



TECHNOCRATS INSTITUTE OF TECHNOLOGY (EXCELLENCE)

(Run by ChandravadaniMahilaShikshaSamiti, Bhopal)

Approved By AICTE New Delhi & Govt. of Madhya Pradesh

Affiliated To Rajeev Gandhi Proudyogiki Vishwavidyalaya, Bhopal

Anand Nagar Post Piplani, BHEL, Bhopal-21, Ph. No.- 0755-2751801 Fax- 0755-2751679 website:www.tifexcellence.net



B.Tech : I st year (I st and II nd Semester)	
Subject Name	Engineering Chemistry
Subject Code	BT – 101
Students will be able to:	
CO 1	Determine hardness and alkalinity of water.
CO 2	Illustrate properties of lubricants and polymers with respect to their applications.
CO 3	Interpret graphical representation of phase equilibrium diagram and mechanism of corrosion.
CO 4	Analyze electronic, vibrational and rotational Spectroscopy.
CO 5	Determine periodic properties of various elements in s, p, d and f orbital's.

Subject Name	Engineering Mathematics-I
Subject Code	BT – 102
Students will be able to:	
CO 1	Apply Fundamental theorems of calculus in solving Engineering problems.
CO 2	Determine surface areas and volumes of revolution by method of integration.
CO 3	Use sequential series in generation of waves.
CO 4	Analyze the transformation of function from one stage to another by vectors and their combination.
CO 5	Solve complex problems of engineering through matrices.

Subject Name	Communication Skills
Subject Code	BT – 103
Students will be able to:	
CO 1	Develop grammatical competence.
CO 2	Demonstrate lexical ability.
CO 3	Demonstrate effective oral and written communication.
CO 4	Create reports, resumes, and other technical documents effectively and coherently.
CO 5	Show competency in business communication skills in real world.

Subject Name	Basic Electrical and Electronics Engineering
Subject Code	BT – 104
Students will be able to:	
CO 1	Analyze electrical and electronics circuits using network theorems and laws.
CO 2	Analyze the performance of AC circuits.
CO 3	Apply electromagnetic induction principle for the performance analysis of magnetic circuits like transformer etc.
CO 4	Classify the electrical machines for different applications.
CO 5	Utilize basic concepts of semiconductor devices and digital circuits for problem solving.


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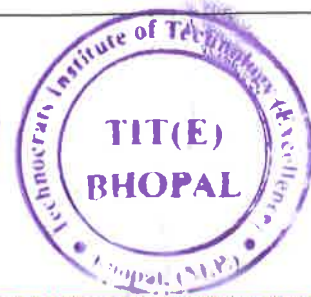
Subject Name	Engineering Graphics
Subject Code	BT – 105
Students will be able to:	
CO 1	Apply BIS standards and conventions while drawing Lines, printing letters and showing dimensions.
CO 2	Construct engineering scales, conic sections and engineering curves.
CO 3	Apply the principle of orthographic projection to draw orthographic views of point, line, planes, solids and section of solids.
CO 4	Convert pictorial and isometric view of simple objects to orthographic views and vice-versa
CO 5	Create 2D and 3D models using Auto-CAD.

Subject Name	Engineering Physics
Subject Code	BT – 201
Students will be able to:	
CO 1	Apply Schrodinger wave equation to one dimensional box.
CO 2	Analyze interference and diffraction phenomena in wave optics.
CO 3	Determine the conductivity in different type of semiconductor diodes.
CO 4	Classify different types of lasers on the basis of their properties.
CO 5	Estimate the charge distribution within a close surface.

Subject Name	Engineering Mathematics-II
Subject Code	BT – 202
Students will be able to:	
CO 1	Solve ordinary differential equation of first order and higher degree.
CO 2	Illustrate the concept of higher order differential equation and its application.
CO 3	Solve linear and non-linear partial differential equation.
CO 4	Apply function of complex variable to solve contour integration.
CO 5	Apply the concept of vector calculus and its application in engineering problems.

Subject Name	Basic Mechanical Engineering
Subject Code	BT – 203
Students will be able to:	
CO 1	Assess the engineering properties of ferrous materials.
CO 2	Identify concepts of measurement, important manufacturing processes and machine tools.
CO 3	Apply elementary principles of fluid statics and dynamics.
CO 4	Apply laws of thermodynamics in steam engineering.
CO 5	Estimate the efficiency of reciprocating machines.


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Name of the Program	Bachelor of Technology
Subject Name	Basic Civil Engineering and Engineering Mechanics
Subject Code	BT – 204
Students will be able to:	
CO 1	Discuss critically different building materials and building components.
CO 2	Determine distance, direction and elevation of survey lines.
CO 3	Interpret contours, remote sensing techniques and cross section elements of given profile.
CO 4	Analyze system of forces and trusses.
CO 5	Determine cross sectional properties and draw bending moment diagram of statically determinate beams.

Name of the Program	Bachelor of Technology
Subject Name	Basic Computer Engineering
Subject Code	BT – 205
Students will be able to:	
CO 1	Illustrate the basic understanding of computer hardware and software.
CO 2	Develop the problem solving skills using programming language.
CO 3	Develop deeper understanding of object oriented programming by using C++.
CO 4	Create comprehensive understanding of computer networking, security basics.
CO 5	Develop the basic concepts and state of the art of database and cloud technology.

Name of the Program	Bachelor of Technology
Subject Name	Engineering Chemistry Laboratory
Subject Code	BT – 101
COURSE OUTCOMES	
Students will be able to:	
CO 1	Examine alkalinity of water through neutralization titration method.
CO 2	Examine the hardness of water through titration method.
CO 3	Analyze the quality of lubricating oil.
CO 4	Evaluate percentage of metal in metal alloy.
CO 5	Analyze quality of coal through proximate analysis.

Name of the Program	Bachelor of Technology
Subject Name	Basic Electrical and Electronics Engineering Laboratory
Subject Code	BT – 104
Students will be able to:	
CO 1	Verify KVL and KCL for DC electrical circuits.
CO 2	Determine the performance of AC electrical circuits.
CO 3	Test for performance parameters of transformer.
CO 4	Demonstrate working of DC and AC machine.
CO 5	Analyze different semiconductor devices and digital circuits.

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Name of the Program	Bachelor of Technology
Subject Name	Communication Skills Laboratory
Subject Code	BT – 103
COURSE OUTCOMES	
Students will be able to:	
CO 1	Develop listening skills in English.
CO 2	Develop pronunciation skills, intonation and rhythm.
CO 3	Acquire basic proficiency in English conversation.
CO 4	Develop effectiveness in interview skills by the knowledge of all spheres of communication skills.
CO 5	Inculcate presentation skills in formal environment.

Name of the Program	Bachelor of Technology
Subject Name	Engineering Graphics Laboratory
Subject Code	BT – 105
After completion of this course, the student will be able to:	
CO 1	Prepare engineering drawings of objects as per BIS conventions mentioned in the relevant codes.
CO 2	Develop imaginative skills required to understand projection of solids, section of solids and developments of surfaces.
CO 3	Develop simple solids and their frustum/truncated part to interpret actual shape and size of raw materials needed.
CO 4	Develop isometric drawings of simple objects.
CO 5	Construct orthographic and isometric views in CAD environment.

Name of the Program	Bachelor of Technology
Subject Name	Manufacturing Practices
Subject Code	BT – 106
Students will be able to:	
CO 1	Develop mould cavity in green sand of given pattern.
CO 2	Prepare a fitting job of prescribed geometry.
CO 3	Create lap joint of wooden material in carpentry shop.
CO 4	Demonstrate different welding operations in the welding shop.
CO 5	Demonstrate turning operation using lathe machine.


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Name of the Program	Bachelor of Technology
Subject Name	Rural Outreach
Subject Code	BT – 108
Students will be able to:	
CO 1	Relate the importance of Swachh Bharat Abhiyan in Health and hygiene.
CO 2	Motivate communities of rural areas for personal hygiene.
CO 3	Create awareness towards sanitation and cleanliness.
CO 4	Apply modern and scientific techniques for managing society waste.
CO 5	Apply the technological innovation in the field of sanitation and cleanliness.

Name of the Program	Bachelor of Technology
Subject Name	Engineering Physics
Subject Code	BT – 201
After completion of this course, the student will be able to:	
CO 1	Determine the wavelength of laser beam by diffraction grating.
CO 2	Determine the radius of curvature of Plano convex lens and wavelength of light source by Newton's ring experiment.
CO 3	Deduct wavelength of different colors of white light using diffraction grating.
CO 4	Inspect the internal resistance of different types of semiconductor diodes by plotting V-I characteristics.
CO 5	Determine charge carriers density and mobility of a given semiconductor crystals by hall effect.

Name of the Program	Bachelor of Technology
Subject Name	Basic Mechanical Engineering Laboratory
Subject Code	BT – 203
Students will be able to:	
CO 1	Determine tensile and compressive strength of a material.
CO 2	Verify Bernoulli's equation using Bernoulli's Apparatus.
CO 3	Evaluate hardness of a given specimen.
CO 4	Perform turning operation using lathe machine.
CO 5	Demonstrate two stroke & four stroke petrol and diesel engines.


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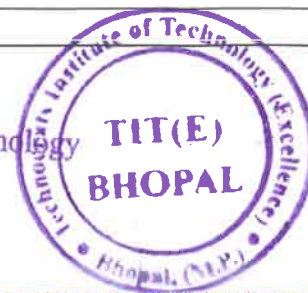
Name of the Program	Bachelor of Technology
Subject Name	Basic Civil Engineering and Engineering Mechanics Laboratory
Subject Code	BT – 204
Students will be able to:	
CO 1	Determine properties of various building materials.
CO 2	Measure distance, direction and elevation of survey lines.
CO 3	Verify law of forces.
CO 4	Determine moment of inertia of fly wheel.
CO 5	Determine support reactions for given beam and truss experimentally.

Name of the Program	Bachelor of Technology
Subject Name	Basic Computer Engineering Laboratory
Subject Code	BT – 205
Students will be able to:	
CO 1	Interpret the fundamentals of word processing software skills.
CO 2	Implement the concept of control and condition statement in program.
CO 3	Write programs using concept of object oriented paradigm.
CO 4	Outline the concepts of linear data structures.
CO 5	Create database structure using SQL command.

Name of the Program	Bachelor of Technology
Subject Name	Language Laboratory and Seminar
Subject Code	BT – 206
Students will be able to:	
CO 1	Develop conversational skills in English.
CO 2	Build spontaneous and public speaking skills.
CO 3	Interpret text enhancing for reading proficiency.
CO 4	Evaluate critically and provide recommendations based on comprehension of a text.
CO 5	Construct and communicate thoughts in real world scenario and different roles.

Branch: Department of Computer Science Engineering	
Name of Subject:	Energy & Environmental
Subject Code:	ES 301
Student will be able to	
CO1	Classify various energy systems and resources.
CO2	Identify the elements of an Ecosystem.
CO3	Illustrate the Biodiversity and its conservation.
CO4	Examine various causes of Environmental Pollution
CO5	Discuss the issues involved in environmental social issues.

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Name of Subject: Discrete Structure	
Subject Code: CS 302	
Student will be able to	
CO1	Apply the concepts of the Set theory, Relation and Functions.
CO2	Illustrate the concepts of Algebraic Structures.
CO3	Analyze the relation between Propositional Logic and Finite state machines
CO4	Apply various types of graph structures to computational problem solving.
CO5	Apply the concept of phase diagram, posets, lattice and combinatorics to solve problems in multiple domains.

Name of Subject: Data Structure	
Subject Code: CS 303	
Student will be able to	
CO1	Summarize the concept of data structure and explore arrays and linked lists.
CO2	Classify various linear data structures with their representation and perform different operations on them.
CO3	Analyze algorithms for operations on Tree.
CO4	Analyze algorithms for operations on Graph.
CO5	Apply data structures to implement algorithms for searching and sorting.

Name of Subject: Data Structure Lab	
Subject Code: CS 303	
Student will be able to	
CO1	Develop program for different operations using array and linked list.
CO2	Develop programs for linear data structures
CO3	Build program for non linear data structures to solve various computing problems.
CO4	Apply various sorting, searching and hashing techniques
CO5	Develop code for real life problems like shortest path and MST using graph theory.

Name of Subject: Digital System	
Subject Code: CS 304	
Student will be able to	
CO1	Simplify Boolean expression using minimization techniques.
CO2	Design various combinational circuits.
CO3	Design various sequential circuits.
CO4	Contrast between logic families, Converters and programmable logic devices.
CO5	Illustrate the working principle of digital communication systems.


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Name of Subject: Digital System Lab	
Subject Code: CS 304	
Student will be able to	
CO1	Examine the truth table of digital circuits.
CO2	Design various combinational circuits.
CO3	Design sequential circuits using flip flop
CO4	Make use of digital ICs to implement digital circuits.
CO5	Test different digital circuits.

Name of Subject: Object Oriented Programming & Methodology	
Subject Code: CS-305	
Student will be able to	
CO1	Outline the basics of Object Oriented Programmings and its elements.
CO2	Apply the concepts of encapsulation and abstraction in Object Oriented Programmings.
CO3	Apply concept of inheritance in program development.
CO4	Discuss different polymorphisms methods with real world examples.
CO5	Apply concept of exception handling and multithreading.

Name of Subject: Object Oriented Programming & Methodology Lab	
Subject Code: CS-305	
Student will be able to	
CO1	Apply object oriented programming concept in program design.
CO2	Create programs using friend function and function overloading.
CO3	Implement concept of operator overloading, Inheritance and polymorphism in program design.
CO4	Construct programs to handle exceptions in programming in C++.
CO5	Build program using constructor and destructor.


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Name of Subject: Computer Workshop	
Subject Code: CS-306	
Student will be able to	
CO1	Make use of basics of Java Features using programming environment.
CO2	Apply Java collective framework to design data structures, generics and collections algorithms.
CO3	Develop programs using advance Java Features-Multithreading, Networking and JDBC.
CO4	Development of web based applications with the help of servlets, JSP and Multimedia.
CO5	Experiment with advanced web/internet programming technologies like J2ME, J2EE, EJB and XML.

Name of Subject: Evaluation of Internship-I completed at I year level	
Subject Code: BT107	
Student will be able to	
CO1	Demonstrate the ability to resolve the problems.
CO2	Demonstrate critical thinking skills, such as related to social issues.
CO3	Adapt professional software development environment.
CO4	Identify the different resources for the software development
CO5	Summarize new practices observed during internship

Name of Subject: Mathematics III	
Subject Code: BT 401	
Student will be able to	
CO1	Solve polynomial and transcendental equations using interpolation and extrapolation techniques.
CO2	Implement numerical differentiation and integration techniques by nm
CO3	Evaluate ordinary differential equations and partial differential equations.
CO4	Apply Laplace and Fourier transforms in complex engineering problems.
CO5	Analyze and represent complicated data in an easy way with various probability distributions.

Name of Subject: Analysis Design of Algorithm	
Subject Code: CS-402	
Student will be able to	
CO1	Analyze different divide and conquer algorithms with respect to time and space complexity.
CO2	Apply greedy strategies and Dynamic programming technique for algorithm development
CO3	Apply branch and bound and backtracking technique for the solution of computing problems
CO4	Apply the concepts of trees and graphs for solving of real world problems
CO5	Choose the problem solving strategies for given problem

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Name of Subject: Analysis Design of Algorithm Lab	
Subject Code: CS-402	
Student will be able to	
CO1	Create programs using Greedy method to find optimal solution for problems like single source shortest path algorithm
CO2	Create program using Dynamic programming concept for Floyd-Warshal algorithm.
CO3	Create program for Hamiltonian cycle problem using backtracking
CO4	Develop AVL and B-trees based simple search programs
CO5	Create programs using Greedy method to find optimal solution for problems like single source shortest path algorithm

Name of Subject: Software Engineering	
Subject Code: CS-403	
Student will be able to	
CO1	Classify different software process models.
CO2	Determine software functional and non-functional requirements.
CO3	Design software process, architecture, user Interface.
CO4	Categorize various types of software testing techniques.
CO5	Discuss project management and software maintenance.

Name of Subject: Software Engineering Lab	
Subject Code: CS-403	
Student will be able to	
CO1	Apply the software engineering methodologies involved in the phases for project development.
CO2	Create function oriented and object oriented software design using tools like rational rose.
CO3	Develop software requirements specifications for a given problem.
CO4	Create structure and behavior of UML diagrams.
CO5	Create the test cases and test strategies for conventional software.

Name of Subject: Computer Organisation and Architecture	
Subject Code: CS-404	
Student will be able to	
CO1	Summarize the basic organization of computer with emphasis on working of each component.
CO2	Interpret the steps of execution of instruction cycle, micro instructions along with the control signals generated by control unit.
CO3	Evaluate the computer based different arithmetic operations.
CO4	Discuss input-output Organization of Computer System.
CO5	Classify various Memory devices, Multiprocessors with its working.

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Name of Subject: Computer Organisation and Architecture Lab	
Subject Code: CS-404	
Student will be able to	
CO1	Elaborate basic principles of computer architecture.
CO2	Interpret multiplication operation on memory.
CO3	Develop programs to perform addition operation on memory.
CO4	Construct programs to perform subtraction operation on memory.
CO5	Build the steps of execution of instructions and micro instructions along with the control signals generated by control unit.

Name of Subject: Operating Systems	
Subject Code: CS-405	
Student will be able to	
CO1	Develop the concept of operating systems and its services.
CO2	Contrast file system along with disk scheduling algorithms.
CO3	Analyze different process scheduling algorithms and memory management techniques to achieve better performance of a computer system.
CO4	Determine techniques to deal with different Concurrent processes.
CO5	Examine case studies of Unix/Linux and Windows operating system.

Name of Subject: Operating Systems Lab	
Subject Code: CS-405	
Student will be able to	
CO1	Construct a program for different CPU scheduling algorithm.
CO2	Build a program for different classical problem of synchronization.
CO3	Construct a program for different page replacement algorithm.
CO4	Create a program for disk scheduling algorithms.
CO5	Construct a program for Deadlock free condition.

Name of Subject: Programming Practices Python Lab	
Subject Code: CS406	
Student will be able to:	
CO1	Interpret the basic Python syntax.
CO2	Construct programs in python using conditional statements.
CO3	Demonstrate the concepts of object oriented programming like encapsulation, inheritance and polymorphism in python.
CO4	Identify the different types of exceptions occurring in python programs and handle them.
CO5	Utilize different Standard Libraries in python programs.


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Name of Subject: Theory of Computation	
Subject Code: CS -501	
Student will be able to	
CO1	Summarize the fundamentals of various Languages, Grammars & Automata.
CO2	Construct Automata to recognize the languages.
CO3	Select appropriate automata as per the requirements.
CO4	Prove properties of languages, grammars and automata using formal mathematical methods.
CO5	Discuss the complexity and limitation of computation in problem solving.

Name of Subject: Theory of Computation Lab	
Subject Code: CS -501	
Student will be able to	
CO1	Write a Program to implement DFA to accept a given language.
CO2	Write a program for modelling a system using PDA to accept appropriate language.
CO3	Write a program to implement turing machine to accept a given language.
CO4	Select appropriate automata to implement a given dynamic system of moderate complexity.
CO5	Measure Complexity of various Computation problems.

Name of Subject: Database Management Systems	
Subject Code: CS-502	
Student will be able to	
CO1	Discuss the concepts of Database and make use of ER diagram.
CO2	Write the database queries in the form of relational algebra and calculus expression.
CO3	Demonstrate the Normalization with example.
CO4	Utilize the concept of concurrency control & recovery mechanism for database.
CO5	Design RDBMS through Oracle / Postgresql / mySql.

Name of Subject: Database Management Systems Lab	
Subject Code: CS-502	
Student will be able to	
CO1	Create database structure using DDL commands.
CO2	Build user defined constraints on the database.
CO3	Create queries for interacting with database.
CO4	Construct procedures, cursor and trigger.
CO5	Develop a simple data base application in RDBMS.

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Name of Subject: Departmental Elective- Cyber Security	
Subject Code: CS-503(C)	
Student will be able to	
CO1	Classify the cyber crimes along with its challenges
CO2	Discuss perception of cyber criminals.
CO3	Identify and tackle the Cyber Crime
CO4	Discuss Criminal justice according latest Act for Digital Media Ethics Code
CO5	Select tools to avoid cyber crime

Name of Subject: Open Elective Internet and Web Technology	
Subject Code: CS-504(A)	
Student will be able to	
CO1	Outline the concept and state of the art of world wide web and effective web design
CO2	Apply HTML tags for user friendly web pages.
CO3	Design dynamic web pages using CSS and Javascript as per need of applications.
CO4	Develop server side scripting with PHP to generate the web pages dynamically using the database connectivity.
CO5	Create the modern Web applications using the client and server side technologies.

Name of Subject: Lab (Linux)	
Subject Code: CS-505	
Student will be able to	
CO1	Develop the Linux environment and shell scripts.
CO2	Analyze system and network based file system.
CO3	Build, control and monitor the system level process to optimize the Linux kernel.
CO4	Develop physical, user and system level security in Linux environment.
CO5	Carryout implementation of Apache web, Domain Name System, Dynamic Host Configuration Protocols and security server in Linux.

Name of Subject: Lab (Python)	
Subject Code: CS-506	
Student will be able to:	
CO1	Formulate Conditional statements and Loops for Python Programs
CO2	Construct programs to Read and write data to and from files in Python.
CO3	Design Graphical user Interfaces in Python
CO4	Create database applications in Python.
CO5	Develop real world Application in python using Pygam

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Name of Subject: Evaluation of Internship-II	
Subject Code: CS-507	
Student will be able to:	
CO1	Apply the real working environment principles in his/her professional development.
CO2	Correlate theoretical concepts learned in class rooms to the industrial work scenario.
CO3	Adapt professional software development environment.
CO4	Learn various key practices for working in team and optimizing processes.
CO5	Develop work competencies for a specific profession or occupation.

Name of Subject: Minor Project- I	
Subject Code: CS-508	
Student will be able to:	
CO1	Choose the technology to implement the project from the available technologies.
CO2	Identify the project based on the review of the selected technology.
CO3	Develop the project in legal and ethical ways using project management principals such as planning, scheduling, budgeting and risk management.
CO4	Work effectively with team members, communicate and resolve conflicts if any within the team.
CO5	To present their project outcomes effectively in verbal and written form.

Name of Subject: Machine Learning	
Subject Code: CS-601	
Student will be able to:	
CO1	Utilize the knowledge of probability, statistics and linear algebra to machine learning problems.
CO2	Determine terminologies involved in machine learning and deep learning models.
CO3	Build the concept of CNN, SVM and RNN to solve specific machine learning problem.
CO4	Build the concept of Reinforcement Learning framework to solve specific machine learning problem.
CO5	Apply the knowledge of machine learning algorithms in computer vision, speech processing and Natural language processing.

Name of Subject: Machine Learning Lab	
Subject Code: CS-601	
Student will be able to:	
CO1	Identify the hardware requirements for implementation of machine learning and install Anaconda and Tensor Flow in the laboratory.
CO2	Create the program using LSTM (Long Short Term Memory) for real world classification problem of moderate complexity.
CO3	Carry out implementation of SVM for three dimensional numerical data Classification
CO4	Examine which model is performing well for a specific problem.
CO5	Carry out implementation of CNN in tensor flow environment for Image Classification

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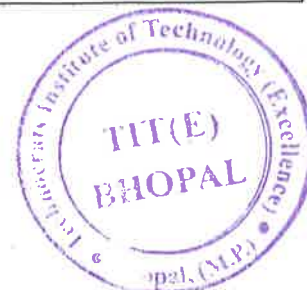
Name of Subject: Computer Networks	
Subject Code: CS-602	
Student will be able to:	
CO1	Outline basics of computer networks and design issues related to various layers of TCP/IP
CO2	Apply different protocols of data link layer
CO3	Apply multiple approaches for medium access control in a computer network
CO4	Analyze different routing algorithms to optimize the use of channel
CO5	Discuss transport and application issues (related to protocols such as HTTP, FTP, SMTP, SNMP, DNS, SSH etc.)

Name of Subject: Computer Networks Lab	
Subject Code: CS-602	
Student will be able to:	
CO1	Demonstrate computer network component and devices.
CO2	Analyze how communication works at different layers of TCP/IP model
CO3	Apply mathematical foundations to solve computational problems.
CO4	Apply the various Routing Protocols/Algorithms and Internetworking
CO5	Design network with client/server programming

Name of Subject: Departmental Elective Compiler Design	
Subject Code: CS-603(C)	
Student will be able to:	
CO1	Summarize the fundamentals & different phases of compiler with examples.
CO2	Construct Parsing Table & Show the parsing of string for various parsers.
CO3	Analyze data structures used for symbol table and runtime organization and errors in various phases
CO4	Apply code generation techniques to create target code.
CO5	Summarize the fundamentals & different phases of compiler with examples.

Name of Subject: Open Elective Project Management	
Subject Code: CS-604(B)	
Student will be able to:	
CO1	Contrast between conventional and modern software management techniques.
CO2	Apply the evaluation criteria to the various phases of the software management process.
CO3	Identify software development process workflow and put required checkpoints
CO4	To develop ability to monitor and control projects life cycle and risk involved.
CO5	Discuss the quality of the software products using software metrics.


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Name of Subject: Data Analytics Lab	
Subject Code: CS 605	
Student will be able to:	
CO1	Interpret the concepts of data analytics using statistics and probability
CO2	Demonstrate the data pre-processing techniques used in data analytics.
CO3	Identify the relation between Correlation and Covariance.
CO4	Develop programs in the field of data analytics based on R programming language.
CO5	Build programs using MATLAB and Python as data analytics tools.

