structured into two key modules: Engineering Management and Engineering Economics. The first module is centered on building the managerial skills necessary to guide, mentor, and inspire technical professionals in their engineering roles. The second module delves into engineering economics, a vital area for engineering firms to maintain their competitive advantage and market presence, focusing on economic decision-making.

Course Learning Outcomes:
After successful completion of the course, students will be able to,

1. Develop administrative, organizational, and planning skills to effectively manage and execute engineering projects.
2. Create bar charts and milestone charts to track and manage project progress.
3. Analyze profit and cost data, conducting economic evaluations to make informed, optimal decisions.
4. Calculate depreciation using various methods.

Prerequisite: Basics of Mathematics

Course Content

Unit No	Description	Hrs
1	**Managerial skills** Theories of Management Principles of Management (by Henry Fayol), Functions of Management, Planning, Organizing, Staffing, Directing, Co-Ordination, Communication, Motivation and Controlling	04
2	**Organizational skills** Levels of management, Organizations-elements, types and characteristics of organization, Management by Objectives (MBO)	04

3	**Planning Tools** Methods of scientific management- Critical Path Method (CPM), Programme Evaluation & Review Techniques (PERT), Network Crashing, Bar Chart, Mile-Stone chart, Gant Chart	**04**
4	**Methods of Economic Analysis** Economic equivalence, Methods of comparison of alternatives- Present Worth Method, Rate of Return method, Benefit-Cost ratio method	**04**
5	**Make or Buy Decision** Approaches of make or buy decision-Simple cost analysis, Economic analysis, break-even analysis, Payback analysis	**04**
6	**Depreciation** Methods of Depreciation- Straight line method, Declining balance depreciation, Sum of years digits method, sinking fund method, service output method	**04**

References -

Text Books:

- Gilbert Daniel R, Freeman R. Edward and Stoner James A. F, "Management" Pearson Education.
- Harold Kerzner, "Project Management- A system approach to planning, scheduling and controlling", John Wiley & Sons Inc.
- Punmia B. C. and Khandelwal K. K, "Project Planning, Scheduling and controlling with PERT and CPM", Laxmi Publications Pvt. Ltd.
- Paneerselvam R, "Engineering Economics", Prentice Hall India Learning Private Limited.

Reference Books:

- Cannice Mark V, Koontz Harold and Weihrich Heinz, "Management", McGraw Hill Education (I) Pvt. Ltd.
- Blank Leland and Tarquin Anthony, "Basics of Engineering Economy", Tata McGraw-Hill.
- Mithani D. M, "Managerial Economics- Theory & Applications", Himalaya Publishing House-New Delhi.

Note:- Being online course, lecture videos of each unit will be made available through college platform to the students. For each unit there will be separate assignment. Students need to submit all assignments as per schedule.

Weightage: 25% weightage for unit wise assignments + 75% weightage for final examination.

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Class: **Final Year B. Tech.**	Semester: **VIII**
Course Code: RE4044	Course Name: **Research Internship** (Model-II Research Internship (RI))

L	T	P	Credits
-	-	-	**12**

Course Description:
Research experience for undergraduates is important not only for conducting research on a topic that has an impact on a current research activity, but also as a tool to enhance undergraduate education. For the engineering technology students, research experiences allow them to carry out in-depth study of engineering concepts, while emphasizing hands-on experiences and practical applications. Participating in research projects strengthens the student's resume, and fulfills the requirements of present day employers, who demand sound engineering skills in their employees.

Course Learning Outcomes:
After completion of this course, the student will be able to,

1. Investigate the technical literature.
2. Recognize and evaluate theories, practices, and/or research on a chosen topic by conducting a thorough literature review and submitting a written integrative, critical summary of the current literature.
3. Design a research problem and develop a methodology.
4. Develop and implement an advanced original research or creative project.
5. Develop the ability to explain the conceptual viability of the project and describe the major components involved.
6. Develop advanced discipline-relevant skills and competencies.
7. Write a research report and paper.

Course Content

Students should carefully discuss with their research advisor about time expectations to complete the research project.

