# SARANATHAN COLLEGE OF ENGINEERING

**(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai-25)**

**Venkateswara Nagar, Panjappur, Tiruchirappalli - 620 012, Tamil Nadu.**

## INDEX

**CRITERION: 2.6.1**

***Programme and course outcomes for all Programmes offered by the institution are stated and displayed on website and communicated to teachers and students.***

**2023 - 2024**

Link for additional Information

http://172.16.1.19/Sarastaff/nba_entire_dept_outcomes_print.jsp

# SARANATHAN COLLEGE OF ENGINEERING

**(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)**

## COURSE OUTCOMES (2023-2024)

## PROGRAMME: BE.TECH AI&DS

## COURSE OUTCOME FOR THE ACADEMIC YEAR: 2023-2024

| **Title:PROFESSIONAL ENGLISH - 1,Subject Code:HS3152 NBA Code for the Subject :C101 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C101.1 | To improve the communicative competence of learners by throwing light on vocabulary and basic grammar |
| C101.2 | To help learners use language effectively in academic (grammar) /work contexts (reports) |
| C101.3 | To build on students¿ English language skills by engaging them in listening, speaking and grammar learning activities those are relevant to authentic contexts. |
| C101.4 | To develop learners¿ ability to read and write complex texts, summaries, articles, blogs, Definitions, essays and user manuals. |
| C101.5 | To use language efficiently in expressing their opinions via various media and graphical representation. |
| C101.6 | Participate effectively in informal conversations; introduce themselves and their friends and express opinion in English with different types of sentences |

| **Title:MATRICES AND CALCULUS,Subject Code:MA3151 NBA Code for the Subject :C102 ,Semester : 1 [23-24ODD]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C102.1 | Eigenvalues and eigenvectors, diagonalization of a matrix,symmetric matrices, Positive definite matrices and similar matrices. |
| C102.2 | Understand the limit, continuity and derivative of the functions. Solve various functions and its maxima /minima using differentiation rules. |
| C102.3 | Apply the total and partial derivatives in Taylor series expansion of functions and the extremum of functions. |
| C102.4 | Evaluate the integrals both by using Riemann sums and by using the Fundamental theorem of Calculus. Evaluate integrals using various techniques of integration. |
| C102.5 | Understand the concepts of double integration and determine the area using integration. Also understands the concepts of the change of order of integration and Change of variables in integrals. |
| C102.6 | Understand the concepts of Triple integration and determine the volume using integration. |

| **Title:ENGINEERING PHYSICS,Subject Code:PH3151 NBA Code for the Subject :C103 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C103.1 | Understand the importance of mechanics |
| C103.2 | Express their knowledge in electromagnetic waves |
| C103.3 | Demonstrate a strong foundational knowledge in oscillations. |
| C103.4 | Demonstrate a strong foundational knowledge in optics and lasers |
| C103.5 | Understand the importance of quantum physics. |
| C103.6 | Comprehend and apply quantum mechanical principles towards the formation of energy bands |

| **Title:ENGINEERING CHEMISTRY,Subject Code:CY3151 NBA Code for the Subject :C104 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C104.1 | to infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water |
| C104.2 | to identify and apply basic concepts of nanoscience and technology in designing the syntheses of nanomaterials for engg and tech applications |
| C104.3 | to apply the knowledge of phase rule and composites for materials selection requirements |

| | |
|---|---|
| C104.4 | to recommend suitable fuels for engg processes and applications |
| C104.5 | to analyze the combustion process and its calculations |
| C104.6 | to recognize different forms of energy sources and apply them for suitable applications |

**Title:PROBLEM SOLVING AND PYTHON PROGRAMMING,Subject Code:GE3151 NBA Code for the Subject :C105 ,Semester : 1 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C105.1 | To understand the basics of algorithmic problem solving |
| C105.2 | To learn to solve problems using Python conditionals and loops. |
| C105.3 | To define Python functions and use function calls to solve problems. |
| C105.4 | To use Python data structures - lists, tuples, dictionaries to represent complex data. |
| C105.5 | To learn about usage of python packages and modules |
| C105.6 | To do input/output with files in Python |

**Title:PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY,Subject Code:GE3171 NBA Code for the Subject :C106 ,Semester : 1 [23-24ODD]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C106.1 | To understand the problem solving approaches. |
| C106.2 | To learn the basic programming constructs in Python |
| C106.3 | To learn the programming constructs in Python like loop, function, recursion. |
| C106.4 | To practice various computing strategies for Python-based solutions to real world problems. |
| C106.5 | To use Python data structures-lists, tuples, dictionaries. |
| C106.6 | To do input/output with files in Python. |

**Title:PHYSICS AND CHEMISTRY LABORATORY,Subject Code:BS3171 NBA Code for the Subject :C107 ,Semester : 1 [23-24ODD]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C107.1 | gain knowledge about elasticity, modulus, oscillations and also able to calculate Young's,rigidity modulus, moment of inertia of regular and irregular bodies. |
| C107.2 | Gain knowledge about elasticity, modulus, oscillations and also able to calculate Young's,rigidity modulus, moment of inertia of regular and irregular bodies. |
| C107.3 | calculate the variation of resistance with respect to temperature and also able to calculate the band gap of semiconductor |
| C107.4 | Analyse various water quality parameters-Hardness, alkalinity and DO in water sample. |
| C107.5 | Acquire practical skills by using instruments like conductivity meter, pH meter and potentiometer. |
| C107.6 | Finding the strength and amount of nickel in steel. |

**Title:PROFESSIONAL ENGLISH-II,Subject Code:HS3252 NBA Code for the Subject :C108 ,Semester : 2 [23-24EVEN]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C108.1 | To compare and contrast products and ideas through technical texts in essays with appropriate grammatical usage and contextual meanings. |
| C108.2 | To enhance learners¿ awareness of general rules of writing for specific audiences through professional emails and responses to complaints. |
| C108.3 | To help learners understand the purpose, audience, contexts of different types of letters/essays/checklists |
| C108.4 | To analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format. To report events and the processes of technical and industrial nature |
| C108.5 | To make use of grammatical items effectively in writing recommendations and in transcoding the graphs |

| | |
|---|---|
| C108.6 | To write a winning job/internship application-cover letter and resume /SoP-Statement of purpose |

| **Title:STATISTICS AND NUMERICAL METHODS,Subject Code:MA3251 NBA Code for the Subject :C109 ,Semester : 2 [23-24EVEN]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C109.1 | Apply the concept of testing of hypothesis for small and large samples in real life problems. |
| C109.2 | Apply the basic concepts of classifications of design of experiments in the field of agriculture. |
| C109.3 | Solve algebraic, transcendental equations and simultaneous equations by direct method. |
| C109.4 | Solve simultaneous equations by iterative method and Eigen value problems. |
| C109.5 | Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems. |
| C109.6 | Gain the knowledge of various techniques and methods to solve first order ordinary differential equations with initial conditions in engineering applications. |

| **Title:PHYSICS FOR INFORMATION SCIENCE,Subject Code:PH3256 NBA Code for the Subject :C110 ,Semester : 2 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C110.1 | To make the students understand the importance in studying electrical properties of materials |
| C110.2 | To enable the students to gain knowledge in semiconductor physics |
| C110.3 | To instil the knowledge of magnetic properties of materials |
| C110.4 | To establish a sound grasp of knowledge on different optical properties of materials , optical displays and |
| C110.5 | To inculcate an idea of significance of nano structures , quantum confinement ensuing nano device applications |
| C110.6 | To inculcate an idea of significance of Quantum computing |

| **Title:BASIC ELECTRICAL AND ELECTRONICS ENGINEERING,Subject Code:BE3251 NBA Code for the Subject :C111 ,Semester : 2 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C111.1 | Compute the DC electric circuit parameters for simple problems |
| C111.2 | Compute the AC parameters for simple problems |
| C111.3 | Explain the working principle and applications of electrical machines |
| C111.4 | Analyze the characteristics of analog electronic devices |
| C111.5 | Explain the basic concepts of digital electronics |
| C111.6 | Explain the operating principles of measuring instruments |

| **Title:ENGINEERING GRAPHICS,Subject Code:GE3251 NBA Code for the Subject :C112 ,Semester : 2 [23-24EVEN]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C112.1 | Drawing engineering curves |
| C112.2 | Drawing a freehand sketch of simple objects. |
| C112.3 | Drawing orthographic projection of solids and section of solids |
| C112.4 | Drawing development of solids |
| C112.5 | Drawing isometric and perspective projections of simple solids. |
| C112.6 | Drawing isometric and perspective projections of simple solids. |

| **Title:DATA STRUCTURE DESIGN,Subject Code:AD3251 NBA Code for the Subject :C116 ,Semester : 2 [23-24EVEN]Target :65 Credits:3** |
|---|
| At the end of this course, Student will be able to |

| CO-Code | Course outcome Description |
|---|---|
| C116.1 | Implement ADT, classes and object, recursive algorithms |
| C116.2 | Implement list ADT in array, Linked list implementation of list, stack, queue and their application |
| C116.3 | Implement sorting and searching algorithm |
| C116.4 | Implement various hash functions |
| C116.5 | Implement tree and its traversals, binary search tree and heaps |
| C116.6 | Implement graph and its traversals, shortest path algorithms and minimum spanning tree |

**Title:DATA STRUCTURE DESIGN LAB,Subject Code:AD3271 NBA Code for the Subject :C119 ,Semester : 2 [23-24EVEN]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C119.1 | Implement ADT, Classes and Objects, Recursive algorithms |
| C119.2 | Implement List ADT in Arrays, Linked list implementations of Lists, Stack, Queue and their applications |
| C119.3 | Implement Sorting and Searching algorithms |
| C119.4 | Implement various Hashing functions |
| C119.5 | Implement Tree and its traversals, Binary Search trees and heaps |
| C119.6 | Implement Graph and its traversals, Shortest path algorithms and minimum spanning trees |

**Title:ENGINEERING PRACTICES LABORATORY,Subject Code:GE3271 NBA Code for the Subject :C114 ,Semester : 2 [23-24EVEN]Target :60 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C114.1 | Students will be able to distinguish residential house wiring, fluorescent lamp wiring and stair case wiring. |
| C114.2 | Students will be able to define electrical quantities like voltage, current, energy and resistance and their measurement using CRO. |
| C114.3 | Students will be able to analyze different logic gates, clock, rectifier and to solder devices and components. |
| C114.4 | Students will able to understand the pipe connections for the home application and industrial constructions |
| C114.5 | Students will able to understand the pipe connections for the home application and industrial constructions |
| C114.6 | Students will be able to understand the concept of joining the metal by welding. |

**Title:DISCRETE MATHEMATICS,Subject Code:MA3354 NBA Code for the Subject :C201 ,Semester : 3 [23-24ODD]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C201.1 | Have knowledge of the concepts needed to test the logic of a program |
| C201.2 | Use proof techniques to check the truthfulness of a real life situations |
| C201.3 | Be aware of a class of functions which transforms a finite set into another finite set which relate to input and output functions in computer science and counting principles |
| C201.4 | Use graph theory to formulate the problem and solve it |
| C201.5 | Be exposed to concepts and properties of algebraic structure such as groups, rings and fields |
| C201.6 | Analyse the basic knowledge gained by Lattices , Boolean algebra and apply them |

**Title:DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION,Subject Code:CS3351 NBA Code for the Subject :C202 ,Semester : 3 [23-24ODD]Target :75 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C202.1 | Understand the basic concepts of number system,logic gates and boolean theorems |

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|---|---|
| C202.2 | Analyze and design the various combinational circuits using logic gates like adder,subtracted, comparator and conversion |
| C202.3 | Analyze and design the synchronous sequential circuits |
| C202.4 | Understand the fundamentals of computer systems and analyze the execution of an instruction |
| C202.5 | Analyze different types of control design and identify hazards |
| C202.6 | Understand the characteristics of various memory systems and I/O Communication |

**Title:DATABASE DESIGN AND MANAGEMENT,Subject Code:AD3391 NBA Code for the Subject :C203 ,Semester : 3 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C203.1 | understand the database development life cycle and apply conceptual modeling |
| C203.2 | Apply SQL and programming in SQL to create, manipulate and query the database |
| C203.3 | Apply the conceptual-to-relational mapping and normalization to design relational database |
| C203.4 | determine the serializability of any non-serial schedule using concurrency techniques |
| C203.5 | Apply the data model and querying in Object-relational Databases |
| C203.6 | Learn the basics of No-SQL databases. |

**Title:DESIGN AND ANALYSIS OF ALGORITHMS,Subject Code:AD3351 NBA Code for the Subject :C204 ,Semester : 3 [23-24ODD]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C204.1 | Analyze the efficiency of recursive and non-recursive algorithms mathematically |
| C204.2 | Analyze the efficiency of brute force algorithmic techniques |
| C204.3 | Analyze the efficiency of divide and conquer, decrease and conquer, Transform and conquer algorithmic techniques |
| C204.4 | Implement and analyze the problems using dynamic programming and greedy algorithmic techniques |
| C204.5 | Solve the problems using iterative improvement techniques for optimization |
| C204.6 | Compute the limitations of algorithmic power and solve the problems using backtracking and branch and bound techniques |

**Title:DATA EXPLORATION AND VISUALIZATION,Subject Code:AD3301 NBA Code for the Subject :C205 ,Semester : 3 [23-24ODD]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C205.1 | Understand the fundamentals of exploratory data analysis |
| C205.2 | Implement data visualization using Matplotlib |
| C205.3 | Perform univariate data exploration and analysis |
| C205.4 | Apply bivariate data exploration and analysis |
| C205.5 | Use data exploration techniques for Multivariate and time series data |
| C205.6 | Use visualization techniques for Multivariate and time series data |

**Title:ARTIFICIAL INTELLIGENCE,Subject Code:AL3391 NBA Code for the Subject :C206 ,Semester : 3 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C206.1 | Explain Intelligent Agent Frameworks |
| C206.2 | Apply Problem Solving Techniques |
| C206.3 | Apply Game Playing Techniques |
| C206.4 | Apply Constraint Satisfaction Problem Techniques |
| C206.5 | Perform Logical Reasoning |

| | |
|---|---|
| C206.6 | Perform probabilistic reasoning under uncertainty |
| **Title:DATABASE DESIGN AND MANAGEMENT LABORATORY,Subject Code:AD3381 NBA Code for the Subject :C207 ,Semester : 3 [23-24ODD]Target :65 Credits:1.5** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C207.1 | Understand the database development life cycle |
| C207.2 | Design relational database using conceptual-to-relational mapping, Normalization |
| C207.3 | Apply SQL for creation, manipulation and retrieval of data |
| C207.4 | Develop a database applications for real-time problems |
| C207.5 | Design and query object-relational databases |
| C207.6 | Learn the basics of No-SQL databases. |
| **Title:ARTIFICIAL INTELLIGENCE LABORATORY,Subject Code:AD3311 NBA Code for the Subject :C208 ,Semester : 3 [23-24ODD]Target :65 Credits:1.5** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C208.1 | Design and implement search strategies |
| C208.2 | Implement A* and memory bounded A* algorithms |
| C208.3 | Implement game playing techniques |
| C208.4 | Implement Constraint Satisfaction Problem techniques |
| C208.5 | Develop logical reasoning systems |
| C208.6 | Develop probabilistic reasoning systems |
| **Title:PROBABILITY AND STATISTICS,Subject Code:MA3391 NBA Code for the Subject :C210 ,Semester : 4 [23-24EVEN]Target :60 Credits:4** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C210.1 | Understand the fundamental concepts of probability and to apply them in real time problems. |
| C210.2 | Understand the basic concepts of one dimensional random variables and have knowledge of standard distributions which can describe real life phenomenon. |
| C210.3 | Understand the knowledge of two dimensional random variables and apply in engineering applications. |
| C210.4 | Understand the concept of point estimation and interval estimation. |
| C210.5 | To learn the different types of statistical test when the distributional assumptions of common procedures are not satisfied. |
| C210.6 | Acquire knowledge on the traditional statistical quality control methods and develop charting techniques. |
| **Title:OPERATING SYSTEMS,Subject Code:AL3452 NBA Code for the Subject :C211 ,Semester : 4 [23-24EVEN]Target :65 Credits:4** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C211.1 | Analyze various scheduling algorithm and process synchronization. |
| C211.2 | Explain Deadlock prevention and avoidance algorithms. |
| C211.3 | Compare and contrast various memory management schemes. |
| C211.4 | Explain the functionality of file systems I/O systems. |
| C211.5 | Explain the functionality of virtualization. |
| C211.6 | Compare iOS and Android operating system. |
| **Title:MACHINE LEARNING,Subject Code:AL3451 NBA Code for the Subject :C212 ,Semester : 4 [23-24EVEN]Target :65 Credits:3** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |

| | |
|---|---|
| C212.1 | Explain the basic concepts of machine learning |
| C212.2 | Construct supervised learning models |
| C212.3 | Learn the concepts in Bayesian analysis from probability models and methods |
| C212.4 | Construct unsupervised learning models |
| C212.5 | Analyze the concept of neural networks for learning linear and non-linear activation functions |
| C212.6 | Evaluate and compare different models |

**Title:FUNDAMENTALS OF DATA SCIENCE AND ANALYTICS,Subject Code:AD3491 NBA Code for the Subject :C213 ,Semester : 4 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C213.1 | To understand the techniques and processes of data science |
| C213.2 | To apply descriptive data analytics |
| C213.3 | To visualize data for various applications |
| C213.4 | To understand inferential data analytics |
| C213.5 | To analysis and build predictive models from data |
| C213.6 | To learn about time series analysis and survival analysis |

**Title:COMPUTER NETWORKS,Subject Code:CS3591 NBA Code for the Subject :C214 ,Semester : 4 [23-24EVEN]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C214.1 | Explain the basics layers and its functions in computer networks |
| C214.2 | Understand the basics of how data flows from one node to another |
| C214.3 | Analyse the Routing Algorithms |
| C214.4 | Describe the protocols for various function sin the networks |
| C214.5 | Analyse the working of various application layer protocols |
| C214.6 | Understanding the different Switching Mechanism |

**Title:ENVIRONMENTAL SCIENCES AND SUSTAINABILITY,Subject Code:GE3451 NBA Code for the Subject :C215 ,Semester : 4 [23-24EVEN]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C215.1 | Infer the importance of environment and explain the concept, types, structure and function of ecosystem. |
| C215.2 | Recall the various functions, values, levels, threats and conservation of biodiversity. |
| C215.3 | Explain the different types of pollution and propose the suitable methods to prevent the same to enhance the environment. |
| C215.4 | Discuss the conservation of different energy sources, optimal usage and the importance. |
| C215.5 | Discuss the aspect of sustainability and the means of sustainability management to realize the sustainable development goals. |
| C215.6 | Lists the various environment management systems, protection and discuss the green solutions for energy to materials for sustainability. |

**Title:DATA SCIENCE AND ANALYTICS LABORATORY,Subject Code:AD3411 NBA Code for the Subject :C217 ,Semester : 4 [23-24EVEN]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C217.1 | To develop the python program to handle data using numpy and pandas |
| C217.2 | To develop data analytics code in python |
| C217.3 | To to be able to use python libraries for handling data |
| C217.4 | To perform inferential data analytic in python |
| C217.5 | Build model of predictive analytics in python |

| | |
|---|---|
| C217.6 | To perform data visualization using plots |

| **Title:DATA SCIENCE AND ANALYTICS LABORATORY,Subject Code:AL3461 NBA Code for the Subject :C217 ,Semester : 4 [23-24EVEN]Target :65 Credits:** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C217.1 | Apply suitable algorithms for selecting the appropriate features for analysis. |
| C217.2 | Implement supervised machine learning algorithms on standard datasets and evaluate the performance. |
| C217.3 | Apply unsupervised machine learning algorithms on standard datasets and evaluate the performance |
| C217.4 | Build the graph based learning models for standard data sets |
| C217.5 | Find different approaches to improve the accuracy of the learning model |
| C217.6 | Assess and compare the performance of different ML algorithms and select the suitable one based on the application |

| **Title:DEEP LEARNING,Subject Code:AD3501 NBA Code for the Subject :C301 ,Semester : 5 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C301.1 | Explain the basics in deep neural networks |
| C301.2 | Apply Convolution Neural Network for image processing |
| C301.3 | Apply Recurrent Neural Network and its variants for text analysis |
| C301.4 | Understand different ways of to constructs, train and use recurrent neural networks |
| C301.5 | Apply model evaluation for various applications |
| C301.6 | Apply autoencoders and generative models for suitable applications |

| **Title:DATA AND INFORMATION SECURITY,Subject Code:CW3551 NBA Code for the Subject :C302 ,Semester : 5 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C302.1 | Understand the basics of data and information security. |
| C302.2 | Understand the legal, ethical and professional issues in information security. |
| C302.3 | Understand the various authentication schemes to simulate different applications. |
| C302.4 | Understand various security practices. |
| C302.5 | Understand the system security standards. |
| C302.6 | Understand the Web security protocols for E-Commerce applications. |

| **Title:DISTRIBUTED COMPUTING,Subject Code:CS3551 NBA Code for the Subject :C303 ,Semester : 5 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C303.1 | Explain the foundations of distributed system. |
| C303.2 | Solve synchronisation and state consistency problems. |
| C303.3 | Use resource sharing techniques in distributed systems. |
| C303.4 | Apply working model of consensus and reliability of distributed system. |
| C303.5 | Explain the fundamentals of cloud computing. |
| C303.6 | Compute cloud services and platforms. |

| **Title:BIG DATA ANALYTICS,Subject Code:CCS334 NBA Code for the Subject :C304 ,Semester : 5 [23-24ODD]Target :65 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C304.1 | Describe big data and use cases from selected business domains. |

| | |
|---|---|
| C304.2 | Explain NoSQL big data management. |
| C304.3 | Install, configure, and run Hadoop and HDFS. |
| C304.4 | Perform map-reduce analytics using Hadoop. |
| C304.5 | Use Hadoop-related tools such as HBase, Cassandra for big data analytics |
| C304.6 | Use Hadoop-related tools such as Pig, and Hive for big data analytics |

**Title:Cloud Computing,Subject Code:CCS335 NBA Code for the Subject :C305PE1V31 ,Semester : 5 [23-24ODD]Target :60 Credits:0**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C305PE1V31.1 | CO1: Understand the design challenges in the cloud. |
| C305PE1V31.2 | CO2: Apply the concept of virtualization and its types. |
| C305PE1V31.3 | CO3: Experiment with virtualization of hardware resources |
| C305PE1V31.4 | CO4: Develop and deploy services on the cloud and set up a cloud environment |
| C305PE1V31.5 | CO5: Explain security challenges in the cloud environment. |
| C305PE1V31.6 | CO6: Experiment with virtualization of Docker |

**Title:Data Warehousing,Subject Code:CCS341 NBA Code for the Subject :C306PE2V34 ,Semester : 5 [23-24ODD]Target :60 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C306PE2V34.1 | Design data warehouse architecture for various problems. |
| C306PE2V34.2 | Apply the OLAP technology. |
| C306PE2V34.3 | Analyze the partitioning strategy |
| C306PE2V34.4 | Critically analyze the differentiation of various schema for given problem. |
| C306PE2V34.5 | Frame roles of process manager. |
| C306PE2V34.6 | Frame roles of system manager. |

**Title:FILM APPRECIATION,Subject Code:MX3083 NBA Code for the Subject :C307M13 ,Semester : 5 [23-24ODD]Target :65 Credits:0**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C307M13.1 | To know the development of film as an art and entertainment form To learn the language of cinema as an evolved over a century To read a film and appreciate the various nuances of a film as a text To k |
| C307M13.2 | To learn the language of cinema as an evolved over a century |
| C307M13.3 | To read a film and appreciate the various nuances of a film as a text |
| C307M13.4 | To learn the process of film making, structure of film with social concern and crew members |
| C307M13.5 | To get the knowledge about the film theories, professional ethics and early era of films individually and as a team work |
| C307M13.6 | To inculcate their technical knowledge in the par with technological advancements in film making |

**Title:DEEP LEARNING LABORATORY,Subject Code:AD3511 NBA Code for the Subject :C308 ,Semester : 5 [23-24ODD]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C308.1 | Apply deep neural network for simple problems |
| C308.2 | Apply Convolution Neural Network for image processing |
| C308.3 | Apply Recurrent Neural Network |
| C308.4 | Apply Recurrent Neural Network and its variants for text analysis |
| C308.5 | Apply generative models for data augmentation |
| C308.6 | Develop real-world solutions using suitable deep neural networks |

**Title:Embedded Systems and IoT,Subject Code:CS3691 NBA Code for the Subject :C301 ,Semester : 6 [23-24EVEN]Target :65 Credits:4**

| At the end of this course, Student will be able to | |
|---|---|
| **CO-Code** | **Course outcome Description** |
| C301.1 | Explain the architecture of embedded processors |
| C301.2 | Write embedded C programs. |
| C301.3 | Design simple embedded applications |
| C301.4 | Compare the communication models in IOT |
| C301.5 | Design IoT applications using Arduino/Raspberry Pi /open platform. |
| C301.6 | Design of real time applications |

| **Title:Cloud Services Management,Subject Code:CCS336 NBA Code for the Subject :C310PE3V33 ,Semester : 6 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C310PE3V33.1 | Learn the key and enabling technologies that help in the development of cloud service management. |
| C310PE3V33.2 | Develop the ability to understand the cloud service strategy. |
| C310PE3V33.3 | To be familiar with the cloud service models and management services. |
| C310PE3V33.4 | Exhibit the cloud-design skills to build and automate business solutions using cloud technologies. |
| C310PE3V33.5 | possess strong theoretical foundation leading to excellence and excitement towards adoption of clous-based services. |
| C310PE3V33.6 | Solve the real-world problems using cloud services and technologies. |

| **Title:Software Defined Networks,Subject Code:CCS365 NBA Code for the Subject :C311PE4V36 ,Semester : 6 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C311PE4V36.1 | Describe the motivation behind SDN |
| C311PE4V36.2 | Identify the functions of the data plane Identify the functions of the data plane and control plane Identify the functions of the data plane and control plane |
| C311PE4V36.3 | identify the functions of the control plane |
| C311PE4V36.4 | Design and develop network applications using SDN |
| C311PE4V36.5 | Orchestrate network services using NFV |
| C311PE4V36.6 | Explain various use cases of SDN and NFV |

| **Title:Virtualization,Subject Code:CCS372 NBA Code for the Subject :C312PE5V32 ,Semester : 6 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C312PE5V32.1 | Analyze the virtualization concepts and hypervisor |
| C312PE5V32.2 | Explore the types of virtual machines, server and desktop virtualization |
| C312PE5V32.3 | Examine the functions and tools for network virtualization |
| C312PE5V32.4 | Install and configure the different VM platforms |
| C312PE5V32.5 | Apply the virtualization for real-world applications |
| C312PE5V32.6 | Experiment VM with various software |

| **Title:Digital marketing,Subject Code:CCW332 NBA Code for the Subject :C313PE6V55.1 ,Semester : 6 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C313PE6V55.1.1 | To examine and explore the role and importance of digital marketing in today¿s rapidly changing business environment. |
| C313PE6V55.1.2 | To focuses on how digital marketing can be utilized by organizations and how its effectiveness can be measured. |
| C313PE6V55.1.3 | To know the key elements of a digital marketing strategy. |
| C313PE6V55.1.4 | To know the various types of E-mail marketing and measures in maximizing E-mail |

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|---|---|
| | campaign effectiveness. |
| C313PE6V55.1.5 | To study how the effectiveness of a digital marketing campaign can be measured |
| C313PE6V55.1.6 | To demonstrate advanced practical skills in common digital marketing tools such as SEO, SEM, Social media and Blogs |

## PROGRAMME: BE.CIVIL ENGINEERING

## COURSE OUTCOME FOR THE ACADEMIC YEAR: 2023-2024

| **Title:PROFESSIONAL ENGLISH - 1,Subject Code:HS3152 NBA Code for the Subject :C101 ,Semester : 1 [23-24ODD]Target :65 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C101.1 | To improve the communicative competence of learners by throwing light on vocabulary and basic grammar |
| C101.2 | To improve the communicative competence of learners by throwing light on vocabulary and basic grammar |
| C101.3 | To help learners use language effectively in academic (grammar) /work contexts (reports) |
| C101.4 | To build on students English language skills by engaging them in listening, speaking and grammar learning activities those are relevant to authentic contexts |
| C101.5 | To develop learners ability to read and write complex texts, summaries, articles, blogs,Definitions, essays and user manuals. |
| C101.6 | Participate effectively in informal conversations; introduce themselves and their friends and express opinion in English with different types of sentences |
| **Title:MATRICES AND CALCULUS,Subject Code:MA3151 NBA Code for the Subject :C102 ,Semester : 1 [23-24ODD]Target :60 Credits:4** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C102.1 | Eigenvalues and eigenvectors, diagonalization of a matrix, symmetric matrices, Positive definite matrices and similar matrices. |
| C102.2 | Understand the limit, continuity and derivative of the functions. Solve various functions and its maxima /minima using differentiation rules. |
| C102.3 | Apply the total and partial derivatives in Taylor series expansion of functions and the extremum of functions. |
| C102.4 | Evaluate the integrals both by using Riemann sums and by using the Fundamental theorem of Calculus. Evaluate integrals using various techniques of integration. |
| C102.5 | Understand the concepts of double integration and determine the area using integration. Also understands the concepts of the change of order of integration and Change of variables in integrals. |
| C102.6 | Understand the concepts of Triple integration and determine the volume using integration. |
| **Title:ENGINEERING PHYSICS,Subject Code:PH3151 NBA Code for the Subject :C103 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C103.1 | Understand the importance of mechanics |
| C103.2 | Express their knowledge in electromagnetic waves |
| C103.3 | Demonstrate a strong foundational knowledge in oscillations. |
| C103.4 | Demonstrate a strong foundational knowledge in optics and lasers. |
| C103.5 | Understand the importance of quantum physics.Comprehend and apply quantum mechanical principles towards the formation of energy bands |
| C103.6 | Comprehend and apply quantum mechanical principles towards the formation of energy bands |
| **Title:ENGINEERING CHEMISTRY,Subject Code:CY3151 NBA Code for the Subject :C104 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C104.1 | To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water |
| C104.2 | To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials |

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|---|---|
| C104.3 | To apply the knowledge of phase rule and composites for materials selection requirements. |
| C104.4 | To recommend suitable fuel for engg. processes and applications |
| C104.5 | To analyse combustion process and its calculations |
| C104.6 | To recognize different forms of energy resources and apply them for suitable applications in energy sectors. |

| **Title:PROBLEM SOLVING AND PYTHON PROGRAMMING,Subject Code:GE3151 NBA Code for the Subject :C105 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C105.1 | Develop algorithmic solutions to simple computational problems |
| C105.2 | Develop and execute simple Python programs. |
| C105.3 | Write simple Python programs using conditionals and looping for solving problems. |
| C105.4 | Decompose a Python program into functions. |
| C105.5 | Represent compound data using Python lists, tuples, dictionaries etc |
| C105.6 | Read and write data from/to files in Python programs. |

| **Title:PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY,Subject Code:GE3171 NBA Code for the Subject :C106 ,Semester : 1 [23-24ODD]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C106.1 | Develop algorithmic solutions to simple computational problems |
| C106.2 | Develop and execute simple Python programs. |
| C106.3 | Implement programs in Python using conditionals and loops for solving problem |
| C106.4 | Deploy functions to decompose a Python program. |
| C106.5 | Process compound data using Python data structures |
| C106.6 | Utilize Python packages in developing software applications |

| **Title:PHYSICS AND CHEMISTRY LABORATORY,Subject Code:BS3171 NBA Code for the Subject :C107 ,Semester : 1 [23-24ODD]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C107.1 | understand the application of interference and diffraction in finding thickness of the given sample and wavelength of the source respectively |
| C107.2 | calculate the variation of resistance with respect to temperature and also able to calculate the band gap of |
| C107.3 | Analyse various water quality parameters-Hardness, alkalinity and DO in water sample. |
| C107.4 | Acquire practical skills by using instruments like conductivity meter, pH meter and potentiometer. |
| C107.5 | Acquire practical skills by using instruments like conductivity meter, pH meter and potentiometer. |
| C107.6 | Finding the strength and amount of nickel in steel. |

| **Title:PROFESSIONAL ENGLISH-II,Subject Code:HS3252 NBA Code for the Subject :C108 ,Semester : 2 [23-24EVEN]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C108.1 | C108.1 To compare and contrast products and ideas through technical texts in essays with appropriate grammatical usage and contextual meanings. |
| C108.2 | C108.2 To enhance learners¿ awareness of general rules of writing for specific audiences through professional emails and responses to complaints. |
| C108.3 | C108.3 To help learners understand the purpose, audience, contexts of different types of letters/essays/checklists |
| C108.4 | C108.4 To analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format. To report events and the processes of technical and industrial nature |

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|---|---|
| C108.5 | C108.5 To make use of grammatical items effectively in writing recommendations and in transcoding the graphs |
| C108.6 | C108.6 To write a winning job/internship application-cover letter and resume /SoP-Statement of purpose |

| **Title:STATISTICS AND NUMERICAL METHODS,Subject Code:MA3251 NBA Code for the Subject :C109 ,Semester : 2 [23-24EVEN]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C109.1 | Apply the concept of testing of hypothesis for small and large samples in real life problems. |
| C109.2 | Apply the basic concepts of classifications of design of experiments in the field of agriculture. |
| C109.3 | Solve algebraic, transcendental equations and simultaneous equations by direct method. |
| C109.4 | Solve simultaneous equations by iterative method and Eigen value problems. |
| C109.5 | Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems. |
| C109.6 | Gain the knowledge of various techniques and methods to solve first order ordinary differential equations with initial conditions in engineering applications. |

| **Title:PHYSICS FOR CIVIL ENGINEERING,Subject Code:PH3201 NBA Code for the Subject :C111 ,Semester : 2 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C111.1 | acquire knowledge about heat transfer through different materials, thermal performance of the building and thermal insulation. |
| C111.2 | Gain knowledge on the ventilation and air Conditioning of buildings |
| C111.3 | understand the concepts of sound absorption, noise insulation and lighting designs |
| C111.4 | Know about the processing and applications of composites, metallic glasses, shape memory alloys and ceramis |
| C111.5 | Get an awareness on natural disasters such as earth quake and cyclone |
| C111.6 | Acquire knowledge on fire hazards and fire protection, fire-proofing of materials, fire safety regulations and fire fighting equipment |

| **Title:BASIC ELECTRICAL ELECTRONICS AND INSTRUMENTATION ENGINEERING,Subject Code:BE3252 NBA Code for the Subject :C112 ,Semester : 2 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C112.1 | Compute the electric circuit parameters for simple problems |
| C112.2 | Explain the concepts of Magnetic circuit parameters |
| C112.3 | Explain the concepts of domestics wiring and protective devices |
| C112.4 | Explain the concepts of AC and Dc Machines |
| C112.5 | Analyze the characteristics of analog electronic devices |
| C112.6 | Explain the types and working principles of sensors and transducers |

| **Title:ENGINEERING GRAPHICS,Subject Code:GE3251 NBA Code for the Subject :C112 ,Semester : 2 [23-24EVEN]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C112.1 | Student will be able to draw basic geometrical curves |
| C112.2 | Student will be able to project points, lines and planes in first angle projection by rotating method |
| C112.3 | Student will be able to orthographic projection with free hand sketches |
| C112.4 | Students will be able to project views of any solids by rotating object method. |
| C112.5 | Students will be able to project sectioned view and to develop lateral surface of given solid. |

| | |
|---|---|
| C112.6 | Students will be able to sketch isometric and perspective views of given solid. |

**Title:ENGINEERING PRACTICES LABORATORY,Subject Code:GE3271 NBA Code for the Subject :C114 ,Semester : 2 [23-24EVEN]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C114.1 | Students will be able to distinguish residential house wiring, fluorescent lamp wiring and stair case wiring. |
| C114.2 | Students will be able to define electrical quantities like voltage, current, energy and resistance and their measurement using CRO. |
| C114.3 | Students will be able to analyze different logic gates, clock, rectifier and to solder devices and components. |
| C114.4 | Students will able to understand the pipe connections for the home application and industrial constructions |
| C114.5 | Students will able to understand the pipe connections for the home application and industrial constructions |
| C114.6 | Students will be able to understand the concept of joining the metal by welding. |

**Title:BASIC ELECTRICAL ELECTRONICS AND INSTRUMENTATION ENGINEERING LAB,Subject Code:BE3272 NBA Code for the Subject :C116 ,Semester : 2 [23-24EVEN]Target :75 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C116.1 | Use experimental methods to verify the Ohm¿s law and Kirchhoff¿s Law |
| C116.2 | Use experimental methods to measure three phase power : Use experimental methods to verify the Ohm¿s law and Kirchhoff¿s Law and to measure three phase power |
| C116.3 | Analyze experimentally the load characteristics of DC electrical machines |
| C116.4 | Analyze experimentally the load characteristics of AC electrical machines |
| C116.5 | Analyze the characteristics of basic electronic devices Analyze the characteristics of basic electronic devices Analyze the characteristics of basic electronic devices Analyze the characteristics of b |
| C116.6 | Use LVDT to measure displacement |

**Title:TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS,Subject Code:MA3351 NBA Code for the Subject :C201 ,Semester : 3 [23-24ODD]Target :60 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C201.1 | Solve the given partial differential equations |
| C201.2 | Apply Fourier series analysis which plays a vital role in engineering applications |
| C201.3 | Apply Fourier series techniques to solve one dimensional wave, one and two dimensional heat equations |
| C201.4 | Gain the knowledge in Fourier transform techniques to solve the problems of engineering. |
| C201.5 | Formulate some of the physical problems of engineering using difference equations |
| C201.6 | Apply Z-transform techniques to solve the difference equations. |

**Title:ENGINEERING MECHANICS,Subject Code:ME3351 NBA Code for the Subject :C202 ,Semester : 3 [23-24ODD]Target :60 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C202.1 | Illustrate the vectorial and scalar representation of forces and moments. |
| C202.2 | Analyse the rigid body in equilibrium. |
| C202.3 | Evaluate the properties of distributed forces. |
| C202.4 | Determine the friction and the effects by the laws of friction. |
| C202.5 | Calculate dynamic forces causing motion exerted in rigid body. |
| C202.6 | Calculate dynamic forces exerted in rigid body. |

**Title:FLUID MECHANICS,Subject Code:CE3301 NBA Code for the Subject :C203 ,Semester : 3 [23-24ODD]Target :65 Credits:3**

| At the end of this course, Student will be able to | |
|---|---|
| **CO-Code** | **Course outcome Description** |
| C203.1 | Demonstrate the difference between solid and fluid, its properties and behaviour in static conditions. |
| C203.2 | Apply the conservation laws applicable to fluids and its application through fluid kinematics and dynamics. |
| C203.3 | Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performance of prototypes by model studies. |
| C203.4 | Estimate the losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel. |
| C203.5 | Explain the concept of boundary layer and its application. |
| C203.6 | To find the drag force excreted by the fluid on the flat solid surface. |

| **Title:CONSTRUCTION MATERIALS AND TECHNOLOGY,Subject Code:CE3302 NBA Code for the Subject :C204 ,Semester : 3 [23-24ODD]Target :80 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C204.1 | Identify the good quality brick, stone and blocks for construction. |
| C204.2 | Identify the good quality blocks and Lime for construction. |
| C204.3 | Recognize the market forms of timber, steel, aluminum and applications of various composite materials. |
| C204.4 | Identify the best construction and service practices such as thermal insulations and air conditioning of the building. |
| C204.5 | Select various equipments for construction works conditioning of building |
| C204.6 | Understand the construction planning and scheduling techniques. |

| **Title:WATER SUPPLY AND WASTEWATER ENGINEERING,Subject Code:CE3303 NBA Code for the Subject :C206 ,Semester : 3 [23-24ODD]Target :65 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C206.1 | Understand the various components of water supply scheme and design of intake structure and conveyance system for water transmission. |
| C206.2 | Understand on the characteristics and composition of sewage, ability to estimate sewage generation and design sewer system including sewage pumping stations. |
| C206.3 | Understand the process of conventional treatment and design of water and wastewater treatment system and gain knowledge of selection of treatment process and biological treatment process. |
| C206.4 | Ability to design and evaluate water distribution system and water supply in buildings and understand the self-purification of streams and sludge and septage disposal methods. |
| C206.5 | Able to understand and design the various advanced treatment system and knowledge. |
| C206.6 | To know about the recent advances in water and wastewater treatment process and reuse of sewage. knowledge about the recent advances in water and wastewater treatment process and reuse of sewage. |

| **Title:SURVEYING AND LEVELLING,Subject Code:CE3351 NBA Code for the Subject :C206 ,Semester : 3 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C206.1 | Introduce the rudiments of various surveying and its principles. |
| C206.2 | Imparts knowledge in computation of levels of terrain and ground features |
| C206.3 | Imparts concepts of Theodolite Surveying for complex surveying operations |
| C206.4 | Understand the procedure for establishing horizontal |
| C206.5 | Understand the procedure for establishing vertical control |
| C206.6 | Imparts the knowledge on modern surveying instruments |

| **Title:SURVEYING AND LEVELLING LABORATORY,Subject Code:CE3361 NBA Code for the Subject :C207 ,Semester : 3 [23-24ODD]Target :65 Credits:1.5** |
|---|

| At the end of this course, Student will be able to | |
|---|---|
| **CO-Code** | **Course outcome Description** |
| C207.1 | Impart knowledge on the usage of basic surveying instruments like chain/tape instruments |
| C207.2 | Impart knowledge on the usage of basic surveying instruments like compass, levelling instruments |
| C207.3 | Able to use levelling instrument for surveying operations |
| C207.4 | Able to use theodolite for various surveying operations |
| C207.5 | Able to carry out necessary surveys for social infrastructures |
| C207.6 | Able to prepare planimetric maps |

| **Title:WATER AND WASTEWATER ANALYSIS LABORATORY,Subject Code:CE3311 NBA Code for the Subject :C208 ,Semester : 3 [23-24ODD]Target :65 Credits:1.5** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C208.1 | Calibrate and standardize the equipment |
| C208.2 | Collect proper sample for analysis |
| C208.3 | To know the sample preservation methods |
| C208.4 | To perform field oriented testing of water, wastewater |
| C208.5 | To perform coliform analysis |
| C208.6 | To perform feecalcoliform analysis |

| **Title:PROFESSIONAL DEVELOPMENT,Subject Code:GE3361 NBA Code for the Subject :C209 ,Semester : 3 [23-24ODD]Target :80 Credits:1** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C209.1 | Use MS office effectively for academic and Technical requirements |
| C209.2 | Use MS word to create quality documents by structuring and organizing content for day to day events |
| C209.3 | Use MS EXCEL to perform data operations |
| C209.4 | Use MS EXCEL for analytics, record, retrieve data as per requirements |
| C209.5 | Use MS Powerpoint to create high quallity academic presentation |
| C209.6 | Use MS Powerpoint to interlink other elements such as charts and Graphs for quality communication |

| **Title:ENVIRONMENTAL SCIENCES AND SUSTAINABILITY,Subject Code:GE3451 NBA Code for the Subject :215 ,Semester : 4 [23-24EVEN]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| 215.1 | Infer the importance of environment and explain the concepts, types, structure and function of ecosystem |
| 215.2 | Recall the various functions, levels, threats and conservation of biodiversity |
| 215.3 | Explain the different type of pollution and propose the suitable methods to prevent the same to enhance the environment |
| 215.4 | Discuss the conservation of different energy sources,optimal usage and the importance |
| 215.5 | Discuss the aspect of sustainability and means of sustainability management to realize the sustainable develoment goals |
| 215.6 | List the various management systems, protection and discuss the given solutions for energy to materials for sustainability |

| **Title:APPLIED HYDRAULICS ENGINEERING,Subject Code:CE3401 NBA Code for the Subject :C210 ,Semester : 4 [23-24EVEN]Target :65 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C210.1 | Describe the basics of open channel flow, its classification and analysis of uniform flow in steady state conditions with specific energy concept and its application. |

