DEPARTMENT OF INFORMATION TECHNOLOGY

DEPARTMENT VISION

To be a centre of excellence in the field of information technology that yields pioneers and research experts who can contribute for the socio-economic development of the nation.

DEPARTMENT MISSION

1. To impart state-of-the-art value based education in the field of Information Technology.
2. To collaborate with industries and research organizations and excel in the emerging areas of research.
3. To imbibe social responsibility in students.
4. To motivate students to be trend setters and technopreneurs.

Program : B.E in Information Technology

B.E (IT) PROGRAM OUTCOMES (PO'S)

Engineering Knowledge:

Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex engineering problems

Problem analysis:

Identify, formulate, review, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Design/development of solutions:

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

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Conduct investigations of complex problems:

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

Modern tool usage:

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

The engineer and society:

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

Environment and sustainability:

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

Ethics:

Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

Individual and team work:

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

Communication:

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

Project management and finance:

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

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Life-long learning:

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

BE (IT) - PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

Graduates of IT will be able to:

1. Analyze and provide solutions for real world problems using state-of-the-art engineering, mathematics, computing knowledge and emerging technologies.
2. Exhibit professional leadership qualities and excel in interdisciplinary domains.
3. Demonstrate human values, professional ethics, skills and zeal for lifelong learning.
4. Contribute to the research community and develop solutions to meet the needs of public and private sectors. Work in emerging areas of research and develop solutions to meet the needs of public and private sectors.

BE (IT) -PROGRAM SPECIFIC OUTCOMES (PSOs):

After successful completion of the program, students will be able to:

1. Contribute to the growth of the nation by providing IT enabled solutions.
2. Develop professional skills in the thrust areas like Computer Networks, Image Processing, Data Mining, Internet of Things, Cloud Computing and Information Security.
3. Pursue higher studies in specializations like Artificial Intelligence, Data Science, Cyber Security and Software Engineering in reputed Universities.

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Chaitanya Bharathi Institute of Technology (A)					
Department of Information Technology					
Course Outcomes for B.E. (IT) - R22					
Academic year: 2023-24					**Sem: I to IV (R22 –Regulation)**
S.No.	**Semester**	**AY**	**Course details**		**Course Outcomes Statements**
			Course code	**Name of the Course**	
THEORY					
1	I	2023-24	22MTC01	Linear Algebra & Calculus	1. Determine the extreme values of functions of two variables. 2. Apply the vector differential operator to scalar and vector functions 3. Solve line, surface & volume integrals by Greens, Gauss and Stoke's theorems. 4. Determine the basis and dimension of a vector space, compute linear transformation. 5. Apply the Matrix Methods to solve the system of linear equations
2	I	2023-24	22PYC01	Optics and Semiconductor Physics	1. Demonstrate the physical properties of light. 2. Explain characteristic properties of lasers and fiber optics 3. Find the applications of quantum mechanics 4. Classify the solids depending upon electrical conductivity 5. Identify different types of semiconductors
3	I	2023-24	22CSC01	Problem Solving and Programming	1. Understand real world problems and develop computer solutions for those problems. 2. Understand the basics of Python. 3. Apply Python for solving basic programming solutions. 4. Create algorithms/flowcharts for solving real-time problems. 5. Build and manage dictionaries to manage data. 6. Handle data using files.

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4	I	2023-24	22EGC01	English	1. Illustrate the nature, process and types of communication and communicate effectively without barriers. 2. Construct and compose coherent paragraphs, emails and adhering to appropriate mobile etiquette. 3. Apply techniques of precision to write a précis and formal letters by using acceptable grammar and appropriate vocabulary. 4. Distinguish formal from informal reports and demonstrate advanced writing skills by drafting formal reports. 5. Critique passages by applying effective reading techniques.
PRACTICALS					
5	I	2023-24	22PYC03	Optics and Semiconductor Physics Lab	1. Interpret the errors in the results of an experiment. 2. Demonstrate physical properties of light experimentally 3. Make use of lasers and optical fibers for engineering applications 4. Explain the V-I characteristics of some optoelectronic and semiconductor devices 5. Find the applications of thermistor
6	I	2023-24	22EGC02	English lab	1. Define the speech sounds in English and understand the nuances of pronunciation in English. 2. Apply stress correctly and speak with the proper tone, intonation and rhythm. 3. Analyze IELTS and TOEFL listening comprehension texts to enhance their listening skills. 4. Determine the context and speak appropriately in various situations. 5. Design and present effective posters while working in teams, and discuss and participate in Group discussions
7	I	2023-24	22CSC02	Problem Solving And Programming Lab	1. Understand various Python program development Environments. 2. Demonstrate the concepts of Python. 3. Implement algorithms/flowcharts using Python to solve real-world problems. 4. Build and manage dictionaries to manage data. 5. Write Python functions to facilitate code reuse. 6. Use Python to handle files and memory.

8	I	2023-24	22MEC01	CAD and Drafting	1. Become conversant with appropriate use of CAD software for drafting. 2. Recognize BIS, ISO Standards and conventions in Engineering Drafting. 3. Construct the projections of points, lines, planes, solids 4. Analyse the internal details of solids through sectional views 5. Create an isometric projections and views 1. Become conversant with appropriate use of CAD software for drafting. 2. Recognize BIS, ISO Standards and conventions in Engineering Drafting. 3. Construct the projections of points, lines, planes, solids 4. Analyse the internal details of solids through sectional views 5. Create an isometric projections and views
9	I	2023-24	22MEC38	Digital Fabrication Lab	1. Understand safety measures to be followed in workshop to avoid accidents. 2. Identify various tools used in carpentry, house wiring and plumbing. 3. Make a given model by using workshop trades like carpentry, plumbing, House wiring and 3d modeling using solid works software for Additive Manufacturing. 4. Perform pre-processing operations on STL files for 3D printing, also understand reverse engineering process. 5. Conceptualize and produce simple device/mechanism of their choice
THEORY					
1	II	2023-24	22MTC04	Differential Equations & Numerical Methods	1. Calculate the solutions of first order linear differential equations. 2. Calculate the solutions of higher order linear differential equations. 3. Solve the algebraic, transcendental and system of equations. 4. Apply interpolation and numerical differentiation techniques for given data. 5. Test the convergence and divergence of Infinite series.

