TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
AN AUTONOMOUS INSTITUTION
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(Sponsored by TKR Educational Society, Approved by AICTE, Affiliated to JNTU H)
Medbowli, Meerpet, Balapur, Hyderabad, Telangana – 500 097
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B.Tech - Computer Science and Engineering
R-22
I Year

ENGLISH FOR SKILL ENHANCEMENT (D1HSE1)

Course Outcomes:

Students will be able to:

1. Understand the importance of vocabulary and sentence structures.
2. Choose appropriate vocabulary and sentence structures for their oral and written communication.
3. Demonstrate their understanding of the rules of functional grammar.
4. Develop comprehension skills from the known and unknown passages.
5. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports invarious contexts.
6. Acquire basic proficiency in reading and writing modules of English.

LINEAR ALGEBRA AND ORDINARY DIFFERENTIAL EQUATIONS (D1BSM1)

Course Outcomes:

After learning the contents of this paper the student must be able to

1. Discuss the matrix representation of a set of linear equations and to analyses the solution of thesystem of equations.
2. Reduce the quadratic form to canonical form using orthogonal transformation.
3. Identify whether the given DE of first order is exact or not.
4. Can find applications of first order ODE.
5. Solve higher differential equation and apply the concept of differential equation to real worldproblems.
6. Evaluating double integrals and applying them to compute the areas of regions.

ENGINEERING CHEMISTRY (D1BSEC1)

Course Outcomes:

1. Students will acquire the basic knowledge of conductance in Metals and Bond Structures.
2. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
3. They will acquire the Knowledge of chemistry in Batteries.
4. They can learn the fundamentals and general properties of polymers and other engineering materials.
5. They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

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C PROGRAMMING FOR PROBLEM SOLVING (D1ESCP1)

Course Outcomes:

After learning the contents of this course, the student must be able to
1. Learn the taxonomy of computers and C fundamentals
2. Demonstrate arrays and functions to write c programming
3. Write C programs using pointers and strings
4. Analyze and write C programs using structures and unions
5. Develop C programs for various applications using file I/O functions.

IT WORKSHOP AND ELEMENTS OF COMPUTER ENGINEERING (D1ESITW1)

Course Outcomes:

After learning the contents of this course, the student will be able to
1. Apply knowledge for computer assembling and software installation.
2. Solve the trouble shooting problems.
3. Apply the tools for preparation of PPT, Documentation and budget sheet
4. Create standard documents and research documents using Latex.
5. Create project plans.

COMPUTER AIDED ENGINEERING GRAPHICS (D1ESCEG)

Course Outcomes:

At the end of the course, the student will be able to:
1. Apply computer aided drafting tools to create 2D and 3D objects
2. Sketch conics and different types of solids
3. Appreciate the need of Sectional views of solids and Development of surfaces of solids
4. Read and interpret engineering drawings
5. Conversion of orthographic projection into isometric view and vice versa manually and byusing computer aided drafting

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB (D1HSE2)

Course Outcomes
Students will be able to:
1. Understand the nuances of English language through audio- visual experience and groupactivities.
2. Neutralise their accent for intelligibility
3. Speak with clarity and confidence which in turn enhances their employability skills

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ENGINEERING CHEMISTRY LAB (D1BSEC2)

Course Outcomes

The experiments will make the student gain skills on:
1. The concepts of error and its analysis and can also develop the skills to tabulate the experimental data and derive valid conclusions.
2. Hands on experience in performing the electro-analytical techniques such as conductometry, potentiometry and pH metry.
3. The ability to prepare polymers.
4. Estimation of Surface tension and viscosity of Lubricant oil.

C PROGRAMMING FOR PROBLEM (D1ESCP3)

Course Outcomes

After learning the contents of this course, the student will be able to
1. Design and test programs to solve mathematical and scientific problems.
2. Write structured programs using control structures and functions.