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|---|---|
| C210.2 | Analyse steady gradually varied flow, water surface profiles and its length calculation using direct and standard step methods with change in water surface profiles due to change in grades. |
| C210.3 | Derive the relationship among the sequent depths of steady rapidly varied flow and estimating energy loss in hydraulic jump with exposure to positive and negative surges. |
| C210.4 | Design turbines and explain the working principle. |
| C210.5 | Differentiate pumps and explain the working principle with characteristic curves and design of Centrifugal pumps. |
| C210.6 | Differentiate pumps and explain the working principle with characteristic curves and design of Reciprocating pumps. |

**Title:STRENGTH OF MATERIALS PCC 3 0 0 3,Subject Code:CE3402 NBA Code for the Subject :C211 ,Semester : 4 [23-24EVEN]Target :60 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C211.1 | Understand the concepts of stress and strain, principal stresses and principal planes. |
| C211.2 | Determine Shear force and bending moment in beams and understand concept of theory of simple bending. |
| C211.3 | Calculate the deflection of beams by different methods and selection of method for determining slope or deflection. |
| C211.4 | Analyze propped cantilever, fixed beams and continuous beams for external loadings and support settlements. |
| C211.5 | Determine the stresses due to Unsymmetrical bending of beams, locate the shear center. |
| C211.6 | Study the various theories of failure. |

**Title:CONCRETE TECHNOLOGY PCC 3 0 0 3 3,Subject Code:CE3403 NBA Code for the Subject :C212 ,Semester : 4 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C212.1 | THE VARIOUS REQUIREMENTS OF CEMENT, AGGREGATES AND WATER FOR MAKING CONCRETE |
| C212.2 | THE EFFECT OF ADMIXTURES ON PROPERTIES OF CONCRETE |
| C212.3 | THE CONCEPT AND PROCEDURE OF MIX DESIGN AS PER IS METHOD |
| C212.4 | THE PROPERTIES OF CONCRETE IN FRESH STATE |
| C212.5 | THE PROPERTIES OF CONCRETE IN HARDENED STATE |
| C212.6 | THE IMPORTANCE AND APPLICATION OF SPECIAL CONCRETE |

**Title:SOIL MECHANICS PCC 3 0 0 3 3,Subject Code:CE3404 NBA Code for the Subject :C213 ,Semester : 4 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C213.1 | Classify the soil based on Index Properties |
| C213.2 | Assess the engineering Properties based on Index properties |
| C213.3 | Understand the stress concept in soils |
| C213.4 | Understand and identify the settlement in soils |
| C213.5 | Determine the shear strength of soil |
| C213.6 | Analyse both finite and infinite slopes |

**Title:HIGHWAY AND RAILWAY ENGINEERING,Subject Code:CE3405 NBA Code for the Subject :C214 ,Semester : 4 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C214.1 | Plan a highway according to the principles and standards adopted in various institutions in India. |
| C214.2 | Design the geometric features of road network and components of pavement. |
| C214.3 | Test the highway materials and construction practice methods and know its properties and able to perform pavement evaluation and management. |

| | |
|---|---|
| C214.4 | Understand the methods of route alignment and design elements in railway planning and constructions. |
| C214.5 | Understand the construction techniques of track laying and railway stations. |
| C214.6 | Understand the maintenance of track laying and railway stations. |

| **Title:HYDRAULIC ENGINEERING LABORATORY,Subject Code:CE3411 NBA Code for the Subject :C217 ,Semester : 4 [23-24EVEN]Target :65 Credits:1.5** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C217.1 | Apply Bernoulli equation for calibration of flow measuring devices. |
| C217.2 | Measure friction factor in pipes and compare with Moody diagram. |
| C217.3 | Determine the performance characteristics of rotodynamic pumps. |
| C217.4 | Determine the performance characteristics of positive displacement pumps. |
| C217.5 | Determine the performance characteristics of Impulse turbines. |
| C217.6 | Determine the performance characteristics of Reaction turbines. |

| **Title:SOIL MECHANICS LABORATORY PCC 0 0,Subject Code:CE3413 NBA Code for the Subject :C217 ,Semester : 4 [23-24EVEN]Target :80 Credits:1.5** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C217.1 | fekhjbfflmklxbj,kfx,mkvxknffknhh |
| C217.2 | shhjjfjjhyyeufjnvnnnnnhhhnn c |
| C217.3 | shhbcnnbbxnnncnbnbxnnnx |
| C217.4 | sthncn nsxbxbbc xzbbxnnxbbxnnc |
| C217.5 | hhbnnbcnn n nnnxnncnnnc |
| C217.6 | syyhbnbxsbxnnxnbxnnnxbnxnn |

| **Title:MATERIALS TESTING LABORATORY PCC,Subject Code:CE3412 NBA Code for the Subject :C218 ,Semester : 4 [23-24EVEN]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C218.1 | Determine the mechanical properties of steel. |
| C218.2 | Determine the physical properties of cement. |
| C218.3 | Determine the physical properties of fine aggregate. |
| C218.4 | Determine the physical properties of coarse aggregate. |
| C218.5 | Determine the workability and compressive strength of concrete. |
| C218.6 | Determine the strength of brick and wood. |

| **Title:DESIGN OF REINFORCED CONCRETE STRUCTURAL ELEMENTS,Subject Code:CE3501 NBA Code for the Subject :C301 ,Semester : 5 [23-24ODD]Target :75 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C301.1 | Know the various design concepts and design RC rectangular beams by working stress method. |
| C301.2 | Know the various design concepts and design RC rectangular beams by limit state methods. |
| C301.3 | Understand the design of flanged beams, design for shear and torsion, and anchorage and development length. |
| C301.4 | Design a RC slabs and staircase and draw the reinforcement detailing. |
| C301.5 | Design short columns for axial, uni-axial and bi-axial eccentric loadings. |
| C301.6 | Design wall footings, isolated footings and combined rectangular footing. |

| **Title:STRUCTURAL ANALYSIS,Subject Code:CE3502 NBA Code for the Subject :C302 ,Semester : 5 [23-24ODD]Target :65 Credits:3** |
|---|
| At the end of this course, Student will be able to |

| CO-Code | Course outcome Description |
|---|---|
| C302.1 | Analyze the pin-jointed plane frames |
| C302.2 | Analyse the continuous beams and rigid frames by slope defection method. |
| C302.3 | Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway. |
| C302.4 | Analyse the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method. |
| C302.5 | Understand the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames. |
| C302.6 | Analyze space frames |

**Title:FOUNDATION ENGINEERING,Subject Code:CE3503 NBA Code for the Subject :C303 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C303.1 | Graduate will demonstrate an ability to plan and execute a detailed site investigation to select geotechnical design parameters and type of foundation |
| C303.2 | Graduate will demonstrate an ability to design shallow foundations, its component or process as per the needs and specifications. |
| C303.3 | Graduate will demonstrate an ability to design combined footings, its component or process as per the needs and specifications. |
| C303.4 | Graduate will demonstrate an ability to design raft foundations, its component or process as per the needs and specifications. |
| C303.5 | Graduate will demonstrate an ability to design deep foundations, its component or process as per the needs and specifications. |
| C303.6 | Graduate will demonstrate an ability to design retaining walls, its component or process as per the needs and specifications. |

**Title:Prefabricated Structures,Subject Code:CE3003 NBA Code for the Subject :C304PE1V1S3 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C304PE1V1S3.1 | Understand concepts about principles of prefabrication, production, transportation, erection. |
| C304PE1V1S3.2 | Acquire knowledge about panel systems, slabs, beams, shear walls and columns used in precast construction. |
| C304PE1V1S3.3 | Acquire knowledge about design of cross section, joint flexibility |
| C304PE1V1S3.4 | Acquire knowledge about joints |
| C304PE1V1S3.5 | Acquire knowledge about structural stability. |
| C304PE1V1S3.6 | Acquire knowledge about connection in precast construction. |

**Title:Rehabilitation/Heritage Restoration,Subject Code:CE3005 NBA Code for the Subject :C305PE1V15 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C305PE1V15.1 | Know the importance of inspection and maintenance. |
| C305PE1V15.2 | Study the Impacts of cracks, corrosion and climate on structures. |
| C305PE1V15.3 | Know about various special concretes. |
| C305PE1V15.4 | Understand the Non-Destructive testing techniques. |
| C305PE1V15.5 | Understand the various corrosion protection measures. |
| C305PE1V15.6 | Know the Repair of structures and Restoration of Heritage structures. |

**Title:Airports and Harbours,Subject Code:CE3025 NBA Code for the Subject :C306 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C306.1 | Gain an insight on the planning and site selection of Airport Planning and Design. |

| | |
|---|---|
| C306.2 | Knowledge on Design of various Airport Components. |
| C306.3 | Analyze and design the elements for orientation of runways and passenger facility systems. |
| C306.4 | Understand the various features in harbours and ports, their construction. |
| C306.5 | Understand the various features of coastal protection works. |
| C306.6 | Knowledge on various Environment Regulations and Acts. |

**Title:DISASTER RISK REDUCTION AND MANAGEMENT,Subject Code:MX3084 NBA Code for the Subject :C307M14 ,Semester : 5 [23-24ODD]Target :65 Credits:0**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C307M14.1 | To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR) |
| C307M14.2 | To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction |
| C307M14.3 | To develop disaster response skills by adopting relevant tools and technology |
| C307M14.4 | To Enhance awareness of institutional processes for Disaster response in the country |
| C307M14.5 | To Develop rudimentary ability to respond to their surroundings |
| C307M14.6 | To Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity. |

**Title:HIGHWAY ENGINEERING,Subject Code:CE3511 NBA Code for the Subject :C308 ,Semester : 5 [23-24ODD]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C308.1 | Characterize Pavement Aggregate through relevant test. |
| C308.2 | Ascertain the Quality of Bitumen. |
| C308.3 | Determine the Optimum Binder Content Using Marshall Method. |
| C308.4 | Evaluate the Consistency of Bitumen. |
| C308.5 | Evaluate the Properties of Bitumen. |
| C308.6 | Determine the Bitumen Content in the Bituminous Mixes. |

**Title:Design of Steel Structural Elements,Subject Code:CE3601 NBA Code for the Subject :C310 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C310.1 | Recognize the design philosophy of steel structures and identify the different failure modes of bolted and welded connection and determine their design strength |
| C310.2 | Select the most suitable section, shape and size for the tension and compression members according to specific design criteria |
| C310.3 | Select the most suitable section, shape and size for the Beams, plate girder according to specific design criteria |
| C310.4 | Find out the ultimate load of steel beams and portal frames using plastic analysis. |
| C310.5 | Identify and compute the design loads of industrial trusses and purlin. |
| C310.6 | Design the gantry girder and pre-engineered buildings. |

**Title:Structural Analysis II,Subject Code:CE3602 NBA Code for the Subject :C311 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C311.1 | Draw influence lines for statically determinate structures and calculate critical stress resultants. |
| C311.2 | Understand Muller Breslau principle and draw the influence lines for statically indeterminate beams. |
| C311.3 | Analyse three hinged,two hinged and fixed arches. |
| C311.4 | Analyse the suspension bridges with stiffening girders |
| C311.5 | Analyse rigid frames by approximate methods for gravity loads. |

| | |
|---|---|
| C311.6 | Analyse rigid frames by approximate methods for horizontal loads. |

**Title:Engineering Geology,Subject Code:AG3601 NBA Code for the Subject :C312 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C312.1 | Knowing the internal structure of earth and its relation to earthquakes. Landforms created by various geological agents and their importance in civil engineering. |
| C312.2 | Getting knowledge on various minerals and rocks that can be used as construction materials and road aggregates. In addition, testing the suitability of rocks for foundation purposes. |
| C312.3 | Studying various geological structures and their impact in engineering constructions. Further, learning the geo mechanical properties of rocks and their significance in engineering projects. |
| C312.4 | Gaining knowledge on the role of geological mapping, remote sensing and geophysics for surface and subsurface investigations. In addition, students will also gain knowledge on borehole logging techniq |
| C312.5 | Applying geological knowledge for designing and constructing major civil engineering structures. |
| C312.6 | To know about various Geological hazards such as earthquakes, landslides and tsunamis. |

**Title:Construction Equipment and Machinery,Subject Code:CE3009 NBA Code for the Subject :C313PE4V22 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C313PE4V22.1 | CO1 Develop knowledge on planning of equipment and selection of equipment |
| C313PE4V22.2 | Explain the knowledge on fundamentals of earth work operations, earth moving operations |
| C313PE4V22.3 | Develop the knowledge on special construction equipment |
| C313PE4V22.4 | Apply the knowledge on asphalt and concrete plants |
| C313PE4V22.5 | Apply the knowledge and select the proper materials handling equipment |
| C313PE4V22.6 | Explain the knowledge on fundamentals of types of earth work equipment |

**Title:Advanced Construction Techniques,Subject Code:CE3013 NBA Code for the Subject :C314PE5V26 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C314PE5V26.1 | Understand the modern construction techniques used in the sub structure construction. |
| C314PE5V26.2 | Understand the modern construction techniques used in the under water construction. |
| C314PE5V26.3 | Demonstrate knowledge and understanding of the principles and concepts relevant to super structure construction for buildings. |
| C314PE5V26.4 | Understand the concepts used in the construction of special structures. |
| C314PE5V26.5 | Knowledge on Various strengthening and repair methods for different cases. |
| C314PE5V26.6 | Identify the suitable demolition technique for demolishing a building. |

**Title:Environmental Health and Safety,Subject Code:CCE332 NBA Code for the Subject :C315 ,Semester : 6 [23-24EVEN]Target :80 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C315.1 | Know about Need for EHS in industries and related Indian regulations. |
| C315.2 | Get knowledge about role of Trade Union safety representatives and Ergonomics. |
| C315.3 | Understand about Various types of Health hazards, effect, assessment and control methods. |
| C315.4 | Know about Various safety systems in working environments. |
| C315.5 | Understand about the methodology for preparation of Emergency Plans and Accident investigation. |
| C315.6 | know about the EHS Management System and its elements. |

| Title:Industrial Safety,Subject Code:MX3089 NBA Code for the Subject :C317 ,Semester : 6 [23-24EVEN]Target :60 Credits:0 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C317.1 | To Understand the Introduction and basic Terminologies safety. |
| C317.2 | To enable the students to learn about the Important Statutory Regulations and standards. |
| C317.3 | To enable students to Conduct and participate the various Safety activities in the industry. |
| C317.4 | To have knowledge about Workplace Exposures and Hazards. |
| C317.5 | To assess the various Hazards through various Risk Assessment Techniques. |
| C317.6 | To assess the various consequences through various Risk Assessment Techniques. |

| Title:Building Drawing and Detailing Laboratory,Subject Code:CE3611 NBA Code for the Subject :C319 ,Semester : 6 [23-24EVEN]Target :65 Credits:2 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C319.1 | Know the principles of planning and orientation |
| C319.2 | Draft the plan, elevation and sectional view of load bearing and framed buildings |
| C319.3 | Draw the structural detailing of RCC elements |
| C319.4 | Draw the structural detailing of RCC Water tanks, footings, and retaining walls |
| C319.5 | Draw the structural detailing of steel structures |
| C319.6 | Draw the structural detailing of industrial structures |

| Title:ESTIMATION, COSTING AND VALUATION ENGINEERING,Subject Code:CE8701 NBA Code for the Subject :C401 ,Semester : 7 [23-24ODD]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C401.1 | Estimate the quantities of the buildings, Roads and other structures |
| C401.2 | Rate analysis for all building and other construction works |
| C401.3 | Understand types of specifications, Principles of report writing and tender process. |
| C401.4 | Gain Knowledge on types of contracts, process and responsibilities of a contractor |
| C401.5 | Evaluate valuation for building and land |
| C401.6 | Utilize the modern tools for estimate the quantities and rate analysis |

| Title:RAILWAYS AIRPORTS AND HARBOUR ENGINEERING,Subject Code:CE8702 NBA Code for the Subject :C402 ,Semester : 7 [23-24ODD]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C402.1 | Students will be able to Understand the methods of route alignment and design elements in Railway Planning and Constructions. |
| C402.2 | Students will be able to Understand the Construction techniques and Maintenance of Track laying and Railway stations. |
| C402.3 | Students will be able to Gain an insight on the planning and site selection of Airport Planning and design. |
| C402.4 | Students will be able to Analyze and design the elements for orientation of runways and passenger facility systems. |
| C402.5 | Students will be able to Understand the various features in Harbours and Ports, their construction. |
| C402.6 | Students will be able to coastal know about the various coastal protection works and coastal Regulations to be adopted. protection works and coastal Regulations to be adopted. |

| Title:STRUCTURAL DESIGN DRAWING,Subject Code:CE8703 NBA Code for the Subject :C403 ,Semester : 7 [23-24ODD]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |

| | |
|---|---|
| C403.1 | Design and draw reinforced concrete Cantilever and Counterfort Retaining Walls. |
| C403.2 | Design and draw flat slab as per codal provisions. |
| C403.3 | Design and draw reinforced concrete bridges and water tanks. |
| C403.4 | Design and draw steel bridges and water tanks. |
| C403.5 | Design and detail the various steel trusses. |
| C403.6 | Design and detail plate girder and gantry girder. |

**Title:INDUSTRIAL SAFETY,Subject Code:OME754 NBA Code for the Subject :C404 ,Semester : 7 [23-24ODD]Target :80 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C404.1 | Students will be able to understand and prevent the problems related to fire safety. |
| C404.2 | Students must be able to identify and prevent chemical hazards. |
| C404.3 | Students must be able to recognize and prevent environmental hazards. |
| C404.4 | Students will be able to learn various methods of hazard analysis. |
| C404.5 | Students will obtain knowledge on various safety regulations. |
| C404.6 | Students must be able to apply proper safety techniques on safety engineering and management. |

**Title:CREATIVE AND INNOVATIVE PROJECT (ACTIVITY BASED -SUBJECT RELATED),Subject Code:CE8711 NBA Code for the Subject :C406 ,Semester : 7 [23-24ODD]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C406.1 | Selection of a problem for project work by team work |
| C406.2 | Collect, Review and infer from the literature available on the chosen problem |
| C406.3 | Come out with the methodology to solve the identfied problem |
| C406.4 | Apply the principles, tools, modern construction materials and techniques to solve the problem |
| C406.5 | Develop understanding of technical dissertation presentation and writing |

| Title:MAINTENANCE, REPAIR AND REHABILITATION OF STRUCTURES,Subject Code:CE8020 NBA Code for the Subject :C409 ,Semester : 8 [23-24EVEN]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C409.1 | Understand the importance of maintenance and assessment method of distressed structures. |
| C409.2 | Understand the strength and durability properties, their effects due to climate and temperature. |
| C409.3 | Understand the recent development in concrete. |
| C409.4 | Understand the techniques for repair rand protection methods. |
| C409.5 | Understand about repair, rehabilitation and retrofitting of structures. |
| C409.6 | Know about the various types of demolition methods. |

| Title:PROJECT WORK,Subject Code:CE8811 NBA Code for the Subject :C410 ,Semester : 8 [23-24EVEN]Target :65 Credits:10 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C410.1 | Selection of a problem for project work by team work |
| C410.2 | Collect, Review and infer from the literature available on the chosen problem |
| C410.3 | Come out with the methodology to solve the identified problem |
| C410.4 | Apply the principles, tools, modern construction materials and techniques to solve the problem |
| C410.5 | Develop understanding of technical dissertation presentation and writing |
| C410.6 | Improve presentation skills. |

## PROGRAMME: CSBS

## COURSE OUTCOME FOR THE ACADEMIC YEAR: 2023-2024

| Title:PROFESSIONAL ENGLISH - 1,Subject Code:HS3152 NBA Code for the Subject :C101 ,Semester : 1 [23-24ODD]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C101.1 | To improve the communicative competence of learners by throwing light on vocabulary and basic grammar |
| C101.2 | C101.2 To help learners use language effectively in academic (grammar) /work contexts (reports) |
| C101.3 | C101.3 To build on students¿ English language skills by engaging them in listening, speaking and grammar learning activities those are relevant to authentic contexts. |
| C101.4 | C101.4 To develop learners¿ ability to read and write complex texts, summaries, articles, blogs, Definitions, essays and user manuals. C101.4 To develop learners¿ ability to read and write complex tex |
| C101.5 | C101.5 To use language efficiently in expressing their opinions via various media and graphical representation. |
| C101.6 | C101.6 Participate effectively in informal conversations; introduce themselves and their friends and express opinion in English with different types of sentences |

| Title:MATRICES AND CALCULUS,Subject Code:MA3151 NBA Code for the Subject :C102 ,Semester : 1 [23-24ODD]Target :60 Credits:4 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C102.1 | Eigenvalues and eigenvectors, diagonalization of a matrix,symmetric matrices, Positive definite matrices and similar matrices. |
| C102.2 | Understand the limit, continuity and derivative of the functions. Solve various functions and its maxima /minima using differentiation rules. |
| C102.3 | Apply the total and partial derivatives in Taylor series expansion of functions and the extremum of functions. |
| C102.4 | Evaluate the integrals both by using Riemann sums and by using the Fundamental theorem of Calculus. Evaluate integrals using various techniques of integration. |
| C102.5 | Understand the concepts of double integration and determine the area using integration. Also understands the concepts of the change of order of integration and Change of variables in integrals. |
| C102.6 | Understand the concepts of Triple integration and determine the volume using integration. |

| Title:ENGINEERING PHYSICS,Subject Code:PH3151 NBA Code for the Subject :C103 ,Semester : 1 [23-24ODD]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C103.1 | Understand the importance of mechanics |
| C103.2 | Express their knowledge in electromagnetic waves |
| C103.3 | Demonstrate a strong foundational knowledge in oscillations |
| C103.4 | Demonstrate a strong foundational knowledge in optics and lasers |
| C103.5 | Understand the importance of quantum physics. |
| C103.6 | Comprehend and apply quantum mechanical principles towards the formation of energy bands |

| Title:ENGINEERING CHEMISTRY,Subject Code:CY3151 NBA Code for the Subject :C104 ,Semester : 1 [23-24ODD]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C104.1 | To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water |
| C104.2 | To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engg and tech. applications |

| | |
|---|---|
| C104.3 | To apply the knowledge of phase rule and composites for materials selection requirements. |
| C104.4 | To recommend suitable fuel for engg. processes and applications |
| C104.5 | To analyse combustion process and its calculations |
| C104.6 | To recognize different forms of energy resources and apply them for suitable applications in energy sectors. |

**Title:PROBLEM SOLVING AND PYTHON PROGRAMMING,Subject Code:GE3151 NBA Code for the Subject :C105 ,Semester : 1 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C105.1 | Develop algorithmic solutions to simple computational problems. |
| C105.2 | Develop and execute simple Python programs. |
| C105.3 | Write simple Python programs using conditionals and loops for solving problems. |
| C105.4 | Decompose a Python program into functions. |
| C105.5 | Represent compound data using Python lists, tuples, dictionaries etc. |
| C105.6 | Read and write data from/to files in Python programs. |

**Title:PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY,Subject Code:GE3171 NBA Code for the Subject :C106 ,Semester : 1 [23-24ODD]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C106.1 | To understand the problem solving approaches. |
| C106.2 | To learn the basic programming constructs in Python |
| C106.3 | To learn the programming constructs in Python like loop, function, recursion. |
| C106.4 | To practice various computing strategies for Python-based solutions to real world problems. |
| C106.5 | To use Python data structures-lists, tuples, dictionaries. |
| C106.6 | To do input/output with files in Python. |

**Title:PHYSICS AND CHEMISTRY LABORATORY,Subject Code:BS3171 NBA Code for the Subject :C107 ,Semester : 1 [23-24ODD]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C107.1 | Gain knowledge about elasticity, modulus, oscillations and also able to calculate Young's,rigidity modulus, moment of inertia of regular and irregular bodies. |
| C107.2 | understand the application of interference and diffraction in finding thickness of the given sample and wavelength of the source respectively |
| C107.3 | calculate the variation of resistance with respect to temperature and also able to calculate the band gap of |
| C107.4 | Analyse various water quality parameters-Hardness, alkalinity and DO in water sample. |
| C107.5 | Acquire practical skills by using instruments like conductivity meter, pH meter and potentiometer. |
| C107.6 | Finding the strength and amount of nickel in steel. |

**Title:PROFESSIONAL ENGLISH-II,Subject Code:HS3252 NBA Code for the Subject :C108 ,Semester : 2 [23-24EVEN]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C108.1 | To compare and contrast products and ideas through technical texts in essays with appropriate grammatical usage and contextual meanings. |
| C108.2 | To enhance learners¿ awareness of general rules of writing for specific audiences through professional emails and responses to complaints. |
| C108.3 | To help learners understand the purpose, audience, contexts of different types of letters/essays/checklists |
| C108.4 | To analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format. To report events and the processes of technical and industrial nature |

| | |
|---|---|
| C108.5 | To make use of grammatical items effectively in writing recommendations and in transcoding the graphs |
| C108.6 | To write a winning job/internship application-cover letter and resume /SoP-Statement of purpose |

| **Title:STATISTICS AND NUMERICAL METHODS,Subject Code:MA3251 NBA Code for the Subject :C109 ,Semester : 2 [23-24EVEN]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C109.1 | Apply the concept of testing of hypothesis for small and large samples in real life problems. |
| C109.2 | Apply the basic concepts of classifications of design of experiments in the field of agriculture. |
| C109.3 | Solve algebraic, transcendental equations and simultaneous equations by direct method. |
| C109.4 | Solve simultaneous equations by iterative method and Eigen value problems. |
| C109.5 | Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems. |
| C109.6 | Gain the knowledge of various techniques and methods to solve first order ordinary differential equations with initial conditions in engineering applications. |

| **Title:PHYSICS FOR INFORMATION SCIENCE,Subject Code:PH3256 NBA Code for the Subject :C110 ,Semester : 2 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C110.1 | Gain knowledge on classical mechanics, quantum theory and energy band structure. |
| C110.2 | Acquire knowledge on basics of semiconductor physics |
| C110.3 | Get knowledge on magnetic properties of materials and their applications. |
| C110.4 | Have necessary understanding on the functioning of optical materials for opto electronics |
| C110.5 | Understand the basics of quantum structures. |
| C110.6 | Gain knowledge on basics and applications of quantum computing. |

| **Title:BASIC ELECTRICAL AND ELECTRONICS ENGINEERING,Subject Code:BE3251 NBA Code for the Subject :C111 ,Semester : 2 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C111.1 | Compute the DC electric circuit parameters for simple problems |
| C111.2 | Compute the AC parameters for simple problems |
| C111.3 | Explain the working principle and applications of electrical machines |
| C111.4 | Analyze the characteristics of analog electronic devices |
| C111.5 | Explain the basic concepts of digital electronics |
| C111.6 | Explain the operating principles of measuring instruments |

| **Title:ENGINEERING GRAPHICS,Subject Code:GE3251 NBA Code for the Subject :C112 ,Semester : 2 [23-24EVEN]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C112.1 | Student will be able to draw basic geometrical curves |
| C112.2 | Student will be able to project points, lines and planes in first angle projection by rotating method |
| C112.3 | Student will be able to orthographic projection with free hand sketches |
| C112.4 | Students will be able to project views of any solids by rotating object method. |
| C112.5 | Students will be able to project sectioned view and to develop lateral surface of given solid. |
| C112.6 | Students will be able to sketch isometric and perspective views of given solid. |

| **Title:DATA STRUCTURE DESIGN,Subject Code:AD3251 NBA Code for the Subject :C116 ,Semester : 2 [23-24EVEN]Target :65 Credits:3** |
|---|

| At the end of this course, Student will be able to | |
|---|---|
| **CO-Code** | **Course outcome Description** |
| C116.1 | To understand the abstract data types |
| C116.2 | Students will be able to Design, implement, and analyse linear data structures, such as lists, queues, and stacks, according to the needs of different applications |
| C116.3 | Students will be able to understand sorting algorithms |
| C116.4 | Students will be able to understand and Explain searching and hashing algorithms |
| C116.5 | Students will be able to Design, implement, and analyse efficient tree structures for different applications |
| C116.6 | Students will be able to Model problems as graph problems and implement efficient graph algorithms to solve them |

| **Title:ENGINEERING PRACTICES LABORATORY,Subject Code:GE3271 NBA Code for the Subject :C114 ,Semester : 2 [23-24EVEN]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C114.1 | Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work |
| C114.2 | Saw, plane, make joints in wood materials used in common household wood work. |
| C114.3 | Weld various joints in steel plates using arc welding work |
| C114.4 | Machine various simple processes like turning, drilling, tapping in parts |
| C114.5 | Assemble simple mechanical assembly of common household equipments |
| C114.6 | Make a tray out of metal sheet using sheet metal work. |

| **Title:DATA STRUCTURE DESIGN LAB,Subject Code:AD3271 NBA Code for the Subject :C119 ,Semester : 2 [23-24EVEN]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C119.1 | 1mplement ADModel problems as graph problems and implement efficient graph algorithms to solve them Ts as Python classes |
| C119.2 | Implement List ADT using Python arrays and Linked list for different applications |
| C119.3 | Design, implement, and analyse linear data structures - queues and stacks according to the needs of different applications |
| C119.4 | Implement searching, sorting and hashing algorithms |
| C119.5 | Design, implement, and analyse efficient tree structures to meet requirements such as searching, indexing, and sorting |
| C119.6 | Model problems as graph problems and implement efficient graph algorithms to solve them |

| **Title:DISCRETE MATHEMATICS,Subject Code:MA3354 NBA Code for the Subject :C201 ,Semester : 3 [23-24ODD]Target :65 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C201.1 | Have knowledge of the concepts needed to test the logic of a program |
| C201.2 | Use proof techniques to check the truthfulness of a real life situations |
| C201.3 | Be aware of a class of functions which transforms a finite set into another finite set which relate to input and output functions in computer science and counting principles |
| C201.4 | Use graph theory to formulate the problem and solve it |
| C201.5 | Be exposed to concepts and properties of algebraic structure such as groups, rings and fields |
| C201.6 | Analyse the basic knowledge gained by Lattices , Boolean algebra and apply them |

| **Title:DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION,Subject Code:CS3351 NBA Code for the Subject :C202 ,Semester : 3 [23-24ODD]Target :65 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |

| | |
|---|---|
| C202.1 | Understand the basic concepts of number systems ,logic gates and Boolean expression |
| C202.2 | Analyze and design the various combinational circuits using logic gates |
| C202.3 | Analyze and design the synchronous sequential circuits |
| C202.4 | Understand the fundamentals of computer systems and analyze the execution |
| C202.5 | Analyze different types of control design and identify hazards |
| C202.6 | Understand the characteristics of various memory systems and I/O |

**Title:FUNDAMENTALS OF ECONOMICS,Subject Code:CW3301 NBA Code for the Subject :C203 ,Semester : 3 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C203.1 | To analyze the supporting of price, income and substitution effects in the consumers and producers surplus |
| C203.2 | To compare the equilibrium of a firm under perfect competition, monopoly and monopolistic competition |
| C203.3 | To study the concepts of demand for money and supply of money with appropriate model in macro economic analysis |
| C203.4 | To determine economic variables including inflation, unemployment, poverty, GDP, etc. |
| C203.5 | To analyze macroeconomic policies including fiscal and monetary policies of India |
| C203.6 | To examine and evaluate the problems of voluntary and involuntary unemployment |

**Title:OBJECT ORIENTED PROGRAMMING,Subject Code:CS3391 NBA Code for the Subject :C204 ,Semester : 3 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C204.1 | CO1:Apply the concepts of classes and objects to solve simple problems |
| C204.2 | CO2:Develop programs using inheritance, packages and interfaces |
| C204.3 | CO3:Make use of exception handling mechanisms and multithreaded model to solve real world problems |
| C204.4 | CO3:Make use of exception handling to solve real world problems |
| C204.5 | CO4:Build Java applications with I/O packages, string classes, Collections and generics concepts |
| C204.6 | CO5:Integrate the concepts of event handling and JavaFX components and controls for developing GUI based applications |

**Title:DESIGN AND ANALYSIS OF ALGORITHMS,Subject Code:AD3351 NBA Code for the Subject :C205 ,Semester : 3 [23-24ODD]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C205.1 | Analyze the efficiency of recursive and non-recursive algorithms mathematically |
| C205.2 | Analyze the efficiency of brute force, divide and conquer, Transform and conquer algorithmic techniques |
| C205.3 | Implement and analyze the problems using dynamic programming and greedy algorithmic techniques. |
| C205.4 | Solve the problems using iterative improvement techniques for optimization. |
| C205.5 | Compute the limitations of algorithmic power and solve the problems using backtracking and branch and bound techniques. |
| C205.6 | Analyze the approximation algorithm and the benefits of using the approximation algorithm. |

**Title:FUNDAMENTALS OF DATA SCIENCE AND ANALYTICS,Subject Code:AD3491 NBA Code for the Subject :C206 ,Semester : 3 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C206.1 | Understand the techniques and processes of data science |
| C206.2 | Apply descriptive data analytics |

| | |
|---|---|
| C206.3 | Visualize data for various applications |
| C206.4 | Understand inferential data analytics |
| C206.5 | Analysis and build predictive models from data |
| C206.6 | Learn about time series analysis and survival analysis |

| **Title:BUSINESS COMMUNICATION LABORATORY I,Subject Code:CW3311 NBA Code for the Subject :C207 ,Semester : 3 [23-24ODD]Target :65 Credits:1.5** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C207.1 | Speak fluently in English without errors and present themselves as effective communicators. |
| C207.2 | Use business vocabulary and take part comfortably in business conversations in English |
| C207.3 | Draft letters and reports with appropriate formats and choice of words. |
| C207.4 | Perform well in team and group, resolve conflicts in workplaces and acquire leadership skills. |
| C207.5 | Understand women in all spheres and cultural behaviours of the people and approach them with positive human values |
| C207.6 | Develop their confidence and help them attend interviews successfully. |

| **Title:OBJECT ORIENTED PROGRAMMING LABORATORY,Subject Code:CS3381 NBA Code for the Subject :C208 ,Semester : 3 [23-24ODD]Target :65 Credits:1.5** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C208.1 | To execute simple java program |
| C208.2 | To design and develop java programs using object oriented programming concepts |
| C208.3 | To develop simple applications using object oriented concepts such as package, exceptions |
| C208.4 | To create GUIs and event driven programming applications for real world problems |
| C208.5 | To implement multithreading, and generics concepts |
| C208.6 | To implement and deploy web applications using Java |

| **Title:ENVIRONMENTAL SCIENCES AND SUSTAINABILITY,Subject Code:GE3451 NBA Code for the Subject :215 ,Semester : 4 [23-24EVEN]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| 215.1 | Infer the importance of environment and explain the concepts, types, structure and function of ecosystem |
| 215.2 | Recall the various functions, levels, threats and conservation of biodiversity |
| 215.3 | Explain the different type of pollution and propose the suitable methods to prevent the same to enhance the environment |
| 215.4 | Discuss the conservation of different energy sources, optimal usage and the importance |
| 215.5 | Discuss the aspect of sustainability and means of sustainability management to realize the sustainable development goals |
| 215.6 | List the various management systems, protection and discuss the given solutions for energy to materials for sustainability |

| **Title:PROBABILITY AND STATISTICS,Subject Code:MA3391 NBA Code for the Subject :C210 ,Semester : 4 [23-24EVEN]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C210.1 | Understand the fundamental concepts of probability and to apply them in real time problems. |
| C210.2 | Understand the basic concepts of one dimensional random variables and have knowledge of standard d distributions which can describe real life phenomenon |
| C210.3 | Understand the knowledge of two dimensional random variables and apply in engineering applications. |
| C210.4 | Understand the concept of point estimation and interval estimation |

| | |
|---|---|
| C210.5 | To learn the different types of statistical test when the distributional assumptions of common procedure are not satisfied |
| C210.6 | Acquire knowledge on the traditional statistical quality control methods and develop charting techniques |

| **Title:DATABASE MANAGEMENT SYSTEMS,Subject Code:CS3492 NBA Code for the Subject :C211 ,Semester : 4 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C211.1 | Construct SQL Queries using relational algebra |
| C211.2 | Design database using ER model and normalize the database 70 |
| C211.3 | Construct queries to handle transaction processing |
| C211.4 | Construct queries to maintain consistency of the database |
| C211.5 | Compare and contrast various indexing strategies and apply the knowledge to tune the performance of the database |
| C211.6 | Appraise how advanced databases differ from Relational Databases and find a suitable database for the given requirement |

| **Title:OPERATING SYSTEMS,Subject Code:AL3452 NBA Code for the Subject :C212 ,Semester : 4 [23-24EVEN]Target :65 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C212.1 | Explain the basic concepts and functions of Operating Systems and discuss evolution and organization of operating systems |
| C212.2 | Analyze various scheduling algorithms and process synchronization. |
| C212.3 | Explain deadlock, prevention and avoidance algorithms. |
| C212.4 | Compare and contrast various memory management schemes. |
| C212.5 | Explain the functionality of file systems I/O systems, and Virtualization |
| C212.6 | Compare IOS and Android Operating Systems. |

| **Title:INTRODUCTION TO BUSINESS SYSTEMS,Subject Code:CW3401 NBA Code for the Subject :C213 ,Semester : 4 [23-24EVEN]Target :60 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C213.1 | To demonstrate and strengthen business quality and motivation in students |
| C213.2 | Examine basic business skills and measuring business performance |
| C213.3 | To demonstrate business Applications using business software |
| C213.4 | Apply Enterprise application and Business application |
| C213.5 | Use Business Intelligence in e-business for marketing and sales |
| C213.6 | Use Business Intelligence in e-business for marketing and sales |

| **Title:MACHINE LEARNING,Subject Code:AL3451 NBA Code for the Subject :C214 ,Semester : 4 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C214.1 | C214.1-To understand the basic concepts of machine learning |
| C214.2 | C214.2-To learn basics of linear algebra and statistics for machine learning |
| C214.3 | C214.3-To understand and build supervised learning models |
| C214.4 | C214.4-To understand and build unsupervised learning models |
| C214.5 | C214.5-To understand the concepts of neural networks |
| C214.6 | C214.6-To evaluate the algorithms based on corresponding metrics identified |

| **Title:BUSINESS COMMUNICATION LABORATORY II,Subject Code:CW3411 NBA Code for the Subject :C207 ,Semester : 4 [23-24EVEN]Target :65 Credits:1.5** |
|---|
| At the end of this course, Student will be able to |

| CO-Code | Course outcome Description |
|---|---|
| C207.1 | Speak fluently in English without errors in the sentence construction and hence present themselves as effective English communicators |
| C207.2 | Differentiate between vocabularies used as adjectives, verbs.. |
| C207.3 | Deliver a public speech according to the need of the audience and also be aware of positive body language to be manifested during a speech |
| C207.4 | Deal with the deeper parameters of working in teams like team motivation, multicultural team activity and team conflict resolution |
| C207.5 | Set realistic goals in terms of personal growth |
| C207.6 | Set realistic goals in terms of professional growth |