Name of Subject: Skill Development Lab	
Subject Code: CS-606	
Student will be able to:	
CO1	Select appropriate software life cycle model, Process & methods for developing software product according user requirements & expectations.
CO2	Translate user requirements & expectations in the form of software requirement specification.
CO3	Make use of various design pattern & design methods for implementing the design of software product.
CO4	Develop skills in software development through analysis of case study.
CO5	Organize all activities like requirement analysis, design, and coding, testing, maintenance in the form of documentation for systematic execution of project.

Name of Subject: Minor Project II	
Subject Code: CS-608	
Student will be able to:	
CO1	Choose the technology to implement the project from the available technologies.
CO2	Identify the project title based on the review of the selected technology.
CO3	Develop the project in legal and ethical ways using project management principals such as planning, scheduling, budgeting and risk management.
CO4	Work effectively with team members, communicate and resolve conflicts if any within the team.
CO5	To present their project outcomes effectively in verbal and written form.

Name of Subject: Software Architectures	
Subject Code: CS-701	
Student will be able to:	
CO1	Outline the software architecture frame work and business cycle.
CO2	Choose a software architectural models, styles and patterns.
CO3	Select appropriate software architectural implementation technology.
CO4	Examine software architectures and review its design
CO5	Propose a documentation using standard principles of sound documentation


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Name of Subject: Software Architectures Lab	
Subject Code: CS-701	
Student will be able to:	
CO1	Build Use Case diagram using UML
CO2	Install Open EJB and AngularJs
CO3	Create software architecture design patterns in java
CO4	Develop server side programming module with database handling servlets
CO5	Prepare documentation of the developed software design.

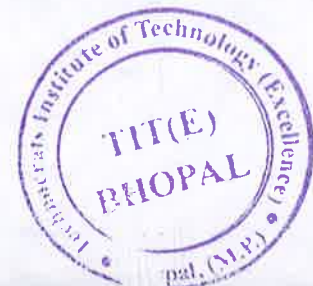
Name of Subject: Departmental Elective Big Data	
Subject Code: CS-702(D)	
Student will be able to:	
CO1	Analyze the big data characteristics and challenges.
CO2	Interpret the big data infrastructure through hadoop.
CO3	Develop Big Data Solutions using Hadoop Eco System.
CO4	Determine data architectural patterns and its variations of NoSQL and MangoDB.
CO5	Analyze the mining of social network graphs and its applications.

Name of Subject: Data Mining and Warehousing	
Subject Code: CS-703(B)	
Student will be able to:	
CO1	Build the concept of multidimensional data and perform OLAP operations
CO2	Identify data preprocessing steps required to build Data warehouse
CO3	Identify the properties of data required to Build the concept of data mining
CO4	Build the concept of Fuzzy logic, neural network , Classification and clustering algorithms
CO5	Choose the appropriate classification and clustering algorithm for data mining task

Name of Subject: Departmental Elective Lab	
Subject Code: CS 704	
Student will be able to:	
CO1	Perceive hands-on experience on large-scale analytics tools.
CO2	Design Algorithms to solve Data Intensive Problems using Map Reduce Paradigm.
CO3	Analyze and perform different operations on data using Hive and Pig Latin scripts.
CO4	Create NoSQL data for Unstructured data and perform operations with API.
CO5	Apply the concept of social network graphs and clustering in real world applications.


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Name of Subject: Open Elective Lab	
Subject Code: CS 705	
Student will be able to:	
CO1	Build a tool for creation of a Data warehouse.
CO2	Measure the statistical characteristics of data using statistical tool.
CO3	Experiment with the handling of data quality issues present in data
CO4	Demonstrate the application of machine learning algorithms for data mining task.
CO5	Discover interesting patterns from large amounts of data to analyze for predictions and classification

Name of Subject: Major Project -I	
Subject Code: CS 706	
Student will be able to:	
CO1	Identify the project title based on the review of the current state of the field of project.
CO2	Choose the technology to implement the problem from the available technologies.
CO3	Develop creative and innovative solutions to the problems in legal and ethical ways using project management principals such as planning, scheduling , budgeting and risk management.
CO4	Work effectively with team members, communicate and resolve conflicts if any within the team.
CO5	To present their project outcomes effectively in verbal and written form.

Name of Subject: Evaluation of Internship -III	
Subject Code: CS 607	
Student will be able to:	
CO1	Apply the real working environment principles in his/her professional development.
CO2	Correlate theoretical concepts learned in class rooms to the industrial work scenario.
CO3	Adapt professional software development environment.
CO4	Learn various key practices for working in team and optimizing processes.
CO5	Develop work competencies for a specific profession or occupation.

Name of Subject: Internet of Things	
Subject Code: CS-801	
Student will be able to:	
CO1	Summarize the design, components and state of the art of IoT.
CO2	Outline the components, classes and types of sensors.
CO3	Discuss different wired and wireless IoT networking technologies.
CO4	Interpret the working of message passing protocol of IoT.
CO5	Build the IoT on Arduino and Raspberry Pi platform.

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Name of Subject: Internet of Things Lab	
Subject Code: CS-801	
Student will be able to:	
CO1	Interpret concepts of IoT, including sensors, actuators and IoT plate forms.
CO2	Implement interfacing of various sensors with Arduino/Raspberry Pi.
CO3	Design service oriented architecture and network for RFID, NFC, Bluetooth, ZigBee, NFC.
CO4	Apply IoT protocols, such as MQTT, CoAP on IoT applications.
CO5	Develop IoT applications using various platforms and technologies such as Arduino, Raspberry Pi.

Name of Subject: Departmental Elective-Cloud Computing	
Subject Code: CS 802(B)	
Student will be able to:	
CO1	Summarize various service oriented architectures in cloud computing.
CO2	Classify cloud computing architecture including virtualization technology and multitenant architecture.
CO3	Outline the cloud file system and apply map reduce model
CO4	Discuss secured cloud environment
CO5	Elaborate quality of service issues in real time cloud application.

Name of Subject: Open Elective Image Processing and Computer Vision	
Subject Code: CS 803(A)	
Student will be able to:	
CO1	Build the concept of representation, preprocessing and operational algorithms required for CVIP.
CO2	Demonstrate use of mathematical tools for digital image processing and computer vision.
CO3	Identify, formulate and solve problems in image processing and computer vision.
CO4	Use & apply appropriate image processing methods for image filtering, image restoration, image reconstruction, segmentation, classification and representation & Region analysis.
CO5	Apply Facet model recognition & Knowledge based Vision for Image processing.

Name of Subject: Elective Lab	
Subject Code: CS 804 D/O	
Student will be able to:	
CO1	Examine virtualization tools with the help of VMare workstation
CO2	Develop a web application in a PaaS environment.
CO3	Analyze different cloud programming models to solve problem on the cloud.
CO4	Create generic cloud environment.
CO5	Compile different services of cloud service provider.


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Name of Subject: Major Project-II	
Subject Code: CS – 805	
Student will be able to:	
CO1	Identify the project title based on the review of the current state of the field of project.
CO2	Choose the technology to implement the problem from the available technologies.
CO3	Develop creative and innovative solutions to the problems in legal and ethical ways using project management principals such as planning, scheduling, budgeting and risk management.
CO4	Work effectively with team members, communicate and resolve conflicts if any within the team.
CO5	To present their project outcomes effectively in verbal and written form.

Branch: Department of Mechanical Engineering	
Subject Name: Mathematics-III	
Subject Code: BT301	
Student will be able to:	
CO1	Solve polynomial and transcendental equations using interpolation and extrapolation techniques.
CO2	Implement numerical differentiation and integration techniques by numerical methods.
CO3	Evaluate ordinary differential equations and partial differential equations.
CO4	Apply Laplace and Fourier transforms in complex engineering problems.
CO5	Analyze complicated data in an easy way with various probability distributions.

Subject Name: Thermodynamics	
Student will be able to:	
CO1	Determine performance parameters of work producing and work absorbing devices.
CO2	Apply second law of thermodynamics to find performance parameters of heat engines and refrigerators.
CO3	Assess properties of steam using steam tables and Mollier charts.
CO4	Determine air standard efficiency of power cycles.
CO5	Analyze actual & theoretical combustion processes.

Subject Name: Materials Technology	
Subject Code: ME303	
Student will be able to	
CO1	Interpret crystal lattice structure of materials.
CO2	Elaborate different phase diagrams for solid solutions
CO3	Choose heat treatment processes for phase transformation in cast iron and steel.
CO4	Identify various properties and defects using destructive and non destructive testing methods.
CO5	Select appropriate material for commercial applications.


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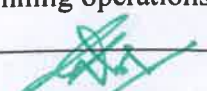


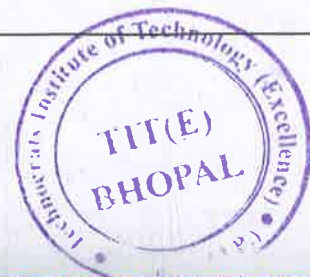
Subject Name: Materials Technology (LAB)	
Subject Code: BT303	
Student will be able to	
CO1	Analyze microstructure using optical microscope.
CO2	Analyze properties of materials using non destructive method.
CO3	Determine the lattice structure of engineering materials.
CO4	Identify heat treatment methods for various metals.
CO5	Analyze phase transformation reactions in iron carbon and TTT diagram.

Subject Name: Strength of Material	
Subject Code: ME304	
Student will be able to	
CO1	Analyze the simple and compound stresses and strains induced in structural members
CO2	Determine the slope and deflection of beams.
CO3	Analyze stresses due to torsional loading in solid and hollow shafts.
CO4	Apply suitable failure theory to predict and prevent the failures.
CO5	Determine the stability of column and strut.

Subject Name: Strength of Material (LAB)	
Subject Code: ME304	
Student will be able to	
CO1	Evaluate hardness of a given specimen.
CO2	Determine tensile and compressive strength of a material.
CO3	Perform transverse bending test to obtain deflection.
CO4	Evaluate behavior of a given specimen in Torsion.
CO5	Determine impact strength of a material.

Subject Name: Manufacturing Process	
Subject Code: ME305	
Student will be able to	
CO1	Identify suitable casting methods for different applications.
CO2	Apply appropriate welding method for a specific application.
CO3	Identify the suitable forging operation for a given application.
CO4	Interpret theories of cold and hot rolling techniques.
CO5	Examine the role of various machining operations to make jobs consisting of salient operations.


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Subject Name: Manufacturing Process (LAB)	
Subject Code: ME305	
Student will be able to	
CO1	Prepare basic patterns for Metal Casting process.
CO2	Develop Metal Casting of Simple component using moulding equipments.
CO3	Prepare permanent joints using Arc welding and Gas welding.
CO4	Determine salient characteristics of rolling and forging through studies
CO5	Perform various machining operations on different machine tools.

Subject Name: Thermal Engg. Lab	
Subject Code: ME306	
Student will be able to:	
CO1	Categorize high pressure boilers with the help of their respective components
CO2	Determine quality of steam using different calorimeters.
CO3	Determine the performance of Boilers through Heat balance sheet.
CO4	Determine volumetric and isothermal efficiencies of a single and multi stage compressor.
CO5	Elaborate working principles of thermocouples, temperature sensors through study of engine testing facility.

Subject Name: Internship -I	
Subject Code: BT107 -Internship -I	
Student will be able to	
CO1	Identify their areas of interest as per their training requirement.
CO2	Formulate problems and try to find their solution through gained knowledge.
CO3	Adapt actual engineering environment.
CO4	Develop the habit of utilization of technical resources.
CO5	Develop training report and give oral presentations related to the training completed.

Subject Name: Energy & Environmental Engineering	
Subject Code: ES401	
Student will be able to:	
CO1	Discuss the potential of various energy resources.
CO2	Summarize ecosystem and its components.
CO3	Discuss biodiversity and its conservation at global, national and local levels.
CO4	Describe causes, effects and preventive measures of various environmental pollutions and natural disasters.
CO5	Propose appropriate solutions on social issues related to environment.

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Subject Name: Instrumentation & Control	
Subject Code: ME402	
Student will be able to	
CO1	Estimate static and dynamic characteristics of measurement.
CO2	Choose suitable temperature measurement method for a domestic and industrial application.
CO3	Apply pressure, velocity and flow measurement methods in diversified applications.
CO4	Demonstrate working principle of torque/force sensors and transducers.
CO5	Formulate mathematical model for dynamic systems.

Subject Name: Instrumentation & Control (LAB)	
Subject Code: ME402	
Student will be able to	
CO1	Analyze static and dynamic characteristics of measuring instruments.
CO2	Perform the flow and velocity measurement using venturimeter, orificemeter and rotameter.
CO3	Measure force and torque using load cell and dynamometers.
CO4	Measure pressure and its gradient using manometers.
CO5	Perform first and second order systems using simulators.

Subject Name: Theory of Machines	
Subject Code: ME403	
Student will be able to	
CO1	Evaluate displacement, velocity & acceleration of linkages in mechanism.
CO2	Analyze dynamic motion of mechanisms using analytical and graphical approaches.
CO3	Design cam & follower mechanisms for specified motions.
CO4	Perform parametric analysis of different power transmission system.
CO5	Develop the concepts of compound gear trains and balancing of masses.

Subject Name: Theory of Machines (LAB)	
Subject Code: ME403	
Student will be able to:	
CO1	Categorize various kinematic links, pairs, chains, & mechanisms.
CO2	Construct velocity and acceleration diagram of different mechanism.
CO3	Construct cam profiles for different applications.
CO4	Perform balancing of rotating unbalanced masses.
CO5	Categorize various power transmission systems.


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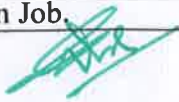


Subject Name: Fluid Mechanics	
Subject Code: ME404	
Student will be able to	
CO1	Perceive properties of fluids and condition for stability of floating bodies.
CO2	Determine various aspects of fluid motion in fluid kinematics.
CO3	Determine of forces on immersed bodies using fundamental laws.
CO4	Interpret the different principles of flow through pipes and losses in fluid flow.
CO5	Apply the boundary layer theory for problems related to fluid flow.

Subject Name: Fluid Mechanics (LAB)	
Subject Code: ME404	
Student will be able to:	
CO1	Determine coefficient of discharge through venturimeter, orificemeter and notch.
CO2	Verify Bernoullis Theorem for streamline flow.
CO3	Illustrate flow patterns and determine Reynold's number.
CO4	Measure force due to impact of water jet on differently shaped vane.
CO5	Determine losses in a pipe during fluid flow.

Subject Name: Manufacturing Technology	
Subject Code: ME405	
Student will be able to:	
CO1	Analyze theory of metal cutting, tool geometry, cutting forces and super finishing processes.
CO2	Identify different gear production techniques.
CO3	Perceive basic concepts of plastic moulding & plastic welding techniques.
CO4	Categorize unconventional machining processes and their applications.
CO5	Interpret elements of NC machine tools and basic principle of extrusion.

Subject Name: Manufacturing Technology (LAB)	
Subject Code: ME405	
Student will be able to:	
CO1	Analyze the significance of cutting tool geometry in machining.
CO2	Perform gear machining using milling machine.
CO3	Perform finishing operations on Grinding Machine.
CO4	Examine the suitability of non-conventional with conventional machining for different applications.
CO5	Formulate NC part program for a given Job.


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Subject Name: Software Lab	
Subject Code: ME406	
Student will be able to	
CO1	Identify the merits and demerits of Computer Aided Design process.
CO2	Make use of sketching tools to generate geometric models.
CO3	Generate a detailed model of a machine component.
CO4	Generate a component assembling different parts.
CO5	Outline IGES system for import and export of designs.

Subject Name: I C Engines	
Subject Code: ME501	
Student will be able to:	
CO1	Analyze performance characteristics of IC engines.
CO2	Interpret the effect of variables affecting combustion phenomenon in IC engines.
CO3	Select the appropriate fuel injection system in IC engines.
CO4	Analyze characteristics of traditional and alternate fuels.
CO5	Analyze the influence of turbo charging and supercharging on engine performance.

Subject Name: I C Engines (LAB)	
Subject Code: ME501	
Student will be able to	
CO1	Determine performance characteristics of single cylinder petrol engine through load test.
CO2	Determine the performance characteristics a multi-cylinder petrol engine by Morse Test.
CO3	Estimate the losses occurred in IC engines by preparing the heat balance sheet.
CO4	Measure performance and combustion characteristics of a diesel engine using alternative fuels
CO5	Perform assembling and disassembling of an IC engine.

Subject Name: Mechanical Vibration	
Subject Code: ME502	
Student will be able to	
CO1	Derive the mathematical model of undamped natural vibration system.
CO2	Analyze under damped free vibration system.
CO3	Determine response to forced vibrations due to harmonic excitation.
CO4	Analyze vibration system with two degrees of freedom.
CO5	Elaborate attributes of noise and its impact.


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Subject Name: Mechanical Vibration (LAB)	
Subject Code: ME502	
Student will be able to	
CO1	Determine the natural frequency of spring mass and pendulum system.
CO2	Determine the natural frequency of the damped vibration.
CO3	Evaluate the natural frequency of a forced vibration.
CO4	Estimate natural frequency of a rotor system.
CO5	Determine the critical speed of the shaft.

Subject Name: Dynamics of Machine	
Subject Code: ME503	
Student will be able to:	
CO1	Determine the dynamic parameters of the reciprocating engine mechanism.
CO2	Analyze the characteristics of centrifugal governors.
CO3	Determine balanced masses in unbalanced rotatory and reciprocating systems.
CO4	Evaluate frictional torque in pivots, collars and clutches.
CO5	Interpret the working of brakes, dynamometers and cams.

Subject Name: TQM and SQC	
Subject Code: ME504	
Student will be able to:	
CO1	Apply TQM and BPR principles in manufacturing and service industries.
CO2	Estimate quality of product using Kaizen concept and Taguchi method.
CO3	Select suitable quality control chart for acceptance or rejection of samples.
CO4	Estimate the features of process diagnostics using appropriate method.
CO5	Apply acceptance sampling plan for process improvement.

Subject Name: FEM/CFD Lab	
Subject Code: ME505	
Student will be able to:	
CO1	Identify the applicability of Finite element and finite volume methods in engineering analysis.
CO2	Apply linear static FE analysis on one dimensional model.
CO3	Build a simple model to conduct steady state and transient thermal FE analysis.
CO4	Analyze computational fluid dynamics of flow over a flat plate
CO5	Analyze computational fluid dynamics of flow over conduits.

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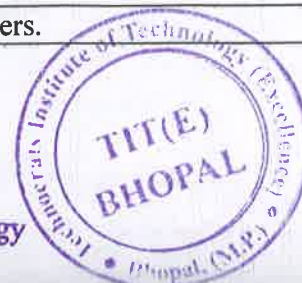
Subject Name: Python	
Subject Code:ME506	
Student will be able to:	
CO1	Formulate Conditional statements and Loops for Python Programs
CO2	Construct programs to Read and write data to and from files in Python.
CO3	Design Graphical user Interfaces in Python
CO4	Create database applications in Python.
CO5	Develop real world Application in python using Pygam

Subject Name: Internship -II	
Subject Code:BT407	
Student will be able to:	
CO1	Identify their areas of interest as per their training requirement.
CO2	Formulate problems and try to find their solution through gained knowledge.
CO3	Adapt actual engineering environment.
CO4	Develop the habit of utilization of technical resources.
CO5	Develop training report and give oral presentations related to the training completed.

Subject Name: Minor Project-I	
Subject Code:ME508	
Student will be able to:	
CO1	Identify a potential problem based on literature survey/impending industrial/real time needs.
CO2	Categorize various solution methodologies to solve problem taken for study.
CO3	Carry out design and or experimental procedure relevant to the problem.
CO4	Analyze results and findings obtained.
CO5	Draw conclusion based on analysis and recommend solution to potential engineering problems.

Subject Name: Thermal Engineering and Gas Dynamics	
Subject Code: ME601	
Student will be able to:	
CO1	Determine boiler performance parameters and heat balance sheet.
CO2	Calculate the work done and efficiency of an ideal and modified vapor cycles.
CO3	Analyze one dimensional isentropic flow of ideal gases through ducts.
CO4	Determine volumetric, isentropic, isothermal and mechanical efficiency of reciprocating single and multi stage air compressors.
CO5	Estimate performance of steam nozzles and condensers.


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Subject Name: Thermal Engineering and Gas Dynamics (LAB)	
Subject Code:ME601	
Student will be able to	
CO1	Identify various high pressure boilers through their construction and operating parameters.
CO2	Determine heat transfer rate of a parallel and counter flow heat exchanger.
CO3	Evaluate the performance of multi stage air compressor.
CO4	Evaluate the Performance of steam condenser.
CO5	Determine the thermal efficiency of a cooling tower.

Subject Name: Machine Component Design	
Subject Code:ME602	
Student will be able to	
CO1	Identify causes of stress concentration & fatigue failure of machine components
CO2	Design the shaft for combined bending, twisting & axial loading
CO3	Design various types of springs such as helical, leaf, torsion springs
CO4	Design various types of brakes & clutches.
CO5	Evaluate load carrying capacity of ball and rolling contact bearings.

Subject Name: Machine Component Design (LAB)	
Subject Code:ME602	
Student will be able to	
CO1	Design of compression helical spring.
CO2	Design of keys and couplings
CO3	Design of leaf spring.
CO4	Design of clutches and brakes.
CO5	Design of screw jack for a given load.

Subject Name: Turbo Machinery	
Subject Code:ME603	
Student will be able to:	
CO1	Apply moment of momentum equation to develop power equation.
CO2	Evaluate performance characteristics of a steam turbine.
CO3	Analyze performance parameters of hydro turbines and centrifugal pumps.
CO4	Calculate the efficiency of a centrifugal blower, centrifugal and axial flow compressors.
CO5	Analyze elementary performance parameters of power transmitting turbo machines.

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Subject Name: Renewable Energy Technology	
Subject Code: ME604	
Student will be able to	
CO1	Elaborate radiation measuring methods and photovoltaic conversion of solar energy.
CO2	Estimate wind energy conversion and its characteristics.
CO3	Interpret the phenomenon of biomass gasification process and associated cost analysis.
CO4	Analyze the designing criteria of a hydro turbine and principles of ocean energy and tidal energy.
CO5	Evaluate principles of geothermal energy, generation of hydrogen power and fuel cell technology.

Subject Name: CAD Lab	
Subject Code: ME605	
Student will be able to	
CO1	Identify basic tools and commands available in CAD software package.
CO2	Apply the drawing commands for drafting planes, curves etc.
CO3	Apply the drawing commands to draft solid elements like prism, pyramid, cylinder and cone.
CO4	Apply the drawing tools for drafting sectional views of solids and isometric projection of objects
CO5	Create 3D models of simple objects and obtain 2D multi view drawings from 3D object

Subject Name: RDBMS	
Subject Code: ME606	
Student will be able to	
CO1	Outline database language commands to create the database.
CO2	Analyze the database using queries to retrieve records.
CO3	Explain the concept of query processing.
CO4	Analyze front end tools to design forms, reports and menus.
CO5	Develop the concept of create web database.

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Subject Name: Minor Project-II	
Subject Code:ME608	
Student will be able to	
CO1	Identify a potential problem based on literature survey/impending industrial/real time needs.
CO2	Categorize various solution methodologies to solve problem taken for study.
CO3	Carry out design and or experimental procedure relevant to the problem.
CO4	Analyze results and findings obtained.
CO5	Draw conclusion based on analysis and recommend solution to potential engineering problems.

Subject Name: Heat and Mass Transfer	
Subject Code:ME701	
Student will be able to:	
CO1	Apply the governing equation of conduct on to find rate of heat transfer in different geometries.
CO2	Assess heat transfer rate for fins and conceptualize lumped body analysis for transient conduction.
CO3	Estimate heat transfer rate in forced and free convection using dimensional analysis.
CO4	Design heat exchangers using LMTD and NTU approaches.
CO5	Analyze radiation heat transfer, and theories of boiling and condensation.

Subject Name: Heat and Mass Transfer (LAB)	
Subject Code:ME701	
Student will be able to:	
CO1	Determine the thermal conductivity of a metal rod using Fourier's law.
CO2	Determine Heat flow rate and effectiveness of pin fin in natural and forced convection
CO3	Determine Heat exchanger effectiveness for parallel and counter flow
CO4	Determine emissivity of a given grey specimen
CO5	Evaluate heat transfer rate in Film wise and Drop wise condensation.

Subject Name: Advance Machine Design	
Subject Code:ME702	
Student will be able to	
CO1	Design the flexible elements used in power transmission system.
CO2	Evaluate major design parameters in spur, helical and bevel gears.
CO3	Design basic components of an I.C. Engine.
CO4	Design joints, coupling and keys.
CO5	Design pressure vessels subjected to internal pressure and power screw.


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Subject Name: Operation Research and Supply Chain	
Subject Code:ME703	
Student will be able to:	
CO1	Apply Linear Programming for solving transportation and assignment problems.
CO2	Elaborate strategies of Supply Chain Management system.
CO3	Perceive the importance of inventory control techniques for assessing the economically viable inventory order size.
CO4	Evaluate different parameters of service industry using waiting line models for building elementary competitive strategies.
CO5	Apply network analysis and meta-heuristic algorithm in project management and decision making.

Subject Name: CAD/CAM/CIM	
Subject Code:ME704	
Student will be able to	
CO1	Identify the use of CNC machines on the basis of various criteria for manufacturing.
CO2	Apply M&G codes to fulfill different machining requirements.
CO3	Build a part involving basic turning operations.
CO4	Create a part using single and multi point cutting tools.
CO5	Elaborate the importance of integration of CAD/CAM and CIM.