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2	II	2023-24	22CYC01	Chemistry	1. Identify the microscopic chemistry in terms of molecular orbitals, intermolecular forces and rate of chemical reactions. 2. Discuss the properties and processes using thermodynamic functions, electrochemical cells and their role in batteries and fuel cells. 3. Illustrate the major chemical reactions that are used in the synthesis of organic molecules. 4. Classify the various methods used in treatment of water for domestic and industrial use. 5. Outline the synthesis of various Engineering materials & Drugs.
3	II	2023-24	22EEC01	Basic Electrical Engineering	1. Understand the concepts of Kirchhoff's laws and their application various theorems to get solution of simple dc circuits. 2. Predict the steady state response of RLC circuits with AC single phase/three phase supply. 3. Infer the basics of single phase transformer 4. Describe the construction, working principle of DC machine and 3-phase Induction motor. 5. Acquire the knowledge of electrical wires, cables, earthing, Electrical safety precautions to be followed in electrical installations and electric shock and its safety and energy calculations.
4	II	2023-24	22CSC03	Object Oriented Programming	1. Understand the concepts of Object-Oriented features. 2. Apply OOPs concepts and different libraries to solve programming problems. 3. Understand the advanced concepts of Python. 4. Develop programs to access databases and web data. 5. Understand APIs and third-party libraries to be used with Python
PRACTICALS					

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5	II	2023-24	22CYC02	Chemistry Lab	1. Identify the basic chemical methods to analyse the substances quantitatively & qualitatively. 2. Estimate the amount of chemical substances by volumetric analysis. 3. Determine the rate constants of reactions from concentration of reactants/ products as a function of time. 4. Calculate the concentration and amount of various substances using instrumental techniques. 5. Develop the basic drug molecules and polymeric compounds.
6	II	2023-24	22MBC02	Community Engagement	1. Gain an understanding of Rural life, Culture and Social realities. 2. Develop a sense of empathy and bonds of mutuality with Local Communities. 3. Appreciate significant contributions of Local communities to Indian Society and Economy. 4. Exhibit the knowledge of Rural Institutions and contributing to Community's Socio Economic improvements. 5. Utilise the opportunities provided by Rural Development Programmes
7	II	2023-24	22CSC04	Object Oriented Programming Lab	1. Demonstrate the features of Object-Oriented Programming. 2. Understand APIs and third-party libraries to be used with Python. 3. Use Python libraries to solve real-world problems. 4. Write scripts to solve data science/machine leaning problems using NumPy and Pandas. 5. Develop applications by accessing web data and databases.
8	II	2023-24	22MEC37	Robotics and Drones Lab	1. Demonstrate knowledge of the relationship between mechanical structures of robotics and their operational workspace characteristics 2. Understand mechanical components, motors, sensors and electronic circuits of robots and build robots. 3. Demonstrate knowledge of robot controllers. 4. Use Linux environment for robotic programming. 5. Write Python scripts to control robots using Python and Open CV

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9	II	2023-24	22EEC02	Basic Electrical Engineering Lab	1. Comprehend the circuit analysis techniques using various circuital laws and theorems. 2. Analyse the parameters of the given coil and measurement of power and energy in AC circuits 3. Determine the turns ration/performance parameters of single-phase transformer 4. Infer the characteristics of DC shunt motor different tests. 5. Illustrate different parts and their function of electrical components, equipment and machines
THEORY					
1	III	2023-24	22ITC01	Digital Logic and Computer Architecture	1 Apply Boolean algebra for simplification and learn representation of data using numbers. 2 Understand fundamentals of combinational & sequential logic gates, registers and counters. 3 Infer the architecture and functionality of the central processing unit. 4 Explore the techniques that computers use to communicate with I/O devices for data transfer. 5 Comprehend memory hierarchy, cache memory and virtual memory.
2	III	2023-24	22CSC05	Data Structures	1.Understand the basic concepts and types of data structures. 2. Analyze various linear and nonlinear data structures. 3. Identify the applications of stacks, queues, trees and graphs. 4. Identify the significance of balanced search trees, graphs and hashing. 5. Evaluate various searching and sorting techniques. 6. Use appropriate data structures to design efficient algorithms.

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3	III	2023-24	22CSC32	Discrete Mathematics	1. Describe rules of inference for Propositional and Predicate logic. 2. Demonstrate use of Set Theory, Venn Diagrams, and relations in Real-world scenarios. 3. Model solutions using Generating Functions and Recurrence Relations. 4. Determine the properties of graphs and trees to solve problems arising in computer science applications. 5. Distinguish between groups, semi groups and monoids in algebraic systems
4	III	2023-24	22ITC02	Java Programming	Apply the concept of OOP to design, implement and execute programs. 2. Use the strings, interfaces, packages and inner classes for application development. 3. Apply the exception handling mechanisms and multithreading for the development. 4. Develop applications using collection framework. 5. Develop database applications using SQL package.
5	III	2023-24	22CSC15	Operating systems	1. Understand the basics of Operating systems and its major components. 2. Illustrate the concepts related to process management. 3. Distinguish various memory management techniques. 4. Apply concepts of process synchronization and deadlocks to a given situation. 5. Evaluate various file allocation methods and Apply security as well as recovery features in the design Operating system.

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6	III	2023-24	22EGM01	Indian Constitution and Fundamental Principles	1. Understand the history of framing of the Indian Constitution and its features. 2. Assess the realization of Fundamental Rights and Directive Principles of State Policy. 3. Analyze the challenges to federal system and position of the President and the Prime Minister in the Union Government. 4. Underline the role of the Legislature and the Judiciary in Union Government and their mutual relations. 5. Evolve the development of the local governments in India and assess the role of Collector in district administration.
PRACTICALS					
7	III	2023-24	22CSC31	Data Structures Lab	1. Implement the abstract data type. 2. Implement linear data structures such as stacks, queues using array and linked list. 3. Implement non-linear data structures such as trees, graphs. 4. Evaluate various sorting techniques. 5. Analyze various algorithms of linear and nonlinear data structures. 6. Choose or create appropriate data structures to solve real world problems
8	III	2023-24	22ITC03	Java Programming Lab	1. Practice the basics of OOPs to develop java applications. 2. Use the inheritance and interfaces for application development. 3. Apply the exception handling and multithreading to handle multiple flows of execution. 4. Develop applications using collection framework. 5. Apply the SQL concepts for application development.