**Title:DATABASE MANAGEMENT SYSTEMS LABORATORY,Subject Code:CS3481 NBA Code for the Subject :C211 ,Semester : 4 [23-24EVEN]Target :65 Credits:1.5**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C211.1 | Construct SQL Queries using relational algebra |
| C211.2 | Design database using ER model and normalize the database 70 |
| C211.3 | Construct queries to handle transaction processing |
| C211.4 | Construct queries to maintain consistency of the database |
| C211.5 | Compare and contrast various indexing strategies and apply the knowledge to tune the performance of the database |
| C211.6 | Appraise how advanced databases differ from Relational Databases and find a suitable database for the given requirement. |

**Title:DATABASE MANAGEMENT SYSTEMS LABORATORY,Subject Code:AL3461 NBA Code for the Subject :C217 ,Semester : 4 [23-24EVEN]Target :65 Credits:**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C217.1 | C217.1-Apply suitable algorithms for selecting the appropriate features for analysis. |
| C217.2 | C217.2-Implement supervised machine learning algorithms on standard datasets and evaluate the performance. |
| C217.3 | C217.3-Apply unsupervised machine learning algorithms on standard datasets and evaluate the performance |
| C217.4 | C217.4-Build the graph based learning models for standard data sets |
| C217.5 | C217.5-Assess the performance of different ML algorithms and select the suitable one based on the application. |
| C217.6 | C217.6-Compare the performance of different ML algorithms and select the suitable one based on the application. |

**Title:EMBEDDED SYSTEMS AND IOT,Subject Code:CS3691 NBA Code for the Subject :C301 ,Semester : 5 [23-24ODD]Target :60 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C301.1 | Explain the architecture of embedded processors. |
| C301.2 | Write embedded C programs |
| C301.3 | Design simple embedded applications. |
| C301.4 | Compare the communication models in IOT |
| C301.5 | Design IoT applications using Arduino |
| C301.6 | Design IoT applications using Raspberry Pi |

**Title:FUNDAMENTALS OF MANAGEMENT,Subject Code:CW3501 NBA Code for the Subject :C302 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C302.1 | Understand the different elements of effective management |

| | |
|---|---|
| C302.2 | Understand the roles and responsibilities of a good manager |
| C302.3 | Apply the concepts of planning and decision making in organizations |
| C302.4 | Describe the concepts of organization and need for staffing process |
| C302.5 | Adopt the concept of directing through motivation and leadership |
| C302.6 | Demonstrate the use of control methods in changing business environment |

**Title:DATA AND INFORMATION SECURITY,Subject Code:CW3551 NBA Code for the Subject :C303 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C303.1 | CO1: Understand the basics of data and information security |
| C303.2 | CO2:Understand the legal, ethical and professional issues in information security |
| C303.3 | CO3: Understand the various authentication schemes to simulate different applications. |
| C303.4 | CO4:Understand various security practices |
| C303.5 | CO5: Understand various system security standards |
| C303.6 | CO6:Understand the Web security protocols for E-Commerce applications. |

**Title:Cloud Computing,Subject Code:CCS335 NBA Code for the Subject :C304PE1V21 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C304PE1V21.1 | Understand the design challenges in the cloud |
| C304PE1V21.2 | Apply the concept of virtualization and its types |
| C304PE1V21.3 | Experiment with virtualization of hardware resources and Docker |
| C304PE1V21.4 | Develop and deploy services on the cloud and set up a cloud environment |
| C304PE1V21.5 | To study about pioneers in cloud service provider |
| C304PE1V21.6 | Explain security challenges in the cloud environment |

**Title:Storage Technologies,Subject Code:CCS367 NBA Code for the Subject :C305PE2V25 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C305PE2V25.1 | To understand the fundamentals of information storage management. |
| C305PE2V25.2 | To illustrate the usage of advanced intelligent storage systems and RAID |
| C305PE2V25.3 | To interpret various storage networking architectures. |
| C305PE2V25.4 | To understand the concept for disaster recovery techniques. |
| C305PE2V25.5 | To understand various replication technologies |
| C305PE2V25.6 | To infer the security measures to be employed in information storage systems |

**Title:FILM APPRECIATION,Subject Code:MX3083 NBA Code for the Subject :C306M13 ,Semester : 5 [23-24ODD]Target :65 Credits:0**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C306M13.1 | learn the Component of Films |
| C306M13.2 | to learn the Evolution of Film Language |
| C306M13.3 | to develop Film Theories |
| C306M13.4 | to make Criticism/Appreciation |
| C306M13.5 | Development of Films |
| C306M13.6 | to comment about Indian Films |

**Title:FILM APPRECIATION,Subject Code:MX3083 NBA Code for the Subject :C306M13 ,Semester : 5 [23-24ODD]Target :65 Credits:0**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C306M13.1 | learn the Component of Films |

| | |
|---|---|
| C306M13.2 | to learn the Evolution of Film Language |
| C306M13.3 | to develop Film Theories |
| C306M13.4 | to make Criticism/Appreciation |
| C306M13.5 | Development of Films |
| C306M13.6 | to comment about Indian Films |

**Title:Business Analytics,Subject Code:CCW331 NBA Code for the Subject :C308 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C308.1 | EXPLAIN THE REALWORLD BUSINESS PROBLEMS AND MODELS WITH ANALYTIC SOLUTIONS |
| C308.2 | IDENTIFY THE BUSINESS PROCESS FOR EXTRACTING BUSINESS INTELLIGENCE |
| C308.3 | APPLY PREDICTIVE ANALYSIS OR BUSINESS FORECASTING |
| C308.4 | APPLY ANALYTICS FOR SUPPLY CHAIN MANAGEMENT |
| C308.5 | APPLY ANALYTICS FOR LOGISTICS MANAGEMENT |
| C308.6 | USE ANALYTICS FOR MARKETING AND DATA |

**Title:Object Oriented Software Engineering,Subject Code:CCS356 NBA Code for the Subject :C309 ,Semester : 6 [23-24EVEN]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C309.1 | To understand Software Engineering Lifecycle Models |
| C309.2 | To Perform software requirements analysis |
| C309.3 | To gain knowledge of the System Analysis and Design concepts using UML |
| C309.4 | To know software architecture and Apply design patterns |
| C309.5 | To understand software testing and maintenance approaches |
| C309.6 | To work on project management scheduling using DevOps |

**Title:Recommender Systems,Subject Code:CCS360 NBA Code for the Subject :C310E1V12 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C310E1V12.1 | Understand the basic concepts of recommender systems |
| C310E1V12.2 | Implement machine-learning and data-mining algorithms in recommender systems data sets |
| C310E1V12.3 | Implementation of Collaborative Filtering in carrying out performance evaluation of recommender systems based on various metrics recommender systems based on various metrics. |
| C310E1V12.4 | Design and implement a simple recommender system. |
| C310E1V12.5 | Learn about advanced topics of recommender systems. |
| C310E1V12.6 | Learn about advanced topic Learn about advanced topics of recommender systems applications s of recommender systems applications |

**Title:Digital marketing,Subject Code:CCW332 NBA Code for the Subject :C311E2V63 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C311E2V63.1 | To examine and explore the role and importance of digital marketing in today¿s rapidly changing business environment |
| C311E2V63.2 | To focuses on how digital marketing can be utilised by organisations and how its effectiveness can measured. |
| C311E2V63.3 | To know the key elements of a digital marketing strategy. |
| C311E2V63.4 | To study how the effectiveness of a digital marketing campaign can be measured |
| C311E2V63.5 | To demonstrate advanced practical skills in common digital marketing tools such as SEO,SEM |
| C311E2V63.6 | To demonstrate advanced practical skills in common digital marketing tools such as |

| | |
|---|---|
| | Social media and Blogs |

**Title:Exploratory Data Analysis,Subject Code:CCS346 NBA Code for the Subject :C312PE11 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C312PE11.1 | Understand the fundamentals of exploratory data analysis. |
| C312PE11.2 | Implement the data visualization using Matplotlib. |
| C312PE11.3 | Perform univariate data exploration and analysis. |
| C312PE11.4 | Apply bivariate data exploration and analysis. |
| C312PE11.5 | Use Data exploration and visualization techniques for multivariate data. |
| C312PE11.6 | Use Data exploration and visualization techniques for time series data. |

**Title:IT Project Management,Subject Code:CW3007 NBA Code for the Subject :C313PE55 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C313PE55.1 | Apply project management principles in business situations |
| C313PE55.2 | Plan for the given project and analyze it |
| C313PE55.3 | Prepare budget for the project based on cosstimation and risk management |
| C313PE55.4 | Optimize resource scheduling, utilization and time optimization |
| C313PE55.5 | Understand project control and completion |
| C313PE55.6 | Learn software quality management |

**Title:Business Analytics Laboratory ,Subject Code:CW3611 NBA Code for the Subject :C308 ,Semester : 6 [23-24EVEN]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C308.1 | IMPLEMENT VARIOUS MACHINE LEARNING TECHNIQUES FOR PREDICTIVE ANALYSIS |
| C308.2 | LEARN THE VARIOUS SOFTWARE DEVELOPMENT TECHNOLOGIES |
| C308.3 | LEARN PREDICTIVE ANALYSIS IN HR |
| C308.4 | LEARN PREDICTIVE ANALYSIS IN SUPPLY CHAIN |
| C308.5 | PERFORM PREDICTIVE ANALYSIS FOR CUSTOMER BEHAVIOUR IN MARKETING |
| C308.6 | PERFORM PREDICTIVE ANALYSIS IN SALES |

**Title:Well Being with Traditional Practices - Yoga, Ayurveda and Siddha,Subject Code:MX3085 NBA Code for the Subject :C314M21 ,Semester : 6 [23-24EVEN]Target :65 Credits:0**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C314M21.1 | To enjoy life happily with fun filled new style activities that help to maintain health also |
| C314M21.2 | To adapt a few lifestyle changes that will prevent many health disorders |
| C314M21.3 | To be cool and handbill every emotion very smoothly in every walk of life |
| C314M21.4 | To learn to eat cost effective but healthy foods that are rich in essential nutrients |
| C314M21.5 | To develop immunity naturally that will improve resistance against many health disorders |
| C314M21.6 | To Know simple practices of Yoga for wellness |

## PROGRAMME: CSE (AIML)

## COURSE OUTCOME FOR THE ACADEMIC YEAR: 2023-2024

| **Title:PROFESSIONAL ENGLISH - 1,Subject Code:HS3152 NBA Code for the Subject :C101 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C101.1 | C101.1 To improve the communicative competence of learners by throwing light on vocabulary and basic grammar |
| C101.2 | C101.2 To help learners use language effectively in academic (grammar) /work contexts (reports) |
| C101.3 | C101.3 To build on students¿ English language skills by engaging them in listening, speaking and grammar learning activities those are relevant to authentic contexts. |
| C101.4 | C101.4 To develop learners¿ ability to read and write complex texts, summaries, articles, blogs, Definitions, essays and user manuals. C101.4 To develop learners¿ ability to read and write complex tex |
| C101.5 | C101.5 To use language efficiently in expressing their opinions via various media and graphical representation. |
| C101.6 | C101.6 Participate effectively in informal conversations; introduce themselves and their friends and express opinion in English with different types of sentences |

| **Title:MATRICES AND CALCULUS,Subject Code:MA3151 NBA Code for the Subject :C102 ,Semester : 1 [23-24ODD]Target :65 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C102.1 | Eigenvalues and eigenvectors, diagonalization of a matrix,symmetric matrices, Positive definite matrices and similar matrices. |
| C102.2 | Understand the limit, continuity and derivative of the functions. Solve various functions and its maxima /minima using differentiation rules. |
| C102.3 | Apply the total and partial derivatives in Taylor series expansion of functions and the extremum of functions. |
| C102.4 | Evaluate the integrals both by using Riemann sums and by using the Fundamental theorem of Calculus. Evaluate integrals using various techniques of integration. |
| C102.5 | Understand the concepts of double integration and determine the area using integration. Also understands the concepts of the change of order of integration and Change of variables in integrals. |
| C102.6 | Understand the concepts of Triple integration and determine the volume using integration. |

| **Title:ENGINEERING PHYSICS,Subject Code:PH3151 NBA Code for the Subject :C103 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C103.1 | Understand the importance of mechanics. |
| C103.2 | Express their knowledge in electromagnetic waves |
| C103.3 | Demonstrate a strong foundational knowledge in optics and lasers |
| C103.4 | Demonstrate a strong foundational knowledge in oscillations |
| C103.5 | Understand the importance of quantum physics |
| C103.6 | Comprehend and apply quantum mechanical principles towards the formation of energy bands |

| **Title:ENGINEERING CHEMISTRY,Subject Code:CY3151 NBA Code for the Subject :C104 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C104.1 | To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water |
| C104.2 | To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials |

| | |
|---|---|
| C104.3 | To apply the knowledge of phase rule and composites for materials selection requirements. |
| C104.4 | To recommend suitable fuel for engg. processes and applications |
| C104.5 | To analyse combustion process and its calculations |
| C104.6 | To recognize different forms of energy resources and apply them for suitable applications in energy sectors. |

| **Title:PROBLEM SOLVING AND PYTHON PROGRAMMING,Subject Code:GE3151 NBA Code for the Subject :C105 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C105.1 | Develop algorithmic solutions to simple computational problems. |
| C105.2 | Develop and execute simple Python programs. |
| C105.3 | Write simple Python programs using conditionals and looping for solving problems. |
| C105.4 | Decompose a Python program into functions. |
| C105.5 | Represent compound data using Python lists, tuples, dictionaries etc. |
| C105.6 | Read and write data from/to files in Python programs. |

| **Title:PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY,Subject Code:GE3171 NBA Code for the Subject :C106 ,Semester : 1 [23-24ODD]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C106.1 | Develop algorithmic solutions to simple computational problems |
| C106.2 | Develop and execute simple Python programs. |
| C106.3 | Implement programs in Python using conditionals and loops for solving problems. |
| C106.4 | Deploy functions to decompose a Python program. |
| C106.5 | Process compound data using Python data structures. |
| C106.6 | Utilize Python packages in developing software applications. |

| **Title:PHYSICS AND CHEMISTRY LABORATORY,Subject Code:BS3171 NBA Code for the Subject :C107 ,Semester : 1 [23-24ODD]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C107.1 | gain knowledge about elasticity, modulus, oscillations and also able to calculate Young's,rigidity modulus, moment of inertia of regular and irregular bodies. |
| C107.2 | understand the application of interference and diffraction in finding thickness of the given sample and wavelength of the source respectively |
| C107.3 | calculate the variation of resistance with respect to temperature and also able to calculate the band gap of semiconductor |
| C107.4 | Analyse various water quality parameters-Hardness, alkalinity and DO in water sample. |
| C107.5 | Acquire practical skills by using instruments like conductivity meter, pH meter and potentiometer. |
| C107.6 | Finding the strength and amount of nickel in steel. |

| **Title:PROFESSIONAL ENGLISH-II,Subject Code:HS3252 NBA Code for the Subject :C108 ,Semester : 2 [23-24EVEN]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C108.1 | To compare and contrast products and ideas through technical texts in essays with appropriate grammatical usage and contextual meanings. |
| C108.2 | to enhance learners' awareness of general rules writing for specific audiences through professional emails and responses to compliants |
| C108.3 | to help learners understand the purpose, audience, contexts of different types of letters/ essays/ checklists |
| C108.4 | to analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format. to report events and the processes of technical and industrial nature |

| | |
|---|---|
| C108.5 | to make use of grammatical items effectively in writing recommendations and in transcoding the graphs |
| C108.6 | to write a winning job/internship application-cover letter and resume SOP |

| **Title:STATISTICS AND NUMERICAL METHODS,Subject Code:MA3251 NBA Code for the Subject :C109 ,Semester : 2 [23-24EVEN]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C109.1 | Apply the concept of testing of hypothesis for small and large samples in real life problems |
| C109.2 | Apply the basic concepts of classifications of design of experiments in the field of agriculture. |
| C109.3 | Solve algebraic, transcendental equations and simultaneous equations by direct method. |
| C109.4 | Solve simultaneous equations by iterative method and Eigen value problems. |
| C109.5 | Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems. |
| C109.6 | Gain the knowledge of various techniques and methods to solve first order ordinary differential equations with initial conditions in engineering applications. |

| **Title:PHYSICS FOR INFORMATION SCIENCE,Subject Code:PH3256 NBA Code for the Subject :C110 ,Semester : 2 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C110.1 | Gain knowledge on classical mechanics, quantum theory and energy band structure. |
| C110.2 | Acquire knowledge on basics of semiconductor physics |
| C110.3 | Get knowledge on magnetic properties of materials and their applications. |
| C110.4 | Have necessary understanding on the functioning of optical materials for opto electronics |
| C110.5 | Understand the basics of quantum structures. |
| C110.6 | Gain knowledge on basics and applications of quantum computing. |

| **Title:BASIC ELECTRICAL AND ELECTRONICS ENGINEERING,Subject Code:BE3251 NBA Code for the Subject :C111 ,Semester : 2 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C111.1 | Compute Electric DC Circuit parameters for simple problems |
| C111.2 | Compute the AC parameters for simple problems |
| C111.3 | Explain the working principle and applications of electrical machines |
| C111.4 | Analyze the characteristics of analog electronic devices |
| C111.5 | Explain the basic concepts of digital electronics |
| C111.6 | Explain the operating principles of measuring instruments |

| **Title:ENGINEERING GRAPHICS,Subject Code:GE3251 NBA Code for the Subject :C112 ,Semester : 2 [23-24EVEN]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C112.1 | Student will be able to draw basic geometrical curves |
| C112.2 | Student will be able to project points, lines and planes in first angle projection by rotating method |
| C112.3 | Student will be able to orthographic projection with free hand sketches |
| C112.4 | Students will be able to project views of any solids by rotating object method. |
| C112.5 | Students will be able to project sectioned view and to develop lateral surface of given solid. |
| C112.6 | Students will be able to sketch isometric and perspective views of given solid. |

| **Title:PROGRAMMING IN C,Subject Code:CS3251 NBA Code for the Subject :C113 ,Semester : 2 [23-24EVEN]Target :65 Credits:3** |
|---|
| At the end of this course, Student will be able to |

| CO-Code | Course outcome Description |
|---|---|
| C113.1 | Demonstrate knowledge on C Programming constructs |
| C113.2 | Develop simple applications in C using basic constructs |
| C113.3 | Design and implement applications using arrays and strings |
| C113.4 | Develop and implement modular applications in C using functions |
| C113.5 | Develop applications in C using structures and pointers |
| C113.6 | Design applications using sequential and random access file processing |

**Title:ENGINEERING PRACTICES LABORATORY,Subject Code:GE3271 NBA Code for the Subject :C114 ,Semester : 2 [23-24EVEN]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C114.1 | Students will be able to distinguish residential house wiring, fluorescent lamp wiring and stair case wiring. |
| C114.2 | Students will be able to define electrical quantities like voltage, current, energy and resistance and their measurement using CRO. |
| C114.3 | Students will be able to analyze different logic gates, clock, rectifier and to solder devices and components. |
| C114.4 | Students will able to understand the pipe connections for the home application and industrial constructions |
| C114.5 | Students will be able to do plan the real geometry of the shapes for industrial applications. |
| C114.6 | Students will be able to understand the concept of joining the metal by welding. |

**Title:PROGRAMMING IN C LABORATORY,Subject Code:CS3271 NBA Code for the Subject :C115 ,Semester : 2 [23-24EVEN]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C115.1 | Demonstrate knowledge on C programming constructs |
| C115.2 | Develop simple applications in C using basic constructs |
| C115.3 | Design and implement applications using arrays and strings |
| C115.4 | Develop and implement modular applications in C using functions |
| C115.5 | Develop applications in C using structures and pointers |
| C115.6 | Design applications using sequential and random access file processing |

**Title:DISCRETE MATHEMATICS,Subject Code:MA3354 NBA Code for the Subject :C201 ,Semester : 3 [23-24ODD]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C201.1 | Have knowledge of the concepts needed to test the logic of a program |
| C201.2 | Use proof techniques to check the truthfulness of a real life situations |
| C201.3 | Be aware of a class of functions which transforms a finite set into another finite set which relate to input and output functions in computer science and counting principles |
| C201.4 | Use graph theory to formulate the problem and solve it |
| C201.5 | Be exposed to concepts and properties of algebraic structure such as groups, rings and fields |
| C201.6 | Analyse the basic knowledge gained by Lattices , Boolean algebra and apply them |

**Title:DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION,Subject Code:CS3351 NBA Code for the Subject :C203 ,Semester : 3 [23-24ODD]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C203.1 | Simplify Boolean functions using K-map |
| C203.2 | Design and analyze combinational circuits |
| C203.3 | Design and analyze synchronous sequential circuits |

| | |
|---|---|
| C203.4 | write HDL code for combinational and sequential circuits |
| C203.5 | Design and analyze asynchronous sequential circuits |
| C203.6 | Implement designs using memory and programmable logic devices |

| **Title:FOUNDATIONS OF DATA SCIENCE,Subject Code:CS3352 NBA Code for the Subject :C203 ,Semester : 3 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C203.1 | Define the data science process |
| C203.2 | Understand different types of data description for data science process |
| C203.3 | Gain knowledge on relationships between data |
| C203.4 | Use the Python Libraries for Data Wrangling |
| C203.5 | Apply visualization Libraries in Python to interpret Data |
| C203.6 | Apply visualization Libraries in Python to explore Data |

| **Title:DATA STRUCTURES AND ALGORITHMS,Subject Code:CD3291 NBA Code for the Subject :C204 ,Semester : 3 [23-24ODD]Target :65 Credits:1.5** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C204.1 | Explain abstract data types and Analysis of Algorithms |
| C204.2 | Learn Stack Queue implementation |
| C204.3 | Implement sorting searching algorithms, hash function and open addressing |
| C204.4 | Learn tree structures and traversals and their types(Binary,AVL) to solve various problems |
| C204.5 | Discuss the topological sort,graph connectivity and applications of graphs |
| C204.6 | Discuss the dynamic program approach, spanning trees |

| **Title:OBJECT ORIENTED PROGRAMMING,Subject Code:CS3391 NBA Code for the Subject :C205 ,Semester : 3 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C205.1 | "To understand Object Oriented Programming concepts and basics of Java programming language |
| C205.2 | To know the principles of packages, inheritance and interfaces |
| C205.3 | To develop a java application with threads and generics classes |
| C205.4 | To define exceptions |
| C205.5 | To learn use I/O streams |
| C205.6 | To design and build Graphical User Interface Application using JAVAFX |

| **Title:OBJECT ORIENTED PROGRAMMING LABORATORY,Subject Code:CS3381 NBA Code for the Subject :C207 ,Semester : 3 [23-24ODD]Target :65 Credits:1.5** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C207.1 | Design and develop java programs using object oriented programming concepts |
| C207.2 | Develop simple applications using object oriented concepts such as package, |
| C207.3 | To develop a java application with threads and generics classes |
| C207.4 | To define exceptions |
| C207.5 | To learn use I/O streams |
| C207.6 | Create GUIs and event driven programming applications for real world problems |

| **Title:DATA SCIENCE LABORATORY,Subject Code:CS3361 NBA Code for the Subject :C208 ,Semester : 3 [23-24ODD]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |

| | |
|---|---|
| C208.1 | Make use of the python libraries for data science |
| C208.2 | Make use of the python libraries for data science |
| C208.3 | Perform descriptive analytics on the benchmark data sets. |
| C208.4 | Perform correlation and regression analytics on standard data sets |
| C208.5 | Present data using visualization packages in Python |
| C208.6 | Interpret data using visualization packages in Python |

**Title:DATA STRUCTURES AND ALGORITHMS LABORATORY,Subject Code:CD3281 NBA Code for the Subject :C306 ,Semester : 3 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C306.1 | To implement ADTs in Python |
| C306.2 | To design and implement linear data structures ¿ lists, stacks, and queues |
| C306.3 | To implement sorting problems |
| C306.4 | To implement searching and hashing algorithms |
| C306.5 | To solve problems using tree |
| C306.6 | To solve graph structures |

**Title:OBJECT ORIENTED PROGRAMMING LABORATORY,Subject Code:CS3381 NBA Code for the Subject :C207 ,Semester : 3 [23-24ODD]Target :65 Credits:1.5**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C207.1 | Design and develop java programs using object oriented programming concepts |
| C207.2 | Develop simple applications using object oriented concepts such as package, |
| C207.3 | To develop a java application with threads and generics classes |
| C207.4 | To define exceptions |
| C207.5 | To learn use I/O streams |
| C207.6 | Create GUIs and event driven programming applications for real world problems |

**Title:Database Design and Management,Subject Code:AD3391 NBA Code for the Subject :C203 ,Semester : 4 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C203.1 | understand the database development life cycle and apply conceptual modeling |
| C203.2 | Apply SQL and programming in SQL to create, manipulate and query the database |
| C203.3 | Apply the conceptual-to-relational mapping and normalization to design relational database |
| C203.4 | determine the serializability of any non-serial schedule using concurrency techniques |
| C203.5 | Apply the data model and querying in Object-relational Databases |
| C203.6 | Learn the basics of No-SQL databases. |

**Title:Theory of Computation,Subject Code:CS3452 NBA Code for the Subject :C210 ,Semester : 4 [23-24EVEN]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C210.1 | Construct automata theory using Finite Automata |
| C210.2 | Write regular expressions for any pattern |
| C210.3 | Design context free grammar and Pushdown Automata |
| C210.4 | Describe CFL and Normal Forms |
| C210.5 | Design Turing machine for computational functions |
| C210.6 | Differentiate between decidable and undecidable problems |

**Title:ENVIRONMENTAL SCIENCES AND SUSTAINABILITY,Subject Code:GE3451 NBA Code for the Subject :C215 ,Semester : 4 [23-24EVEN]Target :65 Credits:2**

| At the end of this course, Student will be able to | |
|---|---|
| **CO-Code** | **Course outcome Description** |
| C215.1 | Infer the importance of environment and explain the concept, types, structure and function of ecosystem |
| C215.2 | Recall the various functions, different values, levels, threats and conservation of biodiversity |
| C215.3 | Explain the different type of pollution and propose the suitable methods to prevent the same to enhance the environment |
| C215.4 | Discuss the types of energy resources and conservation |
| C215.5 | Discuss the aspect of sustainability and the means of sustainability management to realize the SDG targets |
| C215.6 | List the various environmental management systems(EMS) for environmental protection and discusses the given solutions for energy to materials for sustainability |

| **Title:OPERATING SYSTEMS,Subject Code:AL3452 NBA Code for the Subject :C216 ,Semester : 4 [23-24EVEN]Target :65 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C216.1 | Explain the basic concepts and functions of operating systems and discuss evolution of OS |
| C216.2 | Analyze various scheduling algorithms and process synchronization |
| C216.3 | Explain deadlock prevention and avoidance algorithms |
| C216.4 | Compare and contrast various memory management schemes. |
| C216.5 | Explain the functionality of file systems, I/O systems, and Virtualization |
| C216.6 | Compare iOS and Android Operating Systems |

| **Title:MACHINE LEARNING,Subject Code:AL3451 NBA Code for the Subject :C232 ,Semester : 4 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C232.1 | Explain the basic concepts of machine learning |
| C232.2 | Construct supervised learning models |
| C232.3 | Learn the concepts in Bayesian analysis from probability models and methods |
| C232.4 | Construct unsupervised learning models |
| C232.5 | Analyze the concept of neural networks for learning linear and non-linear activation functions |
| C232.6 | Evaluate and compare different models |

| **Title:Artificial Intelligence,Subject Code:AL3391 NBA Code for the Subject :C308 ,Semester : 4 [23-24EVEN]Target :65 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C308.1 | EXPLAIN INTELLIGENT AGENT FRAMEWORK |
| C308.2 | APPLY PROBLEM SOLVING TECHNIQUES |
| C308.3 | APPLY GAME PLAYING TECHNIQUES |
| C308.4 | APPLY CONSTRAINT SATISFACTION TECHNIQUES |
| C308.5 | PERFORM LOGICAL REASONING |
| C308.6 | PERFORM PROBABILISTIC REASONING UNDER UNCERTAINITY |

| **Title:Database Design and Management Laboratory,Subject Code:AD3381 NBA Code for the Subject :C207 ,Semester : 4 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C207.1 | Understand the database development life cycle |
| C207.2 | Design relational database using conceptual-to-relational mapping, Normalization |

| | |
|---|---|
| C207.3 | Apply SQL for creation, manipulation and retrieval of data |
| C207.4 | Develop a database applications for real-time problems |
| C207.5 | Design and query object-relational databases |
| C207.6 | Learn the basics of No-SQL databases. |

| **Title:Artificial Intelligence & Machine Learning Laboratory,Subject Code:AL3411 NBA Code for the Subject :C235 ,Semester : 4 [23-24EVEN]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C235.1 | Implement uninformed and informed search techniques |
| C235.2 | Build a knowledge base in Prolog and process queries to perform inference. |
| C235.3 | Develop supervised learning models |
| C235.4 | Develop regression models |
| C235.5 | Compare and evaluate the performance of different models |
| C235.6 | Develop prediction models |

**Programme:B.E. Computer Science and Engineering**

**Course OutComes for the Academic Year : 2023-24**

| **Title:PROFESSIONAL ENGLISH - 1,Subject Code:HS3152 NBA Code for the Subject :C101 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C101.1 | To improve the communicative competence of learners by throwing light on vocabulary and basic grammar |
| C101.2 | To help learners use language effectively in academic (grammar) /work contexts (reports) |
| C101.3 | To build on students¿ English language skills by engaging them in listening, speaking and grammar learning activities those are relevant to authentic contexts. |
| C101.4 | To develop learners¿ ability to read and write complex texts, summaries, articles, blogs, Definitions, essays and user manuals. |
| C101.5 | To use language efficiently in expressing their opinions via various media and graphical representation |
| C101.6 | Participate effectively in informal conversations; introduce themselves and their friends and express opinion in English with different types of sentences |

| **Title:MATRICES AND CALCULUS,Subject Code:MA3151 NBA Code for the Subject :C102 ,Semester : 1 [23-24ODD]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C102.1 | Eigenvalues and eigenvectors, diagonalization of a matrix,symmetric matrices, Positive definite matrices and similar matrices. |
| C102.2 | Understand the limit, continuity and derivative of the functions. Solve various functions and its maxima /minima using differentiation rules. |
| C102.3 | Apply the total and partial derivatives in Taylor series expansion of functions and the extremum of functions. |
| C102.4 | Evaluate the integrals both by using Riemann sums and by using the Fundamental theorem of Calculus. Evaluate integrals using various techniques of integration. |
| C102.5 | Understand the concepts of double integration and determine the area using integration. Also understands the concepts of the change of order of integration and Change of variables in integrals. |
| C102.6 | Understand the concepts of Triple integration and determine the volume using integration. |

| **Title:ENGINEERING PHYSICS,Subject Code:PH3151 NBA Code for the Subject :C103 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C103.1 | To understand the importance of mechanics |
| C103.2 | Express their knowledge in electromagnetic waves. |
| C103.3 | Demonstrate a strong foundational knowledge in optics and lasers. |
| C103.4 | Understand the importance of quantum physics. |
| C103.5 | Comprehend and apply quantum mechanical principles towards the formation of energy bands |
| C103.6 | Demonstrate a strong foundational knowledge in oscillations |

| **Title:ENGINEERING CHEMISTRY,Subject Code:CY3151 NBA Code for the Subject :C104 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C104.1 | To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water |
| C104.2 | To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engg and tech. applications |
| C104.3 | To apply the knowledge of phase rule and composites for materials selection requirements. |

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|---|---|
| C104.4 | To recommend suitable fuel for engg. processes and applications |
| C104.5 | To analyse combustion process and its calculations |
| C104.6 | To recognize different forms of energy resources and apply them for suitable applications in energy sectors. |

| **Title:PROBLEM SOLVING AND PYTHON PROGRAMMING,Subject Code:GE3151 NBA Code for the Subject :C105 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C105.1 | To understand the basics of algorithmic problem solving |
| C105.2 | To learn to solve problems using Python conditionals and loops. |
| C105.3 | To define Python functions and use function calls to solve problems. |
| C105.4 | To use Python data structures - lists, tuples, dictionaries to represent complex data. |
| C105.5 | To learn about usage of python packages and modules |
| C105.6 | To do input/output with files in Python |

| **Title:PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY,Subject Code:GE3171 NBA Code for the Subject :C106 ,Semester : 1 [23-24ODD]Target :80 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C106.1 | To understand the problem solving approaches. |
| C106.2 | To learn the basic programming constructs in Python. |
| C106.3 | To learn the programming constructs in Python like loop, function, recursion. |
| C106.4 | To practice various computing strategies for Python-based solutions to real world problems. |
| C106.5 | To use Python data structures-lists, tuples, dictionaries. |
| C106.6 | To do input/output with files in Python. |

| **Title:PHYSICS AND CHEMISTRY LABORATORY,Subject Code:BS3171 NBA Code for the Subject :C107 ,Semester : 1 [23-24ODD]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C107.1 | gain knowledge about elasticity, modulus, oscillations and also able to calculate Young's,rigidity modulus, moment of inertia of regular and irregular bodies. |
| C107.2 | understand the application of interference and diffraction in finding thickness of the given sample and wavelength of the source respectively |
| C107.3 | calculate the variation of resistance with respect to temperature and also able to calculate the band gap of semiconductor |
| C107.4 | Analyse various water quality parameters-Hardness, alkalinity and DO in water sample. |
| C107.5 | Acquire practical skills by using instruments like conductivity meter, pH meter and potentiometer. |
| C107.6 | Finding the strength and amount of nickel in steel. |

| **Title:PROFESSIONAL ENGLISH-II,Subject Code:HS3252 NBA Code for the Subject :C108 ,Semester : 2 [23-24EVEN]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C108.1 | To compare and contrast products and ideas through technical texts in essays with appropriate grammatical usage and contextual meanings. |
| C108.2 | To enhance learners¿ awareness of general rules of writing for specific audiences through professional emails and responses to complaints. |
| C108.3 | To help learners understand the purpose, audience, contexts of different types of letters/essays/checklists |
| C108.4 | To analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format. To report events and the processes of technical and industrial nature |
| C108.5 | To make use of grammatical items effectively in writing recommendations and in |

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| | transcoding the graphs |
| C108.6 | To write a winning job/internship application-cover letter and resume /SoP-Statement of purpose |

| **Title:STATISTICS AND NUMERICAL METHODS,Subject Code:MA3251 NBA Code for the Subject :C109 ,Semester : 2 [23-24EVEN]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C109.1 | Apply the concept of testing of hypothesis for small and large samples in real life problems. |
| C109.2 | Gain the knowledge of various techniques, and methods to solve first order ODE equations with initial conditions in engineering applications |
| C109.3 | Apply the basic concepts of classification of design of experiments in the field of agriculture |
| C109.4 | Solve algebraic , transcendental equations ad simultaneous equations by direct method |
| C109.5 | Solve simultaneous equations by iterative method and eigen value problems |
| C109.6 | Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation, integration for engineering problems. |

| **Title:PHYSICS FOR INFORMATION SCIENCE,Subject Code:PH3256 NBA Code for the Subject :C110 ,Semester : 2 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C110.1 | Gain knowledge on classical and quantum electron theories, and energy band structures |
| C110.2 | Acquire knowledge on basics of semiconductor physics |
| C110.3 | Get knowledge on magnetic properties of materials and their applications in data storage |
| C110.4 | Have the necessary understanding on the functioning of optical materials for optoelectronics |
| C110.5 | Understand the basics of quantum structures |
| C110.6 | Applications and basics of quantum computing |

| **Title:BASIC ELECTRICAL AND ELECTRONICS ENGINEERING,Subject Code:BE3251 NBA Code for the Subject :C111 ,Semester : 2 [23-24EVEN]Target :80 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C111.1 | Compute Electric DC Circuit parameters for simple problems |
| C111.2 | Compute the AC parameters for simple problems |
| C111.3 | Explain the working principle and applications of electrical machines |
| C111.4 | Analyze the characteristics of analog electronic devices |
| C111.5 | Explain the basic concepts of digital electronics |
| C111.6 | Explain the operating principles of measuring instruments |

| **Title:ENGINEERING GRAPHICS,Subject Code:GE3251 NBA Code for the Subject :C112 ,Semester : 2 [23-24EVEN]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C112.1 | Draw the various types of Engineering Curves. |
| C112.2 | Draw the Projection of Points, Lines and Plain Surfaces. |
| C112.3 | Draw the Projection of Solids. |
| C112.4 | Draw the Freehand Sketch of Simple Objects. |
| C112.5 | Draw the Projection of Sectioned Solids and Development of Surfaces. |
| C112.6 | Draw the Isometric and Perspective Projections of Simple Solids. |

| **Title:PROGRAMMING IN C,Subject Code:CS3251 NBA Code for the Subject :C113 ,Semester : 2 [23-24EVEN]Target :65 Credits:3** |
|---|
| At the end of this course, Student will be able to |

| CO-Code | Course outcome Description |
|---|---|
| C113.1 | Demonstrate knowledge on C Programming constructs |
| C113.2 | Develop simple applications in C using basic constructs |
| C113.3 | Design and implement applications using arrays and strings |
| C113.4 | Develop and implement modular applications in C using functions. |
| C113.5 | Develop applications in C using structures and pointers. |
| C113.6 | Design applications using sequential and random access file processing. |

**Title:ENGINEERING PRACTICES LABORATORY,Subject Code:GE3271 NBA Code for the Subject :C114 ,Semester : 2 [23-24EVEN]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C114.1 | distinguish residential house wiring, fluorescent lamp wiring and stair case wiring. |
| C114.2 | define electrical quantities like voltage, current, energy and resistance and their measurement using CRO. |
| C114.3 | analyze different logic gates, clock, rectifier and to solder devices and components. |
| C114.4 | understand the pipe connections for the home application and industrial constructions |
| C114.5 | understand the pipe connections for the home application and industrial constructions |
| C114.6 | understand the concept of joining the metal by welding. |

**Title:PROGRAMMING IN C LABORATORY,Subject Code:CS3271 NBA Code for the Subject :C115 ,Semester : 2 [23-24EVEN]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C115.1 | Demonstrate knowledge on C programming construct |
| C115.2 | Develop simple applications in C using basic constructs |
| C115.3 | Design and implement applications using arrays and strings |
| C115.4 | Develop and implement modular applications in C using functions. |
| C115.5 | Develop applications in C using structures and pointers. |
| C115.6 | Design applications using sequential and random access file processing |

**Title:DISCRETE MATHEMATICS,Subject Code:MA3354 NBA Code for the Subject :C201 ,Semester : 3 [23-24ODD]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C201.1 | Have knowledge of the concepts needed to test the logic of a program |
| C201.2 | Use proof techniques to check the truthfulness of a real life situations |
| C201.3 | Be aware of a class of functions which transforms a finite set into another finite set which relate to input and output functions in computer science and counting principles |
| C201.4 | Use graph theory to formulate the problem and solve it |
| C201.5 | Be exposed to concepts and properties of algebraic structure such as groups, rings and fields |
| C201.6 | Analyse the basic knowledge gained by Lattices , Boolean algebra and apply them |

**Title:DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION,Subject Code:CS3351 NBA Code for the Subject :C202 ,Semester : 3 [23-24ODD]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C202.1 | Design various combinational digital circuits using logic gates |
| C202.2 | Design sequential circuits and analyze the design procedures |
| C202.3 | State the fundamentals of computer systems and analyze the execution of an instruction |
| C202.4 | Analyze different types of control design and identify hazards |

| | |
|---|---|
| C202.5 | Identify the characteristics of various memory systems |
| C202.6 | Understand I/O communication |
| **Title:FOUNDATIONS OF DATA SCIENCE,Subject Code:CS3352 NBA Code for the Subject :C203 ,Semester : 3 [23-24ODD]Target :65 Credits:3** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C203.1 | Define the data science process |
| C203.2 | Understand different types of data description for data science process |
| C203.3 | Gain knowledge on relationships between data |
| C203.4 | Use the Python Libraries for Data Wrangling |
| C203.5 | Apply visualization Libraries in Python to interpret Data |
| C203.6 | Apply visualization Libraries in Python to explore Data |
| **Title:DATA STRUCTURES,Subject Code:CS3301 NBA Code for the Subject :C204 ,Semester : 3 [23-24ODD]Target :65 Credits:3** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C204.1 | Define linear and non-linear data structures. |
| C204.2 | Implement linear and non¿linear data structure operations. |
| C204.3 | Use appropriate linear/non linear data structure operations for solving a given problem. |
| C204.4 | Implement multi-way search tree, traversals and their types (B, B+) to solve various problems. |
| C204.5 | Apply appropriate graph algorithms for graph applications. |
| C204.6 | Analyze the various searching and sorting algorithms. |
| **Title:OBJECT ORIENTED PROGRAMMING,Subject Code:CS3391 NBA Code for the Subject :C205 ,Semester : 3 [23-24ODD]Target :65 Credits:3** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C205.1 | "To understand Object Oriented Programming concepts and basics of Java programming language |
| C205.2 | To know the principles of packages, inheritance and interfaces |
| C205.3 | To develop a java application with threads and generics classes |
| C205.4 | To understand the use of exceptions in java ,define predefined and user defined exceptions |
| C205.5 | To learn and use I/O streams in java |
| C205.6 | To design and build Graphical User Interface Application using JAVAFX |
| **Title:DATA STRUCTURES LABORATORY,Subject Code:CS3311 NBA Code for the Subject :C206 ,Semester : 3 [23-24ODD]Target :65 Credits:1.5** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C206.1 | Implement Linear data structure algorithms. |
| C206.2 | Implement applications using Stacks and Linked lists. |
| C206.3 | Implement Binary Search tree and AVL tree operations. |
| C206.4 | Implement heaps using Priority Queues. |
| C206.5 | Implement graph algorithms. |
| C206.6 | Analyze the various searching and sorting algorithms. |
| **Title:OBJECT ORIENTED PROGRAMMING LABORATORY,Subject Code:CS3381 NBA Code for the Subject :C207 ,Semester : 3 [23-24ODD]Target :80 Credits:1.5** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |

| | |
|---|---|
| C207.1 | Design and develop java programs using object oriented programming concepts |
| C207.2 | Develop simple applications using object oriented concepts such as package, |
| C207.3 | To develop a java application with threads and generics classes |
| C207.4 | To define exceptions |
| C207.5 | To learn use I/O streams |
| C207.6 | Create GUIs and event driven programming applications for real world problems |