Subject Name: MATLAB and R Programming	
Subject Code:ME705	
Student will be able to:	
CO1	Create a plot using Plot function in MATLAB.
CO2	Write programs of matrices in MATLAB.
CO3	Apply MATLAB programs for image processing.
CO4	Apply R Programming Language for effective data analysis
CO5	Identify the steps involved to download and install R, R Studio, Anaconda on Mac or Windows

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Subject Name: Internship -III	
Subject Code: ME607	
Student will be able to:	
CO1	Identify their areas of interest as per their training requirement.
CO2	Formulate problems and try to find their solution through gained knowledge.
CO3	Adapt actual engineering environment.
CO4	Develop the habit of utilization of technical resources.
CO5	Develop training report and give oral presentations related to the training completed.

Subject Name: Major Project-I	
Subject Code: ME706	
Student will be able to:	
CO1	Identify a potential problem based on literature survey/impending industrial/real time needs.
CO2	Categorize various solution methodologies to solve problem taken for study.
CO3	Carry out design and or experimental procedure relevant to the problem.
CO4	Analyze results and findings obtained.
CO5	Draw conclusion based on analysis and recommend solution to potential engineering problems.

Subject Name: Refrigeration & Air Conditioning	
Subject Code: ME801	
Student will be able to:	
CO1	Analyze air refrigeration cycles.
CO2	Evaluate performance of vapour compression refrigeration system.
CO3	Analyze performance of theoretical and practical vapour absorption refrigeration.
CO4	Select appropriate refrigerant on the basis of their performance and environmental aspect.
CO5	Design a Heating, Ventilation and Air-conditioning system.

Subject Name: Refrigeration & Air Conditioning (LAB)	
Subject Code: ME801	
Student will be able to	
CO1	Evaluate performance index of Vapour Compression Refrigeration System.
CO2	Determine performance characteristics of Vapour Absorption Refrigeration System.
CO3	Determine COP of a windows air conditioner using eco-friendly refrigerant.
CO4	Determine the refrigeration capacity of an Ice plant.
CO5	Design an air conditioning system for a commercial application.


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Subject Name: Automobile Engineering	
Subject Code: ME802	
Student will be able to:	
CO1	Optimize the types of frames of an automobile.
CO2	Analyze steering system and stability of vehicle.
CO3	Evaluate the performance of transmission system.
CO4	Elaborate functioning and applications of suspension and braking systems.
CO5	Analyze effect and curtail of emission hazards on environment.

Subject Name: Entrepreneurship & Management Concepts	
Subject Code: ME803	
Student will be able to	
CO1	Select between management work system and input-processing-output system for manufacturing industry.
CO2	Apply SWOT analysis in managerial decision making.
CO3	Apply marketing and financial strategies in competitive world.
CO4	Utilize quality control and productivity enhancement techniques.
CO5	Develop entrepreneurship skills to meet the socio-economic needs.

Subject Name: Simulation and Modeling	
Subject Code: ME804	
Student will be able to	
CO1	Develop geometric models using modeling software's.
CO2	Assemble CAD models to create joints and I.C. Engine components.
CO3	Apply meshing techniques to CAD models.
CO4	Evaluate critical parameters in thermo-structural analysis.
CO5	Simulate flow over different geometries through CFD.

Subject Name: Major Project-II	
Subject Code: ME805	
Student will be able to:	
CO1	Identify a potential problem based on literature survey/impending industrial/real time needs.
CO2	Categorize various solution methodologies to solve problem taken for study.
CO3	Carry out design and or experimental procedure relevant to the problem.
CO4	Analyze results and findings obtained.
CO5	Draw conclusion based on analysis and recommend solution to potential engineering problems.


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Branch: Department of Electronics & Communication	
Name of Subject: Mathematics-III	
Subject Code: BT 301	
Student will be able to:	
CO1	Solve polynomial and transcendental equations using interpolation and extrapolation techniques.
CO2	Analyze numerical differentiation and integration techniques by numerical method.
CO3	Evaluate ordinary differential equations and partial differential equations.
CO4	Apply Laplace and Fourier transforms in complex engineering problems.
CO5	Analyze complicated data in an easy way with various probability distributions.

Name of Subject: Electronic Measurements and Instrumentation	
Subject Code: EC 302	
Student will be able to:	
CO1	Analyze the characteristics of measuring instruments.
CO2	Calculate the unknown electrical parameters using AC bridges.
CO3	Analyze the working of different types of transducers as LVDT, RVDT, Thermocouple, thermister etc.
CO4	Analyze the working of CROs, function generators and display devices.
CO5	Analyze the performance of ADCs and DACs.

Name of Subject: Digital System Design	
Subject Code: EC 303	
Student will be able to:	
CO1	Apply the concept of number system, codes and minimization techniques to simplify digital circuits.
CO2	Design various combinational circuits using basic logic gates and universal gates
CO3	Design various sequential circuits using flip flops.
CO4	Solve digital functions using PLDs to give cost effective solution.
CO5	Analyze performance of logic/ universal gates provided by different logic families

Name of Subject: Electronic Devices	
Subject Code: EC304	
Student will be able to:	
CO1	Determine the characteristics of semiconductor diodes
CO2	Analyze the output of rectifier, filter and regulator circuits.
CO3	Apply the fundamentals of transistors in solving electronics circuits.
CO4	Analyze small and large signal amplifier circuits.
CO5	Evaluate the input/output parameters and characteristic of FET in electronic circuits.

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Name of Subject: Network Analysis	
Subject Code: EC - 305	
Student will be able to:	
CO1	Simplify different electrical networks using basic circuit laws.
CO2	Analyze electrical circuits using network and graph theory.
CO3	Solve electrical/electronic circuits using network theorems.
CO4	Analyze transient and steady state response of electrical networks.
CO5	Evaluate input/output parameters of two port networks.

Name of Subject: Digital System Design Lab	
Subject Code: EC - 303	
Student will be able to:	
CO1	Examine Demorgan's theorem and truth table of logic gates.
CO2	Examine the output of various combinational circuits.
CO3	Determine the output of sequential circuits such as flip flop, registers, counters.
CO4	Test the pin functions of digital ICs
CO5	Design digital circuits using digital ICs for given engineering problem.

Name of Subject: Electronic Devices Lab	
Subject Code: EC304	
Student will be able to:	
CO1	Analyze the characteristics of different semiconductor devices.
CO2	Determine characteristics of various semiconductor diodes.
CO3	Examine the output of amplifiers and oscillators
CO4	Determine input/output parameters and working of MOSFET
CO5	Design electronic circuits using diodes and transistors for specific application

Name of Subject: Network Analysis Lab	
Subject Code: EC - 305	
Student will be able to:	
CO1	Apply fundamentals of basic circuit laws in electrical/electronic network.
CO2	Examine the different network theorems.
CO3	Measure parameters in two port network.
CO4	Determine the characteristics of RLC circuits.
CO5	Test passive components in a given network.

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Name of Subject: Electronic Measurement and Instrumentation Lab	
Subject Code: EC 306	
Student will be able to:	
CO1	Work with different electrical and electronic instruments.
CO2	Demonstrate the operation of display devices.
CO3	Measure different parameters related to electrical bridges.
CO4	Examine the output waveform of function generators using CRO.
CO5	Examine the working of ADCs and DACs

Name of Subject: Internship -I	
Subject Code: BT 107	
Student will be able to:	
CO1	Adapt tools/technologies used in industries.
CO2	Develop computer programs for the given problem.
CO3	Develop positive attitude, effective communication and time management skill.
CO4	Adopt professional and ethical values.
CO5	Write internship report in prescribed format.

Name of Subject: Energy & Environmental Engineering	
Subject Code: ES 401	
Student will be able to:	
CO1	Interpret the potential of various energy resources.
CO2	Interpret the concept of ecosystem to control environmental issues.
CO3	Analyze the biodiversity and its conservation process.
CO4	Analyze the sustainable development for environmental issues
CO5	Propose appropriate solutions on social issues related to environment.

Name of Subject: Signals and Systems	
Subject Code: EC 402	
Student will be able to:	
CO1	Analyze various types of signals and their properties.
CO2	Analyze Continuous and Discrete Time systems.
CO3	Apply the properties of Z-transform in Discrete Linear Time Invariant System.
CO4	Solve the problems of discrete time signals using Fourier transform and Fourier Series.
CO5	Analyze the sampling theorem and state space matrix for communication system.

Name of Subject: Analog Communication	
Subject Code: EC 403	
Student will be able to:	
CO1	Apply concept of Fourier transform and its properties.
CO2	Analyze amplitude modulation and demodulation techniques.
CO3	Analyze FM and PM modulation techniques.
CO4	Evaluate the parameters of AM /FM transmitter & receiver.
CO5	Estimate the noise levels for a variety of conditions in AM and FM systems


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Name of Subject: Control System	
Subject Code: EC 404	
Student will be able to:	
CO1	Solve open loop and closed loop control systems.
CO2	Analyze Time response of closed loop control system.
CO3	Analyze Frequency response of closed loop control system.
CO4	Design Lead-Lag compensator in time and frequency domain.
CO5	Draw the state space diagram of control system

Name of Subject: Analog Circuits	
Subject Code: EC - 405	
Student will be able to:	
CO1	Analyze feedback amplifiers and oscillator circuits.
CO2	Evaluate the parameters of various Integrated circuits.
CO3	Analyze the characteristics of operational amplifier.
CO4	Design of analog circuits using Op Amp.
CO5	Design multivibrators and voltage regulators.

Name of Subject: Signal and Systems Lab	
Subject Code: EC - 402	
Student will be able to:	
CO1	Analyze the features MATLAB simulation software.
CO2	Write MATLAB code for given problem.
CO3	Examine plots of Continuous Time and Discrete Time signals.
CO4	Determine the response of the CT LTI system
CO5	Determine the response of the DT LTI system

Name of Subject: Analog Communication Lab	
Subject Code: EC 403	
Student will be able to:	
CO1	Demonstrate working of analog transmitter and receiver system.
CO2	Measure modulation index for different modulation techniques.
CO3	Compare output of AM, FM modulators and demodulators.
CO4	Evaluate the parameters of AGC circuit.
CO5	Determine the characteristic of radio receiver.

Name of Subject: Control System Lab	
Subject Code: EC - 404	
Student will be able to:	
CO1	Analyze features of MATLAB simulink tool.
CO2	Evaluate the parameters of first order control system using MATLAB.
CO3	Evaluate the parameters of second order control system using MATLAB.
CO4	Examine stability of the closed loop control system.
CO5	Determine the performance of control system using PI and PD controllers


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Name of Subject: Analog Circuits Lab	
Subject Code: EC 405	
Student will be able to:	
CO1	Measure input/output parameters of operational amplifier.
CO2	Design amplifiers and oscillators using IC741.
CO3	Examine characteristic of analog filters.
CO4	Design multivibrators using IC555.
CO5	Measure output voltage of AVC/AGC circuit.

Name of Subject: Subject & Code: Simulation Lab	
Subject Code: EC 406	
Student will be able to:	
CO1	Work with circuit simulation software TINAPRO
CO2	Design PCB layout using TINAPRO.
CO3	Examine the output of rectifier circuits.
CO4	Design electronics circuits using TINAPRO.
CO5	Interpret the simulation results of electronic circuit.

Name of Subject: Microprocessor & its Application	
Subject Code: EC- 501	
Student will be able to:	
CO1	Analyze the features of microprocessors and their applications.
CO2	Utilize the instruction set and addressing modes of 8086 Microprocessor in assembly language programming
CO3	Analyze different peripherals and their interfacing with 8086 microprocessor.
CO4	Apply the concept of programmable peripheral devices to interface with microcontroller.
CO5	Illustrate the working of microcontroller & its applications.

Name of Subject: Digital Communication	
Subject Code: EC- 502	
Student will be able to:	
CO1	Analyze Sampling theorem for LPF & Band-pass Signals
CO2	Assess digital modulation techniques and various encoding techniques
CO3	Analyze different digital transmission techniques.
CO4	Estimate probability of error for digital transmission techniques.
CO5	Solve the problems of channel capacity and entropy

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Name of Subject:(Departmental Elective) CNTL	
Subject Code: EC- 503	
Student will be able to:	
CO1	Analyze the symmetrical and asymmetrical networks.
CO2	Design of passive and active filters for given specifications.
CO3	Solve RL, RC, LC and RLC network synthesis problems.
CO4	Evaluate parameters of transmission lines.
CO5	Analyze various transmission lines using smith chart.

Name of Subject:(A) Open Elective-Electro Magnetic Theory	
Subject Code:EC-504	
Student will be able to:	
CO1	Apply concept of vector calculus in steady electric field theory.
CO2	Analyze magnetic field due to steady current.
CO3	Solve time varying field equations using Faraday's law
CO4	Analyze wave equation in free space, dielectric and conducting medium.
CO5	Utilize the concept of field theory and plane wave propagation in lossy and lossless dielectrics.

Name of Subject: Microprocessor & its Application LAB	
Subject Code: EC- 501	
Student will be able to:	
CO1	Examine the working of 8086 microprocessor and its pin functions.
CO2	Write assembly language programs using instruction set of 8086.
CO3	Compile assembly language programs using 8086 instructions set.
CO4	Write code to interface peripherals with microprocessor.
CO5	Select the suitable microcontroller for real time applications

Name of Subject: Digital Communication LAB	
Subject Code: EC- 502	
Student will be able to:	
CO1	Examine ASK, FSK PSK modulation/demodulation techniques
CO2	Show the application of sampling theorem in digital communication.
CO3	Evaluate the performance of PAM, PWM and PPM modulation/demodulation techniques.
CO4	Examine various Line coding techniques
CO5	Examine the principle of multiplexing in digital communication.

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Name of Subject: Communication Networks and Transmission Lines LAB	
Subject Code: EC- 505	
Student will be able to:	
CO1	Work with communication networks and transmission lines.
CO2	Examine frequency response of passive filters.
CO3	Measure characteristic impedance of transmission line.
CO4	Measure reflection coefficient and VSWR
CO5	Determine the attenuation in transmission line.

Name of Subject: MATLAB Programming	
Subject Code: EC- 506	
Student will be able to:	
CO1	Demonstrate features and toolboxes of MATLAB software.
CO2	Write MATLAB code for different application.
CO3	Examine different modulation techniques using MATLAB
CO4	Test the stability of control system using MATLAB tool.
CO5	Interpret the plots and graphs of simulation results.

Name of Subject: Minor Project I	
Subject Code: EC-508	
Student will be able to:	
CO1	Select minor project topic based on acquired technical knowledge.
CO2	Identify problem through literature review.
CO3	List the tools and technology required in project work.
CO4	Propose the engineering solution to identified problem.
CO5	Compile the report in prescribe format to communicate their project ideas.

Name of Subject: Internship -II	
Subject Code: BT 407	
Student will be able to:	
CO1	Adapt tools and technologies used in industries.
CO2	Inference the in-depth knowledge of specific area.
CO3	Apply skills such as time management, positive attitude and effective communication.
CO4	Apply the safety measures and ethics during engineering practice.
CO5	Compile the internship report in prescribed format.


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Name of Subject: Digital Signal Processing	
Subject Code: EC- 601	
Student will be able to:	
CO1	Apply the properties of discrete time signals in systems.
CO2	Analyze the linear time-invariant systems using Z-transform.
CO3	Apply the concept of DFS and DFT in discrete time signals.
CO4	Analyze FFT algorithms used in signal processing.
CO5	Design digital filters using windowing techniques.

Name of Subject: Antenna & Wave Propagation	
Subject Code: EC- 602	
Student will be able to:	
CO1	Calculate radiated field and power by oscillating electric dipole, monopole and half wave dipole antenna.
CO2	Design antenna arrays for desired radiation characteristic.
CO3	Analyze working and radiation characteristic of various antenna along with their applications.
CO4	Evaluate the performance parameters of various antennas.
CO5	Illustrate wave propagation modes used in communication system.

Name of Subject:(Departmental Elective) Data Communication	
Subject Code: EC- 603	
Student will be able to:	
CO1	Apply the concept of data transmission in communication system.
CO2	Analyze OSI model and switching techniques in data communication.
CO3	Illustrate error detection & correction and data link layer protocols.
CO4	Apply the concept of LAN, MAN and WAN networks in data communication.
CO5	Analyze the function of networking devices, routing algorithm & TCP / IP Protocol.

Name of Subject: (Open Elective) Microcontroller and Embedded system	
Subject Code:EC-604	
Student will be able to:	
CO1	Perceive interfacing of microcontroller 8051 to other peripherals.
CO2	Write ALP code using instruction set of 16-bit microcontroller IC 8096/DSPIC.
CO3	Analyze characteristics of embedded system and their applications.
CO4	Interpret RISC, CISC, DSP and other processors for embedded system.
CO5	Design embedded system using input/output and other peripheral devices for specific application.

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Name of Subject: Digital Signal Processing LAB	
Subject Code: EC- 601	
Student will be able to:	
CO1	Examine DFS and DFT in signal processing.
CO2	Examine plots of discrete time signals using MATLAB.
CO3	Assess linear and circular convolution of two discrete signals.
CO4	Determine Auto co-relation & Cross co-relation of discrete signals.
CO5	Design FIR and IIR digital filters using windowing techniques.

Name of Subject: Antenna & Wave Propagation Lab	
Subject Code: EC- 602	
Student will be able to:	
CO1	Examine the performance of different antenna elements like monopole, halfwave dipole, full wave dipole.
CO2	Determine radiation characteristic and performance parameters of different antenna arrays.
CO3	Plot the radiation pattern of different type of antennas.
CO4	Examine the performance parameters like directivity, gain, FBR, beamwidth of various antennas.
CO5	Analyze the radiation characteristics of microstrip antenna.

Name of Subject: Data Communication LAB (DE)	
Subject Code: EC- 605	
Student will be able to:	
CO1	Work with data communication trainer kit.
CO2	Examine digital multiplexing techniques in data communication.
CO3	Examine error detection method for error checking.
CO4	Test for RS-232 and Network Interface Card (NIC) used in networking.
CO5	Design LAN for the given problem.

Name of Subject:(Open Elective) Microcontroller and Embedded system Lab	
Subject Code:EC-606	
Student will be able to:	
CO1	Examine working & pin functions of microcontroller 8051.
CO2	Write ALP for microcontroller 8051.
CO3	Test assembly language programming for microcontroller in embedded system.
CO4	Write code for interfacing different peripherals with Microcontroller.
CO5	Examine external devices and I/O with 8051 micro controller.

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Name of Subject: Minor Project II Lab	
Subject Code:EC-608	
Student will be able to:	
CO1	Design electronic circuits for their selected project.
CO2	Create PCB layout using appropriate software tool.
CO3	Estimate the circuit designing parameters and other technical aspects.
CO4	Test the project model and present its utility for the societal needs.
CO5	Compile the required documents and communicate effectively through presentations.

Name of Subject: VLSI Design	
Subject Code: EC-701	
Student will be able to:	
CO1	Inspect fabrication process for VLSI designing.
CO2	Assess various VLSI device models.
CO3	Design different Models in VLSI.
CO4	Analyze various structured digital circuits & system.
CO5	Elaborate CMOS Processing technology, Layout rules & Latch Up.

Name of Subject:(Department Elective)Microwave Engineering	
Subject Code:EC-702	
Student will be able to:	
CO1	Demonstrate the working principle of vaccum tube and Microwave tube.
CO2	Analyze the working of solid state microwave diodes & transistors.
CO3	Apply scattering matrix and its application in microwave network.
CO4	Analyze various microwave components.
CO5	Design of microwave and millimeter wave integrated circuits.

Name of Subject:(Open Elective) Cellular Mobile Communications	
Subject Code:EC-703	
Student will be able to:	
CO1	Apply the concepts of cellular radio in mobile communication system.
CO2	Analyze cell coverage for signal and traffic.
CO3	Estimate co-channel/non co-channel interference and its reduction methods.
CO4	Inspect frequency management, channel assignment and handoff mechanisms.
CO5	Illustrate technology of digital cellular systems.

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Name of Subject: VLSI Design Lab	
Subject Code:EC-701	
Student will be able to:	
CO1	Analyze the features of Microwind tool.
CO2	Apply CMOS layout rules and process parameters.
CO3	Design structured digital logic circuits using CMOS.
CO4	Compile the CMOS layout and its timing simulation.
CO5	Interpret the simulation results of CMOS models.

Name of Subject: Microwave Engineering Lab	
Subject Code:EC-704	
Student will be able to:	
CO1	Demonstrate microwave bench and components.
CO2	Measure microwave frequency and wavelength in waveguides.
CO3	Determine characteristics and tuning range of reflex klystron tube.
CO4	Examine the VI characteristics of Gunn Diode oscillator.
CO5	Measure VSWR and losses in microwave components and networks.

Name of Subject: IOT Lab	
Subject Code:EC-705	
Student will be able to:	
CO1	Demonstrate Arduino microcontroller board.
CO2	Work with Arduino board for different IOT based applications
CO3	Create programs for sensor based applications.
CO4	Work with Raspberry Pi controller for practical application
CO5	Create programs for MQTT protocol and interfacing using Arduino/Raspberry Pi.

Name of Subject: Major Project I	
Subject Code:EC-706	
Student will be able to:	
CO1	Select major project topic based on acquired technical knowledge for solving realistic problems.
CO2	Identify block representation, electronic circuit and tools required for project module design.
CO3	Propose the engineering solution to identified problem.
CO4	Test the project module on bread board.
CO5	Compile the report in prescribe format to communicate their project ideas.

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Name of Subject: Internship III	
Subject Code: EC-607	
Student will be able to:	
CO1	Interpret technological aspects and basic principles of an industry.
CO2	Examine a given engineering problem with its optimum solution
CO3	Apply prior acquired knowledge in problem solving.
CO4	Apply time management skills, positive attitude and confidence in carrier growth.
CO5	Compile the internship report in prescribed format.

Name of Subject: Optical Fibre Communication	
Subject Code: EC-801	
Student will be able to:	
CO1	Analyze different type of optical fiber using basic optical laws.
CO2	Elaborate fiber fabrication techniques and signal degradation in optical fiber.
CO3	Inspect optical sources and detectors.
CO4	Evaluate the performance of optical transceiver.
CO5	Assess optical networks and amplifiers used in optical fiber communication.

Name of Subject: (Department Elective) Wireless Communication	
Subject Code: EC-802	
Student will be able to:	
CO1	Analyze propagation mechanism in wireless communication system.
CO2	Assess wireless channels and their characteristics.
CO3	Inspect channel models and antennas in wireless communication.
CO4	Analyze the structure and error probability of wireless communication link.
CO5	Apply the concept of diversity and equalizers in wireless communication system.

Name of Subject: Name of Subject: (Open Elective) Wireless Network	
Subject Code: EC-803	
Student will be able to:	
CO1	Apply the concept of cellular network in wireless communication.
CO2	Evaluate the performance of LTE systems for mobile telephony
CO3	Inspect wireless sensor networks and their technologies.
CO4	Elaborate routing protocols for wireless network.
CO5	Adapt the IoT and GPS technology for real time application.

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Name of Subject: Optical Fibre Communication LAB	
Subject Code: EC-801	
Student will be able to:	
CO1	Examine analog and digital optical fibre link.
CO2	Measure losses in different type of optical fiber.
CO3	Evaluate numerical aperture in optical fiber.
CO4	Estimate power budget in optical fiber link.
CO5	Examine voice communication using optical fiber.

Name of Subject: Advanced Communication Engineering Lab	
Subject Code:EC-804	
Student will be able to:	
CO1	Work with equipments and tools of communication systems.
CO2	Examine BPSK, DPSK, QPSK generation and detection.
CO3	Evaluate the performance of TDM and FDM.
CO4	Test for gain and directivity of different antennas.
CO5	Determine coupling and isolation characteristics of a stripline directional coupler.

Name of Subject: Major Project II Lab	
Subject Code:EC-805	
Student will be able to:	
CO1	Construct PCB circuit layout using appropriate software tool.
CO2	Select appropriate electronic components, tools and technology for the implementation of project model.
CO3	Develop project model to solve society and environmental issues by utilizing system approach.
CO4	Test the project model and present its utility for the societal needs.
CO5	Compile document in prescribed format with proper language usage and ethical standard

Branch: Civil Engineering	
Name of Subject: Mathematics-III	
Subject Code: BT 301	
Student will be able to:	
CO1	Solve polynomial and transcendental equations using interpolation and extrapolation techniques.
CO2	Implement numerical differentiation and integration techniques by nm.
CO3	Evaluate ordinary differential equations and partial differential equations.
CO4	Apply Laplace and Fourier transforms in complex engineering problems.
CO5	Analyze and represent complicated data in an easy way with various probability distributions.

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Name of Subject: Construction Materials	
Subject Code: CE -302	
Student will be able to:	
CO1	Examine functioning of various masonry materials.
CO2	Select appropriate fabricating building material as per requirement.
CO3	Illustrate various types of flooring, roofing, plumbing and sanitary material.
CO4	Summarize applications of paints, varnishes and emulsions.
CO5	Identify the requirement of miscellaneous materials like bitumen, tar and insulating materials.

Name of Subject: Surveying	
Subject Code: CE-303	
Student will be able to:	
CO1	Determine distance, direction and elevation of survey lines.
CO2	Estimate missing data in a traverse.
CO3	Illustrate principle and procedure of tacheometric survey.
CO4	Design elements of various curves.
CO5	Illustrate the basic principles of photographic and hydrographic surveying.

Name of Subject: Surveying Lab	
Subject Code: CE-303	
Student will be able to:	
CO1	Measure distance with the help of linear distance measuring instrument.
CO2	Perform traversing by using theodolite or compass.
CO3	Determine reduced level of various points.
CO4	Use tacheometer for traverse survey.
CO5	Prepare plan or map of surveyed area.