BUSINESS ECONOMICS AND FINANCIAL ANALYSIS (D2HSBF)

Course Outcomes
1. Analyze the total structure of the business and able to identify and classify the different types of business entities.
2. Asses the demand and supply analyses with the help of various measures and types of Elasticity of demand.
3. Infer the knowledge about production and cost analysis for product and services.
4. Interpret the fundamental concepts related to financial accounting.
5. Predict the financial position by analyzing the financial statement of the company through various ratios.

STATISTICAL METHODS AND VECTOR CALCULUS (D2BSM5)

Course Outcomes:

After learning the contents of this course the student will be able to
1. Apply Statistical logic for solving the problems.
2. Analyse the qualitative & quantitative data.
3. Analyse the time series for the given data
4. Explain and compute derivatives of vector valued functions, gradient functions
5. Evaluate the line- surface and volume integrals and converting them from one to another.

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APPLIED PHYSICS (D2HSBF)

COURSE OUTCOMES:

After completion of student would able to

1. Summarize the fundamentals of quantum mechanics to understand the quantum physics in the physical world,
2. By understand the fundamentals of band theory of solids; students will be able to classify the materials on the basis of energy gap.
3. Knowing the physics behind the semiconductors, enables the students to use them in different engineering applications
4. Establishing a strong foundation on the different kinds of opto-electronic, dielectric and display materials and paves a way for them to use in at various technical and engineering applications
5. Knowledge on fiber optics and quantum information enables the students to apply them in systems like optical communications and advanced quantum communication.

BASIC ELECTRICAL ENGINEERING (D2ESBEE)

Course Outcomes:

After this course, the student will be able to

1. Understand and analyze DC, AC circuits using basic principles.
2. Analyze and evaluate electrical circuits using various theorems.
3. Understand the characteristics and performance of Electrical Machines and Transformers.
4. Understand the applications of various electrical installations.

DATA STRUCTURES (D2ESDS)

Course Outcomes:

After learning the contents of this course, the student will be able to

1. Analyze time and space complexity of various problems and distinguish various data structures.L4
2. Demonstrate various Abstract Data Types.
3. Analyze the Binary tree and Disjoint set ADT
4. Analyze and implement various kinds of searching and sorting techniques
5. Design programs using a variety of data structures such as graphs and search trees

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APPLIED PHYSICS LAB (D2BSAP2)

Course Outcomes:

1. Identify the V-I characteristics of Laser diode.
2. Evaluate the numerical and bending loss of given optical fiber.
3. Analyze the V-I characteristics of LED and photodiode devices.
4. Identify the type of semiconductor by using Hall Effect experiment.
5. Calculate the Plank's constant using Photocell.

BASIC ELECTRICAL AND SIMULATION LAB (D2ESBES)

Course Outcomes:

After the completion of this laboratory course, the student will be able to

1. Apply various laws to solve electrical networks.
2. Apply network theorems to solve complex electrical networks.
3. Evaluate the performance of different types of Electrical machines and single phasetransformer by conducting various tests
4. Understand and analyze electrical installations using different lamp controlled methods, staircase wiring and different wiring connection

DATA STRUCTURS LAB (D2ESDSL)

Course Outcomes:

1. After learning the contents of this course, the student will be able to
2. Identify the appropriate data structures and algorithms for solving real world problems.
3. Apply various searching and sorting techniques for solving the given problems
4. Apply various data structures such as stacks, queues, search trees, and hash tables to solve the computing problems.
5. Implement different disjoint set operations and k-d trees.

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B.TECH – COMPUTER SCIENCE & ENGINEERING
R-20
II Year

BUSINESS ECONOMICS AND FINANCIAL ANALYSIS (CHSM1)

Course Outcomes:
1. Analyze the total structure of the business & able to identify and classify the different types of business entities.
2. Asses the demand & supply analyses with the help of various measures and types of Elasticity of demand.
3. Infer the knowledge about production and cost analysis for product and services.
4. Interpret the fundamental concepts related to financial accounting.
5. Predict the financial position by analyzing the financial statement of the company through various ratios.