**Title:DATA SCIENCE LABORATORY,Subject Code:CS3361 NBA Code for the Subject :C208 ,Semester : 3 [23-24ODD]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C208.1 | Make use of the python libraries for data science |
| C208.2 | Make use of the python libraries for data science |
| C208.3 | Perform descriptive analytics on the benchmark data sets. |
| C208.4 | Perform correlation and regression analytics on standard data sets |
| C208.5 | Present data using visualization packages in Python |
| C208.6 | Interpret data using visualization packages in Python |

**Title:ENVIRONMENTAL SCIENCES AND SUSTAINABILITY,Subject Code:GE3451 NBA Code for the Subject :215 ,Semester : 4 [23-24EVEN]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| 215.1 | Infer the importance of environment and explain the concept, types, structure and function of ecosystem |
| 215.2 | Recall the various functions, values, levels, threats and conservation of biodiversity |
| 215.3 | Explain the different types of pollution and propose the suitable methods to prevent the same to enhance the environment |
| 215.4 | Discuss of conservation different energy sources, optimal usage and the importance |
| 215.5 | Discuss the aspect of sustainability and the means of sustainability management to realize the sustainable development goals |
| 215.6 | Lists the various environment management systems, protection and discuss the green solutions for energy to materials for sustainability |

**Title:THEORY OF COMPUTATION,Subject Code:CS3452 NBA Code for the Subject :C210 ,Semester : 4 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C210.1 | Construct automata theory using Finite Automata |
| C210.2 | Write regular expressions for any pattern |
| C210.3 | Design context free grammar and Pushdown Automata |
| C210.4 | Describe CFL and Normal Forms |
| C210.5 | Design Turing machine for computational functions |
| C210.6 | Differentiate between decidable and undecidable problems |

**Title:ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING,Subject Code:CS3491 NBA Code for the Subject :C211 ,Semester : 4 [23-24EVEN]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C211.1 | Understand the concepts of Informed and Heuristic search techniques |
| C211.2 | Techniques for reasoning under uncertainty |
| C211.3 | Understand Machine Learning and supervised learning algorithms |
| C211.4 | Build the supervised learning models |
| C211.5 | Understand the unsupervised learning algorithms ensembling and unsupervised models |

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| C211.6 | Understand the basics of deep learning using neural networks and able to build it. |

| **Title:ALGORITHMS,Subject Code:CS3401 NBA Code for the Subject :C213 ,Semester : 4 [23-24EVEN]Target :65 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C213.1 | Analyze the efficiency of algorithms using various frameworks |
| C213.2 | Apply graph algorithms to solve problems and analyze their efficiency. |
| C213.3 | Make use of algorithm design techniques like divide and conquer, dynamic programming to solve problems |
| C213.4 | Make use of algorithm design technique greedy techniques to solve problems |
| C213.5 | Use the state space tree method for solving problems. |
| C213.6 | Solve problems using approximation algorithms and randomized algorithms |

| **Title:DATABASE MANAGEMENT SYSTEMS,Subject Code:CS3492 NBA Code for the Subject :C213 ,Semester : 4 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C213.1 | Study the fundamentals of data models and to represent a database system |
| C213.2 | Apply ER model to Relational model to perform database design effectively and to perform normalization in databases. |
| C213.3 | Understand and analyze the fundamental concepts of transactions |
| C213.4 | Compare and contrast various indexing strategies in different database systems |
| C213.5 | Illustrate and construct query optimization technique in database systems |
| C213.6 | Appraise the difference between advanced databases and traditional databases. |

| **Title:INTRODUCTION TO OPERATING SYSTEMS,Subject Code:CS3451 NBA Code for the Subject :C214 ,Semester : 4 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C214.1 | Explain the basic concepts and functions of operating systems and discuss evolution of OS |
| C214.2 | Analyze various scheduling algorithms and process synchronization |
| C214.3 | Explain deadlock prevention and avoidance algorithms |
| C214.4 | Compare and contrast various memory management schemes |
| C214.5 | Explain the functionality of file systems, I/O systems, and Virtualization |
| C214.6 | Compare iOS and Android Operating Systems |

| **Title:OPERATING SYSTEMS LABORATORY,Subject Code:CS3461 NBA Code for the Subject :C216 ,Semester : 4 [23-24EVEN]Target :65 Credits:1.5** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C216.1 | Define and implement UNIX Commands |
| C216.2 | Compare the performance of various CPU Scheduling Algorithms |
| C216.3 | Compare and contrast various Memory Allocation Methods |
| C216.4 | Define File Organization strategies |
| C216.5 | Define File Allocation Strategies |
| C216.6 | Implement various Disk Scheduling Algorithm |

| **Title:DATABASE MANAGEMENT SYSTEMS LABORATORY,Subject Code:CS3481 NBA Code for the Subject :C218 ,Semester : 4 [23-24EVEN]Target :65 Credits:1.5** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C218.1 | Study the fundamentals of data models and to represent a database system |

| | |
|---|---|
| C218.2 | Apply ER model to Relational model to perform database design effectively and to perform normalization in databases. |
| C218.3 | Understand and analyze the fundamental concepts of transactions |
| C218.4 | Compare and contrast various indexing strategies in different database systems |
| C218.5 | Illustrate and construct query optimization technique in database systems |
| C218.6 | Appraise the difference between advanced databases and traditional databases. |

**Title:COMPUTER NETWORKS,Subject Code:CS3591 NBA Code for the Subject :C301 ,Semester : 5 [23-24ODD]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C301.1 | Build an understanding of the fundamental concepts of computer networking and Application Layer protocols: HTTP ,FTP ,Email protocols (SMTP - POP3 - IMAP - MIME) , DNS ,SNMP |
| C301.2 | Explain the different Transport Layer function i.e. Port addressing, Connection Management, Error control and Flow control mechanism. |
| C301.3 | To Understanding the functions of Network Layer i.e. Logical addressing, Subnetting IPV6, ARP, RARP,ICMP, DHCP |
| C301.4 | To learn the functions of network layer and the various routing protocols |
| C301.5 | To Understand the Functions of Data Link Layer , Framing , Flow control , Error control , Data-Link Layer Protocols , HDLC ,PPP - Media Access Control |
| C301.6 | To Understand the Functions of Physical Layer: Data and Signals - Performance ,Transmission media- Switching , Circuit Switching. |

**Title:COMPILER DESIGN,Subject Code:CS3501 NBA Code for the Subject :C302 ,Semester : 5 [23-24ODD]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C302.1 | Understand the techniques in different phases of a compiler |
| C302.2 | Design a lexical analyser for a sample language and learn to use the LEX tool |
| C302.3 | Apply different parsing algorithms to develop a parser and learn to use YACC tool |
| C302.4 | Understand semantics rules (SDT), intermediate code generation |
| C302.5 | Understand the concept of runtime environment |
| C302.6 | Implement code generation and apply code optimization techniques |

**Title:CRYPTOGRAPHY AND CYBER SECURITY,Subject Code:CB3491 NBA Code for the Subject :C303 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C303.1 | Understand the fundamentals of networks security, security architecture, threats and vulnerabilities |
| C303.2 | Apply the different cryptographic operations of symmetric cryptographic algorithms |
| C303.3 | Apply the different cryptographic operations of public key cryptography |
| C303.4 | Apply the various Authentication schemes to simulate different applications |
| C303.5 | Understand various Key management and distribution. |
| C303.6 | Understand various cyber crimes and cyber security |

**Title:DISTRIBUTED COMPUTING,Subject Code:CS3551 NBA Code for the Subject :C304 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C304.1 | Explain the Foundations of distributed systems |
| C304.2 | Solve synchronization and state consistency problems |
| C304.3 | Use resource sharing techniques in distributed systems |
| C304.4 | Apply working model of consensus and reliability of distributed systems |

| | |
|---|---|
| C304.5 | Explain the Checkpointing and rollback recovery |
| C304.6 | Explain the fundamentals of cloud computing |

**Title:Recommender Systems,Subject Code:CCS360 NBA Code for the Subject :C305E1V102 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C305E1V102.1 | Understand the basic concepts of recommender systems. |
| C305E1V102.2 | Implement machine-learning and data-mining algorithms in recommender systems data sets. |
| C305E1V102.3 | Implementation of Collaborative Filtering in carrying out performance evaluation of recommender systems based on various metrics. |
| C305E1V102.4 | Design and implement a simple recommender system. |
| C305E1V102.5 | Learn about advanced topics of recommender systems. |
| C305E1V102.6 | Learn about advanced topics of recommender systems applications. |

**Title:WEB TECHNOLOGIES,Subject Code:CCS375 NBA Code for the Subject :C306PE2V21 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C306PE2V21.1 | Construct a basic website using HTML and Cascading Style Sheets |
| C306PE2V21.2 | Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms |
| C306PE2V21.3 | Develop server side programs using Servlets and JSP. Also understand how to use JDBC |
| C306PE2V21.4 | Construct simple web pages in PHP |
| C306PE2V21.5 | Learn how to represent data in XML format. |
| C306PE2V21.6 | Develop interactive web applications |

**Title:FILM APPRECIATION,Subject Code:MX3083 NBA Code for the Subject :C307M13 ,Semester : 5 [23-24ODD]Target :65 Credits:0**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C307M13.1 | To know the development of film as an art and entertainment form |
| C307M13.2 | To learn the language of cinema as an evolved over a century |
| C307M13.3 | To read a film and appreciate the various nuances of a film as a text |
| C307M13.4 | To learn the process of film making, structure of film with social concern and crew members |
| C307M13.5 | To get the knowledge about the film theories, professional ethics and early era of films individually and as a team work |
| C307M13.6 | To inculcate their technical knowledge in the par with technological advancements in film making |

**Title:Object Oriented Software Engineering,Subject Code:CCS356 NBA Code for the Subject :C307 ,Semester : 6 [23-24EVEN]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C307.1 | Compare various Software Development Lifecycle Models |
| C307.2 | Evaluate project management approaches as well as cost and schedule estimation strategies. |
| C307.3 | Perform formal analysis on specifications. |
| C307.4 | Use UML diagrams for analysis and design |
| C307.5 | Architect and design using architectural styles |
| C307.6 | design patterns, and test the system |

**Title:Embedded Systems and IoT,Subject Code:CS3691 NBA Code for the Subject :C309 ,Semester : 6 [23-24EVEN]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C309.1 | Explain the architecture of embedded processors |
| C309.2 | Write embedded C programs. |
| C309.3 | Design simple embedded applications |
| C309.4 | Compare the communication models in IOT |
| C309.5 | Design IoT applications using Arduino. |
| C309.6 | Design IoT applications using Raspberry Pi /open platform. |

**Title:Business Analytics,Subject Code:CCW331 NBA Code for the Subject :C310PE1V105 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C310PE1V105.1 | Explain the real world business problems and model with analytical solutions |
| C310PE1V105.2 | Identify the business processes for extracting Business Intelligence |
| C310PE1V105.3 | Apply predictive analytics for business fore-casting |
| C310PE1V105.4 | Need of Human resources for training and development |
| C310PE1V105.5 | Apply analytics for supply chain and logistics management |
| C310PE1V105.6 | Use analytics for marketing and sales |

**Title:Cloud Services Management,Subject Code:CCS336 NBA Code for the Subject :C312PE3V203 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C312PE3V203.1 | Exhibit cloud-design skills to build and automate business solutions using cloud technologies. |
| C312PE3V203.2 | Possess Strong theoretical foundation leading to excellence and excitement towards adoption. of cloud-based services |
| C312PE3V203.3 | Solve the real-world problems using Cloud services and technologies. |
| C312PE3V203.4 | Select appropriate structures for designing, deploying and running cloud-based services in a business environment |
| C312PE3V203.5 | Identify strategies to reduce risk and eliminate issues associated with adoption of cloud services |
| C312PE3V203.6 | Illustrate the benefits and drive the adoption of cloud-based services to solve real world problems |

**Title:Big Data Analytics,Subject Code:CCS334 NBA Code for the Subject :C312PE5V108 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C312PE5V108.1 | Describe big data and use cases from selected business domains. |
| C312PE5V108.2 | Explain NoSQL big data management. |
| C312PE5V108.3 | Install, configure, and run Hadoop and HDFS. |
| C312PE5V108.4 | Perform map-reduce analytics using Hadoop. |
| C312PE5V108.5 | Use Hadoop-related tools such as HBase, Cassandra for big data analytics. |
| C312PE5V108.6 | Use Hadoop-related tools such as Pig, and Hive for big data analytics. |

**Title:Data Warehousing,Subject Code:CCS341 NBA Code for the Subject :C313PE3V304 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C313PE3V304.1 | Design data warehouse architecture for various problems. |
| C313PE3V304.2 | Apply OLAP technology |
| C313PE3V304.3 | Analyse the partitioning strategy. |
| C313PE3V304.4 | Critically analyse the differentiation of various schema for given problem |
| C313PE3V304.5 | Frame roles of process manager & system manager |
| C313PE3V304.6 | Testing roles in data warehouse |

| Title:PRINCIPLES OF MANAGEMENT,Subject Code:MG8591 NBA Code for the Subject :C401 ,Semester : 7 [23-24ODD]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C401.1 | To understand the fundamentals of management principles and practices in the organizations. |
| C401.2 | To know the various types of planning and decision making in the context of organizations. |
| C401.3 | To learn the significance of organizing resources, jobs and manpower for effective management. |
| C401.4 | To understand the various motivational techniques influencing and directing the human behavior in the organization |
| C401.5 | To measure the performance of organization and suggest suitable actions for improving productivity. |
| C401.6 | To identify the various controlling techniques used by managers in the business world. |

| Title:CRYPTOGRAPHY AND NETWORK SECURITY,Subject Code:CS8792 NBA Code for the Subject :C402 ,Semester : 7 [23-24ODD]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C402.1 | Understand the OSI security architecture and classical encryption techniques |
| C402.2 | Learn the importance of number theory in cryptography |
| C402.3 | Learn various block cipher, stream cipher and public key cryptosystems |
| C402.4 | Discuss the requirements and functionalities of various authentication algorithms |
| C402.5 | Understand the implementation of cryptographic algorithms and system security |
| C402.6 | Discuss IPSec,Email Security and Web Security |

| Title:CLOUD COMPUTING,Subject Code:CS8791 NBA Code for the Subject :C403 ,Semester : 7 [23-24ODD]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C403.1 | Articulate the main concepts, key technologies, strengths and limitations of cloud computing. |
| C403.2 | Learn the key and enabling technologies that help in the development of cloud. |
| C403.3 | Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models |
| C403.4 | Explain the core issues of cloud computing such as resource management and security. |
| C403.5 | Be able to install and use current cloud technologies. |
| C403.6 | Evaluate and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud. |

| Title:HOSPITAL MANAGEMENT,Subject Code:OBM752 NBA Code for the Subject :C404OE212 ,Semester : 7 [23-24ODD]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C404OE212.1 | To infer the importance of environment and explain the concept, types, structure and functions of hospital. |
| C404OE212.2 | To understand the fundamentals of hospital administration and management |
| C404OE212.3 | To know the market related research process. |
| C404OE212.4 | To explore various information management systems of hospital. |
| C404OE212.5 | To be familiar with the relative supportive services. |
| C404OE212.6 | To learn the quality and safety aspects in hospital. |

| Title:SOFTWARE PROJECT MANAGEMENT,Subject Code:IT8075 NBA Code for the Subject :C405PE24 ,Semester : 7 [23-24ODD]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |

| | |
|---|---|
| C405PE24.1 | Gain extensive knowledge about the basic project management concepts, framework and the process models |
| C405PE24.2 | Obtain adequate knowledge about software process models and software effort estimation techniques |
| C405PE24.3 | Estimate the risks involved in various project activities |
| C405PE24.4 | Understand Project Management principles while developing software. |
| C405PE24.5 | Define the checkpoints, project reporting structure, project progress and tracking mechanisms using project management principles |
| C405PE24.6 | Learn staff selection process and the issues related to people management |

**Title:PROFESSIONAL ETHICS IN ENGINEERING,Subject Code:GE8076[8] NBA Code for the Subject :C409PE47 ,Semester : 7 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C409PE47.1 | To learn multinational, environment and computer ethics |
| C409PE47.2 | To understand Human values |
| C409PE47.3 | To learn ethics in Engineering professional life |
| C409PE47.4 | To learn code of ethics and experimentation |
| C409PE47.5 | To learn safety, risk, risk analysis |
| C409PE47.6 | To understand Intellectual Property Rights |

**Title:CLOUD COMPUTING LABORATORY,Subject Code:CS8711 NBA Code for the Subject :C407 ,Semester : 7 [23-24ODD]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C407.1 | Configure various virtualization tools such as Virtual Box, VMware workstation. |
| C407.2 | Design and deploy a web application in a PaaS environment link layer |
| C407.3 | Demonstrate generic cloud environment that can be used as a private cloud |
| C407.4 | Learn how to simulate a cloud environment to implement new schedulers |
| C407.5 | Apply Hadoop single node cluster and run simple applications |
| C407.6 | Manipulate large data sets in a parallel environment |

**Title:SECURITY LABORATORY,Subject Code:IT8761 NBA Code for the Subject :C408 ,Semester : 7 [23-24ODD]Target :80 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C408.1 | To implement classical encryption techniques |
| C408.2 | To build cryptosystems by applying symmetric key encryption algorithm |
| C408.3 | To build cryptosystems by applying public key encryption algorithm |
| C408.4 | To build authentication algorithms |
| C408.5 | Develop a signature scheme using digital signature standard |
| C408.6 | Demonstrate the network security using open source tools |

**Title:PROJECT WORK,Subject Code:CS8811 NBA Code for the Subject :C411 ,Semester : 8 [23-24EVEN]Target :80 Credits:10**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C411.1 | Organize the team and apply the knowledge of mathematical concepts and engineering fundamentals to find solutions for social and environmental issues. |
| C411.2 | Identify, formulate the problem and do literature survey for the project ethically. |
| C411.3 | Design the solution based on SDLC approach for the project and identify the tools to be used. |
| C411.4 | Implement and Test the project using modern tools in a cooperative manner. |
| C411.5 | Work efficiently both as an individual and as a member in the multidisciplinary team, document the technical content. |

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|---|---|
| C411.6 | Identify the future work and promote the research in the problem domain |

**Programme:B.E. Electronics and Communication Engineering**

**Course OutComes for the Academic Year : 2023-24**

| **Title: PROFESSIONAL ENGLISH - 1, Subject Code:HS3151 NBA Code for the Subject :C101 ,Semester : 1 [23-24ODD]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able | |
| **CO-Code** | **Course outcome Description** |
| C101.1 | To improve the communicative competence of learners by throwing light on vocabulary and basic grammar |
| C101.2 | To help learners use language effectively in academic (grammar) /work contexts (reports) |
| C101.3 | To build on students¿ English language skills by engaging them in listening, speaking and grammar learning activities those are relevant to authentic contexts. |
| C101.4 | To develop learners¿ ability to read and write complex texts, summaries, articles, blogs, Definitions, essays and user manuals. |
| C101.5 | To use language efficiently in expressing their opinions via various media and graphical representation. |
| C101.6 | Participate effectively in informal conversations; introduce themselves and their friends and express opinion in English with different types of sentences |
| **Title: MATRICES AND CALCULUS, Subject Code:MA3151 NBA Code for the Subject :C102 ,Semester : 1 [23-24ODD]Target :60 Credits:4** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C102.1 | Eigenvalues and eigenvectors, diagonalisation of a matrix, Symmetric matrices, Positive definite matrices and similar matrics |
| C102.2 | Understand the limit, continuity and derivative of the functions. Solve various functions and its maxima /minima using differentiation rules. |
| C102.3 | Apply the total and partial derivatives in Taylor series expansion of functions and the extremum of functions. |
| C102.4 | Evaluate the integrals both by using Riemann sums and by using the Fundamental theorem of Calculus. Evaluate integrals using various techniques of integration. |
| C102.5 | Understand the concepts of double integration and determine the area using integration. Also understands the concepts of the change of order of integration and Change of variables in integrals. |
| C102.6 | Understand the concepts of Triple integration and determine the volume using integration. |
| **Title: ENGINEERING PHYSICS, Subject Code:PH3151 NBA Code for the Subject :C103 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C103.1 | Understand the importance of mechanics |
| C103.2 | Express their knowledge in electromagnetic waves |
| C103.3 | Demonstrate a strong foundational knowledge in optics and lasers |
| C103.4 | Understand the importance of quantum physics. |
| C103.5 | Comprehend and apply quantum mechanical principles towards the formation of energy bands |

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|---|---|
| C103.6 | Demonstrate a strong foundational knowledge in oscillations. |

**Title: ENGINEERING CHEMISTRY, Subject Code:CY3151 NBA Code for the Subject :C104 ,Semester : 1 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able

| CO-Code | Course outcome Description |
|---|---|
| C104.1 | To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water. |
| C104.2 | To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications. |
| C104.3 | To recommend suitable fuels for engineering processes and applications. |
| C104.4 | To apply the knowledge of phase rule and composites for material selection requirements. |
| C104.5 | To analysis of combustion process and its calculations. |
| C104.6 | To recognize different forms of energy resources and apply them for suitable applications in energy sectors. |

**Title: PROBLEM SOLVING AND PYTHON PROGRAMMING, Subject Code:GE3151 NBA Code for the Subject :C105 ,Semester : 1 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able

| CO-Code | Course outcome Description |
|---|---|
| C105.1 | To understand the basics of algorithmic problem solving |
| C105.2 | To learn to solve problems using Python conditionals and loops. |
| C105.3 | To define Python functions and use function calls to solve problems. |
| C105.4 | To use Python data structures - lists, tuples, dictionaries to represent complex data. |
| C105.5 | To learn about usage of python packages and modules |
| C105.6 | To do input/output with files in Python |

**Title: PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY, Subject Code:GE3171 NBA Code for the Subject :C106 ,Semester : 1 [23-24ODD]Target :80 Credits:2**

At the end of this course, Student will be able

| CO-Code | Course outcome Description |
|---|---|
| C106.1 | To understand the problem solving approaches. |
| C106.2 | To learn the basic programming constructs in Python. |
| C106.3 | To learn the programming constructs in Python like loop, function, recursion. |
| C106.4 | To practice various computing strategies for Python-based solutions to real world problems. |
| C106.5 | To use Python data structures-lists, tuples, dictionaries. |
| C106.6 | To do input/output with files in Python. |

**Title: PHYSICS AND CHEMISTRY LABORATORY, Subject Code:BS3171 NBA Code for the Subject :C107, Semester : 1 [23-24ODD]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C107.1 | Gain knowledge about elasticity, modulus, oscillations and also able to calculate Young's,rigidity modulus, moment |
| C107.2 | Understand the application of interference and diffraction in finding thickness of the given sample and wavelength of the source respectively |
| C107.3 | Calculate the variation of resistance with respect to temperature and also able to calculate the band gap of semiconductor |
| C107.4 | Analyze the various water quality parameters like hardness, alkalinity and dissolved oxygen present in the water sample. |
| C107.5 | Acquire practical skills by using instruments Conductivity meter, pH meter and Potentiometer. |
| C107.6 | Find the molecular weight of a polymer by viscometer. |

**Title: PROFESSIONAL ENGLISH-II, Subject Code:HS3251 NBA Code for the Subject :C108 ,Semester : 2 [23-24EVEN]Target :60 Credits:4**

At the end of this course, Student will be able

| CO-Code | Course outcome Description |
|---|---|
| C108.1 | To compare and contrast products and ideas through technical texts in essays with appropriate grammatical usage and contextual meanings. |
| C108.2 | To enhance learners¿ awareness of general rules of writing for specific audiences through professional emails and responses to complaints. |
| C108.3 | To help learners understand the purpose, audience, contexts of different types of letters/essays/checklists |
| C108.4 | To analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format. To report events and the processes of technical and industrial nature |
| C108.5 | To make use of grammatical items effectively in writing recommendations and in transcoding the graphs |
| C108.6 | To write a winning job/internship application-cover letter and resume /SoP-Statement of purpose |

**Title: NUMERICAL AND STATISTICAL METHODS, Subject Code:MA3251 NBA Code for the Subject :C109, Semester : 2 [23-24EVEN]Target :60 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C109.1 | Apply the concept of testing of hypothesis for small and large samples in real life problems. |
| C109.2 | Apply the basic concepts of classifications of design of experiments in the field of agriculture. |
| C109.3 | Solve algebraic, transcendental equations and simultaneous equations by direct method. |
| C109.4 | Solve simultaneous equations by iterative method and Eigen value problems. |
| C109.5 | Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems. |
| C109.6 | Gain the knowledge of various techniques and methods to solve first order ordinary differential equations with initial conditions in engineering applications. |

**Title: PHYSICS FOR ELECTRONICS ENGINEERING, Subject Code:PH3254 NBA Code for the Subject :C110, Semester : 2 [23-24EVEN]Target :65 Credits:3**

| At the end of this course, Student will be able to | |
|---|---|
| **CO-Code** | **Course outcome Description** |
| C110.1 | Gives knowledge about structure of various materials and its properties |
| C110.2 | Gives understanding about the electrical properties of materials, applications of quantum mechanics |
| C110.3 | Gain knowledge on magnetic properties of materials and their applications |
| C110.4 | Gives understanding of semiconductor physics from basics to applications of devices |
| C110.5 | Gain knowledge about the optical properties of materials, optical displays and its applications |
| C110.6 | Gives information about nanostructures, quantum confinement and nano device applications |

| **Title: ELECTRICAL AND INSTRUMENTATION ENGINEERING, Subject Code:BE3254 NBA Code for the Subject :C111 ,Semester : 2 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C111.1 | Comprehend the concepts in transformers |
| C111.2 | Comprehend the concepts in electrical generators and motors |
| C111.3 | Comprehend the concept of ac machines |
| C111.4 | Working principles of various measuring instruments |
| C111.5 | Comprehend the concept of various power system |
| C111.6 | Working of circuit breaker, Earthing concepts |

| **Title: ENGINEERING GRAPHICS, Subject Code:GE3251 NBA Code for the Subject :C112 ,Semester : 2 [23-24EVEN]Target :60 Credits:6** | |
|---|---|
| At the end of this course, | |
| **CO-Code** | **Course outcome Description** |
| C112.1 | Students will be able to develop the graphic skills for communication of concepts, curves,ideas and design of engineering products. |
| C112.2 | Students will be able to represent the application and to draw the orthographic projections of lines and plane surfaces. |
| C112.3 | Students will be able to create the projection solids by rotating line method. |
| C112.4 | Students will be able to develop creative knowledge about the free hand sketching of basic geometrical constructions and multiple views. |
| C112.5 | Students will be able to create the sectioned solids and development of surfaces. |
| C112.6 | Students will be able to learn the optimum path for the benefit of society by using isometric and perspective sections of simple solids |

| **Title: CIRCUIT ANALYSIS, Subject Code:EC3251 NBA Code for the Subject :C113 ,Semester : 2 [23-24EVEN]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C113.1 | Apply the basic concepts of circuit analysis such as Kirchhoff¿s laws, mesh current and node voltage method for analysis of DC and AC circuits |

| | |
|---|---|
| C113.2 | Apply suitable network theorems and analyze AC and DC circuits. |
| C113.3 | Analyze steady state response of any R, L and C circuits. |
| C113.4 | Analyze the transient response for any RC, RL and RLC circuits and Frequency response of parallel and series resonance circuits. |
| C113.5 | Analyze the coupled circuits and network topologies |
| C113.6 | Analyze the network topologies |

**Title: ENGINEERING PRACTICES LABORATORY, Subject Code:GE3271 NBA Code for the Subject :C114, Semester : 2 [23-24EVEN]Target :80 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C114.1 | Distinguish residential house wiring, fluorescent lamp wiring and stair case wiring. |
| C114.2 | Define electrical quantities like voltage, current, energy and resistance and their measurement using CRO. |
| C114.3 | Analyze different logic gates, clock, rectifier and to solder devices and components. |
| C114.4 | Understand the pipe connections for the home application and industrial constructions |
| C114.5 | Do plan the real geometry of the shapes for industrial applications. |
| C114.6 | Understand the concept of joining the metal by welding |

**Title: CIRCUIT ANALYSIS LABORATORY, Subject Code:EC3271 NBA Code for the Subject :C115 ,Semester : 2 [23-24EVEN]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C115.1 | Realize the circuit connection and acquire the knowledge of analyzing the circuit |
| C115.2 | Understand basic information of circuit theory |
| C115.3 | Understand basic circuit laws of voltage and current. |
| C115.4 | Relate the basics of circuit theorem theory and practical implementation. |
| C115.5 | Understand and realize the concept of resonance |
| C115.6 | Interpret the circuit and its uses in real time applications. |

**Title: RANDOM PROCESSES AND LINEAR ALGEBRA, Subject Code:MA3355 NBA Code for the Subject :201 ,Semester : 3 [23-24ODD]Target :60 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| 201.1 | Have a fundamental knowledge of the basic probability concepts and Get exposure and a well-founded knowledge of standard distributions which can describe real life phenomena |
| 201.2 | Acquire skills in handling situations involving more than one random Variable and functions of random variables |
| 201.3 | Understand and characterize phenomena which evolve with respect to time in probabilistic manner. |

| | |
|---|---|
| 201.4 | To introduce the basic notions of groups, rings, fields and vectoe space which will then be used to solve related problems. |
| 201.5 | To understand the concepts of linear transformations and diagnolization. |
| 201.6 | To apply the concept of inner product spaces in orthogonalization. |

**Title: C PROGRAMMING AND DATA STRUCTURES, Subject Code:CS3353 NBA Code for the Subject :C202 ,Semester : 3 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C202.1 | Learn the basics of C, Decision Making and Looping Statements, Functions and Arrays concepts. |
| C202.2 | Learn the concept of Structures, Union, Pointers and File handling in C. |
| C202.3 | Explain the Linear data structures like List, Stack and Queue and their applications. |
| C202.4 | Discuss the Non-Linear data structure Tree, its Representation, Types, Traversals and applications. |
| C202.5 | Learn the concept of Hashing and its types. |
| C202.6 | Discuss the various Sorting and Searching algorithms. |

**Title: ELECTRONIC DEVICES AND CIRCUITS, Subject Code:EC3353 NBA Code for the Subject :C204 ,Semester : 3 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C204.1 | Explain the structure and working operation of basic electronic devices |
| C204.2 | Design and analyze amplifiers. |
| C204.3 | Determine frequency response of BJT and MOSFET amplifiers. |
| C204.4 | Design and analyze feedback amplifiers and oscillator principles. |
| C204.5 | Design and analyse power amplifiers |
| C204.6 | Design and analyse of power supply circuits |

**Title: SIGNALS AND SYSTEMS, Subject Code:EC3354 NBA Code for the Subject :C204 ,Semester : 3 [23-24ODD]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C203.1 | Analyze the basic properties of various types of continuous time and discrete time signals and systems and also determine whether the given system is linear/time invariant/causal/stable |
| C203.2 | Apply, evaluate and analyze Fourier series expansion, Fourier transformation ans Laplace transformation for determining the frequency components of continuous time signals. |
| C203.3 | Evaluate and analyze the characteristics of continuous time linear time invariant systems by applying Fourier and Laplace transforms. |
| C203.4 | Analyze the properties of discrete time signals by applying the Z transform and discrete time Fourier transform. |
| C203.5 | Evaluate the response of the given discrete time LTI systems using difference equations, impulse |

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|---|---|
| | response and Convolution in time domain. |
| C203.6 | Apply, Evaluate and analyze the characteristics of discrete time LTI systems using Z Transform and discrete time Fourier transform in Frequency domain |

| **Title: DIGITAL SYSTEMS DESIGN, Subject Code:EC3352 NBA Code for the Subject :C206 ,Semester : 3 [23-24ODD]Target :65 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C206.1 | Use Boolean algebra and simplification procedures relevant to digital logic. |
| C206.2 | Design various combinational digital circuits using logic gates. |
| C206.3 | Analyse and design synchronous sequential circuits. |
| C206.4 | Analyse and design asynchronous sequential circuits. |
| C206.5 | Build logic gates and use programmable devices |
| C206.6 | Use Digital Electronics in present Contemporary World |

| **Title: CONTROL SYSTEMS, Subject Code:EC3351 NBA Code for the Subject :CO4 ,Semester : 3 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C205.1 | To introduce the components and their representation of control systems |
| C205.2 | To introduce the components and their representation of control systems |
| C205.3 | To learn various methods for analyzing the time response, frequency response and stability of the systems |
| C205.4 | To learn various methods for analyzing the time response, frequency response and stability of the systems |
| C205.5 | To learn the various approach for the state variable analysis. |
| C205.6 | To learn the various approach for the state variable analysis. |

| **Title: ELECTRONIC DEVICES AND CIRCUITS LABORATORY, Subject Code:EC3361 NBA Code for the Subject :C207 ,Semester : 3 [23-24ODD]Target :80 Credits:1.5** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C207.1 | students should be able to understand the characteristics of PN Junction Diode and Zener diode & its operation as regulator |
| C207.2 | students should be able to Design full wave rectifier with and without filter using pn junction diode |
| C207.3 | students should be able to Design and test BJT and MOSFET amplifiers |
| C207.4 | students should be able to Design CE and CS amplifier and analyze their frequency response |
| C207.5 | students should be able to conduct CMRR measurement of differential amplifier |
| C207.6 | students should be able to analyze the operation and frequency response of power amplifiers |

| Title:C PROGRAMMING AND DATA STRUCTURES LABORATORY,Subject Code:CS3362 NBA Code for the Subject :C208 ,Semester : 3 [23-24ODD]Target :80 Credits:1.5 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C208.1 | To implement basic programs and advanced concepts like Functions, Arrays in C |
| C208.2 | To implement Structures, Pointers and Files in C |
| C208.3 | To implement Array and Linked list implementation of Lists, Stack, Queue and its applications in C |
| C208.4 | To implement Tree and its traversals, Binary Search Trees in C |
| C208.5 | To implement Searching and Sorting algorithms in C |
| C208.6 | To implement Hash functions and Collision Resolution techniques in C |

| Title: Environmental Sciences and Sustainability, Subject Code:GE3451 NBA Code for the Subject :215 ,Semester : 4 [23-24EVEN]Target :65 Credits:2 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| 215.1 | Infer the importance of environment and explain the concept of ecosystem. |
| 215.2 | Recall the various functions, different values, threats and conservation of biodiversity. |
| 215.3 | Explain the different types of pollution and propose the suitable methods to prevent the same to enhance the environment. |
| 215.4 | Discuss the different types of renewable resources, optimum usage and its importance. |
| 215.5 | Discuss the aspect of sustainability and the means of sustainability management to realize the SDG targets. |
| 215.6 | List the various environmental management systems for environmental protection and discuss the given solutions for energy to materials for sustainability. |

| Title: Electromagnetic Fields ,Subject Code:EC3452 NBA Code for the Subject :C210 ,Semester : 4 [23-24EVEN]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C210.1 | Display an understanding of fundamental electromagnetic laws and concepts |
| C210.2 | Analyze field potentials due to static charges and explain how materials affect electric fields. |
| C210.3 | Analyze field potentials due to static magnetic fields and explain how materials affect magnetic fields. |
| C210.4 | Write Maxwell's equations in integral, differential and phasor forms and explain their physical meaning, also analyze the relation between the fields under time varying situations |
| C210.5 | Explain electromagnetic wave propagation in lossy and in lossless media. |
| C210.6 | Discuss the principles of propagation of uniform plane waves and also solve simple problems requiring estimation of electric and magnetic field quantities based on these concepts and laws. |

| Title: Linear Integrated Circuits ,Subject Code:EC3451 NBA Code for the Subject :C212 ,Semester : 4 [23-24EVEN]Target :65 Credits:3 |
|---|

| At the end of this course, Student will be able to | |
|---|---|
| **CO-Code** | **Course outcome Description** |
| C212.1 | Analyze the basic building blocks, AC and DC characteristics of linear integrated circuits |
| C212.2 | Design linear and nonlinear applications of OP ¿ AMPS |
| C212.3 | Design applications using analog multiplier and PLL |
| C212.4 | Design ADC and DAC using OP ¿ AMPS |
| C212.5 | Generate waveforms using OP ¿ AMP Circuits |
| C212.6 | Analyze Special function ICs |

| **Title: Digital Signal Processing ,Subject Code:EC3492 NBA Code for the Subject :C213 ,Semester : 4 [23-24EVEN]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C213.1 | Apply DFT for the analysis of Digital signals and Systems |
| C213.2 | Design IIR and FIR filters |
| C213.3 | Characterize the Effects of Finite Precision representation on digital Filters |
| C213.4 | Design Multirate Filters. |
| C213.5 | Apply Adaptive filters appropriately in communication systems. |
| C213.6 | Study of different Digital signal Processor |

| **Title: Communication Systems ,Subject Code:EC3491 NBA Code for the Subject :C214 ,Semester : 4 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C214.1 | Gain knowledge in amplitude modulation techniques |
| C214.2 | Understand the concepts of Random Process to the design of communication systems |
| C214.3 | Gain knowledge in digital techniques |
| C214.4 | Gain knowledge in sampling and quantization |
| C214.5 | Gain knowledge in digital modulations |
| C214.6 | Understand the importance of demodulation techniques |

| **Title: Networks and Security ,Subject Code:EC3401 NBA Code for the Subject :C311 ,Semester : 4 [23-24EVEN]Target :65 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C211.1 | Explain the Network Models, layers and functions |
| C211.2 | Categorize and classify the routing protocols |
| C211.3 | List the functions of the transport and application layer |

| | |
|---|---|
| C211.4 | Evaluate and choose the network security mechanisms |
| C211.5 | Discuss the hardware security attacks and countermeasures |
| C211.6 | Implement all network models and protocols in C programming |

**Title: Communication Systems Laboratory, Subject Code:EC3461 NBA Code for the Subject :C217 ,Semester : 4 [23-24EVEN]Target :65 Credits:1.5**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C216.1 | Design AM, FM & Digital Modulators for specific applications. |
| C216.2 | Compute the sampling frequency for digital modulation. |
| C216.3 | Simulate & validate the various functional modules of Communication system |
| C216.4 | Demonstrate their knowledge in base band signaling schemes through implementation of digital modulation schemes. |
| C216.5 | Apply various channel coding schemes & demonstrate their capabilities towards the improvement of the noise performance of Communication system. |
| C216.6 | Design various pulse modulation schemes |

**Title: Linear Integrated Circuits Laboratory, Subject Code:EC3462 NBA Code for the Subject :C217 ,Semester : 4 [23-24EVEN]Target :80 Credits:1.5**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C217.1 | Analyze various types of feedback amplifiers |
| C217.2 | Design Oscillators, tuned amplifiers, wave shaping circuits and multivibrators |
| C217.3 | Design and simulate feedback amplifiers, tuned amplifiers and Oscillators using SPICE tool |
| C217.4 | Design and simulate wave shaping circuits, multivibrators and filters using SPICE tool |
| C217.5 | Design amplifiers, Oscillators, D-A converters using operational amplifiers |
| C217.6 | Design filters using op-amp and perform an experiment on frequency response |