Name of Subject: Building Planning and Architecture	
Subject Code: CE-304	
Student will be able to:	
CO1	Categorize various substructural and super structural components of a building.
CO2	Apply provisions of National Building code, and Building bye-laws for building planning.
CO3	Choose various building services.
CO4	Apply principles of architecture design in planning.
CO5	Illustrate various aspects of perspective drawing and town planning.

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Name of Subject: Building Planning and Architecture Lab	
Subject Code: CE-304	
Student will be able to:	
CO1	Produce drawing of various substructural and superstructural building components.
CO2	Illustrate various building services.
CO3	Propose building plan for one/two bed room residential building.
CO4	Develop perspective view of elements.
CO5	Create building drawing by using Auto-CAD.

Name of Subject: Strength of Materials	
Subject Code: CE-305	
Student will be able to:	
CO1	Solve complex problems related to stress, strain and elastic constants.
CO2	Determine bending and shearing stresses.
CO3	Determine slope and deflection in beams by various methods.
CO4	Analyse column by various methods.
CO5	Analyse members subjected to torsion and unsymmetrical bending.

Name of Subject: Strength of Materials Lab	
Subject Code: CE-305	
Student will be able to:	
CO1	Evaluate young modulus, torsional strength, and tensile strength of given specimens.
CO2	Assess hardness of given specimens.
CO3	Measure the deflection of beams.
CO4	Determine toughness of given specimens.
CO5	Determine compressive strength of concrete cubes and bricks.

Name of Subject: Study of hist. and anc. CE practice (LAB)	
Subject Code: CE-306	
Student will be able to:	
CO1	Illustrate civil engineering practices in ancient and historical structures.
CO2	Summarize environmental practices in construction of structures during ancient/medieval period.
CO3	Describe construction techniques and materials used in historical structures.
CO4	Explain planning aspects adopted in historical structures.
CO5	Summarize history of civil engineering practices.

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Name of Subject: Evaluation of Internship-I completed at I year level	
Subject Code: BT107	
Student will be able to:	
CO1	Demonstrate the ability to resolve the problems.
CO2	Demonstrate critical thinking skills related to social issues.
CO3	Develop more confidence in experimental knowledge.
CO4	Identify the different resources in interdisciplinary projects.
CO5	Summarize new practices in projects.

Name of Subject: Energy & Environmental Engineering	
Subject Code: ES-401	
Student will be able to:	
CO1	Interpret the potential of various energy resources.
CO2	Summarize ecosystem and its components.
CO3	Illustrate biodiversity and its conservation at global, national and local levels.
CO4	Summarize causes, effects and preventive measures of various environmental pollutions and natural disasters.
CO5	Propose appropriate solutions on social issues related to environment.

Name of Subject: Construction Technology	
Subject Code: CE-402	
Student will be able to:	
CO1	Illustrate design features and behaviour of foundations under eccentric load.
CO2	Design construction features of temporary structures and formworks.
CO3	Describe casting, repairing and protection of various masonry works.
CO4	Choose various flooring and roofing materials and their repairing techniques.
CO5	Interpret planning and construction of an earthquake resistant building.

Name of Subject: Construction Technology Lab	
Subject Code: CE-402	
Student will be able to:	
CO1	Demonstrate the functioning of different material testing equipment's.
CO2	Examine material properties through field and laboratory tests.
CO3	Determine the workability of concrete by different methods
CO4	Interpret the effect of admixtures on the concrete compressive strength.
CO5	Compile test results in the form of report.

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Name of Subject: Structural Analysis-I	
Subject Code: CE-403	
Student will be able to:	
CO1	Analyse the indeterminate structures by principle of virtual work and strain energy.
CO2	Analyse the indeterminate structures by clayperon's theorem and hardy cross method.
CO3	Analyse beams and frames by slope deflection method and column analogy method.
CO4	Interpret the behaviour of arches & cables and their methods of analysis.
CO5	Apply the concepts of ILD and moving loads on determinate beams.

Name of Subject: Structural Analysis-I Lab	
Subject Code: CE-403	
Student will be able to:	
CO1	Verify the maxwell's law.
CO2	Determine the deflection of truss practically.
CO3	Determine the flexural rigidity of a given beam experimentally.
CO4	Verify Muller Breslau principle.
CO5	Analyse the behaviour of column and portal frame practically under different end conditions.

Name of Subject: Transportation Engineering-I	
Subject Code: CE-404	
Student will be able to:	
CO1	Illustrate different ways of transportations and component of permanent way.
CO2	Determine various parameters of railway geometric design and signalling.
CO3	Identify different design parameters required for road and railway bridges.
CO4	Illustrate construction, testing and strengthening techniques of bridge foundation.
CO5	Summarize construction of tunnels.

Name of Subject: Transportation Engineering-I Lab	
Subject Code: CE-404	
Student will be able to:	
CO1	Interpret different modes of transportation.
CO2	Identify requirement of hydraulic design of bridges.
CO3	Summarize launching process of large span pre-stress bridges.
CO4	Detect components of permanent way and signalling system.
CO5	Present effective reports and documents.

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Name of Subject: Engineering Geology & Remote Sensing	
Subject Code: CE-405	
Student will be able to:	
CO1	Illustrate static and dynamic geological features of earth.
CO2	Identify importance of various minerals and crystals in the field of civil engineering.
CO3	Select various rock types of civil engineering importance.
CO4	Infer geological structures and their importance in civil engineering.
CO5	Apply remote sensing and geographical information system in civil engineering and resource mapping.

Name of Subject: Engineering Geology & Remote Sensing Lab	
Subject Code: CE-405	
Student will be able to:	
CO1	Identify different types of rocks.
CO2	Identify different types of ores and minerals.
CO3	Identify geological structures i.e., Folds, Faults, Joints.
CO4	Survey various geological formations through site visit.
CO5	Mark various geological formations on geological map of India

Name of Subject: Software Lab	
Subject Code: CE-406	
Student will be able to:	
CO1	Choose different Auto-CAD commands.
CO2	Apply various commands in Auto-CAD.
CO3	Plan a structure using Auto-CAD.
CO4	Organize a project using Auto-CAD.
CO5	Develop 3D modelling in Auto-CAD.

Name of Subject: Fluid Mechanics-I	
Subject Code: CE -501	
Student will be able to:	
CO1	Conclude various fluid properties at rest and in transit.
CO2	Interpret the pattern of fluid flow and its parameters.
CO3	Illustrate Bernoulli's equation and its applications.
CO4	Examine laminar and turbulent flow under different boundary conditions.
CO5	Apply basic fundamentals of dimensional analysis in fluid flow problems.

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Name of Subject: Fluid Mechanics I Lab	
Subject Code: CE – 501	
Student will be able to:	
CO1	Measure fluid pressure using various pressure measuring equipment's.
CO2	Determine met centric height, terminal velocity, friction factor and parameters like Cc, Cv, Cd of orifices.
CO3	Demonstrate the calibration of equipment's such as venturi meter, orifice meter and mouth piece.
CO4	Demonstrate type of fluid flow using Reynold's experiment.
CO5	Verify the Impulse momentum principle.

Name of Subject: Transportation Engineering-II	
Subject Code: CE-502	
Student will be able to:	
CO1	Design various geometric elements of highway as per IRC recommendations.
CO2	Illustrate various techniques for construction of flexible and rigid pavement.
CO3	Identify the requirements of various elements of road construction, traffic and safety.
CO4	Assess various geometric elements of airport runway and taxiway.
CO5	Summarise the requirements of different services and facilities at airport terminal.

Name of Subject: Transportation Engineering-II Lab	
Subject Code: CE-502	
Student will be able to:	
CO1	Demonstrate working of various highway material testing equipment's.
CO2	Determine the properties of highway materials.
CO3	Assess the quality of highway materials.
CO4	Compile test results in the form of report.
CO5	Justify the use of highway construction materials in field as per IS recommendations.

Name of Subject: Departmental Elective Structural Analysis -II	
Subject Code:CE-503(A)	
Student will be able to:	
CO1	Analyze the structural members for different loading conditions by various methods.
CO2	Assess collapse load for structural members by plastic hinge concept.
CO3	Analyze tall structures subjected to horizontal and vertical loads.
CO4	Develop force and displacement matrix to analyze structures.
CO5	Analyze given structures by using concepts of influence line diagram.

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Name of Subject: Open Elective Renewable energy sources	
Subject Code:CE-504(C)	
Student will be able to:	
CO1	Interpret the potential of various energy resources.
CO2	Demonstrate wind energy, wind mills and grid connected systems.
CO3	Illustrate the components of solar energy and biomass energy system.
CO4	Illustrate geothermal energy, energy from oceans and possibilities of other modern nonconventional energy sources.
CO5	Recommend energy efficient devices and measures of energy conservation.

Name of Subject: Quantity Surveying & Costing Lab	
Subject Code: CE-505	
Student will be able to:	
CO1	Determine quantity of various construction items in measurement sheet.
CO2	Determine cost of various construction items in abstract sheet.
CO3	Estimate the cost of building services like plumbing, water supply and electrification.
CO4	Analyze the rate for any construction work as per current SOR.
CO5	Create DPR for civil engineering projects.

Name of Subject: Material & Testing Lab	
Subject Code: CE-506	
Student will be able to:	
CO1	Demonstrate working of various construction material testing equipment's.
CO2	Determine the properties of the construction materials.
CO3	Assess the quality of construction materials.
CO4	Compile test results in the form of report.
CO5	Justify the use of construction materials in field as per IS recommendations.

Name of Subject: Evaluation of Internship-II	
Subject Code: CE-507	
Student will be able to:	
CO1	Understand the nature of work in preferred domain.
CO2	Apply experimental skills.
CO3	Perceive latest techniques and practices in the field.
CO4	Adapt requisite competence in domain area.
CO5	Formulate effective reports and documents.

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Name of Subject: Field Visit, Case Study and Seminar	
Subject Code: CE-508	
Student will be able to:	
CO1	Asses the technical aspects of work.
CO2	Notice experimental skills and professional practices in field.
CO3	Discuss the impact of civil engineering projects on socio-economic development.
CO4	Apply the skills required to facilitate a group discussion, review and focus on communication skills.
CO5	Identify, compile and prioritize ideas.

Name of Subject: RCC-I	
Subject Code: CE-601	
Student will be able to:	
CO1	Utilize the knowledge of various properties of concrete and compare working stress & limit state methods of design.
CO2	Design singly and doubly reinforced beams.
CO3	Design one-way and two-way slabs.
CO4	Design column and footings.
CO5	Design various staircases.

Name of Subject: RCC-I Lab	
Subject Code: CE-601	
Student will be able to:	
CO1	Prepare the detailed drawing of beams as per IS recommendations.
CO2	Prepare the detailed drawing of slabs as per IS recommendations.
CO3	Prepare the detailed drawing of columns as per IS recommendations.
CO4	Prepare the detailed drawing of footings as per IS recommendations.
CO5	Prepare the detailed drawing of staircases as per IS recommendations.

Name of Subject: Environmental Engineering – I	
Subject Code: CE-602	
Student will be able to:	
CO1	Examine quantity and quality of water for municipal use.
CO2	Identify various impurities of water and components of water conveyance system.
CO3	Design water treatment unit of a treatment plant using suitable method.
CO4	Illustrate design and construction of sewers.
CO5	Identify suitable methods of physical, chemical and biological characteristics of sewage.

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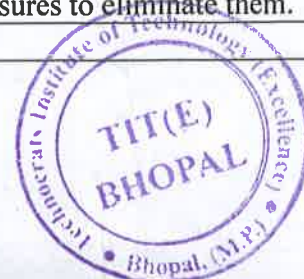
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Name of Subject: Environmental Engg. – I Lab	
Subject Code: CE-602	
Student will be able to:	
CO1	Test for various standards of a given water sample.
CO2	Decide sampling techniques for given water sample.
CO3	Determine physical characteristics of the given water sample.
CO4	Determine chemical characteristics of the given water sample.
CO5	Determine bacteriological characteristics of the given water sample.
Name of Subject: Departmental Elective Water Resources Engineering	
Subject Code: CE-603(A)	
Student will be able to:	
CO1	Discuss various irrigation methods and soil-water-crop relationship.
CO2	Choose methods of improving ground water storage.
CO3	Determine quantity of runoff using hydrograph.
CO4	Classify the hydraulic structures.
CO5	Identify methods of flood estimation.
Name of Subject: Open Elective EIA	
Subject Code: CE-604(C)	
Student will be able to:	
CO1	Illustrate the concept of environmental impact assessment.
CO2	Identify environmental indices and indicators for describing the affected environment.
CO3	Explain the assess of Impacts on environment.
CO4	Formulate effective report on EIA.
CO5	Illustrate the necessity of public participation in EIA studies.
Name of Subject: Advanced Surveying La	
Subject Code: CE605	
Student will be able to:	
CO1	Measure distance with the help of linear distance measuring instrument.
CO2	Perform traversing by using theodolite or compass.
CO3	Determine reduced level of various points.
CO4	Determine area of irregular surfaces by digital planimeter.
CO5	Demonstrate Total Station
Name of Subject: NDT Lab	
Subject Code: CE-606	
Student will be able to:	
CO1	Describe destructive and non-destructive testing methods.
CO2	Classify various non-destructive testing methods.
CO3	Select an appropriate NDT technique as per requirement.
CO4	Identify the internal flaws in the material by NDT and take measures to eliminate them.
CO5	Describe destructive and non-destructive testing methods.


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Name of Subject: Evaluation of Internship-III	
Subject Code: CE-607	
Student will be able to:	
CO1	Inspect the preferred field of specialization.
CO2	Apply and observe experimental skills.
CO3	Perceive latest techniques and practices in field.
CO4	Develop requisite competence in domain area.
CO5	Formulate and write effective reports and design documentation.

Name of Subject: Geotechnical Engineering	
Subject Code: CE-701	
Student will be able to:	
CO1	Identify various types of soil and their index properties.
CO2	Analyse flow of water through soils.
CO3	Discuss critically about stress distribution and compaction methods in soil.
CO4	Interpret consolidation characteristics of different soils.
CO5	Evaluate shear strength parameters of soil.

Name of Subject: Geotechnical Engineering Lab	
Subject Code: CE-701	
Student will be able to:	
CO1	Perform various test for determination of index properties of given soil specimen.
CO2	Perform particle size distribution for fine- and coarse-grained soils.
CO3	Measure permeability of soil sample.
CO4	Assess optimum moisture content and maximum dry density by various compaction tests.
CO5	Determine shear strength of soil through various tests.

Name of Subject: Environmental Engineering- II	
Subject Code: CE-702(B)	
Student will be able to:	
CO1	Design primary treatment units of municipal wastewater.
CO2	Design various biological treatment units.
CO3	Apply knowledge of various advanced wastewater treatment processes.
CO4	Discuss knowledge of air pollution and its effect on ecosystem.
CO5	Explain dispersion of air pollutants.

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Name of Subject: Integrated Waste Management	
Subject Code: CE-703(C)	
Student will be able to:	
CO1	Explain characteristics of solid waste and its sources.
CO2	Identify concepts of integrated solid waste management beginning from source generation to waste disposal.
CO3	Explain various methods of solid waste segregation.
CO4	Elaborate methods of solid waste transformation.
CO5	Compare among different solid waste disposal techniques.

Name of Subject: Prestressed Concrete Structures Lab	
Subject Code: CE 704	
Student will be able to:	
CO1	Describe use of fabrication, casting and testing of simply supported prestressed concrete beam/slab (pre-tensioned or post-tensioned) for strength and deflection behaviour.
CO2	Describe use of fabrication, casting and testing of beam/slab (pre-tensioned or post-tensioned) with different layout of cables for strength and deflection behaviour.
CO3	Describe use of fabrication, casting and testing of various prestressed structures.
CO4	Analyze one real-life structure using open-source/ professional software.
CO5	Assess one real-life structure using open-source/ professional software.

Name of Subject: IOT Lab	
Subject Code: CE-705	
Student will be able to:	
CO1	Build the concept of Internet of Things.
CO2	Create the ability to transmit data wirelessly between different devices.
CO3	Discuss an ability to upload/download sensor data on cloud and server.
CO4	Analyse Cloud security fundamentals and its challenges.
CO5	Design an IoT device to work with a Cloud Computing infrastructure.

Name of Subject: Major Project -I	
Subject Code: CE706	
Student will be able to:	
CO1	Identify the scope and objectives of problem.
CO2	Make use of plan and requirement of any public building.
CO3	Apply learned technical concepts of civil engineering on an approved project.
CO4	Organize design and set of drawings in the form of a report.
CO5	Discuss and submit a report of experimental work.

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Name of Subject: Design of Steel Structures	
Subject Code: CE-801	
Student will be able to:	
CO1	Design bolted, riveted and welded connections.
CO2	Discuss IS provisions for tension and compression members.
CO3	Design flexural members.
CO4	Design columns and column base.
CO5	Design various elements of industrial building.

Name of Subject: Design of Steel Structures Lab	
Subject Code: CE-801	
Student will be able to:	
CO1	Make use of steel table and relevant IS code of practice.
CO2	Prepare detailed drawing of various connections in steel structures as per IS recommendations.
CO3	Prepare detailed drawing of beams under different loading conditions as per IS recommendations.
CO4	Prepare detailed drawing of columns and column bases as per codal provisions.
CO5	Prepare detailed drawing of purlin and elements of truss in multi-storied framed structures.

Name of Subject: Foundation Engineering	
Subject Code: CE 802(B)	
Student will be able to:	
CO1	Identify foundation type and methods of sub- soil exploration.
CO2	Apply different theories for estimating bearing capacity of soil.
CO3	Design pile foundation.
CO4	Interpret the behaviour of foundation on expansive and collapsible soil.
CO5	Describe various earth pressure theories and earth retaining structures.

Name of Subject: Integrated Water Management	
Subject Code: CE 803(D)	
Student will be able to:	
CO1	Discuss the paradigm shift in water management with global and national perspectives of water crisis.
CO2	Develop framework for sustainable water resources management.
CO3	Interpret the modern principles of water management and planning.
CO4	Develop surface and subsurface water systems along with water balance equation.
CO5	Identify the conventional and non-conventional techniques for water security.

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Name of Subject: Earthquake Resistant Structures Lab	
Subject Code: CE 804	
Student will be able to:	
CO1	Analyse the failure pattern of structures due to earthquake.
CO2	Plan structural configuration for seismic resistance in STAAD- PRO.
CO3	Compute seismic forces in multi-story buildings as per prevailing standard codes of practice.
CO4	Prepare working model of earthquake resistance structures.
CO5	Apply various seismic control measures in real world problems.

Name of Subject: Major Project-II	
Subject Code: CE – 805	
Student will be able to:	
CO1	Adapt the application aspects of civil engineering fundamentals to address the problem.
CO2	Identify scope and objectives of problem to manage the activities associated with the work.
CO3	Survey the literature related to problem and prepare the report of outcomes.
CO4	Plan experimentation and design with the team to fulfil the objectives.
CO5	Compile data and results in the form of project report.

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Branch: Electrical Engineering	
Name of Subject: Energy & Environmental Engineering	
Subject Code: ES-301	
Student will be able to	
CO1	Interpret the potential of various energy resources.
CO2	Interpret ecosystem for environmental issues.
CO3	Illustrate the Biodiversity and its conservation.
CO4	Examine various causes of Environmental Pollution
CO5	Propose appropriate solutions on social issues related to environment.

Name of Subject: Subject: Electromagnetic Field & Materials	
Subject Code: EE302	
Student will be able to:	
CO1	Interpret the theory of coordinate system, scalar quantities, vector quantities, different type of distribution of charges in electrostatics.
CO2	Evaluate behaviour of conductor and semiconductor materials.
CO3	Assess the value of magnetic field using boundary conditions and various laws.
CO4	Illustrate use of Maxwell's equations for static and time varying electric field and magnetic field.
CO5	Interpret the nature of electromagnetic waves and its performance.

Name of Subject: Electrical Measurement & Measuring Instruments	
Subject Code: EE303	
Student will be able to:	
CO1	Compare various types of measurements, calibrations, errors in measurements.
CO2	Examine performance of MC, MI and Dynamometer type of measuring instruments.
CO3	Examine the errors in CTs and PTs and subdivide the measurement of power.
CO4	Evaluate different powers and energy using different instruments
CO5	Analyse behaviour of different measuring instruments.

Name of Subject: Analog Electronics	
Subject Code: EE304	
Student will be able to:	
CO1	Illustrate the concepts of semiconductor diodes.
CO2	Apply the fundamentals of transistor in solving electronic circuit.
CO3	Elaborate Feedback amplifier and Oscillators
CO4	Build electronic circuit using diode and transistor for specific application.
CO5	Build analog circuit using OP-AMP.


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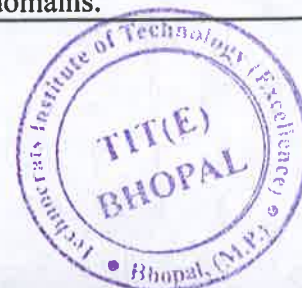
Name of Subject: Network Analysis	
Subject Code: EE305	
Student will be able to:	
CO1	Solve complex AC and DC circuits.
CO2	Examine AC electrical circuits using Laplace transform for solution of Integro-differential equations.
CO3	Compile the structure of signals, hypothesize the forms of Fourier series.
CO4	Formulate parameters of two port networks.
CO5	Demonstrate complex networks through generalized and simplified mathematical analysis.

Name of Subject: Electrical Measurement & Measuring Instruments Lab	
Subject Code: EE303	
Student will be able to:	
CO1	Judge the value of resistance using DC Bridges.
CO2	Justify use of various measuring instruments and their calibration
CO3	Develop a circuit using instrument transformer.
CO4	Verify the values of different electrical quantities such as earth resistance
CO5	Utilize megger for measurement of insulation resistance.

Name of Subject: Analog Electronics Lab	
Subject Code: EE304	
Student will be able to:	
CO1	Appraise the basic concept of carrier transport in metals/ semiconductors and real device structure.
CO2	Execute the fundamentals of operation of the semiconductor electronic devices.
CO3	Indicate the basic parameter of electronic devices by their performance and limiting factors.
CO4	Illustrate operation of bipolar transistor and unipolar microwave devices.
CO5	Solve electronics circuit problems using basic concepts.

Name of Subject: Network Analysis Lab	
Subject Code: EE305	
Student will be able to:	
CO1	CO 1: -Justify different network theorems
CO2	CO 2: -Evaluate of parameters of two port network
CO3	CO 3: -Examine frequency response of RLC series and parallel circuits
CO4	CO 4: -Apply network theorems and circuit laws to various real-life problems
CO5	CO 5: -Analyze resonant circuits both in time and frequency domains.

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Name of Subject: Electrical Workshop Lab	
Subject Code: EE306	
Student will be able to:	
CO1	Categorize various types of switches, different tools & other components used in residential, commercial and industrial applications.
CO2	Develop skills for project work.
CO3	Identify and troubleshoot various practical difficulties encountered in industries.
CO4	Demonstrates capability to develop solutions for complex technical problems in Electrical Engineering by applying scientific methods.
CO5	Demonstrate different types of wiring.

Name of Subject: Evaluation of Intership-I,	
Subject Code: BT 107	
Student will be able to:	
CO1	Identify technologies used in software industries.
CO2	Develop small project for the given problem.
CO3	Develop positive attitude, effective communication and time management skills.
CO4	Adapt professional and ethical values.
CO5	Write internship report in prescribed format.

Name of Subject: Mathematics – III	
Subject Code: BT-401	
Student will be able to:	
CO1	Solve polynomial and transcendental equations using interpolation and extrapolation techniques.
CO2	Implement numerical differentiation and integration techniques by nm
CO3	Evaluate ordinary differential equations and partial differential equations.
CO4	Apply Laplace and Fourier transforms in complex engineering problems.
CO5	Analyze and represent complicated data in an easy way with various probability

Name of Subject: Electrical Machine-I	
Subject Code: EE402	
Student will be able to:	
CO1	Demonstrate the working principle of single-phase transformer and its equivalent circuit
CO2	Assess features of three phase transformer including construction and operation.
CO3	Illustrate application of three phase induction motor by relating the performance measures of induction motor.
CO4	Estimate behaviour of different three phase induction motor under different load conditions and types of different power supply
CO5	Infer the construction, working and application of single-phase induction motor.


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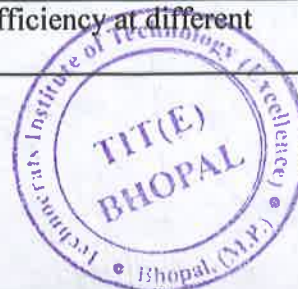
Name of Subject: Digital Electronics & Logic Design	
Subject Code: EE403	
Student will be able to:	
CO1	Illustrate the concepts and techniques associated with the number systems and codes to minimize the logical expressions using Boolean postulates.
CO2	Analyze different logic families and their comparative study.
CO3	Compare different types of memories and programmable logic devices.
CO4	Design different types of digital electronic circuit using various mapping and logical tools
CO5	Apply the memory devices in different types of digital circuits for real world application.

Name of Subject: Power System I	
Subject Code: EE404	
Student will be able to:	
CO1	Utilize the concepts and economic aspects of power system in social and environmental applications.
CO2	Illustrate the issues of electrical parameters R, L and C for transmission line and underground cables.
CO3	Evaluate the performance of transmission line and mechanical parameter
CO4	Examine A.C and D.C distribution networks for necessary variable calculations.
CO5	Estimate performance of electrical power generation, transmission and usage.