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9	III	2023-24	22ITC04	Operating Systems Lab	1. Use the command-line interface and basic Unix commands. 2. Develop shell scripts for simple tasks. 3. Demonstrate inter-process communication (IPC) using Pipes, Shared Memory, and Message queues. 4. Compare the performance of various CPU Scheduling Algorithms and demonstrate Process Synchronization using semaphores. 5. Analyze the performance of the various Page Replacement, Deadlock detection, and avoidance algorithms.
10	III	2023-24	22ITC05	IT Workshop	Identify the basic components of a computer, gain knowledge on assembling and disassembling a PC and OS installations. 2. Inspect internet connectivity issues, secure a computer from cyber threats. 3. Make use of Latex and Ms-word for creating effective documents. 4. Create effective presentations using Ms-PowerPoint. 5. Create, Organize and analyze data within an Excel spreadsheet.
11	III	2023-24	22ITI01	MOOCs/Training/ Internship	Upon completion of this MOOCs/Training/Internship, students will be able to: 1. Learn new technologies and solve real time problems. 2. Expose to industrial environment problems and technologies. 3. Gain knowledge of contemporary technologies and industrial requirements. 4. Identify, design and develop solutions for real world problems. 5. Communicate their ideas and learning experiences through reports and presentations.

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THEORY					
1	IV	2023-24	22MTC15	Probability and Queueing Theory	1. Apply the principle of Least Squares approximating for estimating the value. 2. Analyzing the Random data using Statistical averages. 3. Analyze the Random phenomenon using probability distributions. 4. Distinguishing the data using different methods of hypothesis testing. 5. Analyze the Queue model for the probabilistic nature
2	IV	2023-24	22ECC40	DC Circuits, Sensors and Transducers	1. Develop devices like rectifiers, filters, regulators, etc. 2. Develop the robot using the relevant sensors 3. Evaluate the performance of actuators in practical applications 4. Acquire the data from various sensors and transducers with the help of myRIO 5. Analyze usage of sensors/transducer for the development of real-time applications
3	IV	2023-24	22CSC11	Database Management Systems	1. Design database schema for an application using RDBMS concepts. 2. Write SQL queries for tasks of various complexities. 3. Build applications using database system as backend. 4. Understand internal working of a DBMS including data storage, indexing, query processing, transaction processing, concurrency control and recovery mechanisms. 5. Analyze non-relational and parallel/distributed data management systems with a focus on scalability.
4	IV	2023-24	22CSC14	Design and Analysis of Algorithms	1. Analyze performance of algorithms using asymptotic notations. 2. Demonstrate familiarity with major algorithms and importance of algorithm design techniques. 3. Apply algorithm design techniques of different problems. 4. Analyze the efficiency of the algorithms 5. Understand limits of efficient computation with help of complexity classes.

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5	IV	2023-24	22MBC01	Engineering Economics & Accountancy	1 Apply fundamental knowledge of Managerial Economics Concepts and Tools. 2 Analyze various aspects of Demand Analysis, Supply and Demand Forecasting. 3 Understand Production and Cost relationships to make the best use of resources available. 4 Apply Accountancy Concepts and Conventions and preparation of Final Accounts. 5 Evaluate Capital and Capital Budgeting decision based on any technique.
6	IV	2023-24	22CEM01	Environmental Science	1. Identify the natural resources and realize the importance of water, food, forest, mineral, energy, land resources and effects of over utilization. 2. Understand the concept of ecosystems and realize the importance of interlinking food chains. 3. Contribute to the conservation of bio-diversity. 4. Suggest suitable remedial measures for the problems of environmental pollution and contribute for the framing of legislation for protection of the environment. 5. Follow the environmental ethics and contribute to the mitigation and management of environmental disasters.
PRACTICALS					
7	IV	2023-24	22CSC33	Database Management Systems Lab	1. Outline the built-in functions of SQL and apply these functions to write simple and complex queries using SQL operators. 2. Demonstrate Queries to Retrieve and Change Data using Select, Insert, Delete and Update. Construct Queries using Group By, Order By and Having Clauses. 3. Demonstrate Commit, Rollback, Save point commands, SQL Plus Reports and formulate the Queries for Creating, Dropping and Altering Tables, Views, constraints.

					4. Develop queries using Joins, Sub-Queries and Working with Index, Sequence, Synonym, Controlling Access and Locking Rows for Update, Creating Password and Security features. 5. Demonstrate the usage of data types , Bind and Substitution Variables , Anchored, Declarations, Assignment Operation and PL/SQL code using Control Structures . 6. Develop PL/SQL code using Cursors, Exception, Composite Data Types and Procedures, Functions and Packages.
8	IV	2023-24	22ITC06	Algorithms Lab	1. Implement Divide and Conquer Strategy. 2. Build solutions using Greedy technique. 3. Apply Dynamic programming technique to solve problems. 4. Determine connected and biconnected components from a Graph. 5. Design solutions using Backtracking technique.
9	IV	2023-24	22ITC07	Mini Project – I	1. Interpret Literature with the purpose of formulating a project proposal. 2. Plan, Analyze, Design and implement a project. 3. Find the solution of an identified problem with the help of modern Technology and give priority to real time scenarios. 4. Plan to work as a team and to focus on getting a working project done and submit a report within a stipulated period of time. 5. Prepare and submit the Report and deliver a presentation before the departmental Committee.
Professional Elective-1					
10	IV	2023-24	22ITE01	Data Mining	1. Understand the concepts and issues of data mining. 2. Apply preprocessing techniques, build multidimensional data models and perform OLAP operations. 3. Build association rules through various frequent pattern discovery methods and

					Understand classification concepts. 4. Analyze and evaluate various models for classification and prediction. 5. Illustrate Clustering and Outlier detection techniques.
11	IV	2023-24	22ITE02	Digital Image Processing	1 Illuminate the fundamental concepts and applications of digital image processing techniques. 2 Demonstrate intensity transformations, spatial filtering, smoothing and sharpening in both spatial and frequency domains, image restoration concepts. 3 Demonstrate image restoration and morphological image processing methods. 4 Apply object recognition techniques by using image segmentation and image representation & description methods. 5 Illustrate the various colour models and Application of image compression methods.
12	IV	2023-24	22ITE03	Fundamentals of Cryptography	1. Demonstrate the key security concepts, security attacks and cryptography techniques. 2. Understand and apply various concepts of number theory in symmetric encryption algorithms. 3. Interpret operations of asymmetric key cryptography models and secure hash functions. 4. Make use of the concepts of message authentication codes and digital signatures in real time applications. 5. Understand concepts related to key distribution, user authentication.
13	IV	2023-24	22ITE04	Mobile Application Development	1. Understand the benefits of using Kotlin for Mobile application development. 2. Design user interface for mobile applications. 3. Use Intent, Broadcast receivers and Internet services in Android App. 4. Use multimedia, camera and Location based services in Android App. 5. Apply best practices to implement databases and publish apps on Playstore.