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE (CBSM4)

Course Outcomes:
After learning the contents of this course, the student must be able to
1. Apply mathematical logic to solve problems.
2. Analyse the assertions using predicate logic.
3. Analyse different properties of GCD.
4. Find the GCD using Division and Euclidean Algorithm.
5. Illustrate the basic terminology of functions, relations, sets and demonstrate knowledge of their associated operations.
6. Understand the importance of algebraic properties with regard to working within various number systems.

LOGIC CIRCUITS DESIGN (CESLC1)

Course Outcomes:
After learning the contents of this course, the student will be able to
1. Understand the various number systems and logic gates.
2. Solve Boolean expressions using minimization methods and design the sequential and combinational circuits.
3. Analyze flip flops, Registers and counters.
4. Demonstrate register transfer language and micro-operations
5. Demonstrate memory, RAM, ROM and Programmable Logic Array

DATABASE MANAGEMENT SYSTEMS (C53PC1)

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DATABASE MANAGEMENT SYSTEMS (C53PC1)

Course Outcomes:
After learning the contents of this course, the student will be able to
1. Demonstrate the basic elements of a relational database management system and identify the data models for relevant problems.
2. Design entity relationship model and convert entity relationship diagrams into RDBMS
3. Formulate SQL queries for the given data base and apply the normalization techniques to the development of application software
4. Analyze the transaction management and concurrency control
5. Compare and contrast indexing and Hash based indexing

DATA STRUCTURES (C53PC2)

Course Outcomes:
After learning the contents of this course, the student will be able to
1. Analyze time and space complexity of various problems and distinguish various data structures.
2. Demonstrate various Abstract Data Types.
3. Analyze the Binary tree and Disjoint set ADT
4. Analyze and implement various kinds of searching and sorting techniques
5. Design programs using a variety of data structures such as graphs and search trees

OPERATING SYSTEMS (C53PC3)

Course Outcomes:
After learning the contents of this course, the student will be able to
1. Demonstrate OS structure, design and implementation.
2. Analyze process scheduling and synchronization .
3. Apply various mechanisms to detect and recovery the deadlocks and demonstrate various memory management strategies.
4. Illustrate virtual memory management and storage file management system.
5. Analyze file system implementation

LOGIC CIRCUITS DESIGN LAB (CESLC2)

Course Outcomes:
After learning the contents of this course, the student will be able to
1. Apply the fundamentals of digital logic gates to design combinational and sequential circuits.
2. Analyze and interpret the results obtained for logic gates and various combinational and sequential circuits.

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DATABASE MANAGEMENT SYSTEMS LAB (C53PC4)

Course Outcomes:
After learning the contents of this course, the student will be able to
1. Design and implement a database schema for a given problem.
2. Apply the normalization techniques for development of application software to realistic problems.
3. Formulate queries using SQL DML/DDL/DCL commands.
4. Develop application programs using PL/SQL

DATA STRUCTURES LAB (C53PC5)

Course Outcomes:
After learning the contents of this course, the student will be able to
1. Identify the appropriate data structures and algorithms for solving real world problems.
2. Apply various searching and sorting techniques for solving the given problems
3. Apply various data structures such as stacks, queues, search trees, and hash tables to solve the computing problems.
4. Implement different disjoint set operations and k-d trees.

PROBABILITY & STATISTICS (CBSM3)

Course Outcomes:
After learning the contents of this course, the student must be able to learn the concept of
1. Random variables and various discrete and continuous probability distributions and their properties.
2. Calculate interval estimations of Mean and Proportion of large samples.
3. Make important decisions for few samples which are taken from a large data.
4. Calculate Mean and Proportion and to make important decisions from large samples which are taken from normal populations.
5. Test the hypothesis and give the inference to the given data.
6. The statistical methods of studying data sample.