Degree to which students meet expectations: The following is a minimum set of expectations for every student enrolled for this course for credit:

i) perform a background literature search and review,
ii.) Develop a project plan,
iii.) Perform experimental work or applied experimental work,
iv.) Write and present a research report.
iv) Write and submit research paper to any reputed journal/international conference.

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- **To submit or publish the research paper in any reputed journal/international conference is a necessary criteria to become eligible for End semester Examination (ESE).**

Quality of the final report and oral presentation: The research advisor will provide clear expectations of the desired format, content, and deadlines of the final report. The research advisors will grade the final report.

Attendance: In order to provide the measure of performance, the research advisor is expected to complete a two mid-term evaluation with the student, accompanied by recommendations for improvement for the remainder of the term. The mid-term evaluation with the student should be accompanied by a one-on-one meeting between the research advisor and the student.

Absences and Make-up Work: Requirements for attendance is as per RR of the Institute

- **Evaluation**

Faculty guide will be assigned to each student by the Institute who will monitor the progress of research project and help the student to sort-out any issues/ problems arising. Schedule of evaluation will be as given below.

Sr.No.	Evaluation	Period
5.	Review-I (ISE-1)	During10thweek
6.	Review-II (ISE-2)	During15thweek
7.	Review-III (ESE)	During20thweek

*Review-III is end semester examination (ESE).

*During ESE, students should submit research Project report, proof of submission of research paper to reputed journal/international conference to respective departments.

*If student is doing research project in outside organization (Research Lab/ institutes), he/she should submit project completion certificate given by outside organization.

Class: **Final Year B. Tech**	Semester: **VIII**
Course Code: ED4104	Course Name: **Project Management (Online Course)** (Model III: Entrepreneurial Internship (EI))

L	T	P	Credits
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Course Description:
To improve and update knowledge of new entrepreneurs in the areas of project preparation & appraisal techniques; decision-making process in the sector of industrial, infrastructure & sustainable opportunities that would lead to improved viability, returns and effective investment decisions. Writing a business plan which can gain interest of the fund providers like venture capitalists and other sources of funding.

Course Learning Outcomes:
After successful completion of the course, students will be able to,
1 Develop a Comprehensive Business Plan for selected business
2.Evaluate Project Viability Through Financial Appraisal
3.Analyze the Environmental and Technical Aspects of a Project
4.Apply Project Management Techniques
5.Assess the Commercial Feasibility of a Business Opportunity

Prerequisite:
General knowledge of economics & clear concept about own business model.

Course Content

Unit No	Description	Hrs
1.	**Project appraisal** Project Development Cycle, Preparation of feasibility studies, project formulation, screening for pre-feasibility studies, stages of feasibility report preparation, Project Analysis including Market Analysis, Technical Analysis & Financial Analysis, Various analytical techniques and integrating the data gathered into a full-fledged business plan.	04
2.	**Project Analysis** Environmental Analysis, Risk Analysis, Infrastructure Development & Financing, Risk Management, Risk identification, Qualitative risk analysis, Quantitative risk analysis, Risk planning and control,National Cost-Benefit Analysis, Financing Sustainable Opportunities. Sustainability and Green Business Practices	04

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3.	**Business Plan** What is business plan, Entrepreneurial opportunities and Business Plan. Preparing business plan. (Practical Exercises on preparation of business plan) Components of Business Plan, Executive summary, other components. Project report contents.	**04**
4.	**Commercial Appraisal** Economic feasibility and commercial viability, market analysis, Market Research, Industry Analysis, Competitor analysis, defining the target market, market segmentation, market positioning, building a marketing plan, market strategy.	**04**
5.	**Technical Appraisal** Operation and Production Plan: Types of production systems, Product design and analysis, New product development, location and layout decisions, project layout, plant and technology choices, product specification and customer needs, production planning and control, Commercializing Technologies	**04**
6.	**Financial Appraisal** pro forma income statements, financial projections, working capital requirement, funds flow and Cash flow statements; Ratio Analysis. **Project Management Techniques**: Identifying organizational structures Estimating costs and budgeting Using critical path project management tools (WBS, Gantt chart, Project Network Diagram) Establishing the critical path Tracking project milestones Using the program evaluation and review technique (PERT tool) Using process improvement tools (Fishbone, SIPOC) Managing time Controlling quality	**04**