Name of Subject: Control Systems	
Subject Code: EE405	
Student will be able to:	
CO1	Simplify mathematical modelling of dynamic systems.
CO2	Dissect time domain performance of closed loop system feedback control systems.
CO3	Interpret stability of closed loop system using root locus method.
CO4	Evaluate frequency domain analysis and stability using Bode and Nyquist methods
CO5	Design different types of compensators networks (lag-lead) and Controller.

Name of Subject: Electrical Machine -I lab	
Subject Code: EE402	
Student will be able to:	
CO1	Illustrate the working of transformer and 3 phase induction motor. .
CO2	Perform various test on 1 phase and 3 phase transformers.
CO3	Develop setup for No Load and Block rotor test on Induction motor.
CO4	Distinguish various starter for 3 phase induction motors.
CO5	Make up a circuit utilising transformer for determination of efficiency at different loading.

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Name of Subject: Digital Electronic & Logic Design Lab	
Subject Code: EE403	
Student will be able to:	
CO1	Illustrate the concepts and techniques associated with the number systems and codes to minimize the logical expressions using Boolean postulates.
CO2	Design basic digital circuits and their operations.
CO3	Apply the concept of memories and programmable logic devices.
CO4	Evaluate different logic families and their comparative study.
CO5	Develop combinational circuits and sequential circuits for given problem.

Name of Subject: Power System – I lab	
Subject Code: EE404	
Student will be able to:	
CO1	Illustrate the structure of substation, towers and poles, insulators and transmission lines
CO2	Examine performance of power system
CO3	Judge simulation results of operation of transmission lines.
CO4	Develop a prototype power system, its components, and transmission process
CO5	Create written documents according to a prescribed schedule, records.

Name of Subject: Control System – lab	
Subject Code: EE405	
Student will be able to:	
CO1	Solve control engineering problems using the acquired analog and digital control.
CO2	Examine effect of feedback on the system using transfer function
CO3	Formulate PI, PD and PID controllers
CO4	Use MATLAB for state space model, root-loci and bode plot of type-1, type-2 systems.
CO5	Apply Laplace transform, transfer functions, modelling RLC circuit, block diagrams for simulation and control.

Name of Subject: Electrical Machine II	
Subject Code: EE 501	
Student will be able to:	
CO1	Evaluate performance of DC generator.
CO2	Analyze the operating characteristics & starting methods of DC motors.
CO3	Appraise the construction, working principle and voltage regulation of poly phase synchronous machine.
CO4	Predict the parallel operation and load sharing by using performance parameters of synchronous machine.
CO5	Infer single-phase synchronous motor's applications on the basis of performance.


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Name of Subject: Power Electronics	
Subject Code: EE 502	
Student will be able to:	
CO1	Choose a power electronic device for a particular application.
CO2	Make use of various single phase and three phase power converter circuits.
CO3	Modify power quality of power output of inverters.
CO4	Identify requirements for power electronics-based DC-DC converter
CO5	Design power electronics circuits in commercial and industrial applications.

Name of Subject: Departmental Elective -I (Electrical Power Generation & Economy)	
Subject Code: EE 503(A)	
Student will be able to:	
CO1	Correlate the concepts of electrical power generation from conventional and nonconventional sources of energy.
CO2	Conclude various types of power plants i.e., hydro, thermal, gas and nuclear
CO3	Appraise harnessing of power from renewable sources
CO4	Evaluate the optimum economy for the power plant
CO5	Design layout of various generating power plants

Name of Subject: Open Elective -I (Industrial Electronics)	
Subject Code : EE 504(A)	
Subject Code:	
Student will be able to:	
CO1	Analyze performance of regulated power supplies, SMPS etc.
CO2	Infer characteristics of SCR and related circuits.
CO3	Compare characteristics of power MOSFET, power transistor and power IGBT.
CO4	Demonstrate Applications of OP-AMP and related circuits.
CO5	Develop program through Programmable Logic Controller (PLC).

Name of Subject: Electrical Machines-II lab	
Subject Code : EE 501	
Student will be able to:	
CO1	Inspect the working of DC and AC electrical machines .
CO2	Develop practical scheme for synchronisation of alternator with bus bar.
CO3	Troubleshoot the operation of an electrical machines under loaded and unloaded conditions.
CO4	Implement testing and experimental procedures for DC machines.
CO5	Determination of Xd and Xq of synchronous machine.


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Name of Subject: Subject: Power Electronic lab	
Subject Code: EE 502	
Student will be able to:	
CO1	Inspect VI characteristics of various Power Electronics devices
CO2	Implement transfer characteristics of MOSFET.
CO3	Compile Simulink model of various power electronics devices
CO4	Demonstrate working of controlled rectifier.
CO5	Evaluate different commutation techniques.

Name of Subject: Departmental Lab (Simulation MATLAB)	
Subject Code: EE 505	
Student will be able to:	
CO1	Depicts and conduct simulation and experiments.
CO2	Determine the circuit parameters for economic operation
CO3	Utilize techniques, skills and modern engineering tools necessary for engineering practice.
CO4	Solve engineering problems with simulation.
CO5	Examine the waveforms of various circuits

Name of Subject: Open Elective Lab (PLC & HMI)	
Subject Code: EE 506	
Student will be able to:	
CO1	Illustrated industrial automation and various hardware components
CO2	Apply ladder logic concepts of PLC programming
CO3	Examine PLC programming software though various application
CO4	Able to create project using PLC programming.
CO5	Develop HMI programming for graphics display and screen generation

Name of Subject: Evaluation of Internship-II	
Subject Code: BT 407	
Student will be able to:	
CO1	Build the company profile by compiling the brief history, management structure, products / services offered, key achievements and market performance for his / her organization of internship.
CO2	Assess its Strengths, Weaknesses, Opportunities and Threats (SWOT).
CO3	Determine the challenges and future potential for his / her internship organization in particular and the sector in general. .
CO4	Test the theoretical learning in practical situations by accomplishing the tasks assigned during the internship period.
CO5	Apply various soft skills such as time management, positive attitude and communication skills during performance of the tasks assigned in internship organization


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Name of Subject: Minor Project I/ Seminar	
Subject Code: EE 508	
Student will be able to:	
CO1	Develop specialist knowledge in the area of their course to make a physical model.
CO2	Illustrate the ability to select and organise research-based and scholarly literature.
CO3	Illustrate the ability to initiate research and formulate viable questions.
CO4	Illustrate the capacity to design, conduct and report his/her original work.
CO5	Justify his/her work based on empirical evidence and the scientific approach to knowledge development

Name of Subject: Electrical Machine Design	
Subject Code: EE 601	
Student will be able to:	
CO1	Apply solution techniques to different optimization problems.
CO2	Design DC machine with formulation of design equations, objective function constraint functions etc.
CO3	Design power transformer optimally.
CO4	Design 3 phase alternator optimally .
CO5	Design 3 phase induction motor optimally.

Name of Subject: Power System-II	
Subject Code: EE602	
Student will be able to:	
CO1	Analyze power system in steady state condition.
CO2	Demonstrate stability constraints in synchronous grid.
CO3	Evaluate methods for control of voltage, frequency and power flow.
CO4	Analyze monitoring and control of power system.
CO5	Outline basics of power system economics.

Name of Subject: Power System Protection	
Subject Code: Subject Code :EE603 (A)	
Student will be able to:	
CO1	Infer various types of faults in Power system
CO2	Implement suitable relays and circuit breaker in commercial and domestic applications.
CO3	Analyze protection arrangements for transformer, alternator and busbar
CO4	Analyze digital protection system.
CO5	Develop system protection schemes through U/F, U/V and df/dt relays.

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Name of Subject: Energy Conservation & Management	
Subject Code: EE604(B)	
Student will be able to:	
CO1	Formulate tasks & duties of an energy manager.
CO2	Demonstrate proper utilisation of energy efficient electric motors and drives.
CO3	Interpret energy saving measures for residential, commercial and industrial areas.
CO4	Appraise the need and methods of energy conservation to industrial, commercial and residential sector.
CO5	Formulate principles relating to energy economy.

Name of Subject: Electrical Drives	
Subject Code: EE 701	
Student will be able to:	
CO1	Examine various applications in industrial and domestic areas where use of electric drives is essential.
CO2	Compare different types of electric drive systems based on nature of loads, control objectives, performance and reliability.
CO3	Combine concepts of previously learnt courses such as, electrical machines, control and power electronics to cater to the need of automations in industries.
CO4	Select most suitable type and specification of motor drive combination for efficient conversion and control of electric power.
CO5	Design new control and power conversion schemes for implementing alternative solutions.

Name of Subject: High Voltage Engineering (HVE)	
Subject Code: EE-702 A	
Student will be able to:	
CO1	Infer various theories of ionization process.
CO2	Illustrate various breakdown phenomena of insulating materials.
CO3	Examine the generation of HV AC DC and impulse voltage and current.
CO4	Illustrate the high voltage transmission and measurements.
CO5	Conduct high voltage test on materials and apparatus.

Name of Subject: EE-703(A) Utilization of Electrical Energy	
Subject Code: EE703(A)	
Student will be able to:	
CO1	Estimate Illumination of different kinds of lamp.
CO2	Elaborate the process of heating, welding & electrolysis.
CO3	Classify drives used in traction.
CO4	Examine the techniques for braking system realization in traction.
CO5	Select motors for various industrial drives.


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Name of Subject: Electrical Drives – lab	
Subject Code: EE-701	
Student will be able to:	
CO1	Propose ways to control the speed of DC machines, AC machine and 3 phase fully controlled converter as speed controller.
CO2	Evaluate the impact of control methods on the measurement results
CO3	Select the control method of induction motor.
CO4	Verify universal AC/DC motor controller.
CO5	Drive system simulation with MATLAB/Simulink

Name of Subject: Electrical Cad Lab	
Subject Code: EE704	
Student will be able to:	
CO1	Demonstrate drafting techniques and shortcuts used by professionals.
CO2	Evaluate design of induction machine.
CO3	Develop electrical drawing of synchronous machine.
CO4	Develop electrical drawing of design of transformer, DC m/c.
CO5	Enhance visualization ability of machine components.

Name of Subject: Energy Audit – Lab	
Subject Code: EE705	
Student will be able to:	
CO1	State the technology, economics and regulation related issues associated with energy auditing
CO2	Classify the instruments for energy auditing
CO3	Examine the energy audit and other related jobs with the help of available software.
CO4	Inspect strategic and policy recommendations on energy auditing
CO5	Develop concept of real time problem solving for energy audit issue

Name of Subject: Major Project-I	
Subject Code: EE706	
Student will be able to:	
CO1	Choose potential problem based on literature survey/impending industrial/real time needs.
CO2	Classify various solution methodologies to solve problem taken for study.
CO3	Judge the design steps or experimental procedure relevant to the problem.
CO4	Examine results and findings obtained.
CO5	Recommend solutions to potential engineering problems.

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Name of Subject: Evaluation of Intership-III,	
Subject Code: EE-607	
Student will be able to:	
CO1	Identify their areas of interest as per their training requirement.
CO2	Formulate problems and try to find their solution through gained knowledge.
CO3	Adapt actual engineering environment.
CO4	Develop the habit of utilization of technical resources.
CO5	Develop training report and give oral presentations related to the training completed.

Name of Subject: Power Quality Improvement & Mitigation Technique	
Subject Code: EE-801	
Student will be able to:	
CO1	Compare the methods involved in power system calculations, applications and regulation of power system network parameters.
CO2	Examine the causes of voltage sag and swell.
CO3	Interpret various methods to improve power quality.
CO4	Evaluate the Effects of harmonics on various equipments.
CO5	Classify compensating techniques for a given power quality problem

Name of Subject: EHV AC and DC Transmission	
Subject Code: EE-802 (C)	
Student will be able to:	
CO1	Evaluate existing status EHV AC and DC transmission.
CO2	Recommend various types of series and shunt FACTS devices.
CO3	Analyze the control characteristics of EHV d.c. system.
CO4	Analyze travelling waves & over voltages on transmission systems.
CO5	Design a system, component, or process with constraints such as economic, environmental and safety.

Name of Subject: Power Electronics Converter for Renewable Energy	
Subject Code: EE-803 (B)	
Student will be able to:	
CO1	Discuss the Importance of power electronics converter in harnessing energy from renewable sources
CO2	Discuss different power converters namely AC to DC, DC to DC and AC to AC converters for renewable energy systems.
CO3	Examine the stand alone and grid connected renewable energy systems.
CO4	Develop maximum power point tracking algorithms
CO5	Evaluate the dynamic analysis of power converters for renewable energy Sources


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Name of Subject: Power Quality Improvement & Mitigation Technique	
Subject Code: EE-801	
Student will be able to:	
CO1	Examine dynamic load with respect to power quality.
CO2	Build electrical system for reactive power compensation of linear load.
CO3	Analyse harmonics of balanced and un-balanced non-linear loads.
CO4	Implement suitable model for compensating device for power factor correction and voltage regulation.
CO5	Develop model of hybrid filters for harmonics compensation.

Name of Subject: Simulation Lab	
Subject Code: EE-804	
Student will be able to:	
CO1	Build an electrical system in terms of its differential equation, transfer function, magnitude response which are mutually convertible.
CO2	Evaluate mathematical expressions that can be used to estimate parameters from different types of data, for different models of electrical system.
CO3	Examine simulation of a continuous-time system by means of numerical integration.
CO4	Synthesise MATLAB code to simulate a given system or model.
CO5	Implement a suitable model for a given problem, making informed choices about the model type.

Name of Subject: Major Project-II	
Subject Code: EE-805	
Student will be able to:	
CO1	Choose potential problem based on literature survey/impending industrial/real time needs.
CO2	Classify various solution methodologies to solve problem taken for study.
CO3	Judge the design steps or experimental procedure relevant to the problem.
CO4	Examine results and findings obtained.
CO5	Recommend solutions to potential engineering problems.

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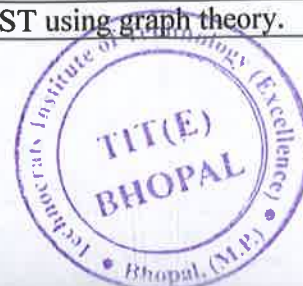
Course Outcomes for B. Tech (Grading) Session 2022-23	
Branch: Department of Computer Science Engineering-Artificial Intelligence & Machine Learning	
Name of Subject: Technical Communication	
Subject Code: AL301	
Student will be able to	
CO1	Summarize the importance of Communication in a Globalized world.
CO2	Classify Writing Skills and Speaking Skills.
CO3	Analyse interpersonal communication skills.
CO4	Analyse Professional Presentations techniques.
CO5	Apply Basics of grammar and common error in writing and speaking.

Name of Subject: Introduction to Probability and Statistics	
Subject Code: AL 302	
Student will be able to:	
CO1	Develop statistical techniques and methodologies.
CO2	Develop and equip the students with standard concepts and tools at an intermediate to advanced level.
CO3	Build a discipline that will serve them well towards tackling various problems in the real world.
CO4	Apply curve fitting methods to calculate mean and mean differences.
CO5	Develop goodness of fit and independence of attributes.

Name of Subject: Data Structures	
Subject Code: AL 303	
Student will be able to :	
CO1	Summarize the concept of data structure and explore arrays and linked lists.
CO2	Classify various linear data structures with their representation and perform different operations on them.
CO3	Analyze algorithms for operations on Tree.
CO4	Analyse algorithms for operations on Graph.
CO5	Apply data structures to implement algorithms for searching and sorting.

Name of Subject: Data Structure Lab	
Subject Code: AL 303	
Student will be able to:	
CO1	Develop program for different operations using array and linked list.
CO2	Develop programs for linear data structures
CO3	Build program for non linear data structures to solve various computing problems.
CO4	Apply various sorting, searching and hashing techniques
CO5	Develop code for real life problems like shortest path and MST using graph theory.


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Name of Subject: Object Oriented Programming & Methodology	
Subject Code: AL 305	
Student will be able to	
CO1	Outline the basics of Object Oriented Programming and its elements.
CO2	Apply the concepts of encapsulation and abstraction in Object Oriented Programming.
CO3	Apply concept of inheritance in program development.
CO4	Discuss different polymorphisms methods with real world examples.
CO5	Apply concept of exception handling and multithreading.

Name of Subject: Object Oriented Programming & Methodology Lab	
Subject Code: AL 305	
Student will be able to	
CO1	Apply object oriented programming concept in program design.
CO2	Create programs using friend function and function overloading.
CO3	Implement concept of operator overloading, Inheritance and polymorphism in program design.
CO4	Construct programs to handle exceptions in programming in C++.
CO5	Build program using constructor and destructor.

Name of Subject: Computer Workshop	
Subject Code: AL 306	
Student will be able to	
CO1	Make use of basics of Java Features using programming environment.
CO2	Apply Java collective framework to design data structures and collections algorithms.
CO3	Develop programs using advance Java Features-Multithreading, Networking and JDBC.
CO4	Development of web based applications with the help of servlets, JSP and Multimedia.
CO5	Experiment with advanced web/internet programming technologies like J2ME, J2EE, EJB and XML.

Name of Subject: Evaluation of Internship-I completed at I year level	
Subject Code: BT107	
Student will be able to	
CO1	Demonstrate the ability to resolve the problems.
CO2	Demonstrate critical thinking skills, such as related to social issues.
CO3	Adapt professional software development environment.
CO4	Identify the different resources for the software development
CO5	Summarize new practices observed during internship


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Name of Subject: Discrete Structure	
Subject Code: AL 401	
Student will be able to	
CO1	Apply the concepts of the Set theory, Relation and Functions.
CO2	Illustrate the concepts of Algebraic Structures.
CO3	Analyze the relation between Propositional Logic and Finite state machines
CO4	Apply various types of graph structures to computational problem solving.
CO5	Apply the concept of hasse diagram, posets, lattice and combinatorics to solve problems in multiple domains.

Name of Subject: Analysis Design of Algorithm	
Subject Code: AL 402	
Student will be able to :	
CO1	Analyse different divide and conquer algorithms with respect to time and space complexity.
CO2	Apply greedy strategies and Dynamic programming technique for algorithm development
CO3	Apply branch and bound and backtracking technique for the solution of computing problems
CO4	Apply the concepts of trees and graphs for solving of real world problems
CO5	Choose the problem solving strategies for given problem

Name of Subject: Analysis Design of Algorithm Lab	
Subject Code: AL 402	
Student will be able to :	
CO1	Create programs using Greedy method to find optimal solution for problems like single source shortest path algorithm
CO2	Create program using Dynamic programming concept for Floyd-Warshal algorithm.
CO3	Create program for Hamiltonian cycle problem using backtracking
CO4	Develop AVL and B-trees based simple search programs
CO5	Create programs using Greedy method to find optimal solution for problems like single source shortest path algorithm

Name of Subject: Software Engineering	
Subject Code: AL 403	
Student will be able to :	
CO1	Classify different software process models.
CO2	Determine software functional and non-functional requirements.
CO3	Design software process, architecture, user Interface.
CO4	Categorize various types of software testing's techniques.
CO5	Discuss project management and software maintenance.


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Name of Subject: Software Engineering Lab	
Subject Code: AL 403	
Student will be able to :	
CO1	Apply the software engineering methodologies involved in the phases for project development.
CO2	Create function oriented and object oriented software design using tools like rational rose.
CO3	Develop software requirements specifications for a given problem.
CO4	Create structure and behavior of UML diagrams.
CO5	Create the test cases and test strategies for conventional software.

Name of Subject: Computer Organisation and Architecture	
Subject Code: AL 404	
Student will be able to :	
CO1	Summarize the basic organization of computer with emphasis on working of each component.
CO2	Interpret the steps of execution of instruction cycle, micro instructions along with the control signals generated by control unit.
CO3	Evaluate the computer based different arithmetic operations.
CO4	Discuss input-output Organization of Computer System.
CO5	Classify various Memory devices, Multiprocessors with its working.

Name of Subject: Computer Organisation and Architecture Lab	
Subject Code: AL 404	
Student will be able to :	
CO1	Elaborate basic principles of computer architecture.
CO2	Interpret multiplication operation on memory.
CO3	Develop programs to perform addition operation on memory.
CO4	Construct programs to perform subtraction operation on memory.
CO5	Build the steps of execution of instructions and micro instructions along with the control signals generated by control unit.

Name of Subject: Machine Learning	
Subject Code: AL 405	
Student will be able to :	
CO1	Elaborate most cost-effective approaches of machine learning.
CO2	Develop automated knowledge acquisition in emerging data-rich disciplines theoretical understanding of these methods.
CO3	Develop computational implications of machine learning algorithms.
CO4	Understanding of the theoretical concepts of machine learning.
CO5	Apply research or industry application of machine learning techniques.

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Name of Subject: Operating Systems	
Subject Code: AL 501	
Student will be able to :	
C01	Develop the concept of operating systems and its services.
C02	Contrast file system along with disk scheduling algorithms.
C03	Analyze different process scheduling algorithms and memory management techniques to achieve better performance of a computer system.
C04	Determine techniques to deal with different Concurrent processes.
C05	Examine case studies of Unix/Linux and Windows operating system.

Name of Subject: Operating Systems Lab	
Subject Code: AL 501	
Student will be able to :	
C01	Construct a program for different CPU scheduling algorithm.
C02	Build a program for different classical problem of synchronization.
C03	Construct a program for different page replacement algorithm.
C04	Create a program for disk scheduling algorithms.
C05	Construct a program for Deadlock free condition.

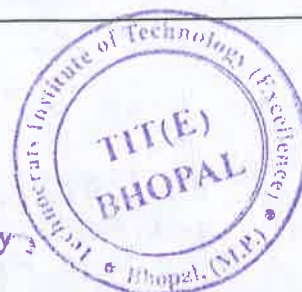
Name of Subject: Database Management Systems	
Subject Code: AL 502	
Student will be able to :	
C01	Discuss the concepts of Database and make use of ER diagram.
C02	Write the database queries in the form of relational algebra and calculus expression.
C03	Demonstrate the Normalization with example.
C04	Utilize the concept of concurrency control & recovery mechanism for database.
C05	Design RDBMS through Oracle / Postgresql / mySql.

Name of Subject: Database Management Systems Lab	
Subject Code: AL 502	
Student will be able to :	
C01	Create database structure using DDL commands.
C02	Build user defined constraints on the database.
C03	Create queries for interacting with database.
C04	Construct procedures, cursor and trigger.
C05	Develop a simple data base application in RDBMS.

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Name of Subject: Open Elective- Deep Learning	
Subject Code: AL-503 (B)	
Student will be able to :	
CO1	Define understanding deep learning fundamentals.
CO2	Demonstrate structure, functionality, and applications of neural network architectures.
CO3	Apply and training deep learning models using appropriate techniques.
CO4	Solve and implement deep learning libraries and frameworks such as Tensor Flow, Keras, PyTorch.
CO5	Describe reinforcement learning and deep reinforcement learning algorithms for sequential decision-making tasks.

Name of Subject: Open Elective- Natural Language Processing	
Subject Code: AL-504 (B)	
Student will be able to :	
CO1	Define different data models used in Information Retrieval using NLP
CO2	Demonstrate current methods for statistical approaches to machine translation.
CO3	Apply syntactic parsing and semantic analysis on text.
CO4	Solve and implement real world problems using NLP.
CO5	Describe man machine interfaces.

Name of Subject: Departmental Elective Lab (Deep Learning)	
Subject Code: AL-505	
Student will be able to :	
CO1	Identify in-depth about theories, fundamentals, and techniques in Deep learning.
CO2	Describe the on-going research in computer vision and multimedia field.
CO3	Illustrate various deep networks using performance parameters.
CO4	Prepare design and validate deep neural network as per requirements.
CO5	Select tools to analyse gradient problems.

Name of Subject: Open Elective Lab (Natural Language Processing)	
Subject Code: AL 506	
Student will be able to :	
CO1	Formulate define different data models used in Information Retrieval using NLP.
CO2	Construct programs to demonstrate current methods for statistical approaches to machine translation
CO3	Design Apply syntactic parsing and semantic analysis on text.
CO4	Create Solve and implement real world problems using NLP.
CO5	Develop programs for intelligent work processors.

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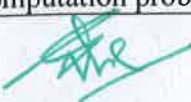


Name of Subject: Evaluation of Internship-II	
Subject Code: AL 507	
Student will be able to :	
CO1	Apply the real working environment principles in his/her professional development.
CO2	Correlate theoretical concepts learned in class rooms to the industrial work scenario.
CO3	Adapt professional software development environment.
CO4	Learn various key practices for working in team and optimizing processes.
CO5	Develop work competencies for a specific profession or occupation.

Name of Subject: Minor Project- I	
Subject Code: AL 508	
Student will be able to :	
CO1	Choose the technology to implement the project from the available technologies.
CO2	Identify the project based on the review of the selected technology.
CO3	Develop the project in legal and ethical ways using project management principals such as planning, scheduling, budgeting and risk management.
CO4	Work effectively with team members, communicate and resolve conflicts if any within the team.
CO5	To present their project outcomes effectively in verbal and written form.

Name of Subject: Theory of Computation	
Subject Code: AL-601	
Student will be able to :	
CO1	Summarize the fundamentals of various Languages, Grammars & Automata.
CO2	Construct Automata to recognize the languages.
CO3	Select appropriate automata as per the requirements.
CO4	Prove properties of languages, grammars and automata using formal mathematical methods.
CO5	Discuss the complexity and limitation of computation in problem solving.

Name of Subject: Theory of Computation Lab	
Subject Code: AL-601	
Student will be able to :	
CO1	Write a Program to implement DFA to accept a given language.
CO2	Write a program for modelling a system using PDA to accept appropriate language.
CO3	Write a program to implement turing machine to accept a given language.
CO4	Select appropriate automata to implement a given dynamic system of moderate complexity.
CO5	Measure Complexity of various Computation problems.