**Title: TRANSMISSION LINES AND RF SYSTEMS, Subject Code:EC3501 NBA Code for the Subject :C303 Semester : 5[23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C303.1 | Explain the characteristics of transmission lines and its losses |
| C303.2 | Write about the standing wave ratio and input impedance in high frequency transmission lines |
| C303.3 | Analyze impedance matching by stubs using smith charts |
| C303.4 | Analyze the characteristics of TE and TM waves |
| C303.5 | Design a RF transceiver system for wireless communication |
| C303.6 | Analyze the characteristics of RF system using Smith chart |

| Title: ADVANCED DIGITAL SIGNAL PROCESSING, Subject Code:CEC332 NBA Code for the Subject :C304PE1V21 Semester : 5 [23-24ODD]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C304PE1V21.1 | Comprehend multirate signal processing and demonstrate its applications |
| C304PE1V21.2 | Demonstrate an understanding of the power spectral density and apply to discrete random signals and systems |
| C304PE1V21.3 | Apply linear prediction and filtering techniques to discrete random signals for signal detection and estimation. |
| C304PE1V21.4 | Analyze adaptive filtering problems and demonstrate its application |
| C304PE1V21.5 | Apply power spectrum estimation techniques to random signals |
| C304PE1V21.6 | Estimate the power spectral density using parametric and non parametric methods |
| **Title: MIXED SIGNAL IC DESIGN TESTING, Subject Code:CEC342 NBA Code for the Subject :C306PE3V15 Semester : 5 [23-24ODD]Target :65 Credits:3** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C306PE3V15.1 | Learn the fundamentals of mixed signal circuits. |
| C306PE3V15.2 | Define the various measurement terminologies. |
| C306PE3V15.3 | Acquire knowledge of Analog to Digital Converters. |
| C306PE3V15.4 | Learn testing of Analog to Digital Converters. |
| C306PE3V15.5 | Acquire knowledge of Analog to Digital Converters and testing of ADC |
| C306PE3V15.6 | Comprehend the attributes of a clock signal. |
| **Title: 4G / 5G COMMUNICATION NETWORKS, Subject Code:CEC331 NBA Code for the Subject :C305PE2V83 Semester : 5 [23-24ODD]Target :65 Credits:3** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C305PE2V83.1 | Understand the evolution of wireless networks |
| C305PE2V83.2 | Learn the concepts of 5G networks. |
| C305PE2V83.3 | Comprehend the 5G architecture and protocols. |
| C305PE2V83.4 | Understand the dynamic spectrum management. |
| C305PE2V83.5 | Learn the security aspects in 5G networks. |
| C305PE2V83.6 | Learn the security associated with 5G networks |
| **Title: VLSI AND CHIP DESIGN, Subject Code:EC3552 NBA Code for the Subject :C302Semester : 5 [23-24ODD]Target :65 Credits:3** | |
| At the end of this course, Student will be able to | |

| CO-Code | Course outcome Description |
|---|---|
| C302.1 | Comprehensive knowledge of MOS technology |
| C302.2 | Analysis Combinational Logic Circuits and Design Principles |
| C302.3 | Evaluate Sequential Logic Circuits and Clocking Strategies |
| C302.4 | Recognize Memory architecture and building blocks |
| C302.5 | Realize the ASIC Design Process |
| C302.6 | Verify the Testing of VLSI chip |
| **Title: WIRELESS COMMUNICATION, Subject Code:EC3501 NBA Code for the Subject :C301 Semester : 5 [23-24ODD]Target :60 Credits:4** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C301.1 | Understand The Concept And Design Of A Cellular System |
| C301.2 | Understand Mobile Radio Propagation And Various Digital Modulation Techniques |
| C301.3 | Understand The Concepts Of Multiple Access Techniques And Wireless Networks |
| C301.4 | Characterize a wireless channel and evolve the system design specifications |
| C301.5 | Design a cellular system based on resource availability and traffic demands. |
| C301.6 | Understand the concepts of various wireless network technologies and services. |
| **Title: VLSI LABORATORY, Subject Code: EC3561 NBA Code for the Subject : C308 Semester : 5 [23-24ODD]Target :80 Credits:2** | |
| **At the end of this course, Student will be able to** | |
| **CO-Code** | **Course outcome Description** |
| C308.1 | Write HDL code for basic as well as advanced digital integrated circuit |
| C308.2 | Import the logic modules into FPGA Boards |
| C308.3 | Synthesize Place and Route the digital Ips |
| C308.4 | Design and Simulate the layouts of Digital &Analog IC Blocks using EDA tools |
| C308.5 | Extract the layouts of Digital &Analog IC Blocks using EDA tools |
| C308.6 | Test and Verification of IC design |
| **Title: EMBEDDED SYSTEMS AND IOT DESIGN, Subject Code:ET3491 NBA Code for the Subject :C309 Semester : 6 [23-24EVEN]Target :60 Credits:4** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C309.1 | Understand The Concept And Design Of A Cellular System |
| C309.2 | Understand Mobile Radio Propagation And Various Digital Modulation Techniques |
| C309.3 | Understand The Concepts Of Multiple Access Techniques And Wireless Networks |

| | |
|---|---|
| C309.4 | Characterize a wireless channel and evolve the system design specifications |
| C309.5 | Design a cellular system based on resource availability and traffic demands. |
| C309.6 | Understand the concepts of various wireless network technologies and services. |

| **Title: ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING,Subject Code:CS3491 NBA Code for the Subject :C310Semester : 6[23-24EVEN]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C310.1 | Understand the concepts of Informed and Heuristic search techniques |
| C310.2 | Techniques for reasoning under uncertainty |
| C310.3 | Understand Machine Learning and supervised learning algorithms |
| C310.4 | Build the supervised learning models |
| C310.5 | Understand the unsupervised learning algorithms ensembling and unsupervised models |
| C310.6 | Understand the basics of deep learning using neural networks and able to build it. |

| **Title: RENEWABLE ENERGY SYSTEM, Subject Code:OEE351 NBA Code for the Subject :C311OE15 Semester : 6 [23-24EVEN]Target :60 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C311OE15.1 | Attain knowledge about various renewable energy technologies |
| C311OE15.2 | Ability to understand and design a PV system. |
| C311OE15.3 | Understand the concept of various wind energy system. |
| C311OE15.4 | Understand the concept of various Bio-mass energy system |
| C311OE15.5 | Gained knowledge about various possible hybrid energy systems |
| C311OE15.6 | Attained knowledge about various application of renewable energy technologies |

| **Title: SOFTWARE DEFINED NETWORKS, Subject Code:CEC354 NBA Code for the Subject :C312PE5V84 Semester : 6 [23-24EVEN]Target :60 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C312PE5V84.1 | Describe the motivation behind SDN and its data plane |
| C312PE5V84.2 | Identify the functions of control plane |

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|---|---|
| C312PE5V84.3 | Apply SDN to networking applications |
| C312PE5V84.4 | Apply various operations of network function virtualization |
| C312PE5V84.5 | Apply various operations of network virtualization |
| C312PE5V84.6 | Explain various use cases of SDN |

| **Title: RFID SYSTEM DESIGN AND TESTING, Subject Code:CEC349 NBA Code for the Subject :C313PE6V36 Semester : 6 [23-24EVEN]Target :60 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C313PE6V36.1 | Classify RFID systems based on frequency, architecture and performance |
| C313PE6V36.2 | Define standards for RFID technology |
| C313PE6V36.3 | Illustrate the operation of various components of RFID |
| C313PE6V36.4 | Describe the privacy and security issues in RFID Systems |
| C313PE6V36.5 | Discuss the construction and applications of RFID enabled |
| C313PE6V36.6 | To develop an RFID tag reader and test its characteristics |

| **Title: HUMAN VALUES AND ETHICS, Subject Code:GE3791 NBA Code for the Subject :C401 ,Semester : 7 [24-25 ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C401.1 | Identify the importance of democratic, secular and scientific values in harmonious functioning of social life |
| C401.2 | Practice democratic and scientific values in both their personal and professional life. |
| C401.3 | Find rational solutions to social problems. |
| C401.4 | Behave in an ethical manner in society. |
| C401.5 | Practice critical thinking and the pursuit of truth. |
| C401.6 | Play an important role in the modern society. |

| **Title: IT IN AGRICULTURAL SYSTEM, Subject Code:AI3021 NBA Code for the Subject : C402OE2 ,Semester : 7 [24-25 ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C402OE2.1 | Understand the applications of IT in remote sensing applications such as Drones etc. |
| | Get a clear understanding of how a greenhouse can be automated and its advantages. |

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|---|---|
| C402OE2.2 | |
| C402OE2.3 | Apply IT principles and concepts for management of field operations. |
| C402OE2.4 | Understanding about weather models, their inputs and applications. |
| C402OE2.5 | Understanding of how IT can be used for e-governance in agriculture. |
| C402OE2.6 | Get the knowledge about the design of drone in field of Agriculture. |

| **Title: PRINCIPLES OF MANAGEMENT, Subject Code:GE3751 NBA Code for the Subject :C403,Semester : 7 [24-25 ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C403.1 | Demonstrate critical thinking when presented with managerial problems and express their views and opinions on managerial issues in an articulate way |
| C403.2 | Understand the major internal features of a business system and the environment in which it operates. |
| C403.3 | Identify and explain the importance of the management process and identify some of the key skills required for the contemporary management practice |
| C403.4 | Understand the importance of delegation |
| C403.5 | To implement planning, Organising, directing and controlling activities in project/career |
| C403.6 | Understand the role budget and finance in a project |

| **Title: ELECTRIC VEHICLE TECHNOLOGY, Subject Code:OEE352 NBA Code for the Subject :C404OE20 ,Semester : 7 [24-25 ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C404OE20.1 | Able to understand the principles of conventional and special electrical machines. |
| C404OE20.2 | Acquired the concepts of power devices and power converters |
| C404OE20.3 | Able to understand the control for DC and AC drive systems. |
| C404OE20.4 | Learned the electric vehicle architecture and power train components |
| C404OE20.5 | Acquired the knowledge of mechanics of electric vehicles |
| C404OE20.6 | Acquired the knowledge of control of electric vehicle |

| **Title: SENSORS, Subject Code:OMR353 NBA Code for the Subject : C405OE4 ,Semester : 7 [24-25 ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |

| | |
|---|---|
| C405OE4.1 | Understand various sensor effects, sensor characteristics, signal types, calibration methods and obtain transfer function and empirical relation of sensors. They can also analyze the sensor response. |
| C405OE4.2 | Analyze and select suitable sensor for displacement, proximity and range measurement. |
| C405OE4.3 | Analyze and select suitable sensor for force, magnetic field, speed, position and direction measurement. |
| C405OE4.4 | Analyze and Select suitable sensor for light detection, pressure and temperature measurement and also familiar with other miniaturized smart sensors. |
| C405OE4.5 | Select and design suitable signal conditioning circuit with proper compensation and linearizing element based on sensor output signal. |
| C405OE4.6 | Apply the Data acquisition system for research and development |

| **Title:AD HOC AND WIRELESS SENSOR NETWORKS,Subject Code:EC8702 NBA Code for the Subject :C404 ,Semester : 7 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C404.1 | Know the basics of Ad hoc networks and Wireless Sensor Networks |
| C404.2 | Apply the basic knowledge to identify the suitable routing algorithm based on the network and user requirement |
| C404.3 | Understand the architecture of wireless sensor networks and design considerations |
| C404.4 | Apply the knowledge to identify appropriate physical and MAC layer protocols |
| C404.5 | Understand the transport layer and security issues possible in Ad hoc and sensor networks. |
| C404.6 | Be familiar with the OS used in Wireless Sensor Networks and build basic modules |

| **Title:TRANSDUCER ENGINEERING,Subject Code:OIC751 NBA Code for the Subject :C406OE2 ,Semester : 7 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C406OE2.1 | Apply mathematical knowledge and science and engineering fundamentals gained to solve problems pertaining to measurement application and Summarize the types of transducers and its applications. |
| C406OE2.2 | Determine the static and dynamic characteristics of transducers to model them |
| C406OE2.3 | Get exposed to different types of resistive transducers and their application areas |
| C406OE2.4 | Acquire knowledge on variable inductance and variable capacitance transducers |
| C406OE2.5 | Gain knowledge on variety of transducers and its need |
| C406OE2.6 | Analyze MEMS and Nano sensors |

| **Title:SATELLITE COMMUNICATION,Subject Code:EC8094(8) NBA Code for the Subject :C410PE ,Semester : 7 [23-24ODD]Target :80 Credits:3** | |
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| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C410PE.1 | Explain the satellite orbits and launching of satellites |

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|---|---|
| C410PE.2 | Explain the components of space segment |
| C410PE.3 | Derive and analyze the satellite uplink and downlink |
| C410PE.4 | Explain different types of satellite access |
| C410PE.5 | Explain different satellite systems |
| C410PE.6 | Explain various specialized services provided by the satellites |

**Title:EMBEDDED LABORATORY,Subject Code:EC8711 NBA Code for the Subject :C407 ,Semester : 7 [23-24ODD]Target :80 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C407.1 | Write programs in ARM for a specific Application |
| C407.2 | Interface memory and Write programs related to memory operations |
| C407.3 | Interface A/D and D/A convertors with ARM system |
| C407.4 | Analyze the performance of interrupt |
| C407.5 | Write programs for interfacing keyboard, display, motor and sensor |
| C407.6 | Formulate a mini project using embedded system |

**Title:ADVANCED COMMUNICATIONLABORATORY,Subject Code:EC8761 NBA Code for the Subject :C408 ,Semester : 7 [23-24ODD]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C408.1 | Understand the working principle of optical sources, detector, fibers |
| C408.2 | Develop understanding of simple optical communication link |
| C408.3 | Understand the measurement of BER, Pulse broadening |
| C408.4 | Understand and capture an experimental approach to digital wireless communication |
| C408.5 | Understand actual communication waveforms that will be sent and received across wireless channel |
| C408.6 | Understand the intricacies in Microwave System design |

**Title:PROJECT WORK,Subject Code:EC8811 NBA Code for the Subject :C411 ,Semester : 8 [23-24EVEN]Target :65 Credits:10**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C411.1 | Apply various engineering techniques to solve any challenging practical problems |
| C411.2 | Design and implement their own innovative ideas or research problems which may satisfy the societal and environmental needs. |
| C411.3 | Use various modern engineering and IT tools to solve and assess societal, health, safety, legal and cultural issues |
| C411.4 | Understand the impact of the professional engineering solutions in societal and environmental contexts and apply ethical principles and commit to professional ethics and responsibilities |
| C411.5 | Work effectively as an individual, and as a member or leader in multidisciplinary teams with |

| | |
|---|---|
| | effective communication skills |
| C411.6 | Manage projects in multidisciplinary environments and to engage in lifelong learning |

**Programme:B.E. Electrical and Electronics Engineering**

**Course OutComes for the Academic Year : 2023-24**

| **Title:PROFESSIONAL ENGLISH - 1,Subject Code:HS3152 NBA Code for the Subject :C101 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C101.1 | To improve the communicative competence of learners by throwing light on vocabulary and basic grammar |
| C101.2 | To help learners use language effectively in academic (grammar) /work contexts (reports) |
| C101.3 | To build on students¿ English language skills by engaging them in listening, speaking and grammar learning activities those are relevant to authentic contexts. |
| C101.4 | To develop learners¿ ability to read and write complex texts, summaries, articles, blogs, Definitions, essays and user manuals. |
| C101.5 | To use language efficiently in expressing their opinions via various media and graphical representation. |
| C101.6 | Participate effectively in informal conversations; introduce themselves and their friends and express opinion in English with different types of sentences |

| **Title:MATRICES AND CALCULUS,Subject Code:MA3151 NBA Code for the Subject :C102 ,Semester : 1 [23-24ODD]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C102.1 | Eigenvalues and eigenvectors, diagonalization of a matrix,symmetric matrices, Positive definite matrices and similar matrices. |
| C102.2 | Understand the limit, continuity and derivative of the functions. Solve various functions and its maxima /minima using differentiation rules. |
| C102.3 | Apply the total and partial derivatives in Taylor series expansion of functions and the extremum of functions. |
| C102.4 | Evaluate the integrals both by using Riemann sums and by using the Fundamental theorem of Calculus. Evaluate integrals using various techniques of integration. |
| C102.5 | Understand the concepts of double integration and determine the area using integration. Also understands the concepts of the change of order of integration and Change of variables in integrals. |
| C102.6 | Understand the concepts of Triple integration and determine the volume using integration. |

| **Title:ENGINEERING PHYSICS,Subject Code:PH3151 NBA Code for the Subject :C103 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C103.1 | To understand the importance of mechanics |
| C103.2 | Express their knowledge in electromagnetic waves. |
| C103.3 | Demonstrate a strong foundational knowledge in optics and lasers. |
| C103.4 | Understand the importance of quantum physics. |
| C103.5 | Comprehend and apply quantum mechanical principles towards the formation of energy bands |
| C103.6 | Demonstrate a strong foundational knowledge in oscillations |

| **Title:ENGINEERING CHEMISTRY,Subject Code:CY3151 NBA Code for the Subject :C104 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C104.1 | To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water |
| C104.2 | To identify and apply basic concepts in nano science and nanotechnology in designing the synthesis of nanomaterials for and technology applications |
| C104.3 | To apply the knowledge of phase rule aand composites for material selection requirements |

| | |
|---|---|
| C104.4 | To recommend suitable fuels for engineering processes and applications |
| C104.5 | Analysis of combustion process and its calculations |
| C104.6 | To recognise different forms of energy resources and apply them for suitable applications in energy sector |

| **Title:PROBLEM SOLVING AND PYTHON PROGRAMMING,Subject Code:GE3151 NBA Code for the Subject :C105 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C105.1 | To understand the basics of algorithmic problem solving |
| C105.2 | To learn to solve problems using Python conditionals and loops. |
| C105.3 | To define Python functions and use function calls to solve problems. |
| C105.4 | To use Python data structures - lists, tuples, dictionaries to represent complex data. |
| C105.5 | To learn about usage of python packages and modules |
| C105.6 | To do input/output with files in Python |

| **Title:PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY,Subject Code:GE3171 NBA Code for the Subject :C106 ,Semester : 1 [23-24ODD]Target :80 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C106.1 | To understand the problem solving approaches. |
| C106.2 | To learn the basic programming constructs in Python |
| C106.3 | To learn the programming constructs in Python like loop, function, recursion. |
| C106.4 | To practice various computing strategies for Python-based solutions to real world problems. |
| C106.5 | To use Python data structures-lists, tuples, dictionaries. |
| C106.6 | To do input/output with files in Python. |

| **Title:PHYSICS AND CHEMISTRY LABORATORY,Subject Code:BS3171 NBA Code for the Subject :C107 ,Semester : 1 [23-24ODD]Target :60 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C107.1 | gain knowledge about elasticity, modulus, oscillations and also able to calculate Young's,rigidity modulus, moment of inertia of regular and irregular bodies. |
| C107.2 | understand the application of interference and diffraction in finding thickness of the given sample and wavelength of the source respectively |
| C107.3 | calculate the variation of resistance with respect to temperature and also able to calculate the band gap of |
| C107.4 | Analyse various water quality parameters-Hardness, alkalinity and DO in water sample. |
| C107.5 | Acquire practical skills by using instruments like conductivity meter, pH meter and potentiometer. |
| C107.6 | Finding the strength and amount of nickel in steel. |

| **Title:PROFESSIONAL ENGLISH-II,Subject Code:HS3252 NBA Code for the Subject :C108 ,Semester : 2 [23-24EVEN]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C108.1 | To compare and contrast products and ideas through technical texts in essays with appropriate grammatical usage and contextual meanings. |
| C108.2 | to enhance learners' awareness of general rules writing for specific audiences through professional emails and responses to compliants |
| C108.3 | to help learners understand the purpose, audience, contexts of different types of letters/ essays/ checklists |
| C108.4 | to analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format. to report events and the processes of technical and industrial nature |
| C108.5 | to make use of grammatical items effectively in writing recommendations and in |

| | |
|---|---|
| | transcoding the graphs |
| C108.6 | to write a winning job/internship application-cover letter and resume SOP |

**Title:STATISTICS AND NUMERICAL METHODS,Subject Code:MA3251 NBA Code for the Subject :C109 ,Semester : 2 [23-24EVEN]Target :60 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C109.1 | Apply the concept of testing of hypothesis for small and large samples in real life problems. |
| C109.2 | Apply the basic concepts of classifications of design of experiments in the field of agriculture. |
| C109.3 | Solve algebraic, transcendental equations and simultaneous equations and Eigen value problems. |
| C109.4 | Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems. |
| C109.5 | Understand the knowledge of various techniques and methods for solving first order ordinary differential equations with initial conditions in engineering applications. |
| C109.6 | Solve the ordinary differential equations with initial conditions by using certain techniques in engineering applications. |

**Title:BASIC CIVIL AND MECHANICAL ENGINEERING,Subject Code:BE3255 NBA Code for the Subject :C111 ,Semester : 2 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C111.1 | Understanding profession of Civil and Mechanical engineering. |
| C111.2 | Sumerise the planning of building, infrastructure and working of Machines. the planning of building, infrastructure and working of Machineries. |
| C111.3 | Apply the knowledge gained in respective discipline |
| C111.4 | Illustrate the ideas of Civil and Mechanical Engineering applications. |
| C111.5 | Appraise the material, Structures, machines and energy. |
| C111.6 | understand the refrigeration systems |

**Title:PHYSICS FOR ELECTRICAL ENGINEERING,Subject Code:PH3202 NBA Code for the Subject :C111 ,Semester : 2 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C111.1 | know basics of dielectric materials and insulation |
| C111.2 | gain knowledge on the electrical and magnetic properties of materials and their applications |
| C111.3 | understand clearly of semiconductor physics and functioning of semiconductor devices |
| C111.4 | :understand the optical properties of materials and working principles of various optical devices |
| C111.5 | Gain knowledge on nanotechnology |
| C111.6 | Acquire the knowledge on Carbon Nanotubes and Applications |

**Title:ENGINEERING GRAPHICS,Subject Code:GE3251 NBA Code for the Subject :C112 ,Semester : 2 [23-24EVEN]Target :60 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C112.1 | Draw the various types of Engineering Curves. |
| C112.2 | Draw the Projection of Points, Lines and Plain Surfaces. |
| C112.3 | Draw the Projection of Solids. |
| C112.4 | Draw the Freehand Sketch of Simple Objects. |
| C112.5 | Draw the Projection of Sectioned Solids and Development of Surfaces. |
| C112.6 | Draw the Isometric and Perspective Projections of Simple Solids. |

| Title:ELECTRICAL CIRCUIT ANALYSIS,Subject Code:EE3251 NBA Code for the Subject :C113 ,Semester : 2 [23-24EVEN]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C113.1 | Ability to Explain circuit¿s behavior using circuit laws |
| C113.2 | Compute the transient response of first order and second order systems to step and sinusoidal input |
| C113.3 | Compute the transient response of first order and second order systems to step and sinusoidal input |
| C113.4 | Ability to Compute power, line/ phase voltage and currents of the given three phase circuit |
| C113.5 | Ability to Explain the frequency response of series and parallel RLC circuits |
| C113.6 | Ability to Explain the behavior of magnetically coupled circuits |

| Title:ENGINEERING PRACTICES LABORATORY,Subject Code:GE3271 NBA Code for the Subject :C114 ,Semester : 2 [23-24EVEN]Target :65 Credits:2 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C114.1 | Students will be able to Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work |
| C114.2 | Students will be able to Saw, plane, make joints in wood materials used in common household wood work. |
| C114.3 | Students will be able to Weld various joints in steel plates using arc welding work |
| C114.4 | Students will be able to Machine various simple processes like turning, drilling, tapping in parts |
| C114.5 | Students will be able to Assemble simple mechanical assembly of common household equipment. |
| C114.6 | Students will be able to Make a tray out of metal sheet using sheet metal work. |

| Title:ELECTRIC CIRCUITS LABORATORY,Subject Code:EE3271 NBA Code for the Subject :C115 ,Semester : 2 [23-24EVEN]Target :65 Credits:2 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C115.1 | Use simulation and experimental methods to verify the fundamental electrical laws for the given DC/AC circuit |
| C115.2 | Use simulation and experimental methods to verify the various electrical theorems (Superposition, Thevenin , Norton and maximum power transfer) for the given DC/AC circuit |
| C115.3 | Analyze transient behavior of the given RL/RC/RLC circuit using simulation and experimental methods |
| C115.4 | Analyze frequency response of the given series RLC circuit using simulation and experimentation methods |
| C115.5 | Analyze frequency response of the given parallel RLC circuit using simulation and experimentation methods |
| C115.6 | Analyze the performance of the given three-phase circuit using simulation and experimental methods |

| Title:ELECTROMAGNETIC FIELDS,Subject Code:EE3301 NBA Code for the Subject :C201 ,Semester : 3 [23-24ODD]Target :65 Credits:4 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C201.1 | apply knowledge of mathematical prerequisites and explain the theorems related to vector fields |
| C201.2 | explain the concepts of electric fields, electric potential, energy density and applications of electrostatics |
| C201.3 | explain the concepts of magnetic fields , energy density and applications of magnetostatics |
| C201.4 | explain the concepts of capacitance and inductance |
| C201.5 | derive Maxwel's equation by applying Faraday's And Ampere's laws |

| | |
|---|---|
| C201.6 | derive the electromagnetic wave equations and explain the concept of wave propagation using pyonting's vactor |

**Title:PROBABILITY AND COMPLEX FUNCTIONS,Subject Code:MA3303 NBA Code for the Subject :C201 ,Semester : 3 [23-24ODD]Target :60 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C201.1 | Have a fundamental knowledge of the basic probability concepts. |
| C201.2 | Get exposure and a well founded knowledge of standard distributions which can describe the real life phenomena. |
| C201.3 | Acquire skills in handling situations involving more than one random variable and functions of random variables with correlation and regression. |
| C201.4 | Analytic functions, conformal mapping and complex integration. |
| C201.5 | Solve contour integration and cauchy residue theorem. |
| C201.6 | Solve the linear equations of second and higher order with constant, variable coefficients, simultaneous first order differential equations. |

**Title:C PROGRAMMING AND DATA STRUCTURES,Subject Code:CS3353 NBA Code for the Subject :C202 ,Semester : 3 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C202.1 | To introduce the basics of C programming language. |
| C202.2 | Apply advanced features of C in solving problems. |
| C202.3 | Write functions to implement linear and non¿linear data structure operations. |
| C202.4 | Suggest and use appropriate linear/non¿linear data structure operations for solving a given problem. |
| C202.5 | Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval. |
| C202.6 | Appropriately use sort and search algorithms for a given application. |

**Title:DIGITAL LOGIC CIRCUITS,Subject Code:EE3302 NBA Code for the Subject :C202 ,Semester : 3 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C202.1 | Explain the various number systems and compare the characteristics and operation of digital logic families. Describe the various types of number system, binary codes and examine the digital logic fami |
| C202.2 | se K-map for simplification and implementation of combinational logic circuit |
| C202.3 | Design various synchronous sequential circuit. |
| C202.4 | Design various asynchronous sequential circuit. |
| C202.5 | Analyze the programmability logic devices. |
| C202.6 | Discuss digital simulation for development of application oriented logic circuits. |

**Title:ELECTRON DEVICES AND CIRCUITS,Subject Code:EC3301 NBA Code for the Subject :C204.6 ,Semester : 3 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C204.6.1 | Explain the structure operation and characteristics of PN junction devices (diode,zener diode, LED and Laser diode). |
| C204.6.2 | Design clipper,clamper,half wave and full wave rectifier, regulator circuits using PN junction diodes. |
| C204.6.3 | Analyze the structure and characteristics of BJT,FET,MOSFET,UJT,Thyristor and IGBT. |
| C204.6.4 | Analyze the performance of various configurations of BJT and MOSFET based amplifier. |
| C204.6.5 | Explain the characteristics of MOS based cascade and differential amplifier. |
| C204.6.6 | Explain the operation of various feedback amplifiers and oscillators. |

**Title:ELECTRICAL MACHINES - I,Subject Code:EE3303 NBA Code for the Subject :C205**

| ,Semester : 3 [23-24ODD]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C205.1 | Apply the laws governing the electromechanical energy conversion for singly and multiple excited systems |
| C205.2 | Explain the construction and working principle of DC machines. |
| C205.3 | Interpret various characteristics of DC machines. |
| C205.4 | Compute various performance parameters of the machine, by conducting suitable tests. |
| C205.5 | Draw the equivalent circuit of transformer and predetermine the efficiency and regulation. |
| C205.6 | Describe the working principle of auto transformer, three phase transformer with different types of connections.1 |

| **Title:C PROGRAMMING AND DATA STRUCTURES LABORATORY,Subject Code:CS3362 NBA Code for the Subject :C203 ,Semester : 3 [23-24ODD]Target :65 Credits:1.5** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C203.1 | Use different constructs of C and develop applications |
| C203.2 | Apply advanced features of C in solving problems. |
| C203.3 | Write functions to implement linear and non-linear data structure operations |
| C203.4 | Suggest and use the appropriate linear / non-linear data structure operations for a given problem |
| C203.5 | Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval |
| C203.6 | Implement Sorting and searching algorithms for a given application |

| **Title:ELECTRONIC DEVICES AND CIRCUITS LABORATORY,Subject Code:EC3311 NBA Code for the Subject :C207 ,Semester : 3 [23-24ODD]Target :65 Credits:1.5** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C207.1 | To understand the Characteristics of Semiconductor diode, BJT configuration through experimentation |
| C207.2 | To understand the behavior of JFET and UJT through experimentation |
| C207.3 | To study and understand behavior of photo diode and photo transistor through experimentation |
| C207.4 | To apply diode for rectification purpose in half wave and full wave operation |
| C207.5 | To study the working operation of oscillators RC phase shift and LC filters through experimentation |
| C207.6 | To apply and study the operation of FET as differential operation through experimentation |

| **Title:ELECTRICAL MACHINES LABORATORY ? I,Subject Code:EE3311 NBA Code for the Subject :C208 ,Semester : 3 [23-24ODD]Target :60 Credits:1.5** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C208.1 | Construct the circuit with appropriate connections for the given DC machine/transformer. |
| C208.2 | Experimentally determine the characteristics of different types of DC machines. |
| C208.3 | Demonstrate the speed control techniques for a DC motor for industrial applications. |
| C208.4 | Identify suitable methods for testing of transformer and DC machines |
| C208.5 | Predetermine the performance parameters of transformers and DC motor. |
| C208.6 | Understand DC motor starters and 3-phase transformer connections. |

| **Title:MEASUREMENTS AND INSTRUMENTATION,Subject Code:EE3403 NBA Code for the Subject :C212 ,Semester : 4 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |

| | |
|---|---|
| C212.1 | Ability to understand the fundamental art of measurement in engineering. |
| C212.2 | Ability to understand the structural elements of various instruments. |
| C212.3 | Ability to understand the importance of bridge circuits. |
| C212.4 | Ability to understand about various transducers and their characteristics by experiments. |
| C212.5 | Ability to understand the concept of digital instrumentation by experiments. |
| C212.6 | Ability to understand the concept of virtual instrumentation by experiments. |

**Title:LINEAR INTEGRATED CIRCUITS PCC 3 0 0 3 3,Subject Code:EE3402 NBA Code for the Subject :C213 ,Semester : 4 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C213.1 | Explain monolithic IC fabrication process |
| C213.2 | Explain the fabrication of diodes, capacitance, resistance, FETs and PV Cell |
| C213.3 | Analyze the characteristics and basic applications (inverting/non-inverting amplifier, summer, differentiator, integrator, V/I and I/V converter) of Op-Amp |
| C213.4 | Explain circuit and applications of op-amp based instrumentation amplifier, log/antilog amplifier, analog multiplier /divider, active filters, comparators, waveform generators, A/D and D/A converter |
| C213.5 | Explain Functional blocks, characteristics and applications of Timer, PLL, analog multiplier ICs. |
| C213.6 | Explain the applications of ICs in Instrumentation amplifier, fixed and variable voltage regulator, SMPS and function generator |

**Title:ENVIRONMENTAL SCIENCES AND SUSTAINABILITY,Subject Code:GE3451 NBA Code for the Subject :C215 ,Semester : 4 [23-24EVEN]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C215.1 | Infer the importance of environment and explain the concept, types, structure and function of ecosystem |
| C215.2 | Recall the various functions, different values, levels, threats and conservation of biodiversity |
| C215.3 | Explain the different type of pollution and propose the suitable methods to prevent the same to enhance the environment |
| C215.4 | Discuss the types of energy resources and conservation |
| C215.5 | Discuss the aspect of sustainability and the means of sustainability management to realize the SDG targets |
| C215.6 | List the various environmental management systems(EMS) for environmental protection and discusses the given solutions for energy to materials for sustainability |

**Title:ELECTRICAL MACHINES - II PCC 3 0 0 3 3,Subject Code:EE3405 NBA Code for the Subject :C216 ,Semester : 4 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C216.1 | Ability to understand the construction and working principle of Synchronous generator. |
| C216.2 | Ability to understand the construction and working principle of Synchronous Motor |
| C216.3 | Ability to understand the construction and working principle of Three Phase Induction Motor |
| C216.4 | Acquiring knowledge about the starting and speed control of induction motors |
| C216.5 | Gaining knowledge about the basic principles and working of Single-phase induction motors |
| C216.6 | Gaining knowledge about the basic principles and working of Special Electrical Machines. |

**Title:TRANSMISSION AND DISTRIBUTION PCC 3 0 0 3,Subject Code:EE3401 NBA Code for the Subject :C310 ,Semester : 4 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C310.1 | To impart knowledge about the configuration of the electrical power systems |

| | |
|---|---|
| C310.2 | To study the line parameters and interference with neighboring circuits |
| C310.3 | To understand the mechanical design and performance analysis of transmission lines. |
| C310.4 | To learn about different insulators and underground cables |
| C310.5 | To understand and analyze the distribution system |
| C310.6 | To explain the recent trrends like FACTS devices etc |

**Title:MICROPROCESSOR AND MICROCONTROLLER,Subject Code:EE3404 NBA Code for the Subject :C3O2 ,Semester : 4 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C3O2.1 | Ability to write assembly language program for microprocessor and microcontroller. |
| C3O2.2 | Ability to design and implement interfacing of peripheral with microprocessor and microcontroller |
| C3O2.3 | Ability to analyze, comprehend, design and simulate microprocessor based systems used for control and monitoring |
| C3O2.4 | Ability to analyze, comprehend, design and simulate microcontroller based systems used for control and monitoring |
| C3O2.5 | Ability to understand and appreciate advanced architecture evolving microprocessor field |
| C3O2.6 | Ability to write program in Microcontroller 8051 |

**Title:ELECTRICAL MACHINES LABORATORY-II,Subject Code:EE3411 NBA Code for the Subject :C218 ,Semester : 4 [23-24EVEN]Target :60 Credits:1.5**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C218.1 | Ability to understand and analyze EMF and MMF methods |
| C218.2 | Ability to analyze the characteristics of V and Inverted V curves |
| C218.3 | Acquire hands on experience of conducting various tests on alternators and obtaining their performance indices using standard analytical as well as graphical methods. |
| C218.4 | Acquire hands on experience of conducting various tests on alternators and obtaining their performance indices using standard analytical as well as graphical methods. |
| C218.5 | Ability to acquire knowledge on separation of losses |
| C218.6 | Ability to understand the importance of synchronous motors and induction motors and to understand the starting methods. |

**Title:LINEAR AND DIGITAL CIRCUITS LABORATORY,Subject Code:EE3412 NBA Code for the Subject :C219 ,Semester : 4 [23-24EVEN]Target :65 Credits:1.5**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C219.1 | Ability to understand and implement Boolean Functions. |
| C219.2 | Ability to understand the importance of code conversion |
| C219.3 | Ability to Design and implement circuits with digital ICs like decoders, multiplexers, register. |
| C219.4 | Ability to acquire knowledge on Application of Op-Amp |
| C219.5 | Ability to Design and implement counters using analog ICs like timers, VCOs and digital ICs like Flip-flops and counters. |
| C219.6 | Ability to acquire knowledge on digital gates and Op-amp. |

**Title:MICROPROCESSOR AND MICROCONTROLLER LABORATORY,Subject Code:EE3413 NBA Code for the Subject :C220 ,Semester : 4 [23-24EVEN]Target :65 Credits:1.5**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C220.1 | To perform simple arithmetic operations using assembly language program and study the addressing modes & instruction set of 8085 & 8051 assembly language programming. |
| C220.2 | To develop skills in simple program writing in assembly languages diagram using 8085 microprocessor. |
| C220.3 | To write an assembly language program to convert Analog input to Digital output and |

| | |
|---|---|
| | Digital input to Analog output. |
| C220.4 | To perform interfacing experiments with µP8085 looping and calling subroutines. |
| C220.5 | To perform interfacing experiments with µC8051. and 8051 microcontroller. |
| C220.6 | Ability to analyze, comprehend, design and simulate microcontroller based systems used for control and monitoring |

**Title:POWER SYSTEM ANALYSIS,Subject Code:EE3501 NBA Code for the Subject :C301 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C301.1 | Explain the operation of various power system components, Draw the per unit diagram and form the Y-bus matrix for the power system. |
| C301.2 | Develop the power flow equation for power system problems and Determine the line flows using various algorithm |
| C301.3 | Illustrate the types of faults and their effects, Calculate the fault currents for symmetrical fault condition. |
| C301.4 | Draw the sequence network for L-G, L-L and L-L-G fault of the power system and Determine the fault current in case of L-G, L-L and D-L-G fault |
| C301.5 | Explain the concept of power system stability |
| C301.6 | Analyze the stability of single machine infinite bus system |

**Title:POWER ELECTRONICS,Subject Code:EE3591 NBA Code for the Subject :C302 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C302.1 | Analysis and study of different DC-DC converters, its design, control strategies and its applications in real time. |
| C302.2 | Acquire knowledge in design and analysis of single and three phase inverters, it control schemes, and its applications in real time |
| C302.3 | Acquire knowledge in design and analysis of single and three phase rectifier, and its applications in real time. acquire knowledge in filter design. |
| C302.4 | Acquire knowledge in two diode analog model of SCR.Acquire knowledge in design and analysis of single and three phase controlled rectifiers. |
| C302.5 | Acquire knowledge in design and analysis of single and three phase cycloconverter it control schemes, and its applications in real time |
| C302.6 | Application of power electronics in real world |

**Title:CONTROL SYSTEMS,Subject Code:EE3503 NBA Code for the Subject :C303 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C303.1 | Represent simple systems in transfer function and state variable forms. |
| C303.2 | Analyze simple systems in time domain. |
| C303.3 | Analyze the system using Routh's criterion and root locus |
| C303.4 | Analyze simple systems in frequency domain. |
| C303.5 | Infer the stability of systems in time and frequency domain. |
| C303.6 | Interpret characteristics of the system and find out solution for simple control problems. |

**Title:Embedded System Design,Subject Code:EE3016 NBA Code for the Subject :C304PE1V31 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C304PE1V31.1 | understand the hardware functionals and software strategies required to develop various Embedded systems |
| C304PE1V31.2 | understand the basic differences between various Bus communication standards |
| C304PE1V31.3 | understand the incorporation of the interface as Interrupt services |
| C304PE1V31.4 | understand the various scheduling algorithms through a Real-time operating system. |

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|---|---|
| C304PE1V31.5 | understand The various embedded concepts for developing automation applications. |
| C304PE1V31.6 | understand basics of Real time operating system. |

**Title:Electric Vehicle Architecture,Subject Code:EE3025 NBA Code for the Subject :C305PE2V41 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C305PE2V41.1 | To learn the structure of Electric Vehicle, Hybrid Electric Vehicle |
| C305PE2V41.2 | To study about the EV conversion components |
| C305PE2V41.3 | To know about the details and specifications for Electric Vehicles |
| C305PE2V41.4 | To understand the concepts of Plug-in Hybrid Electric Vehicle |
| C305PE2V41.5 | To model and simulate all types of DC motors |
| C305PE2V41.6 | To study the POWER COMPONENTS AND BRAKES |

**Title:ELECTRICAL DRIVES,Subject Code:EE3012 NBA Code for the Subject :C306PE3V24 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C306PE3V24.1 | Understand the basic requirements of motor selection for different load profiles. |
| C306PE3V24.2 | Analyze the steady state behavior and stability aspects of drive systems. |
| C306PE3V24.3 | Analyze the dynamic performance of the DC drive using converter and chopper control. |
| C306PE3V24.4 | Analyze the dynamic performance of the AC drive |
| C306PE3V24.5 | Design the controller for electrical drives. |
| C306PE3V24.6 | Simulation of converter and chopper fed DC drive and Inverter Fed AC drives |

**Title:FILM APPRECIATION,Subject Code:MX3083 NBA Code for the Subject :C307M13 ,Semester : 5 [23-24ODD]Target :65 Credits:0**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C307M13.1 | To know the development of film as an art and entertainment form |
| C307M13.2 | To learn the language of cinema as an evolved over a century |
| C307M13.3 | To read a film and appreciate the various nuances of a film as a text |
| C307M13.4 | To learn the process of film making, structure of film with social concern and crew members |
| C307M13.5 | To get the knowledge about the film theories, professional ethics and early era of films individually and as a team work |
| C307M13.6 | To inculcate their technical knowledge in the par with technological advancements in film making |

**Title:POWER ELECTRONICS LABORATORY,Subject Code:EE3511 NBA Code for the Subject :C308 ,Semester : 5 [23-24ODD]Target :65 Credits:1.5**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C308.1 | Ability to practice and understand converter and inverter circuits and apply software for engineering problems. |
| C308.2 | Ability to experiment about switching characteristics various switches. |
| C308.3 | Ability to analyze about AC to DC converter circuits. |
| C308.4 | Ability to analyze about DC to AC circuits. |
| C308.5 | Ability to acquire knowledge on AC to AC converters |
| C308.6 | Ability to acquire knowledge on simulation software. |

**Title:CONTROL AND INSTRUMENTATION LABORATORY,Subject Code:EE3512 NBA Code for the Subject :C309 ,Semester : 5 [23-24ODD]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|

| | |
|---|---|
| C309.1 | To make the students familiarize with various representations of systems. |
| C309.2 | To make the students analyze the stability of linear systems in the time domain and frequency domain. |
| C309.3 | To make the students design compensator based on the time and frequency domain Specifications. |
| C309.4 | To develop linear models mainly state variable model and transfer function model |
| C309.5 | To make the students to design a complete closed loop control system for the physical systems. |
| C309.6 | To make the students familiarize in mathematical modeling of Electrical systems. |