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14	IV	2023-24	22ADE01	Data Analysis and Visualization	1. Use Numpy library utilities for various numerical operations. 2. Apply pandas library functions for handling data frames 3. Perform various preprocessing operations on datasets using Pandas Series and DataFrame objects. 4. Analyze the given dataset and derive conclusions using inferential statistics. 5. Apply 2-D and 3-D plotting techniques on datasets using matplotlib and seaborn.
Course Outcomes for B.E. (IT) - R20					
Academic year: 2023-24					**Sem: V to IVIII (R20 –Regulation)**
THEORY					
1	V	2023-24	20ITC19	Operating Systems	Upon successful completion of this course, students will be able to: 1. Demonstrate operating system services, inter process communication and multithreaded Programming. 2. Apply suitable process scheduling, deadlocks handling algorithms and solve process-synchronization. 3. Make use of advanced techniques such as paging, segmentation and virtual memory for memory management. 4. Illustrate file system interfaces and its implementation. 5. Identify the Operating System Security problems and Threats.
2	V	2023-24	20ITC20	Computer Networks	Upon successful completion of this course, students will be able to 1. Summarize functions of each layer in the OSI and TCP/IP reference models and demonstrate the systematic understanding of data communication Techniques. 2. Solve problems related to Addressing, Routing and Interoperability among heterogeneous networks. 3. Identify issues in Internetwork Routing issues and Congestion in computer networks. 4. Appraise the functions and performance of Internet Transport Protocols TCP and UDP. 5. Analyze the operating principles of Domain Name System and Electronic Mail, WWW.

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3	V	2023-24	20ITC21	Basic Machine Learning	Upon successful completion of this course, students will be able to: 1. Explain the types of machine learning and handle the challenges of machine learning. 2. Construct Decision Trees, Measure performance of classifiers. 3. Apply Regression, Logistic Regression and gradient descent to solve problems. 4. Design solutions using Bayesian classifier, SVMs and Ensemble methods. 5. Perform Dimensionality reduction and clustering of data.
4	V	2023-24	20ADC07	Full Stack Development	Upon successful completion of this course, students will be able to: 1. Create web pages with good aesthetic sense of design using HTML and CSS. 2. Create real-world React web applications and related tools. 3. Become an agile practitioner with the ability to quickly complete projects. 4. Build an end-to-end application from scratch using NODE JS. 5. Understand and build logical relationships between documents using MongoDB.
PRACTICALS					
5	V	2023-24	20ITC22	Networks and Security Lab	Upon successful completion of this course, students will be able to: 1. Identify Errors using CRC, Implement routing algorithms and congestion control algorithms. 2. Demonstrate client-server communication using TCP, UDP protocols. 3. Experiment with rootkits to detect malware, wire shark to capture the packets and interfaces. 4. Make use of tools, techniques to protect the system from attacks. 5. Acquire thorough knowledge on tcpdump, dumpcap and nmap.
6	V	2023-24	20ITC23	Basic Machine Learning Lab	Upon successful completion of the course the students will be able to: 1. Perform dimensionality reduction of a dataset. 2. Build decision trees for classification. 3. Design solutions using SVM, KNN, Regression algorithms. 4. Perform clustering of data.

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					5. Use principle Component Analysis for feature Extraction.
7	V	2023-24	20ADC09	Minor Project-I (Full Stack Development Lab)	Upon successful completion of this course, students will be able to: 1. Interpret Literature with the purpose of formulating a project proposal. 2. Plan, analyze, Design and implement a project. 3. Find the solution of identified problem with the help of modern Technology and give priority to real time scenarios. 4. Plan to work as a team and to focus on getting a working project done and submit a report within a stipulated period of time. 5. Prepare and submit the Report and deliver a presentation before the departmental Committee.
8	V	2023-24	20ITI02	Industrial / Rural Internship-II	
Professional Elective-2					
9	V	2023-24	20ITE05	Information Retrieval Systems	Upon successful completion of this course, students will be able to: 1. Understand different Information Retrieval models. 2. Apply query language to retrieve the data and evaluate performance. 3. Analyze various methods to improve the retrieval results. 4. Perform operations on text and build indices. 5. Analyze searching techniques and understand Parallel and Distributed IR models.
10	V	2023-24	20ITE06	Advanced Databases	Upon successful completion of this course, students will be able to: 1. Acquire knowledge on distributed, parallel and multimedia databases. 2. Distinguish the design, query processing and transaction management activities in centralized and distributed databases. 3. Apply query optimization principles for optimizing query performance in distributed database systems. 4. Utilize distributed transaction principles for handling transactions in

					distributed database applications. 5. Develop databases for various applications.
11	V	2023-24	20ITE07	Augmented Reality and Virtual Reality	Upon successful completion of this course, students will be able to: 1. Describe the basic concepts of Virtual Reality and 3D Computer Graphics. 2. Apply 3D manipulation techniques in Virtual Reality. 3. Analyze Development Tools and Frameworks in Virtual Reality. 4. Develop a Virtual Reality application. 5. Evaluate Augmented Reality Systems
12	V	2023-24	20ITE08	Cyber Security	Upon successful completion of this course, students will be able to: 1. Describe legal frameworks to handle cybercrimes. 2. Identify the functioning of different kinds of malware used in cybercrimes. 3. Examine the legal perspectives of cybercrimes in Indian and international context. 4. Describe the need of Digital Forensics and the importance of digital evidence in prosecution 5. Interpret the commercial activities in the event of significant information security incidents in the Organization.
13	V	2023-24	20ITE09	Software Project Management	Upon successful completion of this course, students will be able to: 1. Understand Project Management principles while developing software. 2. Obtain adequate knowledge about software process models and software effort estimation techniques. 3. Estimate the risks involved in various project activities. 4. Define the checkpoints, project reporting structure, project progress and tracking mechanisms using project management principles. 5. Learn staff selection process and the issues related to people management