COMPUTER ORGANIZATION AND ARCHITECTURE (C54PC1)

Course Outcomes:
After learning the contents of this course, the student will be able to
1. Understand the basic computer organization and design
2. Design the hardwired and micro-programmed control units and demonstrate 8086 architecture
3. Analyze the computer arithmetic operations and write 8086 basic ALP programs
4. Analyze I/O data transfer modes and memory hierarchy.
5. Analyze the concurrent processing

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SOFTWARE ENGINEERING (C54PC2)

Course Outcomes:

After learning the contents of this course, the student will be able to
1. Apply different process models for software engineering
2. Recognize the minimum requirements and system models for the development of applications
3. Demonstrate design models
4. Apply the process of validation and verification for a developed application(Prototype)
5. Analyze risks strategies associated with software development

DESIGN AND ANALYSIS OF ALGORITHMS (C54PC3)

Course Outcomes:

After learning the contents of this course, the student will be able to
1. Apply mathematical analysis methods to analyze the performance of algorithms and applydivide and conquer technique to solve the computing problems.
2. Demonstrate disjoint set operations and apply back tracking technique to solve the computing problems.
3. Apply Greedy method to solve various computing problems. –
4. Synthesize efficient algorithms in common engineering design situations using dynamic programming technique.
5. Solve complex problems using branch and bound technique and analyze NP hard and NP complete problems -

FORMAL LANGUAGES & AUTOMATA THEORY (C54PC4)

Course Outcomes:

After learning the contents of this course, the student will be able to
1. Understand the concept of abstract machines and build up the ability to recognize the formal languages.
2. Employ finite state machines for modeling and solving computing problems.
3. Design context free grammars for formal languages.
4. Normalizing the context Free Grammar and design Turing Machines.
5. Demonstrate decidability, intractable problems and NP complete problems.

OBJECT ORIENTED PROGRAMMING THROUGH JAVA (C54PC5)

Course Outcomes:

After learning the contents of this course, the student will be able to
1. Demonstrate the concepts of object oriented programming
2. Develop programs using java packages, interfaces and stream based I/O.
3. Analyze Handling of errors and concurrency using JAVA.
4. Analyze the collection frameworks
5. Develop applets for web applications and GUI based applications

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OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB (C54PC6)

Course Outcomes:
After completion of course, the student will be able to
1. Write programs for problems, using java collection frame work and abstract classes
2. Design and develop programs using objects and inheritance in Java language.
3. Write multithreaded programs.

COMPUTER ORGANIZATION & ARCHITECTURE LAB (C54PC7)

Course Outcomes:
After learning the contents of this course, the student will be able to
1. Design algorithm and develop the assembly language program for different problems using 8086 Assembly Language Programming.

DESIGN AND ANALYSIS OF ALGORITHMS LAB (C54PC8)

Course Outcomes:
After learning the contents of this course, the student must be able to
1. Analyze the asymptotic performance of algorithms.
2. Write rigorous correctness proofs for algorithms.
3. Demonstrate a familiarity with major algorithms and data structures.
4. Apply important algorithmic design paradigms and methods of analysis.
5. Synthesize efficient algorithms in common engineering design situations.

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B.Tech - Computer Science and Engineering
R-20
III Year

OBJECT ORIENTED ANALYSIS AND DESIGN -C55PC1

Course Outcomes:

Upon completion of the Course, the student will be able to

1. Understand the significance of unified modelling language by studying the necessity of unified modelling language
2. Construct basic structural modelling, using class and object diagrams
3. Develop uses cases, and activities for applications
4. Design state chart diagram, based on state machines, use components to deploy and build architectural models
5. Implement unified library applications, develop patterns and framework

PYTHON PROGRAMMING - C55PC2

Course Outcomes:

After completion of course the student will be able to

1. Understand the basic concepts of python programming
2. Illustrate operators, conditional statements, loops in python
3. Construct code and test small python programs using functions and data structures
4. Develop different programs using file concept modules of python – L5
5. Apply the concepts of object – oriented programming in python

COMPUTER NETWORKS (C55PC3)

Course Outcomes:

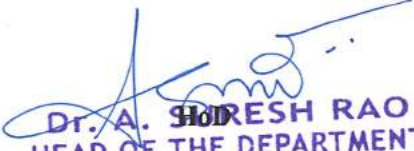Upon completion of the course the student will be able to

1. Understand the protocol layering and physical level communication
2. Analyze Data link layer and MAC layer
3. Compare and contrast between the functions of the network layer and the various routing protocols
4. Demonstrate the functions and protocols of the Transport layer
5. Illustrate the functions and protocols of the Application layer