References -

Text Books:

- Dwivedi, A.K.: Industrial Project and Entrepreneurship Development, Vikas Publishing House.
-

Reference Books:

- Bangs Jr., D.H., *The Business Planning Guide,* Dearborn Publishing Co.
- Katz, J.A. and Green, R.P., Entrepreneurial Small Business, McGraw Hill
- Mullins, J. and Komisar R., Getting to Plan B, Harvard Business Press
- O'Donnell, M., The Business Plan: Step by Step, UND Center for Innovation.
- Scarborough, N.M. and Zimmerer, T.W., Effective Small Business Management, Pearson
- Pickle, H.B.and Abrahamson, R.L., Small Business Management, Wiley

- Desai, V., Dynamics of Entrepreneurial Development & Management, Himalaya Publishing
- Kao, J., Creativity & Entrepreneurship, Prentice Hall
- Singh, Narendra, Project Management & Control, Himalaya Publications

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Class: **Final Year B. Tech**	Semester: **VIII**
Course Code: **ED4044**	Course Name: **Commercial Aspects of the Project (Online Course)** (Model III: Entrepreneurial Internship (EI))

L	T	P	Credits
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Course Description:
To familiarize students with accounting, mechanics of preparation of financial statements, understanding corporate financial statements, their analysis and interpretation.
The objectives of the course are to build the skills, frameworks and knowledge in entrepreneurial finance. Students will study the financing of small and medium sized businesses & Financial management from the perspective of both the entrepreneur and investors.
This course will also give overall understanding of marketing management which will help them in developing their own marketing decisions & in understanding the importance of market survey techniques. It will help them in conducting suitable market survey for their own selected products.

Course Learning Outcomes:
After successful completion of the course, students will be able to,
1. Interpret basic Accounting and Financial Terminologies.
2. Prepare & analyze financial statements.
3. Apply basic principles of marketing.
4. Apply knowledge of marketing mix for any organization.

Prerequisite:
General knowledge of economics & clear concept about own business model

Course Content

Unit No	Description	Hrs
1.	**Accounting Terminologies:** Meaning, nature, functions, types of accounting; generally accepted accounting concepts, principles and conventions; double entry system. Accounting Records: Fundamentals of record keeping, the accounting process, Computer-based accounting systems. Accounting cycle.	04

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2.	**Financial Management** – Definition, nature, objectives, functions and scope of financial management, Preparation of financial plan – its objectives, essential features, consideration in formulating financial plan	04
3.	**Financial Statements:** Balance sheet: assets, liabilities. Income statement: concept of income, concept of expenses, concept of gain and losses. Components of the income statement. Cash flow statements: purpose, components, concept, Process.	04
4.	**Nature & Scope of Marketing** – Evolution, core marketing concepts, selling concept, marketing concept, Holistic marketing concept, portfolio approach-BCG matrix. Marketing Research- Concept & practice, Steps in Marketing Research.	04
5.	**Marketing Environment and STP:** Demographic, economic, political, legal, socio cultural, technological environment (Indian context); environmental scanning to discover marketing opportunities, Segmentation, Targeting and Positioning, difference between segmentation, targeting and positioning.	04
6.	**Marketing Mix: Product, Price, Promotion and Place.** **Product Decisions:** Concept of Product, Levels of Product, Product Mix Decisions, Product Line Decisions, Individual Product Decisions, Branding, Product Life-cycle - Stages. **Pricing Decisions:** Meaning, Factors influencing Pricing Decisions, Methods of Pricing **Place Decisions:** Meaning, Channels of Distribution **Promotion Decisions:** Elements of Promotion Mix, Advertising, Publicity, Sales Promotion, Personal Selling, Direct Marketing and Public Relations,	04

References -

Text Books:

- Maheshwari, S.N. and Maheshwari, S.K., Financial Accounting, Vikas Publishing House
- Leach C.J. and Melicher, R.W. Entrepreneurial Finance, Thomson.
- For B2C = Kotler, P., Keller, K.L., Koshy, A. and Jha, M.: Marketing Management, Pearson
- For B2B = Sarin, S. Strategic Brand Management for B2B Markets, Sage

Reference Books:

- Ghosh, T.P., Financial Accounting for Managers, Tax-mann Allied Services
- Gupta, A., Financial Accounting for Management, Prentice Hall
- Jain, S.P. and Narang, K.L., Advanced Accountancy, Kalyani Publishers.