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THEORY					
1	VI	2023-24	20ADC14	Big Data Analytics	Upon completing this course, students will be able to: 1. Understand the processing large datasets in Hadoop framework and Apply MapReduce architecture to solve real world problems. 2. Develop scripts using Pig over large datasets and query using Hive. 3. Understand the fundamentals of Spark and the Scala programming. 4. Expertise in using Resilient Distributed Datasets (RDD) for creating applications in Spark and query using SparkSQL. 5. Understand NoSQL databases and Develop data models using MongoDB.
2	VI	2023-24	20ITC24	Embedded Systems and IoT	Upon successful completion of this course, students will be able to: 1. Demonstrate Embedded Systems using 8051 Microcontroller. 2. Interpret the various IoT enabling technologies, Levels. 3. Apply IoT design methodology to build a model using devices like Raspberry Pi3. 4. Develop Domain specific Applications and able to differentiate between M2M and IoT. 5. Infer on Industrial IoT through Real case studies.
3	VI	2023-24	20ADC10	Deep Learning	Upon successful completion of this course, students will be able to: 1. Explain the basic principles of neural networks and deep learning. 2. Implement simple neural network algorithms. 3. Compare modeling aspects of various neural network architecture. 4. Evaluate Convolutional Neural Network models on real data sets. 5. Analyze and optimize Recurrent Neural Network models for various applications.
4	VI	2023-24	20ITC25	Cloud Computing	Upon successful completion of this course, students will be able to: 1. Understand the basic ideas of Cloud Computing and its services. 2. Analyze the architecture, deployment models and infrastructure models of Cloud Computing. 3. Realize distributed storage and

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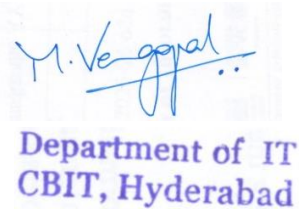
					performance for implementing virtualization. 4. Analyze cloud computing security, federation, presence, identity, and privacy. 5. Use IaaS / PaaS service offered by cloud service providers
5	VI	2023-24	20EGM03	Universal Human Values II: Understanding Harmony	Upon successful completion of the course the students will be able to: 1. Students are expected to become more aware of themselves, and their surroundings (family, society, nature) 2. They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. 3. They would have better critical ability. 4. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). 5. It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.



PRACTICALS					
6	VI	2023-24	20ADC15	Big Data Analytics Lab	Upon completing this course, students will be able to: 1. Explain Hadoop working environment and develop applications using MapReduce framework. 2. Develop scripts using Pig to solve real world problems and query the datasets using Hive. 3. Develop applications in Spark environment using RDDs. 4. Query real time data using SparkSQL. 5. Query large datasets using NoSQL.
7	VI	2023-24	20ITC26	Embedded Systems and IoT Lab	Upon completing this course, students will be able to: 1. Develop Embedded System using 8051 in Embedded 'c' 2. Implement Python scripts that run on Raspberry Pi/Arduino. 3. Build IoT Applications using sensors. 4. Demonstrate Read and write cloud data using Thing speak. 5. Interpret the Case studies in different domains.
8	VI	2023-24	20ITC27	Minor Project-II (Deep Learning Lab)	Upon completing this course, students will be able to: 1. Define a project proposal by interpreting real time scenarios and the Literature. 2. Plan, analyse, Design and implement a project. 3. Develop solution of the identified problem with the help of modern technologies 4. Work as a team and develop a collaborative learning environment. 5. Prepare and submit the Report and deliver a presentation before the departmental Committee.

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9	VI	2023-24	20EGCO3	Employability Skills	Upon successful completion the students will be able to: 1. Become effective communicators, participate in group discussions with confidence and be able to make presentations in a professional context. 2. Write resumes, prepare and face interviews confidently. 3. Be assertive and set short term and long term goals, learn to manage time effectively and deal with stress. 4. Make the transition smoothly from campus to work, use media with etiquette and understand the academic ethics. 5. Enrich their vocabulary, frame accurate sentences and comprehend passages confidently.
Professional Elective-3					
10	VI	2023-24	20ADE03	Natural Language Processing	Upon successful completion of this course, students will be able to: 1. Justify the various steps necessary for processing natural language 2. Suggest appropriate semantic modeling and sequence labeling techniques for a particular application. 3. Apply appropriate neural network based models for a contextual application 4. Analyse existing encoder-decoder models and information extraction techniques. 5. Identify the significance of word net and analyze the applications of Natural Language Processing such as Question Answering and chatbots.
11	VI	2023-24	20ITE10	Data Compression	Upon successful completion of this course, students will be able to: 1. Understand the Mathematical Preliminaries involved in compression techniques. 2. Analyze Hoffman and Arithmetic coding for Lossless image compression, Text compression, and Audio Compression 3. Apply LZ77, LZ78 dictionary-based compression techniques. 4. Identify appropriate Lossless and Lossy algorithms for compression of given digital information. 5. Evaluate scalar and vector quantization techniques

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12	VI	2023-24	20ADE06	Microservices with Spring Boot	Upon completing this course, students will be able to: 1. Acquire the basic concepts of the Spring Framework 2. Interact with databases using Spring's support for JDBC and JPA. 3. Build spring boot applications using Dependency Injection concept 4. Apply Transaction Management concepts of spring in Enterprise Application Development and develop the Spring-MVC based Applications to solve the real-world problems. 5. Use Spring Unit testing framework and configure security on Spring MVC Applications
13	VI	2023-24	20ITE11	Ethical Hacking	Upon successful completion of this course, a student will be able to: 1. Identify the vulnerabilities/threats/attacks. 2. Describe penetration & security testing. 3. Interpret safe penetration techniques on the World Wide Web. 4. Design a computer against a variety of security attacks using various tools. 5. Become a professional ethical hacker.
14	VI	2023-24	20ITE12	Agile Methodologies	Upon successful completion of this course, students will be able to: 1. Compare Agile model with traditional models and explain the principles of agile model. 2. Perform iterative agile software processes. 3. Analyze the impact of agile knowledge management in the software development process. 4. Realize the importance of interacting with business stakeholders in determining the requirements for agile software system. 5. Develop techniques and tools for improving team collaboration and agile software quality.