COMPILER DESIGN (C55PC4)

Course Outcomes:

Upon completion of the course, the student will be able to

1. Understand different phases of a compiler
2. Design different parsers
3. Demonstrate syntax-directed translation schemes and generate intermediate code
4. Analyze code optimization techniques, and runtime environment
5. Design machine independent code optimization techniques

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DISTRIBUTED DATABASES (C55PE5A)

Course Outcomes:

Upon completion of the Course, the student will be able to

1. Identify the necessity of distributed Database concepts, through architecture and design
2. Understand processing queries, decompose, and to optimize queries
3. Practice the control mechanisms and algorithms that are implied through transaction management
4. Discover i s s u e s like reliability, parallelism, associated in developing distributed database system
5. Understand and relate the concepts of Object Oriented design paradigm to Distributed Databases

DISTRIBUTED COMPUTING (C55PE5B)

Course Outcomes:
Upon completion of the course, the student will be able to

1. Understand knowledge on distributed system and computing paradigms
2. Apply the inter process communication concepts to develop socket APIs
3. Develop client server paradigms and imply to build group communication
4. Illustrate the phenomenon of distributed objects, internet applications
5. Understand the basics of grid computing

NETWORK PROTOCOLS (C55PE5C)

Course Outcomes:
Upon completion of the course, the students will be able to:

1. Compare & contrast the different network architectures and protocols
2. Design different TCP/IP protocols
3. Understand various network security technologies and protocols
4. Understand WAN protocols
5. Analyze various LAN protocols

INFORMATION THEORY AND CODING (C55PE5D)

Course Outcomes:
Upon completion of the course, the student will
1. Understand the concept of information and entropy
2. Demonstrate the properties of codes and understand Shannon 's theorem for coding
3. Compute channel capacity and apply mechanism for sharing mutual information
4. Compare the finite geometric codes
5. Understand application of Convolutional Codes

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SOFTWARE PROCESS AND PROJECT MANAGEMENT (C55PE5E)

Course Outcomes:
Upon completion of the course, the student will be able to
1. Understand conventional software management and improving software economics
2. Analyze principles of modern software management and improving software economics
3. Demonstrate life cycle phases and model based software architectures
4. Analyze work flows of the process and Line- of- Business organization
5. Develop future software project management , project control ,process instrumentation and various case studies

ARTIFICIAL INTELLIGENCE (C55PE5F)

Course Outcomes:
Upon completion of the course, the student will be able to

1. Gain knowledge on AI phenomenon, use state space representations and apply heuristic techniques
2. Apply knowledge representation issues to build predicate logic and knowledge rules
3. Understand the uncertainty measures for symbolic reasoning and infer knowledge in statistical reasoning
4. Compare and contrast among weak and strong slots filter structures.
5. Analyze the game playing techniques of AI, plan and build a system

EMBEDDED SYSTEMS DESIGN (C055OE6)

COURSE OUTCOMES:
1. Understands the basic concepts of Embedded Systems
2. Formulates typical Embedded System
3. Illustrates the trends in Embedded Industry
4. Outlines the concepts of RTOS based Embedded System Design
5. Analyze Task Communication in RTOS

OBJECT-ORIENTED ANALYSIS AND DESIGN LAB (C55PC7)

Course Outcomes:

1. Design and implement projects using OO concepts
2. Use the UML analysis and design diagrams
3. Apply appropriate design patterns
4. Create code from design
5. Compare and contrast various testing techniques

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Meerpet, Hyderabad-500 097.

Principal
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TKR College of Engineering & Technology
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Medbowli, Meerpet, Hyderabad- 500097.