**Title:Multilevel Power Converters,Subject Code:EE3011 NBA Code for the Subject :312E ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| 312E.1 | Examine the different topologies of multilevel inverters (MLIs) with and without DC link capacitor. |
| 312E.2 | Examine the performance of MLIs with Bipolar Pulse Width Modulation (PWM) Unipolar PWM Carrier-Based PWM Schemes Phase Level Shifted Multicarrier Modulation |
| 312E.3 | Demonstrate the working principles of Cascaded H-Bridge MLI, diode clamped MLI, flying capacitor MLI and MLI with reduced switch count |
| 312E.4 | Analyze the voltage balancing performance in Diode clamped MLI. |
| 312E.5 | Simulate three level, capacitor clamed and diode clamped MLI with R and RL load. |
| 312E.6 | Simulate MLI with reduced switch configuration using fundamental switching scheme |

**Title:Protection and Switchgear,Subject Code:EE3601 NBA Code for the Subject :C310 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C310.1 | Summarize the causes and effects of faults in power system and explain the necessity of protection in power system. |
| C310.2 | Describe the operation of electromagnetic relays and draw their characteristic curves. |
| C310.3 | List out the various faults that can occur on alternator, motor, transformer, busbar, transmission line and select the suitable protection schemes. |
| C310.4 | Synthesize the static relays using comparators and explain numerical relays. |
| C310.5 | Derive the expression for RRRV, critical resistance value. |
| C310.6 | Explain the construction details, working of various types of circuit breakers. |

**Title:Power System Operation and Control,Subject Code:EE3602 NBA Code for the Subject :C311 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C311.1 | Analyze the various load characteristics with load curve and load duration curve |
| C311.2 | Describe modeling of power-frequency dynamics and design power-frequency controller |
| C311.3 | Explain the modeling of reactive power-voltage interaction and the control actions |
| C311.4 | Solve economic dispatch problems and unit commitments problems in power systems |
| C311.5 | Explain the need of computer controls to energy management |
| C311.6 | Illustrate about SCADA and its application for real time operation and control of power systems |

**Title:Smart System Automation,Subject Code:EE3020 NBA Code for the Subject :C315PE4V35 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C315PE4V35.1 | Understand the concepts of smart system design and its present developments |
| C315PE4V35.2 | Illustrate different embedded open-source and cost-effective techniques for developing solution for real time applications. |

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|---|---|
| C315PE4V35.3 | Acquire knowledge on different platforms and Infrastructure for Smart system design |
| C315PE4V35.4 | Infer about smart appliances and energy management concepts. |
| C315PE4V35.5 | Improve Employability and entrepreneurship capacity due to knowledge upgradation on embedded system technologies. |
| C315PE4V35.6 | Real time working model fabrication for IoT application |

**Title:IoT Concepts and Applications,Subject Code:OCS352 NBA Code for the Subject :COE312 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| COE312.1 | Explain the concept of IoT |
| COE312.2 | Understand the communication models and various protocols for IoT. :Understand the communication models and various protocols for IoT. |
| COE312.3 | Design portable IoT using Arduino/Raspberry Pi /open platform |
| COE312.4 | Apply data analytics and use cloud offerings related to IoT. |
| COE312.5 | Analyze applications of IoT in real time scenario. |
| COE312.6 | Design IoT based system |

**Title:Power System Laboratory,Subject Code:EE3611 NBA Code for the Subject :C316 ,Semester : 6 [23-24EVEN]Target :75 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C316.1 | Ability to write MATLAB programs for computation of line parameters and performance of line |
| C316.2 | Ability to develop algorithms and MATLAB programs for constructing bus admittance matrix |
| C316.3 | Ability to develop mathematical formulation for load flow studies using G-S and N-R methods and solve them using MATLAB programs |
| C316.4 | Ability to develop algorithm and transform it into programs for short circuit studies using MATLAB |
| C316.5 | Ability to develop models for load-frequency studies and analyse using MATLAB/SIMULINK package |
| C316.6 | Ability to write programs and solve economic dispatch problem using MATLAB |

**Title:Well Being with Traditional Practices - Yoga, Ayurveda and Siddha,Subject Code:MX3085 NBA Code for the Subject :C316 ,Semester : 6 [23-24EVEN]Target :65 Credits:0**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C316.1 | To enjoy life happily with fun filled new style activities that help to maintain health also |
| C316.2 | To adapt a few lifestyle changes that will prevent many health disorders |
| C316.3 | To be cool and handbill every emotion very smoothly in every walk of life To be cool and handbill every emotion very smoothly in every walk of life |
| C316.4 | To learn to eat cost effective but healthy foods that are rich in essential nutrients To learn to eat cost effective but healthy foods that are rich in essential nutrients |
| C316.5 | To develop immunity naturally that will improve resistance |
| C316.6 | To develop immunity against many disorders |

**Title:HIGH VOLTAGE ENGINEERING,Subject Code:EE8701 NBA Code for the Subject :C401 ,Semester : 7 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C401.1 | Define various types of over voltages in power system and protection methods |
| C401.2 | Explain the principles behind generating high DC, AC and impulse voltages |
| C401.3 | Select appropriate techniques for measuring the over voltages and currents |
| C401.4 | Demonstrate the breakdown strength of liquid dielectrics |
| C401.5 | Identify and explain appropriate testing methods for different high voltage apparatus |

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|---|---|
| C401.6 | Describe the insulation coordination as applied to the power system |

**Title:POWER SYSTEM OPERATION AND CONTROL,Subject Code:EE8702 NBA Code for the Subject :C402 ,Semester : 7 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C402.1 | Analyze the various load characteristics with load curve and load duration curve |
| C402.2 | Describe modeling of power-frequency dynamics and design power-frequency controller |
| C402.3 | Explain the modeling of reactive power-voltage interaction and the control actions |
| C402.4 | Solve economic dispatch problems and unit commitments problems in power systems |
| C402.5 | Explain the need of computer controls to energy management |
| C402.6 | Illustrate about SCADA and its application for real time operation and control of power systems |

**Title:RENEWABLE ENERGY SYSTEMS,Subject Code:EE8703 NBA Code for the Subject :C403 ,Semester : 7 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C403.1 | Ability to create awareness about renewable Energy Sources and technologies. |
| C403.2 | Ability to get adequate inputs on a variety of issues in harnessing renewable Energy. |
| C403.3 | Ability to recognize current and possible future role of renewable energy sources. |
| C403.4 | Ability to explain the various renewable energy resources and technologies and their applications |
| C403.5 | Ability to understand basics about Biomass energy. |
| C403.6 | Ability to acquire knowledge about Solar energy. |

**Title:POWER SYSTEMS TRANSIENTS,Subject Code:EE8010 NBA Code for the Subject :C405PE45 ,Semester : 7 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C405PE45.1 | Able to explain the types and importance of studying the transients |
| C405PE45.2 | Able to map the given problem to the concerned basic transform |
| C405PE45.3 | Able to explain the resistance switching, capacitance switching and current chopping |
| C405PE45.4 | Able to explain the lightning mechanism and protection schemes |
| C405PE45.5 | Able to construct the Bewley's lattice diagram |
| C405PE45.6 | Able to explain different overvoltage mechanisms in the power system |

**Title:HIGH VOLTAGE DIRECT CURRENT TRANSMISSION,Subject Code:EE8017(8) NBA Code for the Subject :C409PE63 ,Semester : 7 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C409PE63.1 | Understand the principles and types of HVDC system. |
| C409PE63.2 | Analyze and understand the concepts of HVDC converters. |
| C409PE63.3 | Acquire knowledge on DC link control. |
| C409PE63.4 | Understand the concepts of reactive power management, harmonics and power flow analysis. |
| C409PE63.5 | Get knowledge about Planning of DC power transmission and comparison with AC power transmission. |
| C409PE63.6 | Understand the importance of power flow in HVDC system under steady state. |

**Title:FIBRE OPTICS AND LASER INSTRUMENTS,Subject Code:EI8075 NBA Code for the Subject :CEE405 ,Semester : 7 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| CEE405.1 | Understand the principle, transmission, dispersion and attenuation characteristics of optical fibers |

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|---|---|
| CEE405.2 | Apply the gained knowledge on optical fibers for its use as communication medium |
| CEE405.3 | Apply the gained knowledge on sensor which have important applications in production, manufacturing industrial and biomedical applications. |
| CEE405.4 | Understand laser theory and laser generation system. |
| CEE405.5 | apply laser theory for the selection of lasers for a specific Industrial and medical application. |
| CEE405.6 | apply hologram theroy for a specific Industrial and medical application. |

| **Title:POWER SYSTEM SIMULATION LABORATORY,Subject Code:EE8711 NBA Code for the Subject :C407 ,Semester : 7 [23-24ODD]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C407.1 | Ability to write MATLAB programs for computation of line parameters and performance of line |
| C407.2 | Ability to develop algorithms and MATLAB programs for constructing bus admittance matrix |
| C407.3 | Ability to develop mathematical formulation for load flow studies using G-S and N-R methods and solve them using MATLAB programs |
| C407.4 | Ability to develop algorithm and transform it into programs for short circuit studies using MATLAB |
| C407.5 | Ability to develop models for load-frequency studies and analyse using MATLAB/SIMULINK package |
| C407.6 | Ability to write programs and solve economic dispatch problem using MATLAB |

| **Title:RENEWABLE ENERGY SYSTEMS LABORATORY,Subject Code:EE8712 NBA Code for the Subject :C408 ,Semester : 7 [23-24ODD]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C408.1 | understand and analyze Renewable energy systems. |
| C408.2 | train the students in Renewable Energy Sources and technologies. |
| C408.3 | provide adequate inputs on a variety of issues in harnessing Renewable Energy. |
| C408.4 | simulate the various Renewable energy sources. |
| C408.5 | recognize current and possible future role of Renewable energy sources. |
| C408.6 | understand basics of Intelligent Controllers. |

**Programme:B.E. Instrumentation and Control Engineering**

**Course OutComes for the Academic Year : 2023-24**

| **Title:PROFESSIONAL ENGLISH - 1,Subject Code:HS3152 NBA Code for the Subject :C101 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C101.1 | To improve the communicative competence of learners by throwing light on vocabulary and basic grammar |
| C101.2 | To help learners use language effectively in academic (grammar) /work contexts (reports) |
| C101.3 | To build on students¿ English language skills by engaging them in listening, speaking and grammar learning activities those are relevant to authentic contexts. |
| C101.4 | To develop learners¿ ability to read and write complex texts, summaries, articles, blogs, Definitions, essays and user manuals. |
| C101.5 | To use language efficiently in expressing their opinions via various media and graphical representation. |
| C101.6 | Participate effectively in informal conversations; introduce themselves and their friends and express opinion in English with different types of sentences |

| **Title:MATRICES AND CALCULUS,Subject Code:MA3151 NBA Code for the Subject :C102 ,Semester : 1 [23-24ODD]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C102.1 | Eigenvalues and eigenvectors, diagonalization of a matrix, symmetric matrices, Positive definite matrices and similar matrices. |
| C102.2 | Understand the limit, continuity and derivative of the functions. Solve various functions and its maxima /minima using differentiation rules. |
| C102.3 | Apply the total and partial derivatives in Taylor series expansion of functions and the extremum of functions. |
| C102.4 | Evaluate the integrals both by using Riemann sums and by using the Fundamental theorem of Calculus. Evaluate integrals using various techniques of integration. |
| C102.5 | Understand the concepts of double integration and determine the area using integration. Also understands the concepts of the change of order of integration and Change of variables in integrals. |
| C102.6 | Understand the concepts of Triple integration and determine the volume using integration. |

| **Title:ENGINEERING PHYSICS,Subject Code:PH3151 NBA Code for the Subject :C103 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C103.1 | Understand the importance of mechanics |
| C103.2 | Express their knowledge in electromagnetic waves |
| C103.3 | Demonstrate a strong foundational knowledge in oscillations. |
| C103.4 | Demonstrate a strong foundational knowledge in optics and lasers |
| C103.5 | Understand the importance of quantum physics. |
| C103.6 | Comprehend and apply quantum mechanical principles towards the formation of energy bands |

| **Title:ENGINEERING CHEMISTRY,Subject Code:CY3151 NBA Code for the Subject :C104 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C104.1 | To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water |
| C104.2 | To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials |
| C104.3 | To apply the knowledge of phase rule and composites for materials selection requirements. |

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|---|---|
| C104.4 | To recommend suitable fuel for engg. processes and applications |
| C104.5 | To analyse combustion process and its calculations |
| C104.6 | To recognize different forms of energy resources and apply them for suitable applications in energy sectors. |

| **Title:PROBLEM SOLVING AND PYTHON PROGRAMMING,Subject Code:GE3151 NBA Code for the Subject :C105 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C105.1 | Develop algorithmic solutions to simple computational problems |
| C105.2 | Develop and execute simple Python programs. |
| C105.3 | Write simple Python programs using conditionals and looping for solving problems. |
| C105.4 | Decompose a Python program into functions. |
| C105.5 | Represent compound data using Python lists, tuples, dictionaries etc |
| C105.6 | Read and write data from/to files in Python programs. |

| **Title:PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY,Subject Code:GE3171 NBA Code for the Subject :C106 ,Semester : 1 [23-24ODD]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C106.1 | Develop algorithmic solutions to simple computational problems |
| C106.2 | Develop and execute simple Python programs. |
| C106.3 | Implement programs in Python using conditionals and loops for solving problem |
| C106.4 | Deploy functions to decompose a Python program. |
| C106.5 | Process compound data using Python data structures |
| C106.6 | Utilize Python packages in developing software applications. |

| **Title:PHYSICS AND CHEMISTRY LABORATORY,Subject Code:BS3171 NBA Code for the Subject :C107 ,Semester : 1 [23-24ODD]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C107.1 | Gain knowledge about elasticity, modulus, oscillations and also able to calculate Young's,rigidity modulus, moment of inertia of regular and irregular bodies. |
| C107.2 | understand the application of interference and diffraction in finding thickness of the given sample and wavelength of the source respectively |
| C107.3 | calculate the variation of resistance with respect to temperature and also able to calculate the band gap of |
| C107.4 | Analyse various water quality parameters-Hardness, alkalinity and DO in water sample. |
| C107.5 | Acquire practical skills by using instruments like conductivity meter, pH meter and potentiometer. |
| C107.6 | Finding the strength and amount of nickel in steel. |

| **Title:PROFESSIONAL ENGLISH-II,Subject Code:HS3252 NBA Code for the Subject :C108 ,Semester : 2 [23-24EVEN]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C108.1 | C108.1 To compare and contrast products and ideas through technical texts in essays with appropriate grammatical usage and contextual meanings. |
| C108.2 | C108.2 To enhance learners¿ awareness of general rules of writing for specific audiences through professional emails and responses to complaints. |
| C108.3 | C108.3 To help learners understand the purpose, audience, contexts of different types of letters/essays/checklists |
| C108.4 | C108.4 To analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format. To report events and the processes of technical and industrial nature |
| C108.5 | C108.5 To make use of grammatical items effectively in writing recommendations and in |

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| | transcoding the graphs |
| C108.6 | C108.6 To write a winning job/internship application-cover letter and resume /SoP-Statement of purpose C108.6 To write a winning job/internship application-cover letter and resume /SoP-Statement of |

**Title:STATISTICS AND NUMERICAL METHODS,Subject Code:MA3251 NBA Code for the Subject :C109 ,Semester : 2 [23-24EVEN]Target :60 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C109.1 | Apply the concept of testing of hypothesis for small and large samples in real life problems. |
| C109.2 | Apply the basic concepts of classifications of design of experiments in the field of agriculture. |
| C109.3 | Solve algebraic, transcendental equations and simultaneous equations by direct method. |
| C109.4 | Solve simultaneous equations by iterative method and Eigen value problems. |
| C109.5 | Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems. |
| C109.6 | Gain the knowledge of various techniques and methods to solve first order ordinary differential equations with initial conditions in engineering applications. |

**Title:PHYSICS FOR INSTRUMENTATION ENGINEERING,Subject Code:PH3255 NBA Code for the Subject :C110 ,Semester : 2 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C110.1 | Students gain basic knowledge about electricity magnetism and applications of vector in electricity magnetism |
| C110.2 | Gives understanding about electrical properties of materials, quantum mechanical applications to analyze the properties and their applications |
| C110.3 | Gives knowledge about Classification, properties and applications of Magnetic materials in memory storage devices. |
| C110.4 | Gives understanding about semiconductor physics, charge carrier determination and functioning of semiconductor devices |
| C110.5 | Gives complete knowledge about optical properties of materials, optical displays and applications |
| C110.6 | Gives the basic knowledge and importance of functional nano electronic devices |

**Title:BASIC CIVIL AND MECHANICAL ENGINEERING,Subject Code:BE3255 NBA Code for the Subject :C111 ,Semester : 2 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C111.1 | Understanding profession of Civil and Mechanical engineering. |
| C111.2 | Summerise the planning of building, infrastructure and working of Machines. |
| C111.3 | Apply the knowledge gained in respective discipline. |
| C111.4 | Illustrate the ideas of Civil and Mechanical Engineering applications. |
| C111.5 | Appraise the material, Structures, machines and energy. |
| C111.6 | Understand the refrigeration systems. |

**Title:ENGINEERING GRAPHICS,Subject Code:GE3251 NBA Code for the Subject :C112 ,Semester : 2 [23-24EVEN]Target :60 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C112.1 | draw the various types of engineering curves. |
| C112.2 | draw the projection of points, lines and plane surfaces. |
| C112.3 | drawing orthographic projection of solids. |
| C112.4 | draw the freehand sketch of simple objects. |
| C112.5 | draw the development of solids and section. |
| C112.6 | draw the isometric and perspective projections of simple solids. |

| Title:ELECTRICAL CIRCUIT ANALYSIS,Subject Code:EE3251 NBA Code for the Subject :C113 ,Semester : 2 [23-24EVEN]Target :60 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C113.1 | Explain circuits behavior using circuit laws |
| C113.2 | Apply mesh analysis/ nodal analysis / network theorems to determine behavior of the given DC and AC circuit |
| C113.3 | Compute the transient response of first order and second order systems to step and sinusoidal input |
| C113.4 | Compute power, line/ phase voltage and currents of the given three phase circuit |
| C113.5 | Explain the frequency response of series and parallel RLC circuits |
| C113.6 | Explain the behavior of three phase circuits |

| Title:ENGINEERING PRACTICES LABORATORY,Subject Code:GE3271 NBA Code for the Subject :C114 ,Semester : 2 [23-24EVEN]Target :65 Credits:2 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C114.1 | Students will be able to distinguish residential house wiring, fluorescent lamp wiring and stair case wiring. |
| C114.2 | Students will be able to define electrical quantities like voltage, current, energy and resistance and their measurement using CRO. |
| C114.3 | Students will be able to analyse different logic gates, clock, rectifier and to solder devices and components. |
| C114.4 | Students will able to understand the pipe connections for the home application and industrial constructions |
| C114.5 | students will be able to do plan the real geometry of the shapes for industrial applications. |
| C114.6 | Students will be able to understand the concept of connecting the metal by welding. |

| Title:ELECTRIC CIRCUITS LABORATORY,Subject Code:EE3271 NBA Code for the Subject :C115 ,Semester : 2 [23-24EVEN]Target :80 Credits:2 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C115.1 | Use simulation and experimental methods to verify the fundamental electrical laws for the given DC/AC circuit |
| C115.2 | Use simulation and experimental methods to verify the various electrical theorems (Superposition, Thevenin , Norton and maximum power transfer) for the given DC/AC circuit |
| C115.3 | Analyze transient behavior of the given RL/RC/RLC circuit using simulation and experimental methods |
| C115.4 | Analyze frequency response of the given series and parallel RLC circuit using simulation and experimentation methods |
| C115.5 | Analyze the performance of the given three-phase circuit using simulation and experimental methods |
| C115.6 | Analyze the performance of the given three-phase circuit using simulation and experimental methods |

| Title:TRANSFORMS AND DIFFERENTIAL EQUATIONS,Subject Code:MA3353 NBA Code for the Subject :C201 ,Semester : 3 [23-24ODD]Target :65 Credits:4 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C201.1 | Acquaint the students with Differential Equations which are significantly used in engineering problems. |
| C201.2 | Understand how to solve the given standard partial differential equations. |
| C201.3 | Solve differential equations using Fourier series analysis which plays a vital role in engineering applications. |
| C201.4 | Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations. |

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| C201.5 | Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering. |
| C201.6 | Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems. |

**Title:ANALOG ELECTRONICS,Subject Code:EI3351 NBA Code for the Subject :C202 ,Semester : 3 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C202.1 | Explain the operation and characteristics of PN junction diode, Zener diode, LED and Laser diode |
| C202.2 | Formulate the expression for voltage gain, current gain, input resistance and output resistance of a BJT CE and CC amplifier using h-parameter model |
| C202.3 | Formulate the expression for voltage gain, input resistance and output resistance of FET amplifier under CS,CG and Source follower. |
| C202.4 | Explain the operation of cascade amplifier, differential amplifier, single tuned amplifier and power amplifiers |
| C202.5 | Analyze the operation of negative feedback amplifiers |
| C202.6 | To design RC and LC tuned Oscillators for a given frequency range |

**Title:DIGITAL SYSTEM DESIGN AND APPLICATIONS,Subject Code:EI3352 NBA Code for the Subject :C203 ,Semester : 3 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C203.1 | Convert various types of codes and number system & gate level implementation of Boolean functions |
| C203.2 | Apply K Map for simplification and implementation of combinational logic circuit |
| C203.3 | Design the synchronous Sequential logic circuits namely counters, registers etc |
| C203.4 | Analyze the asynchronous sequential circuits and explain the operation of memories and digital logic families |
| C203.5 | Design the VHDL coding for combinational logic and Sequential circuits |
| C203.6 | Produce VHDL coding for combinational logic and sequential circuits |

**Title:TRANSDUCERS ENGINEERING,Subject Code:EI3353 NBA Code for the Subject :C204 ,Semester : 3 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C204.1 | Understand the working principles of various types of transducers |
| C204.2 | Gain knowledge on the application areas of different sensors |
| C204.3 | Select the right sensor/transducer for a given application |
| C204.4 | Determine the static and dynamic characteristics of transducers using software packages |
| C204.5 | Design simple signal conditioning circuits for the R,L and C type of sensors |
| C204.6 | Summarize the advanced sensor technologies and sensors for specific applications |

**Title:C PROGRAMMING AND DATA STRUCTURES,Subject Code:CS3353 NBA Code for the Subject :C206 ,Semester : 3 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C206.1 | To introduce the basics of C programming language. |
| C206.2 | To learn the concepts of advanced features of C. |
| C206.3 | To understand the concepts of ADTs and linear data structures. |
| C206.4 | To know the concepts of non-linear data structure and hashing |
| C206.5 | To familiarize the concepts of sorting and searching techniques. |
| C206.6 | To familiarize the concepts of sorting and searching techniques. |

| Title:LINEAR INTEGRATED CIRCUITS AND APPLICATIONS,Subject Code:EI3354 NBA Code for the Subject :C206 ,Semester : 3 [23-24ODD]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C206.1 | Explain the IC fabrication process and discuss the fabrication of active and passive components |
| C206.2 | Compute the gain and output voltage of the given Op-Amp circuits |
| C206.3 | Explain the internal functional blocks and applications of ICs 555, 566, 565, and AD633 |
| C206.4 | Explain the operation of voltage regulator ICs namely LM78XX, LM79XX, LM317 and LM723 |
| C206.5 | Explain the operation and design of various signal conditioning circuits |
| C206.6 | Explain the concepts of various signal conditioning circuits |

| Title:SEMICONDUCTOR DEVICES AND CIRCUITS LABORATORY,Subject Code:EI3361 NBA Code for the Subject :C207 ,Semester : 3 [23-24ODD]Target :60 Credits:1.5 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C207.1 | Determine the Breakdown voltage, forward and reverse resistance of PN junction diode and Zener diode and calculate the ripple factor of rectifier circuits with filter. |
| C207.2 | Calculate the hybrid parameters of BJT under CE and CB configuration |
| C207.3 | Obtain the frequency response of CE amplifier and CS amplifier |
| C207.4 | Obtain the UJT and JFET parameters from the characteristics and also to calculate the gain of differential amplifier using JFET. |
| C207.5 | Design the RC and LC tuned oscillators for a given oscillating frequency. |
| C207.6 | Analyze the input and output performance of the given diode based circuit using simulation tools. |

| Title:C PROGRAMMING AND DATA STRUCTURES LABORATORY,Subject Code:CS3362 NBA Code for the Subject :C210 ,Semester : 3 [23-24ODD]Target :65 Credits:1.5 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C210.1 | Use different constructs of C and develop applications |
| C210.2 | Write functions to implement linear and non-linear data structure operations |
| C210.3 | Suggest and use the appropriate linear / non-linear data structure operations for a given |
| C210.4 | Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval |
| C210.5 | Implement Sorting and searching algorithms for a given application |
| C210.6 | Implement Sorting and searching algorithms for a given application |

| Title:INDUSTRIAL INSTRUMENTATION,Subject Code:EI3451 NBA Code for the Subject :C210 ,Semester : 4 [23-24EVEN]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C210.1 | Define the measurement techniques of viscosity, humidity and moisture |
| C210.2 | Describe the measurement of temperature and pressure |
| C210.3 | Examine the concept of flow measurement techniques |
| C210.4 | Explain the concept of electrical flow meters |
| C210.5 | Classify the various techniques of level measurements |
| C210.6 | Describe the different types of transmitters |

| Title:AUTOMATIC CONTROL SYSTEMS,Subject Code:IC3451 NBA Code for the Subject :C211 ,Semester : 4 [23-24EVEN]Target :60 Credits:4 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C211.1 | To represent and develop systems in different forms using the knowledge gained. |

| | |
|---|---|
| C211.2 | To analyses the system in time and frequency domain |
| C211.3 | To discuss the effect of PID controller in closed loop systems |
| C211.4 | To construct compensator for the linear systems in frequency domain |
| C211.5 | To analyses the stability of physical systems |
| C211.6 | To acquire and analyses knowledge in State variable model for MIMO systems |

| **Title:MODERN ELECTRONIC INSTRUMENTATION,Subject Code:IC3401 NBA Code for the Subject :C212 ,Semester : 4 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C212.1 | Understand the principle behind measurement of Electrical/ mechanical quantities |
| C212.2 | Interpret the specifications of different ADCs/DACs/ Digital interfaces |
| C212.3 | Gain knowledge on different types of MEMS Sensors and their merits/ demerits |
| C212.4 | Learn the basics of wireless instrumentation |
| C212.5 | Analyze and design measurement system for simple applications |
| C212.6 | Develop simple measurement solutions for the measuring given physical quantity |

| **Title:EMBEDDED SYSTEMS AND IOT,Subject Code:IC3402 NBA Code for the Subject :C214 ,Semester : 4 [23-24EVEN]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C214.1 | Understand the concept of embedded system and its architectural features |
| C214.2 | Develop embedded software using Embedded C and Python. |
| C214.3 | Integrate/Interface real world field devices with microcontrollers. |
| C214.4 | Utilize the power of RTOS for embedded applications. |
| C214.5 | Acquire real world signals and perform remote process monitoring utilizing the concept of IoT. |
| C214.6 | Design and implement IoT enabled embedded control strategy for a given application. |

| **Title:ENVIRONMENTAL SCIENCES AND SUSTAINABILITY,Subject Code:GE3451 NBA Code for the Subject :C215 ,Semester : 4 [23-24EVEN]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C215.1 | Infer the importance of environment and explain the concept of ecosystem. |
| C215.2 | Recall various functions, values, threats and conservation of biodiversity. |
| C215.3 | Explain the different types of pollution and propose suitable methods to prevent it to enhance the environment. |
| C215.4 | Discuss the different types of renewable resources, optimum usage and its importance. |
| C215.5 | Discuss the aspect of sustainability and means of its management to realise the sustainable development goals. |
| C215.6 | List various environment management systems for environment protection and discuss the solutions for energy to materials for sustainability. |

| **Title:ELECTRICAL MACHINES AND DRIVES,Subject Code:IC3452 NBA Code for the Subject :C215 ,Semester : 4 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C215.1 | Ability to understand the terms associated with electrical machines |
| C215.2 | Ability to understand basic concepts and working principle of electrical machines |
| C215.3 | Ability to understand the performance characteristics of machines |
| C215.4 | Ability to identify suitable machines for carrying out interdisciplinary projects. |
| C215.5 | Ability to understand the motor operating principle and characteristics of motor |
| C215.6 | Ability to understand the motor operating principle and characteristics of transformer |

| Title:DIGITAL AND LINEAR INTEGRATED CIRCUITS LABORATORY,Subject Code:EI3461 NBA Code for the Subject :C217 ,Semester : 4 [23-24EVEN]Target :65 Credits:1.5 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C217.1 | Design and implement the given Boolean function using logic gates |
| C217.2 | Design and verify the truth table of combinational logic circuits (code converters, encoders, decoders, multiplexer and de multiplexer). |
| C217.3 | Design and implement the Counters and Shift registers. |
| C217.4 | Design and testing of Op-Amp circuits and to simulate the op-amp application circuit using simulation tools. |
| C217.5 | Design and testing of as table and monostable circuits using Timer IC NE/SE 555. |
| C217.6 | Design and testing of variable voltage regulator using IC LM317/LM723. |

| Title:SENSORS AND SIGNAL CONDITIONING CIRCUITS LABORATORY,Subject Code:EI3462 NBA Code for the Subject :C218 ,Semester : 4 [23-24EVEN]Target :65 Credits:1.5 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C218.1 | perform error analysis and uncertainty analysis |
| C218.2 | evaluate the static and dynamic characteristics of measuring instruments |
| C218.3 | design and construct measurement systems using different types of resistance, capacitance and inductance transducers |
| C218.4 | apply special transducers for measurement applications |
| C218.5 | interface and analyze different signal conditioning units |
| C218.6 | present the results in oral form as well as in written form as a report and graph |

| Title:Process Control,Subject Code:EI3551 NBA Code for the Subject :C301 ,Semester : 5 [23-24ODD]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C301.1 | Develop models using first principles approach for processes such as level, flow, temperature and pressure as well as analyze models. |
| C301.2 | Recommend the right type of control valve along with its characteristics for a given application. |
| C301.3 | Design & implement a suitable control scheme for a given process and validate through simulations. |
| C301.4 | Design & implement a suitable control scheme for a given process and validate through simulations. |
| C301.5 | Analyze various control schemes and recommend the right control strategy for a given application. |
| C301.6 | Use appropriate software tools (Example: MATLAB/SCILAB) for analysis, design and implementation of Process Control System. |

| Title:Advanced Control Theory,Subject Code:IC3501 NBA Code for the Subject :C302 ,Semester : 5 [23-24ODD]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C302.1 | Ability design observer of state feedback controller. |
| C302.2 | Ability to analyze the non-linear systems. |
| C302.3 | Ability to design optimal controller for any application. |
| C302.4 | Apply optimal estimation techniques for specific objective functions. |
| C302.5 | Apply advanced control to practical engineering problems |
| C302.6 | Apply advanced control to practical engineering problems. |

| Title:Thermal Power Plant Instrumentation,Subject Code:CIC342 NBA Code for the Subject :C303PE144 ,Semester : 5 [23-24ODD]Target :65 Credits:3 |
|---|
| At the end of this course, Student will be able to |

| CO-Code | Course outcome Description |
|---|---|
| C303PE144.1 | Describe an overview on power generation through various methods. |
| C303PE144.2 | Identify various measurements and controls used in power plant. |
| C303PE144.3 | Know basic boiler control techniques. |
| C303PE144.4 | Understand the burners and safety in thermal power plant |
| C303PE144.5 | Discriminate advanced boiler control techniques. |
| C303PE144.6 | Summarize the turbine control techniques. |

**Title:Biomedical Instrumentation ,Subject Code:BM3491 NBA Code for the Subject :C304PE2V51 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C304PE2V51.1 | able to illustrate the origin of various biological signals and their characteristics. |
| C304PE2V51.2 | able to claasify the electrodes and explain their function |
| C304PE2V51.3 | able to gain knowledge on characteristics of bio signals sluch as the ECG,EEG etc |
| C304PE2V51.4 | able to gain knowledge on various amplifiers involved in monitoring and transmission of biosignals |
| C304PE2V51.5 | able to explain the different measurement techniques for non-electrical bio-parameters |
| C304PE2V51.6 | able to explain the biochemical measurement techniques as applicable for diagnosis and further treatment |

**Title:Renewable Systems,Subject Code:CIC345 NBA Code for the Subject :C305PE3V47 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C305PE3V47.1 | Recognize the Indian and global energy scenario |
| C305PE3V47.2 | Classify the various solar energy technologies and its applications |
| C305PE3V47.3 | Analyze the various wind energy technologies |
| C305PE3V47.4 | Outline the various bio-energy technologies |
| C305PE3V47.5 | Describe the ocean and geothermal technologies |
| C305PE3V47.6 | acquire knowledge about Solar energy. |

**Title:Computer Architecture,Subject Code:CEI355 NBA Code for the Subject :C306PE4V73 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C306PE4V73.1 | Understand the basic structure of computers, operations and instructions. |
| C306PE4V73.2 | Design arithmetic and logic unit. |
| C306PE4V73.3 | Understand pipelined execution and design control unit. |
| C306PE4V73.4 | Understand parallel processing architecture. |
| C306PE4V73.5 | Understand the various memory systems. |
| C306PE4V73.6 | Understand I/O communication. |

**Title:FILM APPRECIATION,Subject Code:MX3083 NBA Code for the Subject :C307M13 ,Semester : 5 [23-24ODD]Target :65 Credits:0**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C307M13.1 | To know the development of film as an art and entertainment form |
| C307M13.2 | To learn the language of cinema as an evolved over a century |
| C307M13.3 | To read a film and appreciate the various nuances of a film as a text |
| C307M13.4 | To learn the process of film making, structure of film with social concern and crew members |
| C307M13.5 | To get the knowledge about the film theories, professional ethics and early era of films individually and as a team work |
| C307M13.6 | To inculcate their technical knowledge in the par with technological advancements in film making |

| Title:Process Control and Instrumentation Laboratory,Subject Code:EI3561 NBA Code for the Subject :C308 ,Semester : 5 [23-24ODD]Target :60 Credits:2 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C308.1 | Estimate work and measure parameter of flow/ level / temperature / pressure from pilot plant. |
| C308.2 | Analyze, design suitable control schemes for industrial type process. |
| C308.3 | Design ON-OFF, feed forward, cascade and Multi loop PID controllers for the typical industrial process. |
| C308.4 | Use appropriate software tools for design, analysis and implementation of control scheme. |
| C308.5 | Experimentally measure industrial process parameters (such as flow, viscosity and humidity) and physiological parameters of the human body. |
| C308.6 | Validate electrical safety of an instrument. |

| Title:Industrial Automation Systems,Subject Code:EI3651 NBA Code for the Subject :C309 ,Semester : 6 [23-24EVEN]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C309.1 | Explain the working of communication buses used in automation industries |
| C309.2 | Explain the working of sensors and drives used in automation applications |
| C309.3 | Describe about computer aided measurements and various signal transmission techniques |
| C309.4 | Acquire detailed knowledge on data acquisition system interface |
| C309.5 | Explain architecture of PLC and develop ladder program for a given sequence of operation |
| C309.6 | Explain the basics and Importance of communication buses in applied automation Engineering |

| Title:Introduction to Industrial Processes, Measurement and Control,Subject Code:EI3652 NBA Code for the Subject :C310 ,Semester : 6 [23-24EVEN]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C310.1 | Understand common unit operations in process industries. |
| C310.2 | Identify the dynamics of important unit operations in petro chemical industry. |
| C310.3 | Develop understanding of important processes taking place selected case studies namely petrochemical industry, power plant industry and paper & pulp industry. |
| C310.4 | Select appropriate measurement techniques for selective processes |
| C310.5 | Develop controller structure based on the process knowledge |
| C310.6 | Analyze the operation and challenges in integrated industrial processes |

| Title:Fiber Optics Instrumentation,Subject Code:CIC339 NBA Code for the Subject :C312PE5V41 ,Semester : 6 [23-24EVEN]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C312PE5V41.1 | Utilize the principles of light transmission, characteristics and losses in optical fibers for measurement applications |
| C312PE5V41.2 | Apply the concepts of optical fibers for its use in sensor development as well as important applications in production, manufacturing and industrial applications |
| C312PE5V41.3 | Compare the lasing theory of various laser generation systems |
| C312PE5V41.4 | Design laser systems for measurement of physical quantities and for industrial applications |
| C312PE5V41.5 | Select lasers for a specific industrial and medical application |
| C312PE5V41.6 | Apply the principles of lasers for creating new sensors and measurement systems |

| Title:Analytical Instrumentation,Subject Code:CIC340 NBA Code for the Subject :C313PE6V42 ,Semester : 6 [23-24EVEN]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |

| | |
|---|---|
| C313PE6V42.1 | Understand the basic concept of qualitative and quantitative analysis of a given sample. |
| C313PE6V42.2 | Explain the working knowledge of analytical instrumentation typically employed in chemical/biochemical research and industry laboratories |
| C313PE6V42.3 | Apply the fundamental principles of selective analytical instruments for separation, identification and quantitative analysis of chemical substances |
| C313PE6V42.4 | Differentiate between online and offline process and identify suitable instruments for analysis |
| C313PE6V42.5 | Describe the relative strengths and limitations of different instrumental based analysis methods |
| C313PE6V42.6 | Identify and suggest a suitable analytical method for a specific application |

**Title:Electric Vehicle Technology,Subject Code:CIC341 NBA Code for the Subject :C314PE7V43 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C314PE7V43.1 | Outline of electric and hybrid vehicle operation and architectures. |
| C314PE7V43.2 | Design of hybrid and electric vehicles. |
| C314PE7V43.3 | Summarize the energy requirement for vehicles. |
| C314PE7V43.4 | Illustrate the vehicle characteristics, operating modes, and performance parameters of the vehicle. |
| C314PE7V43.5 | Analyze the different subsystems of hybrid and electric vehicles |
| C314PE7V43.6 | Analyze the different subsystems of hybrid and electric vehicles |

**Title:Instrumentation in Petrochemical Industry,Subject Code:CIC343 NBA Code for the Subject :C315PE8V45 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C315PE8V45.1 | To introduce the method of oil recovery in the petrochemical industry |
| C315PE8V45.2 | To understand the process behavior of some of the important unit operations in the petrochemical industry through the mathematical model |
| C315PE8V45.3 | To familiarize the students to apply knowledge to select the appropriate control strategy for the selective process |
| C315PE8V45.4 | To provide information about the most important derivatives obtained from petroleum products |
| C315PE8V45.5 | To help the students in understanding the selection and maintenance of instruments in the petrochemical industry |
| C315PE8V45.6 | To introduce the steps involved in the oil gas production process |

**Title:Industrial Automation Systems Laboratory,Subject Code:EI3661 NBA Code for the Subject :C318 ,Semester : 6 [23-24EVEN]Target :80 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C318.1 | Understand and Programming of PLC, SCADA and DCS |
| C318.2 | Work with industrial automation system |
| C318.3 | Design and implement control schemes in PLC & DCS |
| C318.4 | Interface field devices with PLC & DCS |
| C318.5 | Not applicable and NIL |
| C318.6 | Not Applicable and NIL |

**Title:INDUSTRIAL DATA NETWORKS,Subject Code:EI8751 NBA Code for the Subject :C401 ,Semester : 7 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C401.1 | Ability to define basic concepts of data communication and its importance. |
| C401.2 | Ability to explain the various internet working devices involved in industrial networks |
| C401.3 | Ability to explain the various serial communication used in process industries. |

| | |
|---|---|
| C401.4 | Ability to illustrate, compare & explain the working of HART and Field bus used in process digital communication |
| C401.5 | Ability to summarize the operation of MODBUS, PROFIBUS protocol & its applications |
| C401.6 | Ability to explain and adopt the different Industrial Ethernet protocol and usage of wireless communication in process applications. |

| **Title:INSTRUMENTATION IN PETROCHEMICAL INDUSTRIES,Subject Code:EI8091 NBA Code for the Subject :C402 ,Semester : 7 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C402.1 | introduce the students the method of oil recovery |
| C402.2 | make the students understand the process behavior of some of the important unit operations in petrochemical industry through mathematical model |
| C402.3 | familiarize the students to apply knowledge to select the appropriate control strategy for the selective process |
| C402.4 | provide information about the most important derivatives obtained from petroleum products |
| C402.5 | help the students in understanding selection and maintenance of instruments in petrochemical industry |
| C402.6 | introduce the steps involved in oil gas production process |

| **Title:DIGITAL IMAGE PROCESSING,Subject Code:EC8093 NBA Code for the Subject :C403 ,Semester : 7 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C403.1 | Understand the basics and fundamentals of digital image processing |
| C403.2 | Understand and apply the techniques used in image enhancement |
| C403.3 | Understand and apply the techniques used in image restoration |
| C403.4 | Understand the basics of segmentation and feature extraction techniques |
| C403.5 | understand the basics of compression and recognition methods |
| C403.6 | Apply the knowledge gained in segmentation methods |

| **Title:FIBRE OPTICS AND LASER INSTRUMENTATION,Subject Code:EI8075 NBA Code for the Subject :C404 - E31 ,Semester : 7 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C404-E31.1 | Understand the principle, transmission, dispersion and attenuation characteristics of optical fibers |
| C404-E31.2 | Acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics |
| C404-E31.3 | Apply the gained knowledge on optical fibers for its use as communication medium. |
| C404-E31.4 | Gain knowledge in optical fibre as a sensor which have important applications in production, manufacturing industrial and biomedical applications. |
| C404-E31.5 | Understand laser theory and laser generation system. |
| C404-E31.6 | Apply laser theory for the selection of lasers for a specific Industrial and medical application. |

| **Title:ELECTRONICS INSTRUMENTATION,Subject Code:EI8692 NBA Code for the Subject :C405-E42 ,Semester : 7 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |

| | |
|---|---|
| C405-E42.1 | Outlines the various electronics instruments and their applications. |
| C405-E42.2 | Explains about the cathode ray oscilloscopes, their applications and different types of signal analyzers. |
| C405-E42.3 | Acquire knowledge about Waveform generators, its types and applications. |
| C405-E42.4 | Illustrates about virtual instrumentation, its applications and demonstrate the LabVIEW programming. |
| C405-E42.5 | Describe the telemetry, modulation techniques and multiplexing. |
| C405-E42.6 | Experiment to do interfaces with real time processes with aid of NI components. |