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THEORY					
1	VII	2023-24	20EGMO4	Gender Sensitization	Upon successful completion of the course the students will be able to: 1. Understand the difference between “Sex” and “Gender” and be able to explain socially constructed theories of identity. 2. Recognize shifting definitions of “Man” and “Women” in relation to evolving notions of “Masculinity” and “Femininity”. 3. Appreciate women’s contributions to society historically, culturally and politically. 4. Analyze the contemporary system of privilege and oppressions, with special attention to the ways gender intersects with race, class, sexuality, ethnicity, ability, religion, and nationality. 5. Demonstrate an understanding of personal life, the workplace, the community and active civic engagement through classroom learning.
PRACTICALS					
2	VII	2023-24	20ITC28	Project Part–1	Upon successful completion of this course, students will be able to: 1. Identify problem from literature survey in his/her area of interest 2. Formulate possible solutions for the selected problem and compare with existing ones 3. Prepare synopsis of the selected problem 4. Gather the required information to set up the environment for the implementation of preliminary experimentation 5. Communicate the work effectively in both oral and written forms
3	VII	2023-24	20ITI03	Internship-III	
Professional Elective-4					
9	VII	2023-24	20ITE13	Computer Vision	Upon successful completion of this course, students will be able to: 1. Summarize the fundamentals of Image formation and describe the Geometric primitives and Transformations. 2. Describe different approaches to recognition of objects. 3. Inspect algorithms for feature detection and feature alignment. 4. Analyze images and videos for problems such as tracking and structure from motion. 5. Design recovered 3D structure for ill-posed scenes.

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10	VII	2023-24	20ITE14	Applied Predictive Analytics	Upon successful completion of this course, students will be able to: 1. Comprehend predictive modeling and assess the performance. 2. Apply regression techniques and analyse the performance. 3. Demonstrate Support Vector Machines and build an efficient networking model. 4. Analyze ensemble methods by choosing Tree based classifiers. 5. Select appropriate probabilistic Graphic models and identify topics through topic modeling.
11	VII	2023-24	20ITE15	Unmanned Aerial Vehicles	Upon successful completion of this course, students will be able to: 1. Identify the parts and functions of UAV and drones 2. Demonstrate the concepts of Aerodynamics, Propulsion & Structures of Model Aircrafts 3. Determine the payload and its corresponding propeller's RPM to successfully fly the drone 4. Design a drone with automatic recovery mechanism. 5. Understand Navigation of UAV.
12	VII	2023-24	20ITE16	Fundamentals of Block Chain Technology	Upon successful completion of this course, students will be able to: 1. Describe the concepts of distributed systems and blockchain properties. 2. Discuss the concepts of bitcoin and consensus mechanisms in bitcoin mining. 3. Explore the consensus mechanisms and technologies that support Ethereum. 4. Outline the Hyperledger Fabric architecture and Hyperledger Projects. 5. Analyse blockchain use cases in various domains.

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13	VII	2023-24	20ITE17	Software Architecture and Design Patterns	Upon completing this course, students will be able to: 1. Realize the basic concepts to identify state & behaviour of real world objects. 2. Apply Object Oriented Analysis and Design concepts to solve complex problems. 3. Construct various UML models using the appropriate notation for specific problem context. 4. Design models to Show the importance of systems analysis and design in solving complex problems using case studies. 5. Study of Pattern Oriented approach for real world problems.
14	VII	2023-24	20ITE18	Computer Vision Lab	Upon successful completion of this course, students will be able to: 1. Demonstrate the fundamental image processing operations. 2. Relate computer vision system for real world problems. 3. Implement image enhancement techniques. 4. Make use of kernels and transformations to detect edges in an image. 5. Apply histogram processing and conversion between various colour spaces.
15	VII	2023-24	20ITE19	Applied Predictive Analytics Lab	Upon successful completion of this course, students will be able to: 1. Demonstrate the basic functions and implement R packages and commands 2. Apply regression analysis methods and infer the problems 3. Develop applications of neural networks and evaluate the techniques 4. Evaluation of ensemble methods 5. Build a system to perform topic modeling on real time datasets

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16	VII	2023-24	20ITE20	Unmanned Aerial Vehicles Lab	Upon successful completion of this course, students will be able to: 1. Identify the parts and functions of UAV and drones 2. Demonstrate the concepts of Aerodynamics, Propulsion & Structures of Model Aircrafts 3. Determine the payload and its corresponding propeller's RPM to successfully fly the drone 4. Design a drone with an automatic recovery mechanism. 5. Design a mission-controlled surveillance drone.
17	VII	2023-24	20ITE21	Fundamentals of Block Chain Technology Lab	Upon successful completion of this course, students will be able to: 1. Explore the working of blockchain fundamentals such as cryptography and distributed computing. 2. Implement smart contract on the Ethereum blockchain. 3. Build smart contracts using Solidity programming language 4. Write smart contracts using the Remix tool. 5. Acquire thorough knowledge of Hyperledger fabric.
18	VII	2023-24	20ITE22	Software Architecture and Design Patterns Lab	Upon successful completion of this course, students will be able to: 1. Describe all important concepts of Software Architecture and design 2. Construct software architecture and OO design models (artifacts) for given complex problem in a team. 3. Investigate existing solutions i.e. architectural styles and software design patterns of a particular complex software system design problem for evaluation. 4. Translate the architectural views into an implementable architectural model using CASE tools. 5. Apply the various technologies for design pattern

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Professional Elective-5					
19	VII	2023-24	20ITE23	Social Media Analytics	Upon successful completion of this course, students will be able to: 1. Demonstrate the basics on social media analytics and its significance 2. Find the communities based on computations. 3 Apply the different data mining techniques to get the task relevant information. 4. Demonstrate the skill in developing various applications to influence social media resource. 5. Discuss about the various application based on the analytics.
20	VII	2023-24	20ADE10	Robotic Process Automation	Upon successful completion of this course, students will be able to: 1. To Understand the basic concepts of RPA 2. To Describe various components and platforms of RPA 3. To Describe the different types of variables, control flow and data manipulation techniques 4. To Understand various control techniques and OCR in RPA 5. To Describe various types and strategies to handle exception
21	VII	2023-24	20ADE11	Business Intelligence	Upon successful completion of this course, students will be able to: 1. Understand the concepts and components of Business Intelligence (BI) and Decision support systems. 2. Analyze how BI will help an organization and whether it will help yours. 3. Identify the technological architecture that makes up BI systems 4. Use the tools that make up BI (data science). 5. Plan the implementation of a BI system