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Name of Subject: Computer Networks	
Subject Code: AL-602	
Student will be able to :	
CO1	Outline basics of computer networks and design issues related to various layers of TCP/IP
CO2	Apply different protocols of data link layer
CO3	Apply multiple approaches for medium access control in a computer network
CO4	Analyze different routing algorithms to optimize the use of channel
CO5	Discuss transport and application issues (related to protocols such as HTTP, FTP, SMTP, SNMP, DNS, SSH etc.)

Name of Subject: Computer Networks Lab	
Subject Code: AL-602	
Student will be able to :	
CO1	Demonstrate computer network component and devices.
CO2	Analyze how communication works at different layers of TCP/IP model
CO3	Apply mathematical foundations to solve computational problems .
CO4	Apply the various Routing Protocols/Algorithms and Internetworking
CO5	Design network with client/server programming

Name of Subject: Departmental Elective Data and Visual Analytics	
Subject Code:AL-603(B)	
Student will be able to :	
CO1	Summarize the Levels of Measurement Data management and indexing techniques.
CO2	Construct analysis and variance methods using regression.
CO3	Analyze data gathering, accessing and cleaning techniques.
CO4	Apply Big Data processing tools using Hadoop.
CO5	Implement Python visualization libraries (matplotlib, pandas, seaborn, ggplot, plotly), Introduction to PowerBI tools.

Name of Subject: Open Elective-Cloud Computing	
Subject Code: AL-604(A)	
Student will be able to :	
CO1	Summarize various service oriented architectures in cloud computing.
CO2	Classify cloud computing architecture including virtualization technology and multitenant architecture.
CO3	Outline the cloud file system and apply map reduce model
CO4	Discuss secured cloud environment
CO5	Elaborate quality of service issues in real time cloud application.

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Name of Subject: Departmental Elective Lab (Data and Visual Analytics)	
Subject Code: AL-605	
Student will be able to :	
CO1	Interpret the concepts of data analytics using statistics and probability
CO2	Demonstrate the data pre-processing techniques used in data analytics.
CO3	Identify the relation between Correlation and Covariance.
CO4	Develop programs in the field of data analytics based on R programming language.
CO5	Build programs using MATLAB and Python as data analytics tools.

Name of Subject: Minor Project II	
Subject Code: AL-608	
Student will be able to :	
CO1	Choose the technology to implement the project from the available technologies.
CO2	Identify the project title based on the review of the selected technology.
CO3	Develop the project in legal and ethical ways using project management principals such as planning, scheduling , budgeting and risk management.
CO4	Work effectively with team members, communicate and resolve conflicts if any within the team.
CO5	To present their project outcomes effectively in verbal and written form.

Name of Subject: Computer Vision	
Subject Code: AL-701	
Student will be able to :	
CO1	Understand practice and theory of computer vision.
CO2	Elaborate computer vision algorithms, methods and concepts.
CO3	Implement computer vision systems with emphasis on applications and problem solving
CO4	Apply skills for automatic analysis of digital images to construct representations of physical objects and scenes.
CO5	Design and implement real-life problems using Image processing and computer vision.

Name of Subject: Departmental Elective Advanced Machine Learning	
Subject Code: AL702 (B) Advanced Machine Learning	
Student will be able to :	
CO1	Introduce advanced concepts and methods of machine learning
CO2	Develop an understanding of the role of machine learning in massive scale automation.
CO3	Develop various machine learning algorithms in a range of real-world applications.
CO4	Determine and design dynamic programming algorithms.
CO5	Analyze and implement reinforcement learning techniques.


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Name of Subject: Open Elective Compiler Design	
Subject Code: AL-703(A)	
Student will be able to :	
CO1	Summarize the fundamentals & different phases of compiler with examples.
CO2	Construct Parsing Table & Show the parsing of string for various parsers.
CO3	Analyze data structures used for symbol table and runtime organization and errors in various phases
CO4	Apply code generation techniques to create target code.
CO5	Summarize the fundamentals & different phases of compiler with examples.

Name of Subject: Departmental Elective Lab	
Subject Code: AL704 Advanced Machine Learning	
Student will be able to :	
CO1	Introduce methods of machine learning used for real time data science project.
CO2	Develop an understanding of advanced data visualization techniques with Seaborn and Matplotlib.
CO3	Develop various machine learning algorithms like random forest classifier.
CO4	Determine and design programming logics App behaviour analysis algorithms.
CO5	Analyze and implement machine learning environment using Anaconda, Jupyter Notebook, Spyder.

Name of Subject: Skill Development Lab	
Subject Code: AL-705	
Student will be able to :	
CO1	Select appropriate software life cycle model, Process & methods for developing software product according user requirements & expectations.
CO2	Translate user requirements & expectations in the form of software requirement specification.
CO3	Make use of various design pattern & design methods for implementing the design of software product.
CO4	Develop skills in software development through analysis of case study.
CO5	Organize all activities like requirement analysis, design, and coding, testing, maintenance in the form of documentation for systematic execution of project.


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Name of Subject: Major Project -I	
Subject Code: AL-706	
Student will be able to :	
CO1	Identify the project title based on the review of the current state of the field of project.
CO2	Choose the technology to implement the problem from the available technologies.
CO3	Develop creative and innovative solutions to the problems in legal and ethical ways using project management principals such as planning, scheduling , budgeting and risk management.
CO4	Work effectively with team members, communicate and resolve conflicts if any within the team.
CO5	To present their project outcomes effectively in verbal and written form.

Name of Subject: Evaluation of Internship -III	
Subject Code: AL- 607	
Student will be able to :	
CO1	Apply the real working environment principles in his/her professional development.
CO2	Correlate theoretical concepts learned in class rooms to the industrial work scenario.
CO3	Adapt professional software development environment.
CO4	Learn various key practices for working in team and optimizing processes.
CO5	Develop work competencies for a specific profession or occupation.

Name of Subject: Business Intelligence	
Subject Code: AL801	
Student will be able to :	
CO1	Analyseexposed with the basic rudiments of business intelligence system.
CO2	Interpret and understand the modelling aspects behind Business Intelligence.
CO3	Develop the understanding of the business intelligence life cycle and the techniques used in it.
CO4	Determine data analysis tools and techniques for marketing models.
CO5	Implementadvanced visualization using Rich Report tool.

Name of Subject: Departmental Elective Big Data	
Subject Code: AL802 (C)	
Student will be able to :	
CO1	Analyze the big data characteristics and challenges.
CO2	Interpret the big data infrastructure through hadoop.
CO3	Develop Big Data Solutions using Hadoop Eco System.
CO4	Determine data architectural patterns and its variations of NoSQL and MangoDB.
CO5	Analyze the mining of social network graphs and its applications.


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Name of Subject: Internet of Things	
Subject Code: AL-803(A)	
Student will be able to :	
CO1	Summarize the design, components and state of the art of IoT.
CO2	Outline the components, classes and types of sensors.
CO3	Discuss different wired and wireless IoT networking technologies
CO4	Interpret the working of message passing protocol of IoT
CO5	Build the IoT on Arduino and Raspberry Pi platform

Name of Subject: D/O elective lab	
Subject Code: AL804	
Student will be able to :	
CO1	Perceive hands-on experience on large-scale analytics tools.
CO2	Design Algorithms to solve Data Intensive Problems using Map Reduce Paradigm.
CO3	Analyze and perform different operations on data using Hive and Pig Latin scripts.
CO4	Create NoSQL data for Unstructured data and perform operations with API.
CO5	Apply the concept of social network graphs and clustering in real world applications.

Name of Subject: Major Project-II	
Subject Code: AL-805	
Student will be able to :	
CO1	Identify the project title based on the review of the current state of the field of project.
CO2	Choose the technology to implement the problem from the available technologies.
CO3	Develop creative and innovative solutions to the problems in legal and ethical ways using project management principals such as planning, scheduling, budgeting and risk management.
CO4	Work effectively with team members, communicate and resolve conflicts if any within the team.
CO5	To present their project outcomes effectively in verbal and written form.

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Branch: Department of Computer Science Engineering-Artificial Intelligence & Machine Learning	
Name of Subject: Data Structures & Algorithms	
Subject Code: MTAL101	
Student will be able to	
CO1	Describe the hash function and concepts of collision and its resolution methods.
CO2	Discuss and analyse algorithms for skip lists and various types of trees.
CO3	Identify Develop and analyse algorithms for various variations of Heaps.
CO4	Discuss able to select a proper pattern matching algorithm for given problem.
CO5	Select tools to Identify suitable data structures and develop algorithms for Multidimensional Searching.

Name of Subject: Advances in Operating System	
Subject Code: MTAL102	
Student will be able to	
CO1	Develop the concept of operating systems and its services.
CO2	Contrast file system along with disk scheduling algorithms.
CO3	Analyze different process scheduling algorithms and memory management techniques to achieve better performance of a computer system.
CO4	Determine techniques to deal with different Concurrent processes.
CO5	Examine case studies of Unix/Linux and Windows operating system.

Name of Subject: Mathematics for Machine Learning	
Subject Code: MTAL 103	
Student will be able to	
CO1	Describe in-depth about mathematics used in machine learning and deep learning
CO2	Compare and analyzes different mathematical techniques used in machine learning.
CO3	Examine the nature of a problem at hand and determine best suitable mathematics technique.
CO4	Solve the real world problems using machine learning mathematics.
CO5	Estimate mean, median, mode, weighted average mean and measures of dispersion.

Name of Subject: Machine Learning	
Subject Code: MTAL 104	
Student will be able to	
CO1	Describe in-depth about theories, methods, and algorithms in machine learning.
CO2	Find and analyze the optimal hyper parameters of the machine learning algorithms.
CO3	Examine the nature of a problem at hand and determine whether a machine learning can solve it efficiently enough.
CO4	Solve and implement the real world problems using machine learning.
CO5	Describe theoretical analysis of machine learning problems and algorithms.


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Name of Subject: Elective I (Artificial Intelligence)	
Subject Code: MTAL105	
Student will be able to	
CO1	Describe fundamentals of Artificial Intelligence (AI) and its foundations.
CO2	Understand formal methods of knowledge representation, logic and reasoning.
CO3	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
CO4	Demonstrate awareness and understanding of various applications of AI techniques in intelligent agents, expert systems and other machine learning models.
CO5	Apply AI techniques to various applications of AI in Game Playing, Natural Language Processing, Computer-Vision, Robotics etc.

Name of Subject: Lab-I (101 and 102)	
Subject Code: MTAL 106	
Student will be able to	
CO1	Describe self-balancing BSTs like AVL trees, Red-Black trees, or Splay trees using C++.
CO2	Discuss and analyse algorithms for Analyzing the time complexity of search operations.
CO3	Identify and analyse heaps for tasks like priority queues.
CO4	Implement synchronization mechanisms to ensure proper coordination among concurrent processes.
CO5	Apply Techniques such as paging, segmentation, virtual memory, memory allocation strategies (like first-fit, best-fit, worst-fit) using C++.

Name of Subject: Lab-II (104 and Elective I)	
Subject Code: MTAL 107	
Student will be able to	
CO1	Describe classical machine learning algorithms such as linear regression, logistic regression using TensorFlow.
CO2	Find and analyse the decision trees, k-nearest neighbors (KNN), support vector machines (SVM), and Naive Bayes machine learning algorithms.
CO3	Examine machine learning algorithms for tasks like classification, regression, clustering, and anomaly detection using libraries.
CO4	Demonstrate awareness and understanding of various applications of AI techniques in intelligent agents, expert systems and other machine learning models.
CO5	Apply AI techniques to various applications of AI in Game Playing, Natural Language Processing, Computer-Vision, Robotics etc.


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Name of Subject: Software Project Management	
Subject Code: MTAL 201	
Student will be able to	
CO1	Contrast between conventional and modern software management techniques.
CO2	Apply the evaluation criteria to the various phases of the software management process.
CO3	Identify software development process workflow and put required checkpoints
CO4	To develop ability to monitor and control projects life cycle and risk involved.
CO5	Discuss the quality of the software products using software metrics.

Name of Subject: Computational Intelligence	
Subject Code: MTAL 202	
Student will be able to	
CO1	Describe in-depth about theories, methods, and algorithms in computation Intelligence.
CO2	Compare and contrast traditional algorithms with nature inspired algorithms.
CO3	Examine the nature of a problem at hand and determine whether a computation intelligent technique/algorithm can solve it efficiently enough.
CO4	Design and implement Computation Intelligence algorithms and approaches for solving real-life problems.
CO5	Compare Colony Optimization (ACO), Particle Swarm Optimization (PSO), Bee Colony Optimization techniques.

Name of Subject: Big Data	
Subject Code: MTAL 203	
Student will be able to	
CO1	Analyze the big data characteristics and challenges.
CO2	Interpret the big data infrastructure through hadoop.
CO3	Develop Big Data Solutions using Hadoop Eco System.
CO4	Determine data architectural patterns and its variations of
CO5	Compare NoSQL and MangoDB.

Name of Subject: Deep Learning	
Subject Code: MTAL 204	
Student will be able to	
CO1	Describe in-depth about theories, fundamentals, and techniques in Deep learning.
CO2	Understanding of the on-going research in computer vision and multimedia field.
CO3	Design and Implement, train, and validate their own deep neural network.
CO4	Solve and implement the real world problems using deep learning.
CO5	Describe Deep belief networks, Markov Networks, Markov Chains and various Autoregressive Models.


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Name of Subject: Elective II (Reinforcement Learning)	
Subject Code: MTAL 205	
Student will be able to	
CO1	Define the key features of reinforcement learning that distinguishes it from others machine learning techniques.
CO2	Describe multiple criteria for analyzing RL algorithms and evaluate algorithms on RL performance metrics.
CO3	Design and Implement, train, and validate their own RL models.
CO4	Solve and implement the real world problems using reinforcement learning.
CO5	Describe MAXQ, MAXQ value function decomposition Solving POMDP, applications of RL.

Name of Subject: LAB III	
Subject Code: MTAL 206	
Student will be able to	
CO1	Apply techniques for creating project charters, work breakdown structures (WBS), and Gantt charts to schedule tasks and allocate resources.
CO2	Identify software development process conducting risk assessments, creating risk registers, and developing risk response strategies.
CO3	Examine agile methodologies such as Scrum or Kanban.
CO4	Design different crossover and mutation operators to see their effects on convergence and solution quality.
CO5	Apply artificial neural networks using libraries like TensorFlow or PyTorch..

Name of Subject: Lab-IV	
Subject Code: MTAL 207	
Student will be able to	
CO1	Analyze the big data concepts using NoSQL and MangoDB.
CO2	Interpret the big data infrastructure algorithms usinghadoop.
CO3	Develop recurrent neural networks (RNNs) or transformer-based models like BERT or GPT for tasks such as sentiment analysis, named entity recognition, or text generation.
CO4	Determine Fine-tuning pre-trained language models on domain-specific text corpora for better performance.
CO5	Implement Autoregressive Models for Deep belief networks, Markov Networks, Markov Chains and various.

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Name of Subject: Elective III Natural Language Processing	
Subject Code: MTAL 301	
Student will be able to	
CO1	Define different data models used in Information Retrieval using NLP
CO2	Demonstrate current methods for statistical approaches to machine translation.
CO3	Apply syntactic parsing and semantic analysis on text.
CO4	Solve and implement real world problems using NLP.
CO5	Describe man machine interfaces.

Name of Subject: Elective IV Machine learning in Natural Language Processing	
Subject Code: MTAL302	
Student will be able to	
CO1	Define text preprocessing, feature extraction, and representation of text data.
CO2	Describe machine learning algorithms commonly used in NLP tasks, such as Naive Bayes, Support Vector Machines (SVM), Decision Trees, Random Forests, and Neural Networks.
CO3	Solve real-world problems, such as text classification, sentiment analysis,
CO4	Design text data effectively, including bag-of-words, TF-IDF, word embedding
CO5	Apply practical experience of NLP libraries and frameworks like NLTK, spaCy, scikit-learn, TensorFlow, and PyTorch.

Name of Subject: Seminar	
Subject Code: MTAL 303	
Student will be able to	
CO1	Establish motivation for any topic of interest and develop a thought process for technical presentation.
CO2	Organize a detailed literature survey and build a document with respect to technical publications.
CO3	Analysis and comprehension of proof-of-concept and related data.
CO4	Effective presentation and improve soft skills.
CO5	Make use of new and recent technology (e.g. Latex) for creating technical reports.


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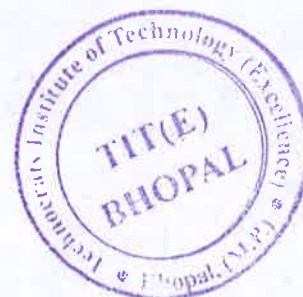
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Name of Subject: Name of Subject: Dissertation Part- I (Literature Review/Problem Formulation/ Synopsis)	
Subject Code: MTAL304	
Student will be able to	
CO1	Define your topic. The first step is defining your task -- choosing a topic and noting the questions you have about the topic. This will provide a focus that guides your strategy in step II and will provide potential words to use in searches in step III.
CO2	Develop a strategy. Strategy involves figuring out where the information might be and identifying the best tools for finding those types of sources. The strategy section identifies specific types of research databases to use for specific purposes.
CO3	Locate the information. In this step, you implement the strategy developed in II in order to actually locate specific articles, books, technical reports, etc.
CO4	Use and Evaluate the information. Having located relevant and useful material, in step IV you read and analyze the items to determine whether they have value for your project and credibility as sources.
CO5	Synthesize. In step V, you will make sense of what you've learned and demonstrate your knowledge. You will thoroughly understand, organize and integrate the information --become knowledgeable-- so that you are able to use your own words to support and explain your research project and its relationship to existing research by others.
CO6	Evaluate your work. At every step along the way, you should evaluate your work. However, this final step is a last check to make sure your work is complete and of high quality.

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Course Outcomes for M. Tech

Construction Technology

&

Management



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MVCT – 101 Advanced Mathematics

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

CO1	Apply methods of Operation research
CO2	Analyse project progress using CPM and PERT techniques
CO3	Demonstrate various Evolutionary algorithms
CO4	Apply Hypothesis, Linear and Non-linear regression
CO5	Design the projects for Reliability considering the constraints

MVCT – 102 Construction Material

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

CO1	Explain concept behind application of material science
CO2	Analyse various properties fresh & hardened concrete
CO3	Design concrete mix for specific requirements using codal provisions
CO4	Select new construction material as per the requirement
CO5	Apply the quality control methods in construction

MVCT – 103 Advanced Geotechnical Engg.

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

CO1	Explain stress distribution in soil
CO2	Design well foundation and coffer dam as per IRC codal provision
CO3	Apply concepts of vibration in design of Machine foundation.
CO4	Demonstrate techniques for construction on expansive soil
CO5	Explain the application of Rock mechanics in relation to civil engineering projects.

MVCT - 104 Construction Technology

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

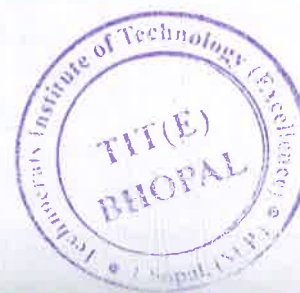
CO1	Understand advanced pavement construction techniques
CO2	Design different types of Temporary Structures
CO3	Apply various construction techniques in construction of steel structures
CO4	Explain Different Techniques of Prestressing
CO5	Demonstrate Construction Techniques for Heavy and Special Structures

MVCT - 105 Low-cost Build materials & cont. Technology

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

CO1	Summarize the concept of low-cost material
CO2	Compare various low-cost building material product
CO3	Suggest suitable Low-cost construction Techniques and Equipment
CO4	Suggest Low-cost sanitation methods
CO5	Analyse cost-benefit of lowcost building material and techniques

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MVCT - 106 Lab-I Computer Workshop

After completion of this course, student will be able to:	
CO1	Demonstrate basic concepts of the AutoCAD software
CO2	Apply basic concepts to develop construction (drawing) techniques
CO3	Manipulate drawings through editing and plotting techniques
CO4	Demonstrate dimensioning concepts and techniques
CO5	Understand geometric construction

MVCT - 107 Lab-II Ad. Construction -I


After completion of this course, student will be able to:	
CO1	Design high grade concrete and identify, carry out laboratory tests related to the use of concrete on site
CO2	Develop correlation between cube and cylinder of high strength concrete and analyze the stress-strain curve.
CO3	Interpret the mechanical properties of high strength concrete and examine the effect of cyclic loading on steel
CO4	Assess the quality of existing concrete members by Non-Destructive testing methods and study the behaviour of beams under flexure.
CO5	Analyse the behaviour of Self Compacting Concrete and understanding reinforcement details and corrosion levels in existing RC structures

MVCT - 201 Construction Management

After completion of this course, student will be able to:	
CO1	Prepare construction contract including the proves involved in making Contract documents
CO2	List the technical specifications of tender bond along with Termination rights and responsibility of various stakeholders
CO3	Apply the fundamentals of bid and tender management, including the process, roles, and legal aspects involved
CO4	Apply the legal implications of contract, common, and regulatory law to manage a construction project.
CO5	Explains alien features of welfare and wage Legislations also to integrate the knowledge of Labour Law in General HRD Practice.

MVCT -202 Prefabrication design & its construction tech

After completion of this course, student will be able to:	
CO1	Understand the procedure of prefabrication
CO2	Design prefabricated unit as per the National Building Code Specification
CO3	Analyse various prefabricated elements
CO4	Design various prefabricated elements
CO5	Apply advanced construction prefabricated techniques for control on construction


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MVCT - 203 Construction Equipment and Material Management

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

CO1	Select heavy equipment based on applications, utilization, productivity, and other factors
CO2	Analyse Cycle time capacity ratings of various construction equipment's.
CO3	Demonstrate Economics of Construction Equipment
CO4	Apply fundamentals of CPM in equipment management.
CO5	Demonstrate inter relationship between purchasing parameters

MVCT - 204 Financial Mgt. in Construction Industries

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

CO1	Utilize diverse skills in personnel management, human resource allocation, and administrative policies.
CO2	Apply industrial relation and regulations during construction & Industrial activity
CO3	Apply waste management skills in construction to boost productivity and cost-efficiency through waste identification, reduction, and regulatory compliance
CO4	Apply managerial economics for effective decision-making, covering demand analysis, cost assessment, pricing, risk evaluation, financial analysis, and budgeting for project selection
CO5	Apply skills of capital generation, financial accounting, banking, construction bookkeeping, and government financial statement preparation

MVCT - 205 Risk & Safety Management in Construction Industry

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

CO1	Apply appropriate technology as per current contexts during construction
CO2	Acquire skills of rural housing and environmental tech proficiency with local materials, water systems, waste treatment, and sanitation solutions.
CO3	Apply concepts of rural road planning, socio-economic factors, material selection, design principles, drainage issues, and maintenance strategies in rural sectors.
CO4	Examine global energy trends, building design's impact on energy budgets, and assess the feasibility of solar, wind, and tidal energies
CO5	Explore low-energy materials, construction methods, and environmental control strategies

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MVCT - 206 Lab-III Cont. mgt. software Lab

After completion of this course, student will be able to:	
CO1	Attain proficiency in Primavera software.
CO2	Gain hands-on experience in project planning and scheduling
CO3	Acquire effective resource management techniques
CO4	Develop skills in generating comprehensive project report
CO5	Apply the concepts of time and resource allocation in project management

MVCT - 207 Lab-IV Ad. Construction - II

After completion of this course, student will be able to:	
CO1	Explore advanced construction techniques through practical laboratory exercises
CO2	Acquire skills in analyzing and solving complex construction challenges
CO3	Understand the importance of safety protocols and risk management in advanced construction environments
CO4	Demonstrate proficiency in utilizing advanced construction equipment and tools
CO5	Acquire practical knowledge of quality control measures and techniques in construction

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MVCT – 301 Advance Highway Construction

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

CO1	Classify highway construction methods, materials selection, quality control, and various road construction techniques in Indian conditions.
CO2	Classify bituminous construction materials, procedures, quality control, binder selection, and surface treatments per industry standards.
CO3	Understand the essentiality of base courses, selecting suitable materials, categorizing joints, and executing construction procedures for cement concrete roads in accordance with IRC specifications.
CO4	Justify reinforcement necessity, mix selection, and construction methods for diverse cement concrete pavements, with tailored recommendations for Indian conditions.
CO5	Apply CPM & PERT techniques in highway construction

MVCT - 302 Advanced Foundation Engineering

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

CO1	Design shallow foundations as per given load parameters.
CO2	Design pile foundations effectively as per given load parameters.
CO3	Apply strength characteristics of reinforced soil in reinforced earth structures.
CO4	Understand bridge substructure elements, including well foundation stability analysis, pier and abutment design, and well sinking.
CO5	Design various hydraulic structures

MVCT - 303 Seminar

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

CO1	Demonstrate a sound technical knowledge of their selected seminar topic.
CO2	Undertake problem identification and formulation of solution
CO3	Design engineering solutions to complex problems utilising a systems approach
CO4	Communicate with engineers and the community at large
CO5	Demonstrate the knowledge, skills and attitudes of a professional engineer


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MVCT – 304 Dissertation Part- I (Literature Review/Problem Formulation/ Synopsis)

After completion of this course, student will be able to:	
CO1	Gain in-depth knowledge and use adequate methods in field of study
CO2	Create, analyse and critically evaluate different technical/research solutions
CO3	Clearly present and discuss the conclusions as well as the knowledge and arguments that form the basis for these findings
CO4	Identify the issues that must be addressed within the framework of the specific dissertation in order to take into consideration
CO5	Describe how their data will be treated and analysed of their study

MVCT – 401 Dissertation Part- II

After completion of this course, student will be able to:	
CO1	Design a research investigation that incorporates appropriate theoretical approaches, conceptual models, and a review of the existing literature.
CO2	Summarize the key arguments and suitable coherent findings for discussion.
CO3	Draw valid conclusions, relating them to the research topic
CO4	Demonstrate a comprehensive review of the literature, including a review of other dissertation research related to their study
CO5	Develop a design of their study with discussion of the methodology to be used during study.