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- Smith, J.K., Smith, R.L. and Bliss, R.T., Entrepreneurial Finance, Stanford University Press
- Smith, J.K. and Smith, R.L., Entrepreneurial Finance, Wiley.
- Rogers, S., Entrepreneurial Finance, McGraw Hill.
- Chandra, P., Financial Management, McGraw Hill.
- Kotler P. & Armstrong, G., Principles of Marketing, Pearson

Note:

- Lectures of this theory course will be conducted through online mode.
- Recorded videos will be made available to students on MOODLE platform.
- Faculty will upload three lectures per week and links will be shared on every Monday.
- Students need to appear in Unit Test-1, Unit Test-2 and ESE in college campus as per the regular practice.
- Faculty of concerned course will take the decision regarding modes of In-Semester Evaluation (ISE).

Department of Computer Science and Information Technology

Class:- **Final Year B. Tech**	Semester-**VIII**
Course Code : ED4064	Course Name : **Entrepreneurship Development Program (EDP)** (Model III: Entrepreneurial Internship (EI))

L	T	P	Credits
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Course Description:
Student will attend short term intensive EDP program organized either in house or by any authorized agency approved by CIIED.

Course Learning Outcomes:
After successful completion of the course, students will be able to,

1. Apply knowledge of engineering, economics, marketing and finance for formulation of business plan, starting & managing new business.

Prerequisite: General knowledge of business & clear concept about own business model.

Course Content:
1 Student will undergo training programs organized by CIIED.
Programs on marketing, Finance management, project report preparation by professional agencies. Students are required to apply this knowledge for preparing final project report.
2. Student will complete online certification course- **Entrepreneurial & Employability Skill Development Program** by Singapore polytechnic in association with Jugad Funda & Shivaji University, Kolhapur or any other approved agencies.

Evaluation- ISE **50** marks by mentor for-

1. Completion of online certification course- **Entrepreneurial & Employability Skill Development Program** by Singapore polytechnic in association with Jugad Funda & Shivaji University, Kolhapur or any approved agencies.
2. Active participation in programs by completing various activities/assignments in program.

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Final Year B. Tech. Syllabus

To be implemented for 2022-26 Batch

Department of Computer Science and Information Technology

Class:- **Final Year B. Tech**	Semester-**VIII**
Course Code : **ED4084**	Course Name: **Entrepreneurial Internship** (Model III: Entrepreneurial Internship (EI))

L	T	P	Credits
-	-	-	**11**

Course Description:

Student will prepare technically feasible and economically viable detailed project report including market survey.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Apply knowledge of engineering, economics, marketing and finance for preparation of project report.
2. Make commercial, technical and financial appraisal of project.

Course Content

Student will start working on collection of data required for business plan. During semester he may require to visit various support organizations, similar industries , suppliers of raw materials, machinery, special service providers. He has to conduct market survey. For this student can go out of campus with prior permission of mentor. Mentor should maintain this record .Students are required to work independently by taking guidance from mentor/Head CIIED/faculty on expert panel of CIIED.

Product prototype & execution of business operation is must & it should be validated by Departmental ED committee.

Continuous efforts taken by student should be observed by mentor for ISE evaluation. At the end of semester detailed project report will be presented before Expert committee for ISE evaluation of 100 marks.

Then student will appear for ESE. Project report evaluation &assessment will be done by a panel of experts appointed by COE.

Evaluation	Weightage	Particulars	converted Marks
ISE	10%	Preliminary project report	10
	20%	Market Survey	20
	20%	Completion of Legal Aspects	20
	50%	Final Report	50
ESE	100%	ESE -Final Report	100

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