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22	VII	2023-24	20ITE24	Mobile Computing	Upon successful completion of this course, students will be able to: 1. Describe GSM architecture, services and protocols 2. Examine challenges in medium access control in wireless and mobile context and associated protocols 3. Analyze the need for mobile IP and its associated functionalities in mobile environments. 4. Evaluate the mobile TCP protocols in terms of their functionality, advantages and limitations 5. Identify and solve database issues using hoarding techniques
23	VII	2023-24	20ADE07	Explainable Artificial Intelligence	Upon completing this course, students will be able to: 1. Describe the context of the machine learning application and why explainability would help, but also scrutinise which kind of explainability technique is necessary. 2. Understand the concepts that are important in model validation, evaluation, and performance visualization for both supervised and unsupervised learning. 3. Install and set up one or more post hoc explain ability techniques through a self-chosen set of programming platforms. 4. Critically reflect on the results from Explainable deep learning techniques and suggest how it helps the problem context. 5. Demonstrate comprehension of challenges and future related to Explainable AI

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Professional Elective-6					
24	VII	2023-24	20ADE13	Reinforcement Learning	Upon successful completion of this course, students will be able to: 1. Explain the fundamental concepts of reinforcement learning and finite markov decision process. 2. Design a Reinforcement Learning system that knows how to make automated decisions 3. Illustrate the integration of model-based and model-free methods. 4. Analyse how a learning algorithm can be implemented in a different ways to obtain computational advantages. 5. Discuss parallels between reinforcement learning and neuroscience
25	VII	2023-24	20ITE25	Software Defined Networks	Upon completing this course, students will be able to: 1. Differentiate between traditional networks and software defined networks. 2. Understand advanced and emerging networking technologies. 3. Learn how to use SDN controllers to perform complex networking tasks. 4. Demonstrate the skills to do advanced networking research and programming. 5. Apply the knowledge on SDN and security measures to solve real world problems
26	VII	2023-24	20ADE12	Serverless Computing	Upon successful completion of this course, students will be able to: 1. Understand the evolution of computing and architectures. 2. Summarize the requirements of serverless computing. 3. Develop event driven applications. 4. Use AWS Lambda for serverless applications. 5. Develop Functions for serverless applications in AWS Lambda
27	VII	2023-24	20ITE26	Digital Forensics	Upon successful completion of the course, students will able to 1. Describe digital forensics and relate it to an investigative process. 2. Explain the legal issues of preparing for and performing digital forensic analysis based on the investigator's position and duty. 3. Interpret the cyber pieces of evidence, Digital forensic process model and their legal perspective. 4. Demonstrate various forensic tools to

					investigate the cybercrime and to identify the digital pieces of evidence. 5. Analyse the digital evidence used to commit cyber offenses
28	VII	2023-24	20ITE27	Real Time Operating System	Upon successful completion of this course, students will be able to: 1. Gain knowledge about Stimulability analysis. 2. Ability to learn Real-time programming environments. 3. Develop efficient algorithms for real-time task scheduling in uniprocessor and multi-processor environments. 4. Knowledge about real time communication protocols. 5. Able to use real-time databases.
Open Elective – 1					
29	VII	2023-24	20MEO03	Research Methodologies	Upon successful completion of this course, students will be able to: 1. Define research problem. 2. Review and assess the quality of literature from various sources. 3. Understand and develop various search designs. 4. Analyze problem by statistical techniques: ANOVA,F-test,Chi-square. 5. Improve the style and format of writing a report for technical paper/Journal report.
30	VII	2023-24	20MEO12	3D Printing	Upon successful completion of this course, students will be able to: 1. Understand the concept of 3D printing processes, advantages and limitations. 2. Evaluate real-life scenarios and recommend the appropriate 3D printing technology. 3. Analyze various pre-processing and post processing techniques. 4. Explain current and emerging 3D printing technologies in diversified applications. 5. Identify components required in construction of3Dprinter.
31	VII	2023-24	20ECO14	Neural Networks and Fuzzy Logic	Upon completion of this course, students will be able to: 1. Understand the principles of Neural Networks and Fuzzy Logic fundamentals. 2. Apply the basic concepts to model the Neural Networks and Fuzzy Logic systems.

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					3. Compare the Neural Network based systems and Fuzzy Logic based systems. 4. Analyze Fuzzy Logic controllers and its applications. 5. Explain the concepts of Fuzzy target tracing control systems.
32	VII	2023-24	20EGO01	Technical Writing Skills	Upon successful completion of this course, students will be able to: 1. Communicate effectively, without barriers and understand aspects of technical communication. 2. Differentiate between general writing and technical writing and write error free sentences using technology specific words 3. Apply techniques of writing in business correspondence and in writing articles. 4. Draft technical reports and technical proposals. 5. Prepare agenda and minutes of a meeting and demonstrate effective technical presentation skills.
33	VII	2023-24	20BTO04	Bio-Informatics	Upon successful completion of this course, students will be able to: 1. Explain the basic concepts of biology and bioinformatics 2. Identify various types of biological databases used for the retrieval and analysis of the information 3. Explain the sequence analysis and data mining 4. Discuss the methods used for sequence alignment and construction of the phylogenetic tree 5. Describe the methods used for gene and protein structure prediction
THEORY					
1	VIII	2023-24	20ITC29	Technical Seminar	Upon successful completion of this course, students will be able to: 1. Collect Organize, Analyze and Consolidate information about emerging technologies from the literature. 2. Exhibit effective communication skills, stage courage, and confidence. 3. Demonstrate intrapersonal skills. 4. Explain new innovations/inventions in the relevant field. 5. Prepare Seminar Report in a prescribed format.