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
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(Sponsored by TKR Educational Society, Approved by AICTE, Affiliated to JNTU H)
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PYTHON PROGRAMMING LAB (C55PC8)

Course Outcomes:
After completion of course the student will be able to
1. Use fundamental programming elements : operators ,statements, conditional andcontrol flow statements
2. Compare & contrast predefined functions and build functions
3. Solve various computing problems using python modules and data structures
4. Apply oops concepts using python

DATA WAREHOUSING AND DATA MINING (C56PC1)

Course Outcomes:
Upon completion of the Course, the student will be able to

1. Understand insights on the necessity of building a data Warehouse, and basic operations that canbe performed on it
2. Understand the basics data mining ,challenges and functionalities
3. Analyze the algorithms developed for understanding Association rule functionality
4. Compare and contrast various classification algorithms
5. Analyze grouping of similar knowledge based on the information, and study different approaches proposed for grouping the information

WEB TECHNOLOGIES (C56PC2)

Course Outcomes:
Upon completion of the course, the student will
1. Understand basics of server side scripting using PHP
2. Illustrate well formed XML programs and how to parse, use XML data with JAVA – L3
3. Design server side programming applications with servlets
4. Develop programs using JSP for various applications
5. Write programs with knowledge of client side scripting , validation of forms and AJAX programs

ADVANCED DATABASES (C56PE3A)

Course Outcomes:
Upon completion of the course, the student will

1. Understand the database system architecture and concepts of parallel databases
2. Illustrate Object databases, and XML databases
3. Compare & contrast the significance and concepts of Information retrieval, apply them in implementingtransaction management features
4. Understand t h e concepts of advance transaction processing, advance application development,spatial and temporal data Mobility
5. Understand the address the prelims of security issues over advance database concepts

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MOBILE COMPUTING (C56PE3B)

Course Outcomes:

Upon completion of the course, the student will
1.Understand mobile communications and limitations of mobile devices
2.Illustrate the architecture of GSM protocol and MAC layer
3.Compare and contrast various mobile IP network layer and mobile transport layer
4.Demonstrate database hoarding techniques and data dissemination for broadcasting
5.Compare & contrast the ad hoc networks and related concepts.

WIRELESS NETWORKS (C56PE3C)

Course Outcomes:

On successful completion of the course the students will be able to
1.Understand the various issues and applications of Ad hoc wireless networks
2.Understand the working of MAC protocols for Ad-hoc wireless networks
3.Compare and contrast the working of various On-Demand Routing protocols
4.Analyze the challenges in designing Transport layer Protocols for Ad-hoc networks,
Compare and contrast the working of Transport protocols
5.Design the issues in designing Security Protocols for Ad-hoc networks focusing on the
working performance of various security protocols

CRYPTOGRAPHY (C56PE3D)

Course Outcomes:

Upon completion of the Course, the student will be able to

1.Understand how to encrypt the information using classical techniques like, symmetry,
substitution, and steganography
2.Apply techniques to generate pseudo random sequences, use stream ciphers to for encrypting
and decrypting the data
3.Understand about Number theory, a mathematical notation of representing information
4.Illustrate the principles of public key crypto systems to encrypt and decrypt the information
5.Understand various algorithms developed for hassing functions; choose one way hashing
functions like, Message Authentication codes, Digital Signal Algorithm, Discrete Logarithm
Signature

SOFTWARE REQUIREMENTS ESTIMATION (C56PE3E)

Course Outcomes:

Upon completion of the Course, the student will
1.Understand the requirements are, necessary to build a software using good
practices of engineering
2.Analyze the developed models for a software
3.Illustrate make estimations, across modules of a software
4.Apply cost estimations based on schedule and effort for developing efficient
software modules.
5.Design various tools that exist for software estimation- L5.

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MACHINE LEARNING (C56PE3F)

Course Outcomes:
Upon completion of the Course, the student will
1. Design a learning system based on well-posed problems, study perspectives issues in machine learning-L5
2. Understand the basic phenomenon of artificial neural networks and infer the evaluation hypothesis mechanism for learning mechanism.
3. Apply bayes theory, computational theory, and instance base on learning mechanism. Classify the learnt information based on hypothesis for predicting probabilities
4. Apply set of rules and analyze the learning mechanism with perfect domain theories like PROLOG-EGB .
5. Compare and contrast combine inductive and Analytical learning approaches

INTRODUCTION TO ANALYTICS (C56PE4A)

Course Outcomes:
On completion of course the student will be able to
1. Use the concepts of Big Data, Data Science and Descriptive Statistics. – L3
2. Analyze descriptive multivariate analysis and various preprocessing techniques.
3. Apply different clustering and regression methods.
4. Apply additional predictive methods and classifications techniques on different data sets.
5. Demonstrate various text, web and social media applications.