**Title:FUNDAMENTALS OF NANO SCIENCE,Subject Code:GE8073[8] NBA Code for the Subject :C410-E64 ,Semester : 7 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C410-E64.1 | To learn about the basis of nano material science and its properties |
| C410-E64.2 | To discuss about the various preparation methods of nano materials |
| C410-E64.3 | Infer various nano materials and its method of synthesis |
| C410-E64.4 | Develop knowledge about various characterization techniques of nano materials |
| C410-E64.5 | To identify the various applications of nanotechnology in computing |
| C410-E64.6 | To identify the various applications of nanotechnology in biomedical |

**Title:INDUSTRIAL AUTOMATION LAB,Subject Code:EI8761 NBA Code for the Subject :C407 ,Semester : 7 [23-24ODD]Target :60 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C407.1 | Ability to understand and Programming of PLC, SCADA and DCS |
| C407.2 | To impart practical skills in interfacing the various field devices with PLC |
| C407.3 | Ability to working with industrial automation system |
| C407.4 | Be able to design and implement control schemes in PLC |
| C407.5 | Ability to interface field devices with PLC & DCS |
| C407.6 | design and implement control schemes in DCS |

**Title:INSTRUMENTATION SYSTEM DESIGN LABORATORY,Subject Code:EI8762 NBA Code for the Subject :C408 ,Semester : 7 [23-24ODD]Target :60 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C408.1 | Design of instrumentation amplifiers and various filters |
| C408.2 | Design of converters and compensation systems |
| C408.3 | Analyze signal conditioning circuits and flow meters. |
| C408.4 | Design of controllers and control valves for various applications |
| C408.5 | Design of data acquisition system and transmitter |
| C408.6 | Inspect, installation procedures and safety regulations used in industries. |

**Title:PROJECT WORK,Subject Code:IC8811 NBA Code for the Subject :C413 ,Semester : 8 [23-24EVEN]Target :65 Credits:10**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|

| | |
|---|---|
| C413.1 | Experiment a specific problem right from its identification, formulation and obtaining successful solution for the same using various engineering techniques. |
| C413.2 | Choose any challenging practical problems and find solution by formulating proper methodology. |
| C413.3 | Prepare project reports and to face reviews and viva voce examination. |
| C413.4 | Integrate and work in a team. |
| C413.5 | Summarize the project and prepare the publication of papers and journals to expose to the technical world. |
| C413.6 | Discriminate various instruments and able to control systems in automation and in emerging trends of instrumentation. |

**Programme:B.Tech Information Technology**

**Course OutComes for the Academic Year : 2023-24**

| **Title:PROFESSIONAL ENGLISH - 1,Subject Code:HS3152 NBA Code for the Subject :C101 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C101.1 | To improve the communicative competence of learners by throwing light on vocabulary and basic grammar |
| C101.2 | To help learners use language effectively in academic (grammar) /work contexts (reports) |
| C101.3 | To build on students¿ English language skills by engaging them in listening, speaking and grammar learning activities those are relevant to authentic contexts. |
| C101.4 | To develop learners¿ ability to read and write complex texts, summaries, articles, blogs, Definitions, essays and user manuals. |
| C101.5 | To use language efficiently in expressing their opinions via various media and graphical representation. |
| C101.6 | Participate effectively in informal conversations; introduce themselves and their friends and express opinion in English with different types of sentences |

| **Title:MATRICES AND CALCULUS,Subject Code:MA3151 NBA Code for the Subject :C102 ,Semester : 1 [23-24ODD]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C102.1 | Eigenvalues and eigenvectors, diagonalization of a matrix,symmetric matrices, Positive definite matrices and similar matrices. |
| C102.2 | Understand the limit, continuity and derivative of the functions. Solve various functions and its maxima /minima using differentiation rules. |
| C102.3 | Apply the total and partial derivatives in Taylor series expansion of functions and the extremum of functions. |
| C102.4 | Evaluate the integrals both by using Riemann sums and by using the Fundamental theorem of Calculus. Evaluate integrals using various techniques of integration. |
| C102.5 | Understand the concepts of double integration and determine the area using integration. Also understands the concepts of the change of order of integration and Change of variables in integrals. |
| C102.6 | Understand the concepts of Triple integration and determine the volume using integration. |

| **Title:ENGINEERING PHYSICS,Subject Code:PH3151 NBA Code for the Subject :C103 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C103.1 | Understand the importance of mechanics. |
| C103.2 | Express their knowledge in electromagnetic waves |
| C103.3 | Demonstrate a strong foundational knowledge in oscillations. |
| C103.4 | Demonstrate a strong foundational knowledge in optics and lasers. |
| C103.5 | Understand the importance of quantum physics. |
| C103.6 | Comprehend and apply quantum mechanical principles towards the formation of energy bands |

| **Title:ENGINEERING CHEMISTRY,Subject Code:CY3151 NBA Code for the Subject :C104 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C104.1 | To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water |
| C104.2 | To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials |
| C104.3 | To apply the knowledge of phase rule and composites for materials selection requirements. |

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| C104.4 | To recommend suitable fuel for engg. processes and applications |
| C104.5 | To analyse combustion process and its calculations |
| C104.6 | To recognize different forms of energy resources and apply them for suitable applications in energy sectors. |

| **Title:PROBLEM SOLVING AND PYTHON PROGRAMMING,Subject Code:GE3151 NBA Code for the Subject :C105 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C105.1 | To understand the basics of algorithmic problem solving |
| C105.2 | To learn to solve problems using Python conditionals and loops. |
| C105.3 | To define Python functions and use function calls to solve problems. |
| C105.4 | To use Python data structures - lists, tuples, dictionaries to represent complex data. |
| C105.5 | To learn about usage of python packages and modules |
| C105.6 | To do input/output with files in Python |

| **Title:PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY,Subject Code:GE3171 NBA Code for the Subject :C106 ,Semester : 1 [23-24ODD]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C106.1 | To understand the problem solving approaches. |
| C106.2 | To learn the basic programming constructs in Python |
| C106.3 | To learn the programming constructs in Python like loop, function, recursion. |
| C106.4 | To practice various computing strategies for Python-based solutions to real world problems. |
| C106.5 | To use Python data structures-lists, tuples, dictionaries. |
| C106.6 | To do input/output with files in Python. |

| **Title:PHYSICS AND CHEMISTRY LABORATORY,Subject Code:BS3171 NBA Code for the Subject :C107 ,Semester : 1 [23-24ODD]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C107.1 | Gain knowledge about elasticity, modulus, oscillations and also able to calculate Young's,rigidity modulus, moment of inertia of regular and irregular bodies. |
| C107.2 | understand the application of interference and diffraction in finding thickness of the given sample and wavelength of the source respectively |
| C107.3 | calculate the variation of resistance with respect to temperature and also able to calculate the band gap of |
| C107.4 | Analyse various water quality parameters-Hardness, alkalinity and DO in water sample. |
| C107.5 | Acquire practical skills by using instruments like conductivity meter, pH meter and potentiometer. |
| C107.6 | Finding the strength and amount of nickel in steel. |

| **Title:PROFESSIONAL ENGLISH-II,Subject Code:HS3252 NBA Code for the Subject :C108 ,Semester : 2 [23-24EVEN]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C108.1 | To compare and contrast products and ideas through technical texts in essays with appropriate grammatical usage and contextual meanings. |
| C108.2 | To enhance learners¿ awareness of general rules of writing for specific audiences through professional emails and responses to complaints. |
| C108.3 | To help learners understand the purpose, audience, contexts of different types of letters/essays/checklists |
| C108.4 | To analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format. To report events and the processes of technical and industrial nature |
| C108.5 | To make use of grammatical items effectively in writing recommendations and in |

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| | transcoding the graphs |
| C108.6 | To write a winning job/internship application-cover letter and resume /SoP-Statement of purpose |

**Title:STATISTICS AND NUMERICAL METHODS,Subject Code:MA3251 NBA Code for the Subject :C109 ,Semester : 2 [23-24EVEN]Target :60 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C109.1 | Apply the concept of testing of hypothesis for small and large samples in real life problems. |
| C109.2 | Apply the basic concepts of classifications of design of experiments in the field of agriculture. |
| C109.3 | Solve algebraic, transcendental equations and simultaneous equations by direct method. |
| C109.4 | Solve simultaneous equations by iterative method and Eigen value problems. |
| C109.5 | Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems. |
| C109.6 | Gain the knowledge of various techniques and methods to solve first order ordinary differential equations with initial conditions in engineering applications. |

**Title:PHYSICS FOR INFORMATION SCIENCE,Subject Code:PH3256 NBA Code for the Subject :C110 ,Semester : 2 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C110.1 | Gain knowledge on classical and quantum electron theories, and energy band structures |
| C110.2 | Acquire knowledge on basics of semiconductor physics |
| C110.3 | Get knowledge on magnetic properties of materials and their applications in data storage |
| C110.4 | Have the necessary understanding on the functioning of optical materials for optoelectronics |
| C110.5 | Understand the basics of quantum structures |
| C110.6 | Applications and basics of quantum computing |

**Title:BASIC ELECTRICAL AND ELECTRONICS ENGINEERING,Subject Code:BE3251 NBA Code for the Subject :C111 ,Semester : 2 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C111.1 | Compute Electric DC Circuit parameters for simple problems |
| C111.2 | Compute the AC parameters for simple problems |
| C111.3 | Explain the working principle and applications of electrical machines |
| C111.4 | Analyze the characteristics of analog electronic devices |
| C111.5 | Explain the basic concepts of digital electronics |
| C111.6 | Explain the operating principles of measuring instruments |

**Title:ENGINEERING GRAPHICS,Subject Code:GE3251 NBA Code for the Subject :C112 ,Semester : 2 [23-24EVEN]Target :60 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C112.1 | Student will be able to draw basic geometrical curves |
| C112.2 | Student will be able to project points, lines and planes in first angle projection by rotating method |
| C112.3 | Student will be able to orthographic projection with free hand sketches |
| C112.4 | Students will be able to project views of any solids by rotating object method. |
| C112.5 | Students will be able to project sectioned view and to develop lateral surface of given solid. |
| C112.6 | Students will be able to sketch isometric and perspective views of given solid. |

**Title:PROGRAMMING IN C,Subject Code:CS3251 NBA Code for the Subject :C113 ,Semester : 2 [23-24EVEN]Target :65 Credits:3**

| At the end of this course, Student will be able to | |
|---|---|
| **CO-Code** | **Course outcome Description** |
| C113.1 | Demonstrate knowledge on C Programming constructs |
| C113.2 | Develop simple applications in C using basic constructs |
| C113.3 | Design and implement applications using arrays and strings |
| C113.4 | Develop and implement modular applications in C using functions. |
| C113.5 | Develop applications in C using structures and pointers |
| C113.6 | Design applications using sequential and random access file processing |

| **Title:ENGINEERING PRACTICES LABORATORY,Subject Code:GE3271 NBA Code for the Subject :C114 ,Semester : 2 [23-24EVEN]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C114.1 | Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers,elbows and other components which are commonly used in household |
| C114.2 | Welding various joints in steel plates using arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household eq |
| C114.3 | Wiring various electrical joints in common household electrical wire work. |
| C114.4 | understand the pipe connections for the home application and industrial constructions |
| C114.5 | understand the pipe connections for the home application and industrial constructions |
| C114.6 | understand the concept of joining the metal by welding. |

| **Title:PROGRAMMING IN C LABORATORY,Subject Code:CS3271 NBA Code for the Subject :C115 ,Semester : 2 [23-24EVEN]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C115.1 | Demonstrate knowledge on C programming constructs. |
| C115.2 | Develop programs in C using basic constructs. |
| C115.3 | Develop programs in C using arrays. |
| C115.4 | Develop applications in C using strings, pointers, functions. |
| C115.5 | Develop applications in C using structures. |
| C115.6 | Develop applications in C using file processing. |

| **Title:DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION ESC 3 0 2 5,Subject Code:CS3351 NBA Code for the Subject :C202 ,Semester : 3 [23-24ODD]Target :65 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C202.1 | Analyzing and designing the combinational circuits |
| C202.2 | Analyzing and designing the sequential circuits |
| C202.3 | understand the basic structure and operation of a digital computer |
| C202.4 | understand the design of data path unit,control unit for processor and to familiarize with different types of hazards |
| C202.5 | understand the concepts of various memories |
| C202.6 | understand the i/o interfacing |

| **Title:FOUNDATIONS OF DATA SCIENCE PCC 3 0 0 3,Subject Code:CS3352 NBA Code for the Subject :C203 ,Semester : 3 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C203.1 | Define the data science process |
| C203.2 | Understand different types of data description for data science process |
| C203.3 | Gain knowledge on relationships between data |

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|---|---|
| C203.4 | use the Python Libraries for Data Wrangling |
| C203.5 | Apply visualization Libraries in Python to interpret data |
| C203.6 | Apply visualization Libraries in Python to explore data |

**Title:DATA STRUCTURES AND ALGORITHMS PCC 3 0 0 3,Subject Code:CD3291 NBA Code for the Subject :C204 ,Semester : 3 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C204.1 | Explain abstract data types and concepts of object oriented programming |
| C204.2 | Design and Analyze the complexity for various algorithms |
| C204.3 | Design, implement, and analyze linear data structures, such as lists, queues, and stacks, according to the needs of different applications |
| C204.4 | Explain and implement searching, sorting and hashing algorithms |
| C204.5 | Design, implement, and analyse efficient tree structures for different applications |
| C204.6 | Model problems as graph problems and implement efficient graph algorithms to solve them |

**Title:OBJECT ORIENTED PROGRAMMING PCC 3 0 0 3,Subject Code:CS3391 NBA Code for the Subject :C207 ,Semester : 3 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C207.1 | Apply the concepts of classes and objects to solve simple problems |
| C207.2 | Develop programs using inheritance, packages and interfaces |
| C207.3 | Make use of exception handling mechanisms and multithreaded model to solve real world problems |
| C207.4 | Build Java applications with I/O packages, string classes, Collections and generics concepts |
| C207.5 | Integrate the concepts of event handling and JavaFX components controls for developing |
| C207.6 | JavaFX controls for developing |

**Title:DISCRETE MATHEMATICS BSC 3 1 0 4,Subject Code:MA3354 NBA Code for the Subject :MA3354 ,Semester : 3 [23-24ODD]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| MA3354.1 | Have knowledge of the concepts needed to test the logic of a program |
| MA3354.2 | Use proof techniques to check the truthfulness of a real life situation. |
| MA3354.3 | Be aware of a class of functions which transforms a finite set into another finite set which relate to input and output functions in computer science and counting principles. |
| MA3354.4 | Use graph theory to formulate the problem and solve it. |
| MA3354.5 | Be exposed to concepts and properties of algebraic structure such as groups, rings and fields. |
| MA3354.6 | Analyse the basic knowledge gained by Lattices, Boolean algebra and apply them. |

**Title:DATA STRUCTURES AND ALGORITHMS LABORATORY PCC 0 0 4 4,Subject Code:CD3281 NBA Code for the Subject :C206 ,Semester : 3 [23-24ODD]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C206.1 | 1mplement ADTs as Python classes |
| C206.2 | Implement List ADT using Python arrays and Linked list for different applications<br>Implement List ADT using Python arrays and Linked list for different applications Implementation |
| C206.3 | Design and implement linear data structures - queues and stacks, according to the needs of different applications |
| C206.4 | Implement searching, sorting and hashing algorithms. |
| C206.5 | Design and implement tree structures. |
| C206.6 | Implement efficient graph algorithms to solve graph problems |

**Title:OBJECT ORIENTED PROGRAMMING LABORATORY PCC 0 0 3 3,Subject Code:CS3381 NBA Code for the Subject :C207 ,Semester : 3 [23-24ODD]Target :65 Credits:1.5**

| At the end of this course, Student will be able to | |
|---|---|
| **CO-Code** | **Course outcome Description** |
| C207.1 | Design and develop java programs using object oriented programming concepts |
| C207.2 | Develop simple applications using object oriented concepts such as package, exceptions |
| C207.3 | Create GUIs and event driven programming applications for real world problems |
| C207.4 | Implement multithreading, and generics concepts |
| C207.5 | Implement and deploy web applications using Java |
| C207.6 | Learn to develop event handling USING JAVAFX |

| **Title:DATA SCIENCE LABORATORY PCC 0 0 4 4,Subject Code:CS3361 NBA Code for the Subject :C208 ,Semester : 3 [23-24ODD]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C208.1 | Make use of the python libraries for data science |
| C208.2 | Make use of the basic Statistical and Probability measures for data science. |
| C208.3 | Perform descriptive analytics on the benchmark data sets |
| C208.4 | Perform correlation and regression analytics on standard data sets |
| C208.5 | Present data using visualization packages in Python. |
| C208.6 | Interpret data using visualization packages in Python. |

| **Title:THEORY OF COMPUTATION,Subject Code:CS3452 NBA Code for the Subject :C210 ,Semester : 4 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C210.1 | Construct automata theory using Finite Automata |
| C210.2 | Write regular expressions for any pattern |
| C210.3 | Design context free grammar and Pushdown Automata |
| C210.4 | Normalize context free grammar |
| C210.5 | Design Turing machine for computational functions |
| C210.6 | Differentiate between decidable and undecidable problems |

| **Title:ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING,Subject Code:CS3491 NBA Code for the Subject :C211 ,Semester : 4 [23-24EVEN]Target :65 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C211.1 | Implement appropriate uninformed search algorithms for problem solving |
| C211.2 | Implement appropriate heuristics search algorithms for problem solving |
| C211.3 | Apply reasoning under uncertainty |
| C211.4 | Build supervised learning models |
| C211.5 | Build ensembling and unsupervised models |
| C211.6 | Build deep learning neural network models |

| **Title:DATABASE MANAGEMENT SYSTEMS,Subject Code:CS3492 NBA Code for the Subject :C212 ,Semester : 4 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C212.1 | Study the fundamentals of data models and to represent a database system |
| C212.2 | Apply ER model to Relational model to perform database design effectively and to perform normalization in databases. |
| C212.3 | Understand and analyze the fundamental concepts of transactions |
| C212.4 | Compare and contrast various indexing strategies in different database systems |
| C212.5 | Illustrate and construct query optimization technique in database systems |

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|---|---|
| C212.6 | Appraise the difference between advanced databases and traditional databases. |
| **Title:WEB ESSENTIALS,Subject Code:IT3401 NBA Code for the Subject :C213 ,Semester : 4 [23-24EVEN]Target :65 Credits:4** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C213.1 | apply java script,html and css effectively to create interactive and dynamic website |
| C213.2 | create simple PHP scripts |
| C213.3 | design ands deploy simple web applications |
| C213.4 | create3 simple database applications |
| C213.5 | handling multimedia appliations |
| C213.6 | creating dynamic web pages |
| **Title:INTRODUCTION TO OPERATING SYSTEMS,Subject Code:CS3451 NBA Code for the Subject :C214 ,Semester : 4 [23-24EVEN]Target :65 Credits:3** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C214.1 | To Design and Analyze various scheduling algorithms and process synchronization. |
| C214.2 | Analyze the deadlock prevention and avoidance algorithms. |
| C214.3 | Compare and contrast various memory management schemes. |
| C214.4 | The functionality of file systems, I/O systems |
| C214.5 | To Understanding of Virtualization |
| C214.6 | To Design and Compare iOS and Android Operating Systems. |
| **Title:ENVIRONMENTAL SCIENCES AND SUSTAINABILITY,Subject Code:GE3451 NBA Code for the Subject :C215 ,Semester : 4 [23-24EVEN]Target :65 Credits:2** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C215.1 | Infer the importance of environment and explain the concept of ecosystem. |
| C215.2 | Recall various functions, values, threats and conservation of biodiversity. |
| C215.3 | Explain the different types of pollution and propose suitable methods to prevent it to enhance the environment. |
| C215.4 | Discuss the different types of renewable resources, optimum usage and its importance. |
| C215.5 | Discuss the aspect of sustainability and means of its management to realise the sustainable development goals. |
| C215.6 | List various environment management systems for environment protection and discuss the solutions for energy to materials for sustainability. |
| **Title:DATABASE MANAGEMENT SYSTEMS LABORATORY,Subject Code:CS3481 NBA Code for the Subject :C217 ,Semester : 4 [23-24EVEN]Target :80 Credits:1.5** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C217.1 | Study the fundamentals of data models and to represent a database system |
| C217.2 | Apply ER model to Relational model to perform database design effectively and to perform normalization in databases. |
| C217.3 | Understand and analyze the fundamental concepts of transactions |
| C217.4 | Compare and contrast various indexing strategies in different database systems |
| C217.5 | Illustrate and construct query optimization technique in database systems |
| C217.6 | Appraise the difference between advanced databases and traditional databases. |
| **Title:OPERATING SYSTEMS LABORATORY,Subject Code:CS3461 NBA Code for the Subject :C217 ,Semester : 4 [23-24EVEN]Target :65 Credits:1.5** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |

| | |
|---|---|
| C217.1 | To install windows operating systems and Linux using VMware |
| C217.2 | To understand the basics of Unix command and shell programming. |
| C217.3 | To implement various CPU scheduling algorithms |
| C217.4 | To implement Deadlock Avoidance and Deadlock Detection Algorithms |
| C217.5 | To implement Page Replacement Algorithms and memory allocation methods |
| C217.6 | To be familiar with File Organization and File Allocation |

**Title:COMPUTER NETWORKS,Subject Code:CS3591 NBA Code for the Subject :C301 ,Semester : 5 [23-24ODD]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C301.1 | To Explain the basic layers and its functions in computer networks |
| C301.2 | To understand the basics of how data flows from one node to another |
| C301.3 | To analyse routing algorithms |
| C301.4 | To describe the protocols for various functions in the network. |
| C301.5 | To analyse the working of various transport layer protocols |
| C301.6 | To analyse the working of various application layer protocols |

**Title:FULL STACK WEB DEVELOPMENT,Subject Code:IT3501 NBA Code for the Subject :C302 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C302.1 | understand the various stacks available for web application development |
| C302.2 | use node.js for application development |
| C302.3 | develop applications with mongodb |
| C302.4 | use the features of Angular and Express |
| C302.5 | develop react applications |
| C302.6 | simple web applications with react and angular |

**Title:DISTRIBUTED COMPUTING,Subject Code:CS3551 NBA Code for the Subject :C303 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C303.1 | Explain the foundations of distributed systems |
| C303.2 | Solve synchronization and state consistency problems |
| C303.3 | Use resource sharing techniques in distributed systems |
| C303.4 | Apply working model of consensus of distributed systems |
| C303.5 | Apply working model of reliability of distributed systems |
| C303.6 | Explain the fundamentals of cloud computing |

**Title:EMBEDDED SYSTEMS AND IOT,Subject Code:CS3691 NBA Code for the Subject :C304 ,Semester : 5 [23-24ODD]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C304.1 | To learn the internal architecture and programming of an embedded processor. |
| C304.2 | To introduce the evolution of the Internet of Things (IoT). |
| C304.3 | To introduce the evolution of the Internet of Things (IoT). |
| C304.4 | To build a small low-cost embedded and IoT system using Arduino/Raspberry Pi/ open platform |
| C304.5 | To apply the concept of Internet of Thing |
| C304.6 | To learn and practice the RTOS |

**Title:Exploratory Data Analysis,Subject Code:CCS346 NBA Code for the Subject :C305PE1V11 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

| At the end of this course, Student will be able to | |
|---|---|
| **CO-Code** | **Course outcome Description** |
| C305PE1V11.1 | Understand the fundamentals of exploratory data analysis. |
| C305PE1V11.2 | Implement the data visualization using Matplotlib. |
| C305PE1V11.3 | Perform univariate data exploration and analysis. |
| C305PE1V11.4 | Apply bivariate data exploration and analysis |
| C305PE1V11.5 | Use Data exploration and visualization techniques for multivariate data |
| C305PE1V11.6 | Use Data exploration and visualization techniques for time series data |

| **Title:Data Warehousing,Subject Code:CCS341 NBA Code for the Subject :C306PE2V34 ,Semester : 5 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C306PE2V34.1 | To know the details of data warehouse Architecture |
| C306PE2V34.2 | To understand the OLAP Technology |
| C306PE2V34.3 | To understand the partitioning strategy |
| C306PE2V34.4 | To differentiate various schema |
| C306PE2V34.5 | To understand the roles of process manager |
| C306PE2V34.6 | To understand the roles of system manager |

| **Title:FILM APPRECIATION,Subject Code:MX3083 NBA Code for the Subject :C307M13 ,Semester : 5 [23-24ODD]Target :65 Credits:0** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C307M13.1 | To know the development of film as an art and entertainment form |
| C307M13.2 | To learn the language of cinema as an evolved over a century |
| C307M13.3 | To read a film and appreciate the various nuances of a film as a text |
| C307M13.4 | To learn the process of film making, structure of film with social concern and crew members |
| C307M13.5 | To get the knowledge about the film theories, professional ethics and early era of films individually and as a team work |
| C307M13.6 | To inculcate their technical knowledge in the par with technological advancements in film making |

| **Title:FULL STACK WEB DEVELOPMENT LABORATORY,Subject Code:IT3511 NBA Code for the Subject :C308 ,Semester : 5 [23-24ODD]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C308.1 | design full stack applications with clear understanding of user interface ,business logical and data storage |
| C308.2 | design and develop user interface screens |
| C308.3 | implement the functional requirements using appropriate tool |
| C308.4 | design and develop databases based on the requirements |
| C308.5 | integrate all the necessary components of the application |
| C308.6 | develops websites and web application using angular,react and using node js ,mongo db |

| **Title:Object Oriented Software Engineering,Subject Code:CCS356 NBA Code for the Subject :C309 ,Semester : 6 [23-24EVEN]Target :65 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C309.1 | Compare various Software Development Lifecycle Models |
| C309.2 | Evaluate project management approaches as well as cost and schedule estimation strategies. |
| C309.3 | Perform formal analysis on specifications |
| C309.4 | Use UML diagrams for analysis and design. |

| | |
|---|---|
| C309.5 | Architect and design using architectural styles and design patterns |
| C309.6 | Understand the various testing methodologies for OO software |

**Title:Cloud Computing,Subject Code:CCS335 NBA Code for the Subject :C310PE1V31 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C310PE1V31.1 | Understand the conceptand design challenges in the cloud |
| C310PE1V31.2 | Apply the concept of virtualization and its types |
| C310PE1V31.3 | Experiment with virtualization of hardware resources |
| C310PE1V31.4 | Experiment with virtualization of hardware resources with Docker container |
| C310PE1V31.5 | Develop and deploy services on the cloud and set up a cloud environment |
| C310PE1V31.6 | Explain security challenges in the cloud environment. |

**Title:Network Security,Subject Code:CCS354 NBA Code for the Subject :C311PE47 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C311PE47.1 | To learn the fundamentals of Cryptography |
| C311PE47.2 | To learn the key management techniques and authentication approaches |
| C311PE47.3 | To explore the network security techniques |
| C311PE47.4 | To explore the transport security Techniques |
| C311PE47.5 | To understand the application layer security standards |
| C311PE47.6 | To learn the real time security practices |

**Title:Software Testing and Automation,Subject Code:CCS366 NBA Code for the Subject :C312PE2V47 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C312PE2V47.1 | Define the key concepts of black-box and white-box testing and analyze the Software Testing Life Cycle and V-model. |
| C312PE2V47.2 | . Create comprehensive test plans, including test cases, bug reporting, and metrics, for different phases of the testing process. |
| C312PE2V47.3 | Apply various testing techniques such as boundary value testing, equivalence class testing, and performance testing in real-world scenarios. |
| C312PE2V47.4 | . Implement test automation using Selenium, understand its features, and develop automated tests for web applications. |
| C312PE2V47.5 | Develop skills in test design, execution, and bug reporting to ensure the quality of software products. |
| C312PE2V47.6 | Understand advanced testing concepts and the role of test automation tools in software testing. |

**Title:BIG DATA ANALYTICS,Subject Code:CCS334 NBA Code for the Subject :C313PEV18 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C313PEV18.1 | Describe big data and use cases from selected business domains. |
| C313PEV18.2 | Explain NoSQL big data management. |
| C313PEV18.3 | Install, configure, and run Hadoop and HDFS. |
| C313PEV18.4 | Perform map-reduce analytics using Hadoop. |
| C313PEV18.5 | Use Hadoop-related tools such as HBase, Cassandra, and Pig for big data analytics |
| C313PEV18.6 | Use of Hive for big data analytics |

**Title:Mobile Applications Development Laboratory,Subject Code:IT3681 NBA Code for the Subject :CS316 ,Semester : 6 [23-24EVEN]Target :65 Credits:1.5**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|

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|---|---|
| CS316.1 | Develop mobile applications using GUI and Layouts |
| CS316.2 | Develop various programming techniques and patterns to build mobile applications. |
| CS316.3 | Develop real-time mobile applications for society/environment |
| CS316.4 | Develop gaming and multimedia based mobile applications |
| CS316.5 | Develop AI based mobile applications for society |
| CS316.6 | Analyze and discover own mobile app for simple needs |

**Title:PRINCIPLES OF MANAGEMENT,Subject Code:MG8591 NBA Code for the Subject :C401 ,Semester : 7 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C401.1 | Demonstrate critical thinking when presented with managerial problems and express their views and opinions on managerial issues in an articulate way |
| C401.2 | Understand the major internal features of a business system and the environment in which it operates. |
| C401.3 | Identify and explain the importance of the management process and identify some of the key skills required for the contemporary management practice |
| C401.4 | Understand the importance of delegation |
| C401.5 | To implement planning, Organizing, directing and controlling activities in project/career |
| C401.6 | Understand the role budget and finance in a project |

**Title:CRYPTOGRAPHY AND NETWORK SECURITY,Subject Code:CS8792 NBA Code for the Subject :C402 ,Semester : 7 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C402.1 | To understand fundamentals of cryptography theories |
| C402.2 | To learn the mathematics of symmetric key cryptography |
| C402.3 | To understand symmetric key cryptography algorithms and systems |
| C402.4 | To learn understand mathematics of asymmetric key cryptography and cryptosystems |
| C402.5 | To understand message authentication and integrity principles |
| C402.6 | To understand security practices and system security |

**Title:CLOUD COMPUTING,Subject Code:CS8791 NBA Code for the Subject :C403 ,Semester : 7 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C403.1 | To understand the concept of cloud computing |
| C403.2 | To appreciate the evolution of cloud from the existing technologies |
| C403.3 | To have knowledge on the various issues in cloud computing |
| C403.4 | To be familiar with the lead players in cloud |
| C403.5 | To appreciate the emergence of cloud as the next generation computing paradigm |
| C403.6 | To be familiar with the advancements in cloud |

**Title:SOFTWARE PROJECT MANAGEMENT,Subject Code:IT8075 NBA Code for the Subject :C405E25 ,Semester : 7 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C405E25.1 | Understand Project Management principles while developing software. |
| C405E25.2 | Gain extensive knowledge about the basic project management concepts, framework and the process models. |
| C405E25.3 | Obtain adequate knowledge about software process models and software effort estimation techniques |
| C405E25.4 | Estimate the risks involved in various project activities |
| C405E25.5 | Define the checkpoints, project reporting structure, project progress and tracking mechanisms using project management principles |

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| C405E25.6 | Learn staff selection process and the issues related to people management |

| **Title:HOSPITAL MANAGEMENT,Subject Code:OBM752 NBA Code for the Subject :C406E12.1 ,Semester : 7 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C406E12.1.1 | To understand the fundamentals of hospital administration and management. |
| C406E12.1.2 | To know the market related research process. |
| C406E12.1.3 | To explore various information management systems and relative supportive services. |
| C406E12.1.4 | To learn the quality and safety aspects in hospital. |
| C406E12.1.5 | To learn the quality and safety aspects in hospital. |
| C406E12.1.6 | To learn the quality and safety aspects in hospital. |

| **Title:E-COMMERCE,Subject Code:IT8005[8] NBA Code for the Subject :C407 ,Semester : 7 [23-24ODD]Target :65 Credits:10** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C407.1 | Learn the E-Commerce Platform and its concepts |
| C407.2 | Understand the Technology, infrastructure in E-Commerce |
| C407.3 | Understand the Security and Challenges in E-Commerce |
| C407.4 | Learn Business concepts in E-Commerce |
| C407.5 | Learn Different Models of E-Commerce Business |
| C407.6 | Build an Own E-Commerce using Open Source Frameworks |

| **Title:FOSS AND CLOUD COMPUTING LABORATORY,Subject Code:IT8711 NBA Code for the Subject :C407 ,Semester : 7 [23-24ODD]Target :80 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C407.1 | Configure various virtualization tools such as Virtual Box, VMware workstation |
| C407.2 | Design and deploy a web application in a PaaS environment |
| C407.3 | Learn how to simulate a cloud environment to implement new schedulers |
| C407.4 | Design of File transfer between VMs |
| C407.5 | Install and use a generic cloud environment that can be used as a private cloud |
| C407.6 | Manipulate large data sets in a parallel environment |

| **Title:SECURITY LABORATORY,Subject Code:IT8761 NBA Code for the Subject :C408 ,Semester : 7 [23-24ODD]Target :80 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C408.1 | Develop code for classical Encryption Techniques to solve the problems. |
| C408.2 | Build cryptosystems by applying symmetric key encryption algorithms |
| C408.3 | Build cryptosystems by applying public key encryption algorithms |
| C408.4 | Construct code for authentication algorithms. |
| C408.5 | Develop a signature scheme using Digital signature standard. |
| C408.6 | Demonstrate the network security system using open source tools |

| **Title:PROJECT WORK,Subject Code:IT8811 NBA Code for the Subject :C411 ,Semester : 8 [23-24EVEN]Target :80 Credits:10** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C411.1 | Gather, organize, summarize and interpret technical literature to formulate a project proposal by applying the various engineering techniques to solve challenging practical problems. |
| C411.2 | Apply SDLC and project management principles to design and implement own innovative |

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| | ideas or research problems. |
| C411.3 | Select and apply modern tools and technologies for design, implementation and testing of software systems |
| C411.4 | Find IT solutions for problems related to social and environmental issues and understand professional ethics and team management principles. |
| C411.5 | Work effectively as an individual, and as a member in multidisciplinary teams with effective communication skills and document the technical report on identified topic and present the ideas using grap |
| C411.6 | Define intended future work based on the technical reviews and engage in lifelong learning. |

**Programme:B.E. Mechanical Engineering**

**Course OutComes for the Academic Year : 2023-24**

| **Title:PROFESSIONAL ENGLISH - 1,Subject Code:HS3152 NBA Code for the Subject :C101 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C101.1 | To improve the communicative competence of learners by throwing light on vocabulary and basic grammar |
| C101.2 | To help learners use language effectively in academic (grammar) /work contexts (reports) |
| C101.3 | To build on students¿ English language skills by engaging them in listening, speaking and grammar learning activities those are relevant to authentic contexts. |
| C101.4 | To develop learners¿ ability to read and write complex texts, summaries, articles, blogs, Definitions, essays and user manuals. |
| C101.5 | To use language efficiently in expressing their opinions via various media and graphical representation |
| C101.6 | Participate effectively in informal conversations; introduce themselves and their friends and express opinion in English with different types of sentences |
| **Title:MATRICES AND CALCULUS,Subject Code:MA3151 NBA Code for the Subject :C102 ,Semester : 1 [23-24ODD]Target :60 Credits:4** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C102.1 | Eigenvalues and eigenvectors, diagonalization of a matrix,symmetric matrices, Positive definite matrices and similar matrices. |
| C102.2 | Understand the limit, continuity and derivative of the functions. Solve various functions and its maxima /minima using differentiation rules. |
| C102.3 | Apply the total and partial derivatives in Taylor series expansion of functions and the extremum of functions. |
| C102.4 | Evaluate the integrals both by using Riemann sums and by using the Fundamental theorem of Calculus. Evaluate integrals using various techniques of integration. |
| C102.5 | Understand the concepts of double integration and determine the area using integration. Also understands the concepts of the change of order of integration and Change of variables in integrals. |
| C102.6 | Understand the concepts of Triple integration and determine the volume using integration. |
| **Title:ENGINEERING PHYSICS,Subject Code:PH3151 NBA Code for the Subject :C103 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C103.1 | To understand the importance of mechanics |
| C103.2 | Express their knowledge in electromagnetic waves. |
| C103.3 | Demonstrate a strong foundational knowledge in optics and lasers. |

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| C103.4 | Understand the importance of quantum physics. |
| C103.5 | Comprehend and apply quantum mechanical principles towards the formation of energy bands |
| C103.6 | Demonstrate a strong foundational knowledge in oscillations |

| **Title:ENGINEERING CHEMISTRY,Subject Code:CY3151 NBA Code for the Subject :C104 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C104.1 | To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water |
| C104.2 | To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engg and tech. applications |
| C104.3 | To apply the knowledge of phase rule and composites for materials selection requirements. |
| C104.4 | To recommend suitable fuel for engg. processes and applications |
| C104.5 | To analyse combustion process and its calculations |
| C104.6 | To recognize different forms of energy resources and apply them for suitable applications in energy sectors. |

| **Title:PROBLEM SOLVING AND PYTHON PROGRAMMING,Subject Code:GE3151 NBA Code for the Subject :C105 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C105.1 | Develop algorithmic solutions to simple computational problems |
| C105.2 | Read, write, execute by hand simple Python programs. |
| C105.3 | Structure simple Python programs for solving problems |
| C105.4 | Decompose a Python program into functions |
| C105.5 | Represent compound data using Python lists, tuples, dictionaries. |
| C105.6 | Read and write data from/to files in Python Programs. |

| **Title:PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY,Subject Code:GE3171 NBA Code for the Subject :C106 ,Semester : 1 [23-24ODD]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C106.1 | To understand the problem solving approaches. |
| C106.2 | To learn the basic programming constructs in Python |
| C106.3 | To learn the programming constructs in Python like loop, function, recursion. |
| C106.4 | To practice various computing strategies for Python-based solutions to real world problems. |
| C106.5 | To use Python data structures-lists, tuples, dictionaries. |
| C106.6 | To do input/output with files in Python. |

| Title:PHYSICS AND CHEMISTRY LABORATORY,Subject Code:BS3171 NBA Code for the Subject :C107 ,Semester : 1 [23-24ODD]Target :65 Credits:2 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C107.1 | gain knowledge about elasticity, modulus, oscillations and also able to calculate Young's,rigidity modulus, moment of inertia of regular and irregular bodies. |
| C107.2 | understand the application of interference and diffraction in finding thickness of the given sample and wavelength of the source respectively |
| C107.3 | calculate the variation of resistance with respect to temperature and also able to calculate the band gap of semiconductor |
| C107.4 | Analyse various water quality parameters-Hardness, alkalinity and DO in water sample. |
| C107.5 | Acquire practical skills by using instruments like conductivity meter, pH meter and potentiometer. |
| C107.6 | Finding the strength and amount of nickel in steel. |

| Title:PROFESSIONAL ENGLISH-II,Subject Code:HS3252 NBA Code for the Subject :C108 ,Semester : 2 [23-24EVEN]Target :65 Credits:2 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C108.1 | To compare and contrast products and ideas through technical texts in essays with appropriate grammatical usage and contextual meanings. |
| C108.2 | To enhance learners¿ awareness of general rules of writing for specific audiences through professional emails and responses to complaints. |
| C108.3 | To help learners understand the purpose, audience, contexts of different types of letters/essays/checklists |
| C108.4 | To analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format. To report events and the processes of technical and industrial nature |
| C108.5 | To make use of grammatical items effectively in writing recommendations and in transcoding the graphs |
| C108.6 | To write a winning job/internship application-cover letter and resume /SoP-Statement of purpose |

| Title:STATISTICS AND NUMERICAL METHODS,Subject Code:MA3251 NBA Code for the Subject :C109 ,Semester : 2 [23-24EVEN]Target :60 Credits:4 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C109.1 | Apply the concept of testing of hypothesis for small and large samples in real life problems. |
| C109.2 | Apply the basic concepts of classifications of design of experiments in the field of agriculture. |
| C109.3 | Solve algebraic, transcendental equations and simultaneous equations by direct method. |
| C109.4 | Solve simultaneous equations by iterative method and Eigen value problems. |
| C109.5 | Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration |

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| | for engineering problems. |
| C109.6 | Gain the knowledge of various techniques and methods to solve first order ordinary differential equations with initial conditions in engineering applications. |