MCSE 101- Advanced Computational Mathematics	
CO	Student will be able to
CO1	Implement partial differentiation and types of partial differential equations and vector operations
CO2	Evaluation classification of second partial differential equations, wave, heat equation and transmission lines.
CO3	Apply statistics including measures of central tendency, correlation, regression and their properties.
CO4	Analyze probability and random variables and various discrete and continuous probability distributions.
CO5	Examine statistical methods of studying data samples, hypothesis testing and statistical quality control charts.


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MCSE 102- Advanced Data Structures and Algorithm	
CO	Student will be able to
CO1	Apply advanced abstract data type (ADT) and data structures in solving real world problem.
CO2	Implement different tree data structures and differentiate them with respect to their applications.
CO3	Design algorithms using graph structure and various string matching algorithm to solve real life problems.
CO4	Apply understanding of memory management concepts, allocation strategies, and garbage collection algorithms.
CO5	Demonstrate different sorting searching techniques and different data structure to develop application.

MCSE 103- Advanced Computer Architecture	
CO	Student will be able to
CO1	Design different processor architectures, system-level design process, components of a memory hierarchy.
CO2	Understand and address data and control hazards in pipelined processors,
CO3	Apply parallel computing concepts to solve real-world problems effectively.
CO4	Manage task distributed across multiple processors efficiently.
CO5	Illustrate techniques for performance evaluation and optimization of pipelined and vector processor

MCSE 104- Object Oriented Technology	
CO	Student will be able to
CO1	Grasp fundamental OOP concepts such as encapsulation, inheritance, polymorphism and abstraction.
CO2	Apply methodologies like Booch and Chen and Chen for modeling and designing software systems.
CO3	Discuss loops and control statements using file streams to read from and write to external files.
CO4	Hands-on experience with OODBMS like GemStone/ O2/orion
CO5	Understand how CORBA can work alongside other distributed technologies.

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MCSE-105 ADVANCED COMPUTER NETWORKING	
CO	Student will be able to
CO1	Understand network layered architecture of OSI model and LAN Standards with its protocols
CO2	Understand various protocols like TCP, UDP, SCTP and concepts comes under Transport layer.
CO3	Gain practical skills in configuring routers, including setting up IP addresses, routing tables, and security features.
CO4	Implement VPNs, ATM networks and routing equipment.
CO5	Discuss Wireless LAN, GSM Architecture and various concept of Mobile and Wireless Networks.

MCSE 106 Lab-I MCSE-103 MCSE-105	
CO	Student will be able to
CO1	Ability to design and optimize computer systems for performance, power, and reliability
CO2	Understanding of instruction-level parallelism and pipelining
CO3	Hands-on experience with advanced computer networking protocols and technologies like TCP/IP and IPv6
CO4	Understanding of network performance optimization and quality of service (QoS)
CO5	Familiarity with network simulation and emulation tools

MCSE 107 Lab-I MCSE-102 MCSE-104	
CO	Student will be able to
CO1	Develop code for real life problems like shortest path and MST using graph theory.
CO2	Apply various sorting, searching and hashing techniques
CO3	Ability to design and develop complex software systems using OOP principles
CO4	Apply OOAD techniques to design and develop software systems that meet real-world requirements
CO5	Build program for non linear data structures to solve various computing problems.

MCSE 201 - Web Technology and Commerce	
CO	Student will be able to
CO1	Apply networking technologies to design, implement, and troubleshoot networks in real-world scenarios
CO2	Analyze and develop static interactive web pages using HTML, CSS and XML.
CO3	Analyze the impact of E-commerce on business models and strategy.
CO4	Rectify problems in internet payment systems and e-governance


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CO5	Apply knowledge of the benefits of WAP for e-commerce and Encryption schemes.
	MCSE- 202 Information theory, coding and cryptography
CO	Student will be able to
CO1	Applying mathematical techniques to communication systems
CO2	Apply stochastic processes to model real-world phenomena.
CO3	Utilize software tools for simulating and analyzing the performance of coded communication systems.
CO4	Design and develop secure communication systems using coding techniques.
CO5	Recognize the ethical responsibilities of using cryptographic techniques for secure communications.

	MCSE- 203 Advanced Concept in Data Bases
CO	Student will be able to
CO1	Implement databases for real-time applications using DBMS.
CO2	Explain in detail advanced query processing and techniques involved in query optimization
CO3	Analyze database with distributed database concepts and its structures
CO4	Implement data modeling and schema development
CO5	Discuss the principles and methodologies of data mining.

	MCSE- 204 System Programming
CO	Student will be able to
CO1	Implement language processors or programming tools.
CO2	Apply compiler construction techniques to solve real-world problems,
CO3	Develop compilers that generate efficient code for distributed systems
CO4	Understand resource allocation and scheduling principles
CO5	Case studies of prominent multiprocessor operating systems, such as Unix, Amoeba, and Andrew

	MCSE- 205 Soft Computing
CO	Student will be able to
CO1	Develop intelligent systems leveraging the paradigm of soft computing techniques
CO2	Demonstrate the models of artificial neural network systems for classification problem.
CO3	Apply unsupervised learning techniques like Kohonen's Self-Organizing Maps
CO4	Apply fuzzy logic and improve system performance and accuracy in pattern recognition
CO5	Understand the genetic algorithm concepts and their applications.


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MCSE 206 Lab-I MCSE-203 MCSE-205	
CO	Student will be able to
CO1	Develop intelligent database systems that support decision-making and automation
CO2	Create queries for interacting with database.
CO3	Build relational database application using MySQL.
CO4	Design and develop intelligent systems that can learn and adapt.
CO5	Apply soft computing techniques to solve real-world problems

MCSE 207 Lab-I MCSE-201 MCSE-204	
CO	Student will be able to
CO1	Developing web applications using HTML, CSS, JavaScript, and server-side programming
CO2	Implementing database integration and backend systems
CO3	Apply system programming concepts to real-world problems
CO4	Implement a compiler for a programming language
CO5	Build dynamic web applications with a robust frontend and backend.

MCSE 301 Data Warehousing & Mining	
CO	Student will be able to
CO1	Understand, apply and evaluate data mining techniques on real data.
CO2	Demonstrate proficiency in using clustering and association rule algorithms.
CO3	Apply advanced data mining techniques like neural networks, AI, and genetic algorithms.
CO4	Demonstrate proficiency in using various tools for time series analysis and event prediction.
CO5	Critically evaluate image and video mining methods for knowledge discovery and retrieval.

MCSE 302 (A) – Network Security	
CO	Student will be able to
CO1	Evaluate the security of conventional encryption algorithms in different scenarios.
CO2	Illustrate the mathematical concepts behind public key cryptography
CO3	Evaluate the performance and security characteristics of hash functions in real-world scenarios.
CO4	Analyze the security strengths and weaknesses of cryptographic systems
CO5	Implement innovative approaches to designing trusted systems that address evolving cybersecurity challenges


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	MCSE 303 – Seminar
CO	Student will be able to
CO1	Identify relevant information, defining and explain topics under discussion.
CO2	Understand problem solving skills and apply theoretical knowledge.
CO3	Demonstrate the ability to learn and write both informal (scientific note taking) and formal (research paper) writing.
CO4	Calculate information, use and apply relevant theories.
CO5	Develop ideas through creating work.

	MCSE 304 – Dissertation Part- I
CO	Student will be able to
CO1	Identify the complex engineering problems and Understand different methodologies for documentation.
CO2	Identify the research topic/area in the field of Computer Science and Engineering to carry out independent research.
CO3	Examine the key stages to analyze / develop the research.
CO4	Select the suitable method which leads to appropriate results.
CO5	Design engineering solutions to various problems used to benefit society.

	MCSE 401 – Dissertation Part- II
CO	Student will be able to
CO1	Understand the process to carry out research in written format with reference to existing literature.
CO2	Analyze and synthesize research finding to the agreed area of research.
CO3	Apply algorithm and methods to solve the specific research problem.
CO4	Develop result on the basis of evaluation and analysis undertake.
CO5	Develop your result and conclusion with reference to existing literature and proposed methodologies.

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Branch: Department of MBA	
Name of Subject: CODE 11 Management Concepts & Practices-CP 101	
Student will be able to:	
CO1	Apply Management concepts within ethical boundaries.
CO2	Evaluate management principles in prevailing business situations.
CO3	Apply the concept and tools of planning in business decision making.
CO4	Recommend organizational principles in department for smooth business functioning.
CO5	Develop effective communication and leadership skills.

Name of Subject: CODE 12 Quantitative Methods-CP102	
Student will be able to:	
CO1	Analyze data to compute various measures of central tendency and get meaningful information.
CO2	Analyze data through different methods of Dispersion.
CO3	Estimate probability and perform probability theoretical distributions.
CO4	Discover Correlation and Regression model to understand their implication on Business performance.
CO5	Apply practical application of inferential statistics to provide solution to managerial and socio-economic issues.

Name of Subject: CODE 13 Managerial Economics CP-103	
Student will be able to:	
CO1	Discover the significance of demand elasticity in relevant market.
CO2	Determine Cost and Production analysis for forecasting purpose from the perspective of a consumer, firm, industry, market, competition and business cycles.
CO3	Evaluate market structure and develop relevant pricing strategy through critical thinking based on principles of micro-economics.
CO4	Predict how consumers and other firms in an industry, will respond to economic decisions made by a business, and how to incorporate these responses into their decisions.
CO5	Anticipate the responses of economic decision and take decisions

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Name of Subject: CODE 15 Communication Skills-CP104	
Student will be able to :	
CO1	Effectively communicate to share thoughts and ideas in personal and professional work.
CO2	Create efficiently the business reports, business emails, office memos, business letters etc. to gain competitive advantage in business communication.
CO3	Confident delivering and designing of business reports and business proposals and business presentations.
CO4	Deliver effective public speeches, confidently communicate in interviews, face group discussions and communicate at conferences.
CO5	Apply theories and concepts of effective non verbal communication to professional atmosphere. Demonstrate impressive personal behaviors (dressing/ grooming/ etiquettes and manners) during professional meetings, conferences, trainings etc

Name of Subject: CODE 16 International Business Environment -CP105	
Student will be able to:	
CO1	Create strategies to grow business to global markets by applying the concepts of International business.
CO2	Assess International Business Environment with reference to the Demography, Political environment, Cultural and Socio Economic and Legal environment to Create marketing and promotional strategies
CO3	Solve trade disputes in accordance with the norms of World Trade Organization (WTO) and trade agreements, to take correct business decisions pertaining to International Trade.
CO4	Apply different kinds foreign exchange management techniques to manage working capital of any multinational company in an efficient and effective manner.
CO5	Appraise key skills required by HR professionals working in an international organization to deal with dynamic employee management.

Name of Subject: CODE 18 Accounting For Managers – CO 106	
Student will be able to:	
CO1	Apply the concepts of Accounting equations, Indian and Global accounting standards, GST implications, Ledger accounting and trial balance in business accounting.
CO2	Analyze the various types of Financial Statements, Profit and Loss statements, Balance Sheet to forecast the financial targets.
CO3	Create the Comparative accounts statements, perform Ratio analysis and prepare the analysis report for cash flow in a business.
CO4	Compile account statements, inventory valuation, yearly budgets, cost volume profit analysis and business forecasts.
CO5	Do cost based financial analysis in any business environment using the concepts of financial cost accounting, cost control and cost reduction analysis and evaluate cost sheets.

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Name of Subject: Organisational Behaviour CODE 21	
Student will be able to:	
CO1	Apply the concept of individuals and group behaviour to improve organization's effectiveness.
CO2	Compare Individual Behaviour on the basis of their perception, learning, attitude, personality, values and job satisfaction.
CO3	Apply theories of motivation in organization.
CO4	Analyze the effect of organizational culture & climate for effective management.
CO5	Develop leadership skill to cope with resistance to change, stress and burnout.

Name of Subject: Human Resource Management CODE 23	
Student will be able to:	
CO1	Estimate the role of digitalization in Human Resource Management and issues in International HRM.
CO2	Plan for Human resource recruitment and selection process.
CO3	Evaluate Human resources training and development methods of employees.
CO4	Evaluate job performance for appraisal.
CO5	Decide for Employee welfare and industrial relation and settle disputes.

Name of Subject: Financial Management CODE 24	
Student will be able to:	
CO1	Interpret different basic concept / fundamentals of business finance.
CO2	Evaluate different capital budgeting techniques & its application on investment decisions.
CO3	Analyze the impact of various financing alternatives on the wealth maximization and valuation of the firm.
CO4	Analyze the different pattern of capital structure & its impact on wealth of the firm.
CO5	Examine firm's dividend policy and working capital.


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Name of Subject: Marketing Management Code 25

Student will be able to:

CO1	Assess marketing environment to decide marketing mix.
CO2	Analyze consumer and industrial markets to decide market segmentation, targeting and positioning (STP strategy).
CO3	Create pricing and promotion strategies for existing as well as new product.
CO4	Select efficient marketing channel and decide appropriate supply chain management and logistics.
CO5	Assess the digital platform dynamics of marketing in business from global perspective within legal boundaries.

Name of Subject: Research Methodology CODE 27

Student will be able to:

CO1	Elaborate significance of research for practical application in business.
CO2	Analysis research proposal through literature review, statement of the problem, framing of objectives, research design and testing of hypothesis.
CO3	Apply knowledge of carrying out a sample survey with the various sampling designs.
CO4	Identify suitable measures, scales and sources of information for data collection.
CO5	Analyzing statistical Techniques, Hypothesis testing and report writing.

Name of Subject: Project Management CODE 28

Student will be able to:

CO1	Select project after examining its phase in Project Management Life cycle.
CO2	Identify the required project manager's skills to manage project management team.
CO3	Apply PERT and CPM techniques for project scheduling.
CO4	Estimate the resource availability to allocate it according to related requirement.
CO5	Evaluate project at various stages through different methods.

Name of Subject: CP301- Business Policy And Strategic Management

Student will be able to:

CO1	Apply the concept of strategic planning in developing the Mission, Vision and Business Policy of an Organisation.
CO2	Evaluate the internal and external business environment through Industry analysis, Value Chain and SWOT analysis.
CO3	Formulate strategy on the basis of SFAS (Strategic Factor Analysis Summary) Matrix to achieve business objectives.
CO4	Apply strategic techniques to meet the challenges in the strategy implementation phase.
CO5	Evaluating the implied strategy through different control techniques like Balanced scorecard and Auditing.


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Name of Subject: CP302 Decision Support Systems And Management Information Systems	
Student will be able to:	
CO1	Analyse the relation between business process and organisation need to develop appropriate information systems.
CO2	Design Information system with the use of Technology like Cloud Computing, Big Data, Data Warehousing, Data Mining, ERP, SCM, CRM.
CO3	Apply different data analytics techniques in Marketing, HR and Finance sectors for taking effective informed decisions.
CO4	Analyse complex financial and operational data using Excel to support managerial decision making.
CO5	Create data visualization through visualization tools, dashboard, business intelligence to support decision making.

Name of Subject: FSF-1 Financial management-Security Analysis And Investment Management	
Student will be able to:	
CO1	Analyse different types of Investment options, Indian stock market and asset allocation to construct efficient portfolios
CO2	Evaluate various investment options in Govt securities to allocate resources efficiently
CO3	Identify the potential return, risks, and suitability of different investments for different clients or situations by using mechanics of investments
CO4	Determine the intrinsic value of a security with Valuation theories to identify potential undervalued or overvalued opportunities.
CO5	Identify the trends, support and resistance in stock markets to build portfolio and make investment decisions

Name of Subject: FSF2 Financial Management- Working Capital Management	
Student will be able to:	
CO1	Apply principles of working capital management to estimate working capital requirement of Business concern.
CO2	Develop effective credit and collection policies by applying various aspects of accounts receivable management to balance sales growth with financial risk.
CO3	Create strategies for maximising liquidity and control cash flows to maximise value of funds
CO4	Apply various techniques like EOQ, VED, ABC analysis for effective inventory management.
CO5	Determine working capital financing mix to ensure the efficient management of short-term financial resources and support its growth strategies.

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Name of Subject: FMS 1 Marketing Management- Consumer Behaviour	
Student will be able to:	
CO1	Relate consumer behaviour to marketing strategy decisions on the basis of consumer involvement level.
CO2	Predict how consumer process information, create perception, perceive different stimuli and get motivated for decision making.
CO3	Apply the consumer attitude theories to craft their marketing strategy in resonance to consumers' attitude and thus motivate them to make buying decision in favor of specific product.
CO4	Develop marketing strategy considering the effect of different factors like Psychographics and lifestyle, culture etc on consumer buying behaviour.
CO5	Identify key indicators of consumer engagement specifically in digital era.

Name of Subject: FMM2 Marketing Management- Advertising Management	
Student will be able to:	
CO1	Develop advertising within legal, ethical and social boundaries
CO2	Plan to communicate advertisements effectively by using appropriate model and evaluation concept
CO3	Create advertising budget for effective campaign considering all relevant factors that affects.
CO4	Propose appropriate media and advertising agency taking digitalization under consideration
CO5	Differentiate between advertising and sales promotion tools & techniques

Name of Subject: FSO1 HR Management-Industrial Relations And Labour Law	
Student will be able to	
CO1	Apply industrial relations law and labour legislation to manage industries and its labour.
CO2	Resolve issues related to trade union and manage its working in national interest.
CO3	Propose the appropriate resolution to identified industrial conflicts and disputes.
CO4	Develop employee safety and welfare plans to meet worker needs.
CO5	Recommend for Labour Welfare, Disputes settlement, Wages and Social Security


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Name of Subject: FSO2 HR Management- Management Training And Development	
Student will be able to:	
CO1	Discover benefits and challenges of employee training
CO2	Design training modules based on training need assessment
CO3	Evaluate the training program as per organisation need
CO4	Develop training modules to increase the effectiveness of a training programme by providing engaging content.
CO5	Evaluate the effectiveness of a training programme in achieving its objectives

Name of Subject: FSB1 Banking & Financial Services Management- Managemnet Of Banking And Insurance Institutions	
Student will be able to:	
CO1	Identify commercial banking operations, regulations and legal framework.
CO2	Minimize interest rate risk, credit risk, liquidity risk and operational risk faced by the banks to maximize liquidity and profitability.
CO3	Differentiate between working of various forms of banking in India
CO4	Apply knowledge of types of insurance & its regulations, to calculate risks, manage investments and advise clients effectively.
CO5	Apply relevant legal principles to factual situations involving insolvency.

Name of Subject: FSB2-Banking & Financial Services Management-Financial Planning And Wealth Management	
Student will be able to:	
CO1	Decide about the financial plan like budgeting, saving for retirement, paying off debt, or planning for a down payment on a home and future financial growth.
CO2	Use basic concept of risk management to utilize insurance as a risk management tool.
CO3	Evaluate different options for pension schemes and the pros and cons of each choice
CO4	Differentiate between types of investments to construct an optimal client portfolio by appropriate allocation of wealth amongst risky assets and the risk free security.
CO5	Apply the knowledge of Indian Tax system to balance the taxes, in financial planning

Name of Subject: FSR1 Retail Management-Retail Concepts And Practices	
Student will be able to	
CO1	Examine the significance of retailing with special reference to India
CO2	Identify challenges of Indian retail industry against global competitiveness to predict future perspectives of Indian retail industry.
CO3	Develop new retailing format or optimize existing formats to enhance retailers value proposition
CO4	Create efficient & adaptable organizational retail structures to drive retail store operation smoothly and manage human resource efficiently.
CO5	Apply strategies to optimize space allocation effectively by selecting the right store location, layout and design.


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Name of Subject: FSR2 Retail Management-Marketing Concepts In Retail Management	
Student will be able to:	
CO1	Examine consumer behavior in retail market for developing its segmentation, targeting and positioning strategy.
CO2	Create and evaluate Merchandise Management Process.
CO3	Manage supply chain effectively considering technology use in retailing.
CO4	Develop effective retail marketing and communication mix.
CO5	Build sustainable customer relationship management to enrich retail customer service experience.

Name of Subject: CP: 402 Business Legislation	
Student will be able to:	
CO1	Apply legal aspects of the laws affecting businesses related to Indian contract Act 1872
CO2	Apply basic legal knowledge to promotion and incorporation of companies and merger and acquisition in view of the multinational companies operating in India.
CO3	Apply provisions related to Intellectual Property Rights & laws related to Companies Act 2002
CO4	Apply provisions of pollution control 1955, Environment Protection act 1986 and the laws related to Information Technology Act 2000 to serve their specific purpose as and when required .
CO5	Resolve fundamental legal issues by using Industrial Disputes Act 1947, Consumer Protection act 1986, Consumers Disputes redressal Agencies and Right of Consumers which is pertaining to the business world to manage businesses effectively.

Name of Subject: CP-403 :Entrepreneurship Development & Management	
Student will be able to:	
CO1	Entrepreneurship - Analyze the Qualities and competencies of entrepreneur and also to improve the social and economic development
CO2	IDEA GENERATION - Develop understanding of converting an Idea to an opportunity
CO3	MANAGERIAL Aspects of Small Business- Analyze environmental set up relating to small industry and small business
CO4	Financing and managing the new venture- Understanding and apply the stages of the entrepreneurial process and the resources needed for the successful development of entrepreneurial ventures
CO5	Entrepreneurial Support System-Evaluate opportunities provided in the various sources business financing for starting a new venture and think of methods to create a bias free society

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Name of Subject: FSF-3 Financial Management "Management Of Financial Services"	
Student will be able to:	
CO1	Financial System and Markets -Analysis knowledge of recent knowledge about financial Services
CO2	Management of risk in Financial Services: - Ability to compare and contrast various banking Services and the regulatory environment in which the Merchant Bankers operates in India
CO3	Managing of issues Shares and bonds- Demonstrate the ability to apply Strategies related bond and share
CO4	Other financial services- Evaluate integrated knowledge of the functional areas of financial services & industry in the real world situation.
CO5	Banking and insurance- Apply the knowledge of current information, models, and techniques and practices in all of the major business disciplines

Name of Subject: FFM-4 Financial Management "Strategic Corporate Finance"	
Student will be able to:	
CO1	Corporate Strategies and its impact on corporate Finance: - Evaluate strategic alternatives available to corporations.
CO2	Financial strategy: -Apply and evaluate analytical tools used in making investment decisions.
CO3	Corporate tax:- To Analyse the basic principles underlying the provisions of direct and indirect tax laws and to develop a broad understanding of the tax laws and accepted tax practices
CO4	Financial Product:- analyse how financial markets and instruments operate and how they can be used to achieve economic objectives
CO5	Joint Venture:-To demonstrate innovative financial decisions in joint venture and how ethical principles are implemented in corporate acquisition programmes


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Name of Subject: FSM-3 Marketing Management "Sales And Distribution Management"	
Student will be able to:	
CO1	Students will develop knowledge, understanding and skills in Sales force management as well as to learn the modes of sales presentation, recruiting and selecting sales personnel and also sales meeting
CO2	Apply or demonstrate the approaches, strategies and applications related to sales & distribution management
CO3	Analyze the various situations, market conditions, and strategies related to quotas, marketing intermediaries, channel dynamics in sales & distribution management
CO4	Apply the sales & distribution management decisions and strategies on logistics, Inventory management and supply chain management of different businesses.
CO5	Analyze the challenges and opportunities before the marketing of services and to develop the suitable marketing mix or plans.

Name of Subject: FSM-4 Marketing Management "Service Marketing"	
Student will be able to:	
CO1	Emergence of service Economy -To understand the difference between goods and services, service products, and key elements of service marketing mix
CO2	Consumer behaviour in services- Evaluate and apply the approaches, strategies and applications related to services marketing
CO3	Distribution and promotion strategies of services - Apply or demonstrate the approaches, strategies and applications related to promotion of services marketing
CO4	Role of service employees- Analyse the various situations, market conditions, and strategies related to services marketing.
CO5	Customer Satisfaction- To understand and Analyse the gap of service quality, the reason for gap, and the strategies for closing gap

Name of Subject: FSO3: Human Resource Management "Human Resource Planning & Development"	
Student will be able to:	
CO1	To Analyze the purpose, process, methods and applications of Macro level manpower planning and Human Resource Planning in the context of different organizational strategies
CO2	Apply the demonstrate the approaches, strategies and applications related to Workforce flow mapping and manpower demand and supply forecasting
CO3	To Analyze the concept of job analysis and various issues that need to be taken care of during job analysis which include job description job specification etc.
CO4	To Apply the application of different concepts of human resource management like HRD climate, QWL and management of change in various situations.
CO5	Apply and relate key HRM practices, such as TQM, HRD in strategic organization, human resources valuation and accounting in Human resources management.