CLOUD COMPUTING (C56PE4B)

Course Outcomes:
Upon completion of the course, the student will

1. Understand the basic concepts of cloud computing and process of migrating into a cloud
2. Understand the paradigm for the cloud era using integration as a service, and the phenomenon of enterprise cloud computing paradigm.
3. understand the concepts of, infrastructure as a service (IAAS), Platform and software as a service
4. Compare &contrast to manage, monitor, and apply a cloud, using governance.
5. Develop different cloud services

MOBILE ADHOC NETWORKS (C56PE4C)

Course Outcomes:
Upon completion of the course, the student will

1. Analyze the applications of Mobile Adhoc Networks
2. Illustrate addressing the design issues of MAC protocols
3. Prepare insights on the challenges of transmission control protocols and its performance overother protocols.
4. Apply different protocols to develop energy management system
5. Create optimize and integrate cross layer design issues .

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NETWORK SECURITY (C56PE4D)

Course Outcomes:

Upon completion of course, the student will be able to

1. Apply security mechanisms across transport layer
2. Understand and learn the security mechanism involved across a wireless network
3. Understand about types of intruders and respective detection mechanism, malicious software, and viruses.
4. Illustrate the need and significance of firewall and its types .
5. Understand and gain knowledge on basic concepts of Network Management System, legal and ethicalaspects of establishing a network.

DESIGN PATTERNS (C56PE4E)

Course Outcomes:

Upon completion of course, the student will be able to

1. Understand scalable and easily maintainable software designs.
2. Design an interface for documenting the built software modules.
3. Compare and contrast decompose the structure of a designed software into classes and objects
4. Identify communication among the objects occurs.
5. Create a behavioral pattern for an organization.-L5

DEEP LEARNING (C56PE4F)

Course Outcomes:

Upon completion of the course, the student will be able to

1. Understand the concepts of deep feed forward networks, regularization for Deep Learning taxonomy
2. Apply the knowledge to optimize training deep models, understand themotivation, and mechanism to build convolutional networks.
3. Develop sequence modelling using the knowledge of recurrent and recursive networks.-L5
4. Analyze various auto encoders, gain overview of representation learning
5. Apply different structured probabilistic models for deep learning.

DATA WAREHOUSING AND DATA MINING LAB (C56PC5)

Course Outcomes:

Upon completion of course, the student will be able to
1. Build a data warehouse and query it (using open source tools like PentahoData Integration and Pentaho Business Analytics)
2. Understand data mining tasks using a data mining toolkit (such as open-sourceWEKA)
3. Understand the data sets and data preprocessing
4. Demonstrate the working of algorithms for data mining tasks such association rule mining, classification, clustering, and regression
5. Practice the data mining techniques with varied input values for different parameters.

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WEB TECHNOLOGIES LAB (C56PC6)

Course Outcomes:

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

1. Solve LAMP Stack for web applications
2. Develop servlets and JSPs applications using tomcat server
3. Practice simple applications with Technologies like HTML, Javascript, AJAX, PHP, Servlets, and JSPs, Parse XML files using Java (DOM and SAX parsers)
4. Create to Database and get results

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B.TECH. COMPUTER SCIENCE & ENGINEERING
IV YEAR R18

Big Data Analytics - B57PE1

COURSE OUTCOMES:
After completion of this course, students will be able to
1. Analyze data management in various sources.
2. Use the big data tools for decision making.
3. Compute descriptive statistics to understand the nature of the data.
4. Design Machine Learning Algorithms for prediction.
5. Use appropriate tools for data visualization.