**Title:MATERIAL SCIENCE,Subject Code:PH3251 NBA Code for the Subject :C110 ,Semester : 2 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C110.1 | To make the students to understand the basics of crystallography and its importance in studying material properties |
| C110.2 | To understand the electrical properties of materials including free electron theory applications of quantum mechanics |
| C110.3 | Application of magnetic materials |
| C110.4 | To instil knowledge of physics of semiconductors , determination of charge carriers and device applications |
| C110.5 | To establish a sound grasp of knowledge on different optical properties of materials, optical displays and applications |
| C110.6 | To inculcate an idea of significance of nano structures,, quantum confinement and ensuing nano device applications |

**Title:BASIC ELECTRICAL AND ELECTRONICS ENGINEERING,Subject Code:BE3251 NBA Code for the Subject :C111 ,Semester : 2 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C111.1 | Compute the DC electric circuit parameters for simple problems |
| C111.2 | Compute the AC parameters for simple problems |
| C111.3 | Explain the working principle and applications of electrical machines |
| C111.4 | Analyze the characteristics of analog electronic devices |
| C111.5 | Explain the basic concepts of digital electronics |
| C111.6 | Explain the operating principles of measuring instruments |

**Title:ENGINEERING GRAPHICS,Subject Code:GE3251 NBA Code for the Subject :C112 ,Semester : 2 [23-24EVEN]Target :60 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C112.1 | Draw basic geometrical curves |
| C112.2 | Project points, lines and planes in first angle projection by rotating method |
| C112.3 | Project Orthographic views through free hand sketching |
| C112.4 | Project inclined views of any given solids by rotating object method |
| C112.5 | Project sectioned view and to develop lateral surface of given solid |
| C112.6 | Sketch isometric and perspective views of given solid |

**Title:BASIC ELECTRICAL ELECTRONICS ENGINEERING LABORATORY,Subject Code:BE3271 NBA Code for the Subject :C114 ,Semester : 2 [23-24EVEN]Target :80 Credits:2**

| At the end of this course, Student will be able to | |
|---|---|
| **CO-Code** | **Course outcome Description** |
| C114.1 | Use experimental methods to verify Ohms law |
| C114.2 | Use experimental methods to verify Kirchoffs law |
| C114.3 | Analyze Experimentally the load characterstics of DC machine |
| C114.4 | Analyze Experimentally the load characterstics of AC machine |
| C114.5 | Analyze the characterstics of basic electronic device |
| C114.6 | use DSO to measure various parameters |

| **Title:ENGINEERING PRACTICES LABORATORY,Subject Code:GE3271 NBA Code for the Subject :C114 ,Semester : 2 [23-24EVEN]Target :80 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C114.1 | Students will be able to distinguish residential house wiring, fluorescent lamp wiring and stair case wiring. |
| C114.2 | Students will be able to define electrical quantities like high voltage, current, energy and resistance and their measurement using CRO. |
| C114.3 | Students will be able to analyze different logic gates, clock, and rectifier and to solder devices and components. |
| C114.4 | Students will able to understand the pipe connections for the home application and industrial constructions. |
| C114.5 | Students will be able to do plan the real geometry of the shapes for industrial applications. |
| C114.6 | Students will be able to understand the concept of joining the metal by welding. |

| **Title:ENGINEERING MECHANICS,Subject Code:ME3351 NBA Code for the Subject :C202 ,Semester : 3 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C202.1 | Illustrate the vectorial and scalar representation of forces and moments. |
| C202.2 | Analyse the rigid body in equilibrium |
| C202.3 | Evaluate the properties of surfaces and solids |
| C202.4 | Determine the friction and the effects by the laws of friction |
| C202.5 | Distinguish different motion of particles with kinematic principles |
| C202.6 | Calculate dynamic forces exerted in rigid body |

| **Title:ENGINEERINGTHERMODYNAMICS,Subject Code:ME3391 NBA Code for the Subject :C203 ,Semester : 3 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C203.1 | Apply the zeroth and first law of thermodynamics by formulating temperature scales. |
| C203.2 | Calculating the property changes in closed and open engineering |

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| | systems. |
| C203.3 | Apply the second law of thermodynamics in analyzing the performance of thermal devices through energy and entropy calculations. |
| C203.4 | Apply the second law of thermodynamics in evaluating the various properties of steam through steam tables and Mollier chart |
| C203.5 | Apply the properties of pure substance in computing the macroscopic properties of ideal and real gases using gas laws and appropriate thermodynamic relations. |
| C203.6 | Apply the properties of gas mixtures in calculating the properties of gas mixtures and applying various thermodynamic relations to calculate property changes. |

**Title:FLUID MECHANICS AND MACHINERY,Subject Code:CE3391 NBA Code for the Subject :C204 ,Semester : 3 [23-24ODD]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C204.1 | Understand the properties and behaviour in static conditions. |
| C204.2 | to understand the conservation laws applicable to fluids and its application through fluid kinematics and dynamics |
| C204.3 | Estimate losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel. Also, to understand the concept of boundary layer and its thickness |
| C204.4 | Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performances of prototype by model studies |
| C204.5 | Explain the working principles of various turbines and design the various types of turbines |
| C204.6 | Explain the working principles of centrifugal, reciprocating and rotary pumps and design the centrifugal and reciprocating pumps |

**Title:MANUFACTURING PROCESSES,Subject Code:ME3393 NBA Code for the Subject :C304 ,Semester : 3 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C304.1 | To illustrate the working principles of various metal casting processes. |
| C304.2 | To learn and apply the working principles of various metal joining processes. |
| C304.3 | To analyse the working principles of bulk deformation of metals. |
| C304.4 | To learn the working principles of sheet metal forming process. |
| C304.5 | To study and practice the working principles of plastics molding. |
| C304.6 | To study and practice the manufacturing process of plastics molding. |

**Title:ENGINEERING MATERIALS AND METALLURGY,Subject Code:ME3392 NBA Code for the Subject :C305 ,Semester : 3 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C305.1 | Explain alloys and phase diagram. |
| C305.2 | Explain Iron-Iron carbon diagram and steel classification. |

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| C305.3 | Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes. |
| C305.4 | Clarify the effect of alloying elements on ferrous and non-ferrous metals. |
| C305.5 | Summarize the properties and applications of non-metallic materials. |
| C305.6 | Explain the testing of mechanical properties. |

**Title:TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS,Subject Code:MA3351 NBA Code for the Subject :MA3351 ,Semester : 3 [23-24ODD]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| MA3351.1 | Solve the given partial differential equations |
| MA3351.2 | Apply Fourier series analysis which plays a vital role in engineering applications |
| MA3351.3 | Apply Fourier series techniques to solve one dimensional wave, one and two dimensional heat equations |
| MA3351.4 | Gain the knowledge in Fourier transform techniques to solve the problems of engineering. |
| MA3351.5 | Formulate some of the physical problems of engineering using difference equations |
| MA3351.6 | Apply Z-transform techniques to solve the difference equations. |

**Title:COMPUTER AIDED MACHINE DRAWING,Subject Code:ME3381 NBA Code for the Subject :C207 ,Semester : 3 [23-24ODD]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C207.1 | Student will be able to classify and illustrate the BIS specifications for metal joints. |
| C207.2 | Student will be able to explain the basic principles behind dimensions and tolerances in an engineering drawing. |
| C207.3 | Student will be able to apply different types of tools in 2-D drafting. |
| C207.4 | Student will be able to build bearings and valves with the help of various components. |
| C207.5 | Student will be able to model orthogonal views of machine components. |
| C207.6 | Student will be able to construct the various machine components like couplings, joints, engine parts, miscellaneous components. |

**Title:MANUFACTURING TECHNOLOGY LABORATORY,Subject Code:ME3382 NBA Code for the Subject :C208 ,Semester : 3 [23-24ODD]Target :80 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C208.1 | Demonstrate the safety precautions exercised in the mechanical workshop. |
| C208.2 | Make the different types of gears using various machines and calculate the corresponding machining time. |
| C208.3 | Convert round bar to square and hexagonal shapes using vertical milling machine. |
| C208.4 | Measure the cutting forces using tool dynamometers |

| | |
|---|---|
| C208.5 | Use sheet metal fabrication tools and make simple tray and funnel. |
| C208.6 | Use different moulding tools, patterns and prepare sand moulds. |

| **Title:THERMAL ENGINEERING,Subject Code:ME3451 NBA Code for the Subject :C211 ,Semester : 4 [23-24EVEN]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C211.1 | Apply thermodynamic concepts to different air standard cycles and solve problems. |
| C211.2 | Solve problems in steam nozzle and calculate critical pressure ratio. |
| C211.3 | Explain the flow in steam turbines, draw velocity diagrams and solve problems |
| C211.4 | Explain the flow in Gas turbines and solve problems. |
| C211.5 | Explain the functioning and features of IC engine, components and auxiliaries. |
| C211.6 | Calculate the various performance parameters of IC engines |

| **Title:HYDRALICS AND PNEUMATICS,Subject Code:ME3492 NBA Code for the Subject :C211 ,Semester : 4 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C211.1 | Apply working principles of fluid power systems. |
| C211.2 | Apply working principles of hydraulic pumps and selection criteria |
| C211.3 | Apply the working principles of hydraulic actuators and control components. |
| C211.4 | Design and develop hydraulic circuits and systems. |
| C211.5 | Apply the working principles of pneumatic circuits and power system and its components. |
| C211.6 | Identify various troubles shooting methods in fluid power systems. |

| **Title:MANUFACTURING TECHNOLOGY,Subject Code:ME3493 NBA Code for the Subject :C213 ,Semester : 4 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C213.1 | To study the concepts and basic mechanics of metal cutting and the factors affecting machinability |
| C213.2 | To learn working of basic and advanced turning machines. |
| C213.3 | To teach the basics of machine tools with reciprocating and rotating motions and abrasive finishing processes |
| C213.4 | To study the basic concepts of CNC of machine tools and constructional features of CNC. To study the basic concepts of CNC of machine tools and constructional features of CNC. |
| C213.5 | To learn the basics of CNC programming concepts to develop the part programme for Machine centre and turning centre |
| C213.6 | To learn the basics of CNC programming concepts to develop the part programme for Machine centre and turning centre |

| Title:STRENGTH OF MATERIALS,Subject Code:CE3491 NBA Code for the Subject :C214 ,Semester : 4 [23-24EVEN]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C214.1 | To understand the concepts of stress and strain. |
| C214.2 | To understand the principal stresses and principal planes. |
| C214.3 | To study the concept of shearing force and bending moment due to external loads in determinate beams and their effect on stresses. |
| C214.4 | To determine stresses and deformation in circular shafts and helical spring due to torsion. |
| C214.5 | To compute slopes and deflections in determinate beams by various methods. |
| C214.6 | To study the stresses and deformations induced in thin and thick shells. |

| Title:ENVIRONMENTAL SCIENCES AND SUSTAINABILITY,Subject Code:GE3451 NBA Code for the Subject :C215 ,Semester : 4 [23-24EVEN]Target :65 Credits:2 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C215.1 | Infer the importance of environment and explain the concept, types, structure and function of ecosystem. |
| C215.2 | Recall the various functions, values, levels, threats and conservation of biodiversity. |
| C215.3 | Explain the different types of pollution and propose the suitable methods to prevent the same to enhance the environment. |
| C215.4 | Discuss the conservation of different energy sources, optimal usage and the importance. |
| C215.5 | Discuss the aspect of sustainability and the means of sustainability management to realize the sustainable development goals. |
| C215.6 | Lists the various environment management systems, protection and discuss the green solutions for energy to materials for sustainability. |

| Title:THEORY OF MACHINES,Subject Code:ME3491 NBA Code for the Subject :C401 ,Semester : 4 [23-24EVEN]Target :65 Credits:3 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C401.1 | Student will be able to discuss the basics of mechanism. |
| C401.2 | Student will be able to solve problems on gears and gear trains. |
| C401.3 | Student will be able to examine friction in machine elements |
| C401.4 | Student will be able to calculate static and dynamic forces of mechanisms. |
| C401.5 | Student will be able to calculate the balancing masses and their locations of reciprocating and rotating masses |
| C401.6 | Student will be able to Computing the frequency of free vibration, forced vibration and damping coefficient. |

**Title:STRENGTH OF MATERIALS AND FLUID MACHINERY LAB,Subject Code:CE3481 NBA Code for the Subject :C216 ,Semester : 4 [23-**

| **24EVEN]Target :80 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C216.1 | Determine the tensile, torsion and hardness properties of metals testing |
| C216.2 | Determine the stiffness properties of helical and carriage spring |
| C216.3 | Apply the consecration laws to determine the coefficient of discharge of a venturi meter and finding the friction factor of given pipe. |
| C216.4 | Apply the fluid static and momentum principles to determine the metacentric height and forces due to impact of jet |
| C216.5 | Determine the performance characteristics of turbine |
| C216.6 | Determine the performance characteristics of pumps |

| **Title:THERMAL ENGINEERING LABORATORY,Subject Code:ME3461 NBA Code for the Subject :C218 ,Semester : 4 [23-24EVEN]Target :80 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C218.1 | Study the fuel properties and its performance characteristics |
| C218.2 | Study the Performance characteristics of Engines |
| C218.3 | Study the energy balancing in engines |
| C218.4 | Study the performance characteristics of compressors |
| C218.5 | Study the performance characteristics of boiler |
| C218.6 | Study the performance characteristics of turbine |

| **Title:Design of Machine Elements,Subject Code:ME3591 NBA Code for the Subject :C301 ,Semester : 5 [23-24ODD]Target :65 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C301.1 | Explain the materials selection based on mechanical properties and fundamentals of stress analysis in the design of machine components. |
| C301.2 | Calculate principal stresses and factor of safety for various theories of failure under different loading conditions. |
| C301.3 | Design the shafts, keys and couplings. |
| C301.4 | Design the permanent and temporary fasteners. |
| C301.5 | Calculate various dimensions of energy storing elements and engine components. |
| C301.6 | Select the various bearings according to the applications and lubrication requirements. |

| **Title:METROLOGY AND MEASUREMENTS,Subject Code:ME3592 NBA Code for the Subject :C302 ,Semester : 5 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C302.1 | Discuss the concepts of measurements to apply in various metrological instruments. |

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|---|---|
| C302.2 | Apply the principle and applications of linear and angular measuring instruments. |
| C302.3 | Study the principle and applications of assembly and transmission elements. |
| C302.4 | Apply the tolerance symbols and tolerance analysis for industrial applications. |
| C302.5 | Apply the principles and methods of form and surface metrology. |
| C302.6 | Apply the advances in measurements for quality control in manufacturing Industries. |

**Title:CAD/CAM,Subject Code:CME340 NBA Code for the Subject :C303PE1V23 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C303PE1V23.1 | Discuss the basics of the design and concepts |
| C303PE1V23.2 | Develop the two dimensional drafting and projection views |
| C303PE1V23.3 | Discuss the three dimensional modeling, parametric and non-parametric modeling |
| C303PE1V23.4 | Discuss the assembly modeling and top down, bottom up approaches |
| C303PE1V23.5 | Develop the computer aided machining and writing part programming |
| C303PE1V23.6 | Discus m/c programming simulation and post processing |

**Title:Energy Storage Devices,Subject Code:CME364 NBA Code for the Subject :C304PE2V65 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C304PE2V65.1 | Discuss the need and identify the suitable energy storage devices for applications. |
| C304PE2V65.2 | Explain the working of various energy storage devices and their importance. |
| C304PE2V65.3 | Explain the basic characteristics of batteries for mobile and hybrid systems |
| C304PE2V65.4 | Discuss the storage of renewable energies and management systems. |
| C304PE2V65.5 | Explain the need for other energy devices and their scope for applications |
| C304PE2V65.6 | Understand the principle of working of advanced storage devices like supercapacitors, fuel cells and biofuel cells etc. |

**Title:Additive Manufacturing,Subject Code:CME339 NBA Code for the Subject :C305PE3V22 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C305PE3V22.1 | Recognize the development of AM technology and how AM technology propagated into various businesses and developing opportunities. |
| C305PE3V22.2 | Acquire knowledge on process of transforming a concept into the final product in AM technology |

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|---|---|
| C305PE3V22.3 | Elaborate the vat polymerization and direct energy deposition processes and its applications. |
| C305PE3V22.4 | Acquire knowledge on process and applications of powder bed fusion and material extrusion. |
| C305PE3V22.5 | Evaluate the advantages, limitations, applications of binder jetting, material jetting and sheet lamination processes. |
| C305PE3V22.6 | Evaluate the Adhesive Bonding and Thermal Bonding- Materials, Application and Limitation. |

**Title:Non-traditional Machining Processes,Subject Code:CME387 NBA Code for the Subject :C305PE3V92 ,Semester : 5 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C305PE3V92.1 | Formulate Different Types of Non-Traditional Machining Processes and Evaluate Mechanical Energy Based Non-Traditional Machining Processes |
| C305PE3V92.2 | Illustrate Chemical and Electro Chemical Energy Based Processes. |
| C305PE3V92.3 | Evaluate Thermo-Electric Discharge Based Processes. (EDM & WEDM). |
| C305PE3V92.4 | Disseminate Thermo-Electric Beam Based Processes. (LBM, PAM, EBM & IBM). |
| C305PE3V92.5 | Interpret Nano-Finishing Processes. |
| C305PE3V92.6 | Analyze Hybrid Non-Traditional Machining Processes and Differentiate Non- Traditional Machining Processes. |

**Title:FILM APPRECIATION,Subject Code:MX3083 NBA Code for the Subject :C307M13 ,Semester : 5 [23-24ODD]Target :65 Credits:0**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C307M13.1 | To know the development of film as an art and entertainment form |
| C307M13.2 | To learn the language of cinema as an evolved over a century |
| C307M13.3 | To read a film and appreciate the various nuances of a film as a text |
| C307M13.4 | To learn the process of film making, structure of film with social concern and crew members |
| C307M13.5 | To get the knowledge about the film theories, professional ethics and early era of films individually and as a team work |
| C307M13.6 | To inculcate their technical knowledge in the par with technological advancements in film making |

**Title:METROLOGY AND DYNAMICS LABORATORY,Subject Code:ME3581 NBA Code for the Subject :C310 ,Semester : 5 [23-24ODD]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C310.1 | Apply the tools and techniques of quality management to manufacturing and services processes. |
| C310.2 | Knowledge on Gear inspection and profile measurements |
| C310.3 | Application of optics in measuring the profile of screw threads and flatness of surfaces |
| C310.4 | Use the comparator tools and gauges for quality inspection |

| | |
|---|---|
| C310.5 | Knowledge to measure measurement of force and torque using sensor. |
| C310.6 | Students will be able to measure surface roughness of machined surface. |

| **Title:Automobile Engineering,Subject Code:CME380 NBA Code for the Subject :C310PE1V81 ,Semester : 6 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C310PE1V81.1 | Recognize the various parts of the automobile and their functions and materials. |
| C310PE1V81.2 | Discuss the engine auxiliary systems and engine emission control. |
| C310PE1V81.3 | Explain catalytic converter system and turbochargers. |
| C310PE1V81.4 | Distinguish the working of different types of transmission systems. |
| C310PE1V81.5 | Explain the Steering, Brakes and Suspension Systems. |
| C310PE1V81.6 | Predict possible alternate sources of energy for IC Engines. |

| **Title:Design of Transmission System,Subject Code:CME389 NBA Code for the Subject :C310PE3V94 ,Semester : 6 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C310PE3V94.1 | Understand the basic concepts of transmission systems. |
| C310PE3V94.2 | Able to design flexible transmission components used in Engine and machines. |
| C310PE3V94.3 | Able to design spur gears and Helical gears used in Engine and machines. |
| C310PE3V94.4 | Able to design Bevel gears and worm gears used in Engine and machines. |
| C310PE3V94.5 | Understand the function of a gear box and its components and able to design gear boxes. |
| C310PE3V94.6 | Able to design cam, clutches and brakes for transmission system. |

| **Title:Power Plant Engineering,Subject Code:CME384 NBA Code for the Subject :C310PE5V86 ,Semester : 6 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C310PE5V86.1 | Study the coal based thermal power plants. |
| C310PE5V86.2 | study the diesel, gas turbine and combined cycle power plants. |
| C310PE5V86.3 | learn the basic of nuclear engineering and power plants. |
| C310PE5V86.4 | learn the power from renewable energy. |
| C310PE5V86.5 | study the energy and economic issues of power plants. |
| C310PE5V86.6 | study the environmental issues of power plants. |

| **Title:Gas Dynamics and Jet Propulsion,Subject Code:CME386 NBA Code for the Subject :C311 ,Semester : 6 [23-24EVEN]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |

| | |
|---|---|
| C311.1 | study the fundamentals of compressible flow concepts and the use of gas tables |
| C311.2 | learn the compressible flow behaviour in variable area ducts. |
| C311.3 | learn the compressible flow behaviour in variable area ducts. |
| C311.4 | study the development of shock waves and its effects |
| C311.5 | study the types of jet engines and their performance parameters |
| C311.6 | learn the types of rocket engines and their performance parameters |

**Title:Heat and Mass Transfer,Subject Code:ME3691 NBA Code for the Subject :C311 ,Semester : 6 [23-24EVEN]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C311.1 | Understand the mechanism of steady state conduction in Cartesian and polar coordinates |
| C311.2 | Evaluate transient heat conduction for lumped analysis, semi-infinite and finite surfaces |
| C311.3 | Understand both free and forced convective heat transfer on plates, cylinder and sphere |
| C311.4 | Analyze the heat transfer concepts in phase changing process and able to design and evaluate the performance of heat exchangers |
| C311.5 | Understand and evaluate the radiation heat transfer in various applications |
| C311.6 | Apply mass diffusion concepts in several applications |

**Title:Process Planning and Cost Estimation,Subject Code:CME396 NBA Code for the Subject :C312 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C312.1 | Students will be able to select the process, equipment and tools for various industrial products. |
| C312.2 | Students will be able to prepare process planning activity chart. |
| C312.3 | Students will be able to explain the concept of cost estimation. |
| C312.4 | Students will be able to compute the job order cost for different type of shop floor. |
| C312.5 | Students will be able to calculate the machining time for various machining operations-Lathe, Drilling & Boring |
| C312.6 | Students will be able to calculate the machining time for various machining operations - Milling, Shaping, Planning & Grinding |

**Title:CAD/CAM Laboratory,Subject Code:ME3681 NBA Code for the Subject :C313 ,Semester : 6 [23-24EVEN]Target :80 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C313.1 | Gain practical experience in handling 2D drafting and 3D modeling software systems |
| C313.2 | Duplicate a 3-D assembly model using 2D drawing. |

| | |
|---|---|
| C313.3 | Designing 3 Dimensional geometric model of parts, sub-assemblies, assemblies and exporting it to drawing. |
| C313.4 | Demonstrate manual part programming and simulate the CNC program and Generate part programming using G and M code through CAM software. |
| C313.5 | Apply Computer Aided Manufacturing Techniques in the areas of machining process. |
| C313.6 | Apply the programming concepts in Computer Aided Part Programming. |

**Title:Heat Transfer Laboratory,Subject Code:ME3682 NBA Code for the Subject :C318 ,Semester : 6 [23-24EVEN]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C318.1 | To gain experimental knowledge of Predicting the thermal conductivity of solids and liquids. |
| C318.2 | To gain experimental knowledge of Estimating the heat transfer coefficient values of various fluids. |
| C318.3 | To gain experimental knowledge of Testing the performance of tubes in tube heat exchangers and fins |
| C318.4 | To gain experimental knowledge of determining the Stefan Boltzmann constant and emissivity by applying radiation laws |
| C318.5 | To gain experimental knowledge in phase change heat transfer |
| C318.6 | To gain experimental knowledge in calibration of thermocouples/RTDs |

**Title:Industrial Safety,Subject Code:MX3089 NBA Code for the Subject :C412 ,Semester : 6 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C412.1 | To Understand the Introduction and basic Terminologies safety. |
| C412.2 | To enable the students to learn about the Important Statutory Regulations and standards. |
| C412.3 | To enable students to Conduct and participate the various Safety activities in the Industry |
| C412.4 | To have knowledge about Workplace Exposures and Hazards |
| C412.5 | To assess the various Hazards and consequences through various Risk Assessment Technique |
| C412.6 | To assess the various Hazards and consequences through various hazard Assessment Technique |

**Title:POWER PLANT ENGINEERING,Subject Code:ME8792 NBA Code for the Subject :C401 ,Semester : 7 [23-24ODD]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C401.1 | Apply thermodynamics concepts to enhance the rankine cycle efficiency and to understand about Cogeneration system and binary vapour cycle |
| C401.2 | Acquire knowledge on the layout, construction and working of the components inside a thermal power plant |
| C401.3 | Gain knowledge on the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants |

| | |
|---|---|
| C401.4 | Describe the layout, construction and working of the components inside nuclear power plants |
| C401.5 | Explain the layout, construction and working of the components inside Renewable energy power plants. |
| C401.6 | Understand the power plant economics and environmental hazards and estimate the costs of electrical energy production |

| **Title:PROCESS PLANNING AND COST ESTIMATION,Subject Code:ME8793 NBA Code for the Subject :C402 ,Semester : 7 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C402.1 | C402.1 Students will be able to select the process, equipment and tools for various industrial products. |
| C402.2 | Students will be able to prepare process planning activity chart. |
| C402.3 | Students will be able to explain the concept of cost estimation. |
| C402.4 | Students will be able to compute the job order cost for different type of shop floor. |
| C402.5 | Students will be able to calculate the machining time for various machining operations - Lathe, Drilling & Boring. |
| C402.6 | Students will be able to calculate the machining time for various machining operations - Milling, Shaping, Planning & Grinding. |

| **Title:MECHATRONICS,Subject Code:ME8791 NBA Code for the Subject :C403 ,Semester : 7 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C403.1 | Discuss the interdisciplinary applications of electronics, electrical and computer system for the control of mechanical, electronic system and sensor technology. |
| C403.2 | Outline appropriate sensors and actuators for an engineering application. |
| C403.3 | Discuss the architecture, pin diagram and addressing modes of microprocessor and microcontroller |
| C403.4 | Discuss programmable peripheral interface, Architecture of 8255 and various device interfacing |
| C403.5 | Explain the architecture, programming and application of PLC to problems and challenges in the areas of mechatronic engineering |
| C403.6 | Discuss various actuators and mechatronic system using the knowledge and acquired through the course and also from the given case studies |

| **Title:LEAN SIX SIGMA,Subject Code:OMF751 NBA Code for the Subject :C404OE12 ,Semester : 7 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C404OE12.1 | Understand the history of evolution and fundamental terminologies used in lean manufacturing and six sigma. |
| C404OE12.2 | Evaluate the perfect implementation of lean six sigma by using various novel tools and techniques. |
| C404OE12.3 | Design six sigma methodologies like FMEA and CAP. |
| C404OE12.4 | Understand the importance of QFD in quality management. |

| | |
|---|---|
| C404OE12.5 | Analyze various challenges faced during the effective implementation of six sigma in an organization. |
| C404OE12.6 | Understand the vitality of continuous improvement in lean manufacturing systems. |

| **Title:ROBOTICS,Subject Code:ME8099 NBA Code for the Subject :C406PE01 ,Semester : 7 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C406PE01.1 | Explain the concepts of industrial robots, classification, specifications and coordinate systems. Also summarize the need and application of robots in different sectors. |
| C406PE01.2 | Illustrate the different types of robot drive systems as well as robot end effectors. |
| C406PE01.3 | Apply the different sensors and image processing techniques in robotics to improve the ability of robots. |
| C406PE01.4 | Develop robotic programs for different tasks and familiarize with the kinematics motions of robot. |
| C406PE01.5 | Develop robotic programs in robot programming language (VAL) |
| C406PE01.6 | Examine the implementation of robots in various industrial sectors and interpolate the economic analysis of robots. |

| **Title:PRODUCTION PLANNING AND CONTROL,Subject Code:IE8693[8] NBA Code for the Subject :C411PE01 ,Semester : 7 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C411PE01.1 | Recognize the objectives, functions, applications of PPC and forecasting techniques. |
| C411PE01.2 | Understand the different work study techniques. |
| C411PE01.3 | Prepare product planning and control activities. |
| C411PE01.4 | Describe the process planning activities with reference to production control. |
| C411PE01.5 | Discuss the concepts of production scheduling. |
| C411PE01.6 | Demonstrate and explain the use of Manufacturing Requirements Planning (MRP2), Just - In - Time (JIT) techniques in terms of operation and their importance in Lean World Class Manufacturing. |

| **Title:SIMULATION AND ANALYSIS LABORATORY ,Subject Code:ME8711 NBA Code for the Subject :C407 ,Semester : 7 [23-24ODD]Target :80 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C407.1 | Demonstrate the use of FEA tool to find the Deflection in Beams, Plates and Trusses. |
| C407.2 | Illustrate the need for Axi-Symmetric Components. |
| C407.3 | Compare the various types of Heat Transfer Analysis on plates. |
| C407.4 | Differentiate the Modal and Vibration Analysis. |
| C407.5 | Perform Harmonic and Transient Analysis of Simple Systems. |
| C407.6 | Describe the use of MATLAB and multi body dynamic software in Design. |

| Title:MECHATRONICS LABORATORY,Subject Code:ME8781 NBA Code for the Subject :C408 ,Semester : 7 [23-24ODD]Target :80 Credits:2 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C408.1 | Explain the working of sensors and actuators for various applications. |
| C408.2 | Design and execute ladder diagrams for PLC and elctropneumatic applications. |
| C408.3 | Able to design and simulate pneumatic and hydraulic circuits using AUTOMATION STUDIO software. |
| C408.4 | Identify the basic elements and techniques of mechatronic devices. |
| C408.5 | Write programs and execute the same for microprocessor and microcontroller. |
| C408.6 | Able to understand the working of servo motor, stepper motor and PID controller. |

| Title:TECHNICAL SEMINAR,Subject Code:ME8712 NBA Code for the Subject :C409 ,Semester : 7 [23-24ODD]Target :65 Credits:1 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C409.1 | Identify and choose appropriate topic of relevance. |
| C409.2 | Assimilate literature on technical articles of specified topic and develop comprehension comprehension. |
| C409.3 | Develop skills regarding professional communication and technical report writing. |
| C409.4 | Design, develop and deliver presentation on specified technical topic |
| C409.5 | Develop the capacity to observe intelligently and propose and defend opinions and ideas with tact and conviction. ideas with tact and conviction. |
| C409.6 | Learn the methodology of publishing technical papers. |

| Title:PROJECT WORK,Subject Code:ME8811 NBA Code for the Subject :C412 ,Semester : 8 [23-24EVEN]Target :80 Credits:10 | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C412.1 | Identify a problem and create a feasible solution |
| C412.2 | Analyze and evaluate various literature and identify suitable problem solving technique/process/methodology |
| C412.3 | Carry out their project work (Experiment/Analysis/Observation/Case-study) |
| C412.4 | Present project work in review meetings |
| C412.5 | Create a project report that confirms to regulatory guidelines |
| C412.6 | Learn the methodology of publishing technical papers. |

# PROGRAMME: M.E (COMMUNICATION SYSTEMS)

## COURSE OUTCOME FOR THE ACADEMIC YEAR: 2023-2024

| **Title:LINEAR ALGEBRA, PROBABILITY AND QUEUEING THEORY,Subject Code:MA4156 NBA Code for the Subject :C101 ,Semester : 1 [23-24ODD]Target :60 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C101.1 | To apply the concept of inner product spaces in orthogonalization. |
| C101.2 | Have a fundamental knowledge of the basic probability concepts and Get exposure and a well-founded knowledge of standard distributions which can describe real life phenomena |
| C101.3 | Acquire skills in handling situations involving more than one random Variable and functions of random variables |
| C101.4 | Understand and characterize phenomena which evolve with respect to time in probabilistic manner. |
| C101.5 | Probabality Queeing theory |
| C101.6 | Operation researh |

| **Title:STATISTICAL SIGNAL PROCESSING,Subject Code:DS4152 NBA Code for the Subject :C103 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C103.1 | Analyze discrete-time random processes |
| C103.2 | Apply appropriate model for estimation and signal modeling for the given problem |
| C103.3 | Analyze non-parametric and parametric methods for spectral estimation |
| C103.4 | Design optimum filters such as Wiener and Kalman filters for the given problem |
| C103.5 | Design adaptive filters for different applications |
| C103.6 | Analyze the adaptation algorithms for adaptive signal processing |

| **Title:MODERN DIGITAL COMMUNICATION SYSTEMS,Subject Code:EL4151 NBA Code for the Subject :C104 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C104.1 | Differentiate coherent and non coherent receivers and analyse their performance under AWGN channel conditions |
| C104.2 | Illustrate the effect of signalling through bandlimited channels and Equalization techniques used to overcome ISI |
| C104.3 | Determine the channel capacity and design various block coding techniques to combat channel errors |
| C104.4 | Construct convolutional coders and analyze the performance of different decoding techniques. |
| C104.5 | Describe the basics of OFDM as a multicarrier communication and CDMA as a multiuser communication technique. |

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| C104.6 | OFDM multicarrier communication and CDMA as a multiuser Techniques communication technique. |

| **Title:ADVANCED WIRELESS COMMUNICATION,Subject Code:CU4151 NBA Code for the Subject :C105 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C105.1 | Analyze the wireless channel characteristics and identify appropriate channel models |
| C105.2 | Understand the mathematics behind the capacity calculation under different channel conditions |
| C105.3 | Understand the implication of diversity combining methods and the knowledge of channel |
| C105.4 | Understand the concepts in MIMO Communications |
| C105.5 | Understand mulitiple access techniques |
| C105.6 | use in different multi-user scenarios |

| **Title:RADIATING SYSTEMS,Subject Code:CU4152 NBA Code for the Subject :C106 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| C106.1 | Understand the fundamentals behind the different techniques in antenna technology. |
| C106.2 | Understand the challenges associated in designing antennas based on different technologies |
| C106.3 | Understand the capability and assess the performance of various antennas. |
| C106.4 | Identify the antennas specific to the applications, design and characterize. |
| C106.5 | Understand the need for optimizing in antenna design and the methodologies for the same |
| C106.6 | understand the concept of smart antennas |

| **Title:RESEARCH METHODOLOGY AND IPR,Subject Code:RM4151 NBA Code for the Subject :RM4151 ,Semester : 1 [23-24ODD]Target :65 Credits:2** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| RM4151.1 | Apply qualitative research methods, observation studies, experiments, and surveys. |
| RM4151.2 | Design and implement effective questionnaires and instruments. |
| RM4151.3 | Effectively present insights and findings through written reports and oral presentations. |
| RM4151.4 | Understand the IPR development process, including trade secrets and utility models. |
| RM4151.5 | Understand equitable assignments, licenses, and the role of patent agents. |
| RM4151.6 | Analyze the examination, grant, and revocation of patents. |

| **Title:RF SYSTEM DESIGN,Subject Code:CU4251 NBA Code for the Subject :C110 ,Semester : 2 [23-24EVEN]Target :65 Credits:3** |
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| At the end of this course, Student will be able to | |
|---|---|
| **CO-Code** | **Course outcome Description** |
| C110.1 | understand the specifications of transceiver modules |
| C110.2 | understand pros and cons of transceiver architectures and their associated design considerations |
| C110.3 | understand the impact of noise and amplifier non-linearity of amplification modules and also will learn the resultant effect during cascade connections |
| C110.4 | get exposure about spurs and generation principles during signal generation and frequency translations |
| C110.5 | understand the case study of transceiver systems and aid to select specification parameters |
| C110.6 | understand the case study of transceiver systems and aid to select specification parameters |

**Programme:M.E. Computer Science and Engineering**

**Course OutComes for the Academic Year : 2023-24**

| **Title:PRINCIPLES OF PROGRAMMING LANGUAGES,Subject Code:CP4154 NBA Code for the Subject :COME106 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| COME106.1 | Describe syntax and semantics of programming languages |
| COME106.2 | Explain data, data types, and basic statements of programming languages |
| COME106.3 | Describe call-return architecture and ways of implementing them |
| COME106.4 | Design and implement subprogram constructs |
| COME106.5 | Apply object-oriented, concurrency, and event handling programming constructs |
| COME106.6 | Develop programs in Scheme, ML, and Prolog and Understand and adopt new programming language |

| **Title:DATABASE PRACTICES,Subject Code:CP4152 NBA Code for the Subject :CP4152 ,Semester : 1 [23-24ODD]Target :65 Credits:4** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| CP4152.1 | Describe the fundamental elements of relational database management systems |
| CP4152.2 | Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL. |
| CP4152.3 | Understand query processing in a distributed database system |
| CP4152.4 | Understand the basics of XML and create well-formed and valid XML documents. |
| CP4152.5 | Distinguish the different types of NoSQL databases |
| CP4152.6 | To understand the different models involved in database security and their applications in real time world to protect the database and information associated with them. |

| **Title:NETWORK TECHNOLOGIES,Subject Code:CP4153 NBA Code for the Subject :CP4153 ,Semester : 1 [23-24ODD]Target :65 Credits:3** | |
|---|---|
| At the end of this course, Student will be able to | |
| **CO-Code** | **Course outcome Description** |
| CP4153.1 | Explain the basic concepts of networks |
| CP4153.2 | Explain various technologies in the wireless domain |
| CP4153.3 | Explain 4G modile data networks |
| CP4153.4 | Explain the concepts of 5G cellular networks |
| CP4153.5 | Implement network concepts using Software defined networks |
| CP4153.6 | Virtualize network functionalities in a virtual machine |

| **Title:APPLIED PROBABILITY AND STATISTICS FOR COMPUTER SCIENCE ENGINEERS,Subject Code:MA4151 NBA Code for the Subject :MA4151 ,Semester : 1 [23-24ODD]Target :60 Credits:4** |
|---|
| At the end of this course, Student will be able to |

| CO-Code | Course outcome Description |
|---|---|
| MA4151.1 | TO ENCOURAGE STUDENTS TO DEVELOP A WORKING KNOWLEDGE OF THE CENTRAL IDEAS OF LINEAR ALGEBRA. |
| MA4151.2 | COMPUTE PROBABILITY FOR SIMPLE AND COMPOUND EVENTS. DEFINE DISCRETE AND CONTINUOUS RANDOM VARIABLES AND TO COMPUTE THE EXPECTED VALUES AND MOMENT GENERATING FUNCTIONS OF DISCRETE AND CONTINUOUS VARIAB |
| MA4151.3 | EXPLAIN VARIOUS DISTRIBUTIONS OF DISCRETE AND CONTINUOUS RANDOM VARIABLES. |
| MA4151.4 | EXPLAIN THE JOINT DISTRIBUTION, MARGINAL DISTRIBUTION AND TO COMPUTE THE CORRELATION AND THE EQUATION OF LINES OF REGRESSION, TO DESCRIBE THE TRANSFORMATION OF TWO DIMENSIONAL RANDOM VARIABLES. |
| MA4151.5 | DEFINE NULL AND ALTERNATE HYPOTHESIS AND APPLY THE CONCEPT OF TESTING OF HYPOTHESIS FOR SMALL AND LARGE SAMPLES IN REAL LIFE PROBLEMS |
| MA4151.6 | PERFORM EXPLORATORY ANALYSIS OF MULTIVARIATE DATA , SUCH AS MULTIVARIATE NORMAL DENSITY, CALCULATING DESCRIPTIVE STATISTICS, TESTING FFOR MULTIVARIATE NORMALIITY. |

**Title:RESEARCH METHODOLOGY AND IPR,Subject Code:RM4151 NBA Code for the Subject :RM4151 ,Semester : 1 [23-24ODD]Target :65 Credits:2**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| RM4151.1 | Ability to formulate research problem |
| RM4151.2 | Ability to carry out research analysis |
| RM4151.3 | Ability to follow research ethics |
| RM4151.4 | Ability to understand that today¿s world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity |
| RM4151.5 | Ability to understand about IPR and filing patents in R & D |
| RM4151.6 | Study of new developments in IPR. |

**Title:INTERNET OF THINGS,Subject Code:CP4291 NBA Code for the Subject :C109 ,Semester : 2 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C109.1 | Understand the basics of IoT, sensors and IoT system management. |
| C109.2 | Understand the Architectural Overview of IoT. |
| C109.3 | Understand the basics of IoT protocols. |
| C109.4 | Implement simple IoT applications. |
| C109.5 | Understand the basics of cloud architecture. |
| C109.6 | Understand the basics of cloud architecture. |

**Title:CLOUD COMPUTING TECHNOLOGIES,Subject Code:MP4251 NBA Code for the Subject :C2021 ,Semester : 2 [23-24EVEN]Target :65 Credits:3**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| C2021.1 | Employ the concepts of virtualization in the cloud computing. |

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|---|---|
| C2021.2 | Identify the architecture, infrastructure and delivery Models of cloud computing |
| C2021.3 | Develop the cloud application in AWS platform. |
| C2021.4 | Apply the concepts of Windows Azure to design cloud Application. |
| C2021.5 | Develop Services using various Cloud Computing Programming Models. |
| C2021.6 | Provides a clear view of of all the above concepts overall. |

**Title:MULTICORE ARCHITECTURE AND PROGRAMMING,Subject Code:CP4292 NBA Code for the Subject :CP4292 ,Semester : 2 [23-24EVEN]Target :65 Credits:4**

At the end of this course, Student will be able to

| CO-Code | Course outcome Description |
|---|---|
| CP4292.1 | Describe multicore architectures and identify their characteristics and challenges. |
| CP4292.2 | Describe Cache coherence, Performance Issues and Parallel program design. |
| CP4292.3 | Identify the issues in programming Parallel Processors |
| CP4292.4 | Write programs using OpenMP and MPI. |
| CP4292.5 | Design parallel programming solutions to common problems. |
| CP4292.6 | Compare and contrast programming for serial processors and programming for parallel processors. |