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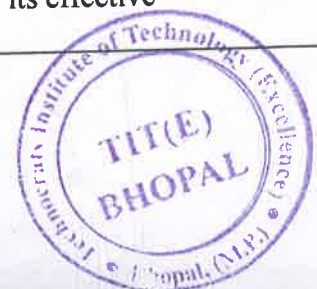


Name of Subject: FSO-4 Human Resource Management "Compensation Management"	
Student will be able to:	
CO1	Compensation philosophies and Approaches- Analyse the nuances of the crucial issues in compensation management.
CO2	Compensation classification-.To study and evaluating various techniques of employee retentions through pay grade and salary matrix
CO3	Wages Structure and salary structure- apply the various salary and wages structure
CO4	sales Compensation Plan-. Apply and relate the theoretical knowledge of compensation subject to the practical aspects.
CO5	Wage Board- understand and Apply the theoretical knowledge of recruitment selection, and compensation subject to the practical aspects

Name Of Subject: FSR-3 Retail Management "Management Of Retail Operations"	
Student will be able to:	
CO1	To analyse various Retail operations and strategies evaluate them.
CO2	To analyse the market research for retail management, Trading area analysis, Research before and after setting up a retail store.
CO3	To apply the retail management terminology including Mall management, Retail store operations and Management of retail brand.
CO4	To Apply the application of different concepts of retail management information system, Application of I.T. to retail management strategies and trends in retailing
CO5	To analyse the evolution of Financial aspects of retail, Retail audit and measures of performance evaluation in retail management.

Name of Subject: FSR-4 Retail Management "Retail Merchandising And Supply Chain Management"	
Student will be able to:	
CO1	Create appropriate merchandise mix and design effective visual merchandising by proper space management.
CO2	Estimate budget, plan and forecast for merchandise requirement on the basis of stock management.
CO3	Evaluate use of IT in retail distribution and replenishment and Compare different replenishment methods.
CO4	Distinguish between strategies applied in retail and manufacturing supply chain management.
CO5	Discuss category specific supply chain issues and apply IT for its effective management.


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Name of Subject: FSB-4 Banking & Financial Service Management "Financial Risk Management"	
Student will be able to:	
CO1	Create appropriate merchandise mix and design effective visual merchandising by proper space management.
CO2	Estimate budget, plan and forecast for merchandise requirement on the basis of stock management.
CO3	Evaluate use of IT in retail distribution and replenishment and Compare different replenishment methods.
CO4	Distinguish between strategies applied in retail and manufacturing supply chain management.
CO5	Discuss category specific supply chain issues and apply IT for its effective management.

Name of Subject: FSB-3 Banking & Financial Service Management "Financial Institutions And Markets"	
Student will be able to:	
CO1	Analyse the working of Indian Financial system and financial market
CO2	Evaluate different financial markets for making informed decisions about one own's as well as business financial investments.
CO3	Estimate how term structure, determinants, and theories impact interest rates which are crucial for financial decisions
CO4	Assess risk in financial institutions and minimize it with different risk management tools like Balance sheet, derivative securities, loan sales and securitization to anticipate potential threats, make informed decisions, and protect institutional well-being.
CO5	Compare financial market functioning at global level on basis of its mechanics and global investments instruments like Eurobonds, Euro notes, Euro equities.


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Branch: Department of MCA	
Name of Subject: Programming in C With Data Structures	
Subject Code: MCA-101	
Student will be able to:	
CO1	Enhance skills on problem solving and C Programming basics.
CO2	Assess suitability of programming concepts in C like Arrays, functions, Dynamic memory allocation, file handling for solving specific problems.
CO3	Illustrate the underlying principles, theories and applications of data structures.
CO4	Evaluate the efficiency and performance of different linked list structures, such as singly linked list circular linked list, doubly linked lists in terms of specific operations.
CO5	Illustrate primitive operations on different types of trees and their applications.

Name of Subject: Statistical Mathematics	
Subject Code: MCA-102	
Student will be able to:	
CO1	To know the application of matrix and implementation in the computer.
CO2	Assess suitability of functions of single and multiple variables through the theoretical and numerical concepts of limit continuity and differentiation and theorems.
CO3	To understand about sampling and distribution Calculate different types of test related to distribution.
CO4	Evaluate the probability and probability distribution also estimate probability density function (PDF), probability mass function (PMF) and their properties.
CO5	To derive basic proof techniques and study about graphs and logics.

Name of Subject: Operating system and Architecture	
Subject Code: MCA - 103	
Student will be able to:	
CO1	Identify the skills of Computer Architecture including Registers and Micro operation.
CO2	Assess suitability of Operating system, Types of OS, OS Concept and Structure and Scheduling Algorithms.
CO3	Identify the problems of memory management in the system and configure as per the application needs.
CO4	Explain non-contiguous memory allocation methods using page replacement algorithms.
CO5	Elaborate various issues related to concurrent processing, Inter process communication and Deadlocks.


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Name of Subject: Information Technology	
Subject Code: MCA – 104	
Student will be able to:	
CO1	Analyze the physical layer, network layer and Application layer protocols for developing IOT application.
CO2	Classify the Geographic information System and its components, methods, working and application.
CO3	Utilization of the Information Security including malicious programming, cryptography under identification and authentication.
CO4	Identify the branches of Artificial Intelligence on the various aspects and its need.
CO5	Explain the performance of distributed computing, cluster computing and grid computing.

Name of Subject: Communication Skills	
Subject Code: MCA – 105	
Student will be able to:	
CO1	Apply effective listening skills and public speaking in their professional career and interpersonal context.
CO2	Utilize reading and writing skills in their personal and occupational growth.
CO3	Implement verbal and non-verbal communication to build impactful relationship with others.
CO4	Solve their day to day problems by applying time and stress management along with leadership skills.
CO5	Apply interview skills to crack the rounds of their company recruitment.

Name of Subject: C and DS LAB	
Subject Code: MCA – 106	
Student will be able to:	
CO1	Able to apply control structure looping functions to solve logical problems.
CO2	Utilize pointer and array to solve memory allocation related problems.
CO3	Design and store data permanently in file system.
CO4	Apply stacks, queue to evaluate mathematical equation.
CO5	Apply suitable searching and sorting various types of data efficiently


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Name of Subject: OS LAB	
Subject Code: MCA – 107	
Student will be able to:	
CO1	Design a program simulate the concept of Dining-philosopher problem.
CO2	Develop programs to implement various scheduling algorithms.
CO3	Develop programs to implement various resource allocation techniques.
CO4	Design a program for Page Replacement Algorithms such as FIFO and LRU.
CO5	Compare different CPU algorithm in different situations.

Name of Subject: DBMS	
Subject Code: MCA – 201	
Student will be able to:	
CO1	Analyze DBMS concept such as database security, Integrity and Concurrency.
CO2	Apply various integrity constraints Primary Keys, Alternate keys, Candidate Keys and Foreign Keys and Check constraints in database to built various types of database application.
CO3	Design a database and solving problems using normalization. of the database using normalization concept and SQL.
CO4	Solve the SQL Queries and apply DDL and DML to manage a Database and analyze various real time problems through SQL.
CO5	Design the application on the basis of given rules and architecture of the database.

Name of Subject: Computer Network	
Subject Code: MCA – 202	
Student will be able to:	
CO1	Describe the hardware and software components of a network and its interrelations, functioning of layers and protocols of OSI reference model.
CO2	Identify the Concept of Protocols and understand the various types of protocols including FDDI Protocol and DQDB Protocols.
CO3	Understand and apply the various components of networks such as Repeaters, Hubs, Bridges, Switches, Routers and Gateways to solve network problems.
CO4	Solve the problems of single destination and single source with single pair of the shortest path using Dijkstra and Bellman-Ford Algorithm.
CO5	Design a network in which a printer shares among number of computers.


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Name of Subject: Software Engineering and UML	
Subject Code: MCA – 203	
Student will be able to:	
CO1	Explain software Engineering and various types of models such as Waterfall Model, Spiral Model and Prototype Model and apply to solve in suitable projects .
CO2	Identify the Software Architecture, Cohesion, Coupling, Abstraction and Modularity.
CO3	Build the Various Diagrams such as Use Case Diagram, Class Diagram, State Diagram, Sequence Diagram, Activity Diagram and Deployment Diagram to explain the entities and flow function in the project.
CO4	Examine the challenges of software maintenance, types of maintenance and maintenance report.
CO5	Design the software by implementing the basic design, principles and methodologies.

Name of Subject: Algorithm Design	
Subject Code: MCA – 204	
Student will be able to:	
CO1	Explain the backtracking and branch & bound methods.
CO2	Apply the greedy paradigm to solve the mathematical and scientific problems.
CO3	Evaluate the use of stack, queue and linked list data structures.
CO4	Apply binary search trees, basic search and traversal techniques for tree and graphs.
CO5	Construct the N-Queens problem and also identify the four-queen and eight-queen problem.

Name of Subject: Object Oriented Programming with Java	
Subject Code: MCA – 205	
Student will be able to:	
CO1	Analyze the different aspects of a specific problem and design Java programs based on object oriented principles like classes, objects, constructors and inheritance.
CO2	Apply the knowledge of JAVA language syntax and semantics to write and execute Java programs.
CO3	Apply threads in java programming to achieve multitasking.
CO4	Explain the use of Java in a variety of technologies and on different platforms.
CO5	Apply java concept for web application using Servlet and JSP.

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Name of Subject: JAVA and OOPS LAB	
Subject Code: MCA – 206	
Student will be able to:	
CO1	Create environment to develop Java application and configure IDE for Java.
CO2	Utilization programming environment, class, objects and OOPs features.
CO3	Develop Java programs using strings, exceptions, threads, files, applets and JDBC.
CO4	Design a web application to insert and retrieve the records to web application.
CO5	Utilization the concept of AWT and Swings to create a user interface.

Name of Subject: DBMS LAB	
Subject Code: MCA – 207	
Student will be able to:	
CO1	Understand, analyze and apply common SQL statements including DDL, DML and DCL statements to perform different operations.
CO2	Identify the user requirements from a typical business situation, and design database accordingly.
CO3	Design different views of tables for different users and to apply embedded and nested queries.
CO4	Design and implement a database for a given problem according to well-known design principles that balance data retrieval performance with data consistency.
CO5	Apply views and triggers in different situation to maintain critical transaction.

Name of Subject: Data Mining	
Subject Code: MCA – 301	
Student will be able to:	
CO1	Elaborate new data mining tools through Knowledge Discovery Data Mining (KDD).
CO2	Develop a database to identify frequent item sets in a dataset & generate an association-based rule based on the itemsets using Apriori Algorithm.
CO3	Define different methodologies used in data mining and data warehousing and apply this knowledge for data analysis.
CO4	Develop the skill in data mining using clustering and association rule mining.
CO5	Illustrate the algorithm of the various data mining, investigate it with given problem and identify better technique increasing reliability.

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Name of Subject: Artificial Intelligence	
Subject Code: MCA – 302	
Student will be able to:	
CO1	Apply the fundamental concepts of Artificial Intelligence such as knowledge representation, problem-solving and expert systems.
CO2	Design a weather Forecasting application using Bayes Theorem.
CO3	Determine heuristic search techniques, Hill climbing, branch and bound techniques, best first search, A* & AO* algorithms.
CO4	Create a AI system using LISP Programming.
CO5	Analyze different learning methods used in artificial intelligence.

Name of Subject: Elective I (Python)	
Subject Code: MCA – 303(1)	
Student will be able to:	
CO1	Implement various control structures and primitive and non primitive data types.
CO2	Identify Python functions and application areas.
CO3	Create and handle files in Python and learn Object Oriented Programming Concepts.
CO4	Design user defined functions, modules, packages and exception handling Methods.
CO5	Design program to perform various matrix operations on numbers.

Name of Subject: Elective I (Web Technology)	
Subject Code: MCA – 303(2)	
Student will be able to:	
CO1	Analyze and apply the role of languages like HTML, CSS, XML and JavaScript.
CO2	Develop the modern web pages using the HTML and CSS features with different layouts as per need of applications.
CO3	Create responsive and attractive webpages using HTML, CSS and JS.
CO4	Apply DOM structure model using JQuery for web programming.
CO5	Develop an interactive website using JQuery or AJAX.


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Name of Subject: Elective I (Introduction to Data Science and Big Data)	
Subject Code: MCA – 303(3)	
Student will be able to:	
CO1	Analyze the concept and challenges of Big data
CO2	Analyze the variety of the data store in Big data .
CO3	Apply knowledge of statistics, science and programming skills, to solve of complex analytical problems related to big data.
CO4	Apply basic data wrangling operations and different data mining algorithms using the tool R.
CO5	Create file management in Hadoop.

Name of Subject: Elective II (Machine Learning)	
Subject Code: MCA – 304(1)	
Student will be able to:	
CO1	Identify the various methods of Machine Learning.
CO2	Develop a Computer vision task like image recognition and classification using CNN() algorithm.
CO3	Build an Artificial Neural Network by implementing the Back propagation algorithm
CO4	Develop program to implement the naïve Bayesian classifier for sample training data set stored.
CO5	Analyze machine learning problem and identify the requirements for its solution.

Name of Subject: Elective II(Soft Computing)	
Subject Code: MCA – 304(2)	
Student will be able to:	
CO1	Identify the components of soft Computing including AI system, Neural networks and Genetic algorithms.
CO2	Identify and apply the Back propagation networks.
CO3	Identify the use of Fuzzy Logic in Numerous Applications such as Business Decision – Making .
CO4	Identify that how to utilize ANN architecture in their project.
CO5	Assess the attempts to connect the psychological and neurological underpinnings of learning's using Hebbian Learning.

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Name of Subject: Elective II (Internet of Things)	
Subject Code: MCA – 304(3)	
Student will be able to:	
CO1	Explain the fundamentals, challenges, and performance techniques of wireless networks.
CO2	Apply the IOT Cloud Based Services in their projects.
CO3	Design an IOT system using Arduino and Raspberry Pi.
CO4	Apply the Sensor Technology in their applications.
CO5	Choose IOT Development Platform for processing IOT data.

Name of Subject: Elective III (Computer Ethics)	
Subject Code: MCA – 305(1)	
Student will be able to:	
CO1	Compare in Morals, Ethics and Laws.
CO2	Identify the integration of ethical principles into technology development.
CO3	Explain ethical behavior for IT workers and IT users.
CO4	Apply for the CEA-IT (Certified Ethics Associate - Information Technology) course for certificates.
CO5	Explain and apply the knowledge of law, intellectual property and express his knowledge in public under the limitation of law.

Name of Subject: Elective III (Advanced Databases)	
Subject Code: MCA – 305(2)	
Student will be able to:	
CO1	Compare the Non – OOPS and OOPS DBMS system and discuss the various features added in the Object Oriented RDBMS.
CO2	Construct simple and moderately advanced database queries using Structured Query Language (SQL) and apply Triggers on database table.
CO3	Apply the concept of Transaction Management & Recovery techniques in RDBMS.
CO4	Design backend structure of a project using Oracle .
CO5	Explain distributed database system and discuss the fragmentation of data in distributed database.


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Name of Subject: Distributed System	
Subject Code: MCA – 305(3)	
Student will be able to:	
CO1	Analyze the concept of Distributed System.
CO2	Identify the Election Algorithms such as Bully and Ring algorithms to get a coordinator that performs function needed by other processes.
CO3	Design a model using Common Object Request Broker Architecture (CORBA) .
CO4	Identify the challenges of Backward Recovery and Forward Recovery.
CO5	Apply KERBEROS for user authentication in their projects.

Name of Subject: Minor Project	
Subject Code: MCA – 306	
Student will be able to:	
CO1	Finding the facts to design the computer based system.
CO2	Design logical database and apply all the logics to develop user interface and store data.
CO3	Utilization of hardware and software requirements in the project .
CO4	Implement and Apply the coding in any language suitable for the project.
CO5	Design test cases to check the project is working properly or not.

Name of Subject: Elective – I Lab (Python)	
MCA – 307(1)	
Subject Code:	
Student will be able to:	
CO1	Create a program using list, dictionaries and tuples.
CO2	Create environment to compile, run and debug Python program.
CO3	Apply Python function and modules to solve real world problems.
CO4	Apply OOPS concept in programming such as class, object, polymorphism and inheritance.
CO5	Create Python program to store and retrieve data in data files.


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Name of Subject: Elective – I Lab (Web Technology)	
Subject Code: MCA – 307(2)	
Student will be able to:	
CO1	Identify the services of Internet and the type of application runs in the internet.
CO2	Design web pages using HTML and CSS.
CO3	Apply dynamic functionalities and validations using Java Script.
CO4	Apply the efficiency of webpage and make it interactive using Ajax and Java Script.
CO5	Apply data communication in web using XML.

Name of Subject: Elective – I (Lab)	
Subject Code: MCA – 307(3)	
Student will be able to:	
CO1	Analyze the Big Data framework like Hadoop and NOSQL to efficiently store and process Big Data to generate analytics.
CO2	Design of Algorithms to solve Data Intensive Problems using Map Reduce Paradigm.
CO3	Design and Implementation of Big Data Analytics using pig and spark to solve data intensive problems and to generate analytics.
CO4	Implement Big Data Activities using Hive.
CO5	Applying data modelling techniques to large data sets.

Name of Subject: Advanced Python	
Subject Code: MCA – 401(1)	
Student will be able to:	
CO1	Apply IDE for rapid development of Python program.
CO2	Apply OOPS concept such as class, object, constructor polymorphism and Inheritance to develop Python program.
CO3	Create data file to store data permanently and analyze it from different sources.
CO4	Utilize python program to communicate data to and from the database.
CO5	Analyze various problems and represent graphically using python.

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Name of Subject: Advanced Web Technology	
Subject Code: MCA – 401(2)	
Student will be able to:	
CO1	Identify the concept of HTML, XML, Java Script, AJAX and PHP.
CO2	Build web applications using PHP, XML documents and XML Schema, and consume web services.
CO3	Apply DOM structure model using jquery for web programming
CO4	Examine the XML HTTP Request Object in different Browsers.
CO5	Design a Live Form Validation using Ajax and PHP.

Name of Subject: Big Data with Analytics	
Subject Code: MCA – 401(3)	
Student will be able to:	
CO1	Analyze the process of Data Science and structure of Big Data.
CO2	Analyze the concept and challenges of Big data
CO3	Apply knowledge of statistics, science and programming skills, to solve complex analytical problems related to big data and business analytics.
CO4	Apply basic data wrangling operations and different data mining algorithms using the tool R.
CO5	Compare Hadoop and various tools in its Framework

Name of Subject: Deep Learning	
Subject Code: MCA – 402(1)	
Student will be able to:	
CO1	Apply mathematical model to understand architecture of neural network.
CO2	Apply CNN (Convolutional Neural Network) to process images.
CO3	Improve the learning process of structured and unstructured problem.
CO4	Utilize Perceptron Learning Algorithm for binary classification.
CO5	Apply Reinforcement model to analyze the behavior of the system and make policy to improve learning process.


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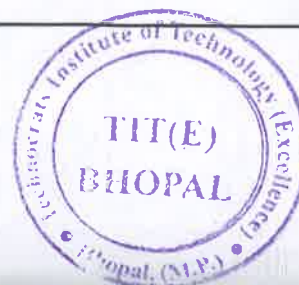


Name of Subject: Cloud Computing	
Subject Code: MCA – 402(2)	
Student will be able to:	
CO1	Explain the core concepts of the cloud computing paradigm.
CO2	Analyze the challenges of Cloud Computing such as Data Security, Cost Management, Multi- Cloud Environments, Performance Challenges etc.
CO3	Identify the Cloud Services and utilize the benefits of SaaS, PaaS, IaaS and DaaS
CO4	Analyze various cloud programming models and apply them to solve problems on the cloud.
CO5	Apply the service providers such as Google App Engine, Amazon EC2, Microsoft Azure etc.

Name of Subject: Digital Marketing	
Subject Code: MCA – 402(3)	
Student will be able to:	
CO1	Identify the concept of Digital Marketing and what is the use of Digital Marketing for Students, Professional and business.
CO2	Apply the website's technical configuration using Search Engine Optimization process.
CO3	Apply the control on optimization parts of the website by using On-Page Search Engine Optimization (SEO).
CO4	Analyze the Search Engine Marketing (SEM) to increase the visibility of a website in search engine result pages.
CO5	Identify the Linking Strategies in their websites.

Name of Subject: Information Security	
Subject Code: MCA – 403(1)	
Student will be able to:	
CO1	Explain the Information Security and need for Security of data saved Virtually.
CO2	Identify the network active and passive attacks and threats.
CO3	Compare the symmetric and asymmetric cryptographic algorithms based on key and block size, number of rounds and keys.
CO4	Identify the concept of SDLC (Software Development Life Cycle) to minimize Project risks through forward planning.
CO5	Utilization of Integrity Policies and Hybrid Policies.


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Name of Subject –Block Chain and Cryptocurrency	
Subject Code – MCA – 403(2)	
Student will be able to:	
CO1	Explain the basic concepts and technology used for blockchain.
CO2	Apply security features in blockchain technologies.
CO3	Illustrate the concepts of Bitcoin and their usage.
CO4	Implement Ethereum block chain contract.
CO5	Learn security measures, and various types of services that allow people to trade and transact with Bitcoins.

Name of Subject –Mobile Computing	
Subject Code – MCA – 403(3)	
Student will be able to:	
CO1	Analyze various protocols of all layers for mobile communication .
CO2	Analyze next generation Mobile Communication System.
CO3	Determine the functionality of MAC, Network layer and Identifying a routing protocol for given Ad-hoc Networks
CO4	Identify the concept of Ad-hoc Network and understand that how Ad-hoc dynamically self-organize in a wireless network without using any pre-established infrastructure.
CO5	Utilize the (Global System for Mobile communication) GSM and understand the Telecommunication systems.

Name of Subject –Major Project	
Subject Code – MCA – 404	
Student will be able to:	
CO1	To provide the hands on experience in analyzing, designing and implementing various projects based on Software Development Lifecycle (SDLC).
CO2	Design Front-end interface using latest IDEs of particular technology.
CO3	Create reports in text and analyze it graphically.
CO4	Students can apply complex business logic separately to design project.
CO5	Identify the challenges to implement the application

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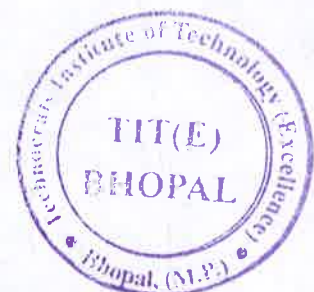


Name of Subject –Lab of Elective –IV, V, VI (Block Chain and Cryptocurrency)	
Subject Code – MCA – 405	
Student will be able to:	
CO1	Understanding Block chain Fundamentals and creating basic blocks.
CO2	Evaluate and Analyze Block chain Systems.
CO3	Develop Block chain Applications in a structured manner.
CO4	Implement smart contracts in Ethereum using different development frameworks.
CO5	Interpret the knowledge of the Bit coin network, nodes, keys, wallets and transactions.

Name of Subject –Lab of Elective IV,V,VI(Advanced Python)	
Subject Code – MCA – 405(1)	
Student will be able to:	
CO1	Utilize advanced data types such as list, tuple, sets and dictionary to frame complex logic.
CO2	Create and handle files in Python and learn Object Oriented Programming Concepts.
CO3	Formulate database application using python.
CO4	Debug a software application written in the python programming language
CO5	Develop a website using python functionalities and libraries

Name of Subject –Lab of Elective –IV, V, VI (Cloud Computing Lab)	
Subject Code – MCA – 405	
Student will be able to:	
CO1	Create virtual machines of different configuration and install various OS such as windows Linux or Mac.
CO2	Configure various virtualization tools such as Virtual Box, VMware workstation.
CO3	Analyze the security of Virtual Machine (VM).
CO4	Analyze the load balancing of the Cloud using various algorithm.
CO5	Analyze various cloud programming models and apply them to solve problems on the cloud.

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Name of Subject –Lab of Elective – IV, V, VI (Deep Learning Lab)	
Subject Code – MCA – 405	
Student will be able to:	
CO1	Determine the key features in a neural network's architecture.
CO2	Analyze the given dataset for designing a neural network based solution.
CO3	Build, train and apply fully connected deep neural networks.
CO4	Identify and implement efficient Convolution Neural Network (CNN) Or Recurrent Neural Network (RNN).
CO5	Design and implementation of deep learning models for signal/image processing applications.

Name of Subject –Lab of Electives IV, V, VI (Digital Marketing)	
Subject Code – MCA – 405	
Student will be able to:	
CO1	Analyze the aspects online marketing and its method.
CO2	Analyze the way to reach to public using digital marketing tools.
CO3	Identify the new technologies to optimize the search engine for online marketing.
CO4	Utilize Social Media marketing like Facebook, Instagram and Youtube.
CO5	Analyze the cost of online marketing and can provide optimum solution.

Name of Subject –Lab of Electives IV, V, VI (Information Security)	
Subject Code – MCA – 405-V	
Student will be able to:	
CO1	Identify basic security attacks and services.
CO2	Utilize symmetric and asymmetric key algorithms for cryptography.
CO3	Make use of Authentication functions.
CO4	Demonstrate the skills learned in the information security into the real life scenarios.
CO5	Assess and critically evaluate techniques for network security

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Name of Subject – Lab of Elective IV, V, VI (Mobile Computing)	
Subject Code – MCA – 405-VI	
Student will be able to:	
CO1	Identify basic security attacks and services.
CO2	Utilize symmetric and asymmetric key algorithms for cryptography.
CO3	Make use of Authentication functions.
CO4	Demonstrate the skills learned in the information security into the real life scenarios.
CO5	Assess and critically evaluate techniques for network security

Name of Subject – Lab of Elective IV, V, VI (Mobile Computing)	
Subject Code – MCA – 405-VI	
Student will be able to:	
CO1	Explain mobile technologies in terms of hardware, software, and communications.
CO2	Evaluate the effectiveness of different mobile computing frameworks.
CO3	Utilize mobile computing nomenclature to describe and analyze existing mobile computing frameworks and architectures
CO4	Describe how mobile technology functions to enable other computing technologies.
CO5	Make use of mobile operating systems in developing mobile applications.


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