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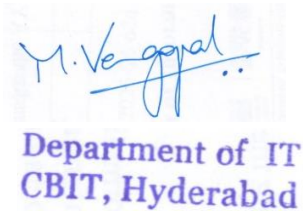
2	VIII	2023-24	20ITC30	Project Part-2	Upon successful completion of this course, students will be able to: 1. Demonstrate a sound technical knowledge of their selected topic. 2. Conduct investigations by using research-based knowledge and methods to provide valid conclusions. 3. Provide solutions to societal complex problems utilizing gained engineering knowledge as an individual or by team work. 4. Create/select/use modern tools to overcome the limitation of complex engineering solutions. 5. Communicate with engineering experts and the community at large in written and oral forms.



Open Elective- 2					
3	VIII	2023-24	20MEO04	Principles of Entrepreneurship	Upon successful completion of this course, students will be able to: 1. Understand the concept and essence of entrepreneurship. 2. Identify business opportunities and nature of enterprise. 3. Analyze the feasibility of new business plan. 4. Apply project management techniques like PERT and CPM for effective planning and execution of projects. 5. Use behavioral, leadership and time management aspects in entrepreneurial journey
4	VIII	2023-24	20MEO10	Introduction to Operations Research	Upon successful completion of this course, students will be able to: 1. Understand the concepts of linear programming problem. 2. Solve the given transportation problem. 3. Develop optimum pair of operations and resources by using assignment technique. 4. Analyze project management techniques like CPM and PERT to plan and execute projects successfully. 5. Apply sequencing concepts for industry applications.
5	VIII	2023-24	20EEO04	Energy Conservation	Upon successful completion of this course, students will be able to: 1. Know the current energy scenario and importance of energy conservation. 2. Understand the concepts of energy conservation. 3. Evaluate the performance of existing engineering systems 4. Explore the methods of improving energy efficiency in different engineering systems. 5. Understand different energy efficient devices.
6	VIII	2023-24	20BTO05	Cognitive Neuro Science	Upon successful completion of this course, students will be able to: 1. Gain familiarity and basic knowledge about brain systems and functions. 2. Understand brain’s neuro-transmitter system. 3. Understanding the brain's methods gives rise to behaviour whether we engage in any activity (e.g., walking, talking, etc.). 4. Identify the patterns of varied

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					activities in neurons that correspond to a person's attempts to move in particular ways. 5. Understand the feedback system and brain disorders.
7	VIII	2023-24	20ECO06	Principle of VLSI	Upon successful completion of this course, students will be able to: 1. Understand characteristic behavior of MOSFET. 2. Describe various MOS layers and layout design rules. 3. Implement various CMOS logic circuits. 4. Design various MOS memories. 5. Understand the concepts of VLSI technology.
Open Elective- 3					
8	VIII	2023-24	20MEO07	Intellectual Property Rights	Upon successful completion of this course, students will be able to: 1. Understand the evolution of IP, working of organization's at global level to protect and promote IP. 2. Familiarize with the patent filing process at national and international level. 3. Draw the logical conclusion of research, innovation and patent filing. 4. Compare different kinds of IP and their patenting system. 5. Understand the techno-legal-business angle of IP, infringement and enforcement mechanisms for protection.
9	VIII	2023-24	20MEO15	Principles of Industry 4.0	Upon successful completion of this course, students will be able to: 1. Understand the Basics and applications of Digital Manufacturing and Industry 4.0. 2. Understand the role of Additive Manufacturing, Virtual prototyping and Reverse Engineering processes and their adaptability to Digital Manufacturing. 3. Understand the concepts of digital manufacturing based product life cycle and its management. 4. Understand the concept of Industry 4.0 and allied technologies. 5. Understand the basics of Internet of things and cloud computing pertaining the fourth industrial revolution.

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10	VIII	2023-24	20ECO01	Remote Sensing and GIS	Upon completion of this course, students will be able to: 1. Demonstrate the understanding of basic concepts of remote sensing and interpret energy interactions. 2. Choose an appropriate technique for a given scenario by appreciating the types of remote sensing. 3. Distinguish the principle behind the working of microwave and LiDAR sensing. 4. Apply Microwave remote sensing techniques 5. Explain the procedure for encoding data and geospatial data analysis.
11	VIII	2023-24	20CEO02	Disaster Risk Reduction andManagement	Upon completion of this course, the student will be able to, 1. Identify and understand the concepts of hazards, causes and impacts of disasters. 2. Develop a critical capacity to evaluate the principles and practices of disaster risk reduction and management. 3. Develop a deep awareness of disaster resilience, risk mitigation, and recovery policies as they arise from natural hazards around the globe. 4. Apply knowledge about existing global frameworks and existing agreements and role of community in successful Disaster Risk Reduction. 5. Evaluate DM study including data search, analysis and presentation as a case study.
12	VIII	2023-24	20MTO03	Quantum Computing	Upon completion of this course, students will be able to: 1. Compute basic mathematical operations on Quantum bits. 2. Will be able to execute Quantum operations of Quantum computing. 3. To build quantum programs. 4. Develop quantum Logical gates and circuits. 5. Develop the quantum algorithm.

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Open Electives offered by IT Department					
1	VIII	2023-24	20ITO01	Object Oriented Programming Using JAVA	Upon completing this course, students will be able to: 1. To understand fundamentals of object-oriented programming paradigm. 2. To apply knowledge of string handling, interfaces, packages and inner classes. 3. To implement Exception handling mechanisms and Multithreading. 4. To demonstrate knowledge on collection framework, stream classes. 5. To develop web applications using Servlets and JSP.
2	VIII	2023-24	20ITO02	Principles of Internet of Things	Upon completing this course, students will be able to: 1. Comprehend the terminology, protocols and communication models of IoT. 2. Define the various IoT enabling technologies and differentiate between M2M and IoT. 3. Acquire the basics of Python Scripting Language used in developing IoT applications. 4. Describe the steps involved in IoT system design methodology. 5. Design simple IoT systems using Raspberry Pi board and interfacing sensors with Raspberry Pi.
3	VIII	2023-24	20ITO03	Introduction To Cloud Computing	Upon completing this course, students will be able to: 1. Understand the characteristics and models in Cloud computing. 2. Asses Cloud services applications and the challenges associated with Cloud Computing. 3. Apply various cloud services and deployment models and virtualization techniques for business. 4. Analyze the concepts of cloud storage and demonstrate their use. 5. Evaluate various cloud programming models and apply them in virtual office management.

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