NETWORK SECURITY (B57PE1)-R18

COURSE OUTCOMES:
After completion of course the student will be able to
1. Analyze various security mechanisms in transport layer security.
2. Compare and contrast security mechanisms in wireless network security.
3. Analyze different types of intruders, malicious softwares, viruses.
4. Analyze various types of firewalls.
5. Learn network management security, legal and ethical aspects.

MOBILE COMPUTING - B57PE1

COURSE OUTCOMES:
After completion of course the student will be able to
1. Understand mobile computing and analyze various MAC protocols
2. Illustrate the taxonomy of telecommunication systems in wireless networks.
3. Analyze various protocols in mobile network layer.
4. Illustrate various protocols related to mobile transport and application layer.
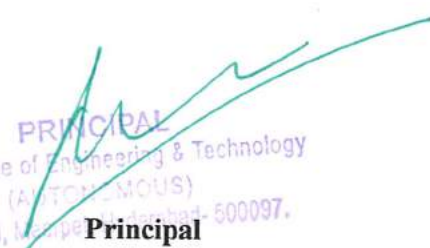5. Develop a mobile application using android/blackberry/iOS/Windows SDK.

WEB SERVICES -B57PE2

COURSE OUTCOMES:
After completion of course the student will be able to
1. Learn evolution and emergence of web services.
2. Explain about the Fundamentals of SOAP.
3. Generalize web service life cycle.
4. Analyze various discovery mechanisms and limitation of UDDI.
5. Create a Java client for Web service interoperability.

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CLOUD COMPUTING -B57PE2

COURSE OUTCOMES:

After completion of course the student will be able to

1. Articulate the main concepts, key technologies, strengths, and limitations of cloud computing andthepossible applications for state-of-the-art cloud computing.
2. Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, publiccloud,private cloud, hybrid cloud, etc.
3. Explain the core issues of cloud computing such as security, privacy, and interoperability.
4. Provide the appropriate cloud computing solutions and recommendations according to the applications used.
5. Analyze various access control mechanisms in cloud.

COMPUTER GRAPHICS -B57PE2

COURSE OUTCOMES:

After completion of course, students will be able to

1. Understand fundamentals of computer graphics and various output primitives.
2. Demonstrate the concepts of 2D Geometrical transforms and viewing.
3. Compare Hermite curve, Bezier curve and B-spline curves.
4. Analyze surface detection and Surface rendering Methods.
5. Design animation sequence.

MACHINE LEARNING -B57PE4

COURSE OUTCOMES:

After completion of course the student will be able to

1. Illustrate the concepts of concept learning.
2. Apply decision trees learning, artificial neural networks and evaluation hypotheses for themachine learning problems.
3. Develop Bayesian and support vector classifiers by removing irregular features and avoidingoverfitting.
4. compare and contrast Instance-based learning techniques.
5. Analyze genetic algorithms and dimensionality reduction techniques

COMPUTER FORENSICS -B57PE4

COURSE OUTCOMES:

After completion of course the student will be able to

1. Understand Fundamentals of Computer Forensics.
2. Illustrate Evidence collection and Data seizure.
3. Processing crime and incident scenes using computer forensic analysis and validation.
4. compare and contrast different computer forensic tools, cellphone and mobile device forensics.
5. Explain whole disk encryption, windows registry and Microsoft startup tasks.

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INTERNET OF THINGS -B57PE4

COURSE OUTCOME:

After completion of course the student will be able to

1. Construct the IoT Logical design architecture with core functional stack.
2. Compare and contrast between IoT and M2M.
3. Design hardware and software for IoT using IoT design methodology and hon packages.
4. Explain the detailed features of IoT devices, Board and Interfaces.
5. Illustrate IoT design for a given application.

MACHINE LEARNING LABORATORY -B57PC6

COURSE OUTCOMES:

After completion of this course will enable students to

1. Make use of Data sets in implementing the machine learning algorithms.
2. Apply the machine learning concepts and algorithms in any suitable language of choice.

INTERNET OF THINGS LAB

COURSE OUTCOMES:

After completion of the course Student will be able to

1. Develop the programs in python.
2. Gain knowledge of Arduino IDE and different types of Arduino Board Write program using ArduinoIDE for Blink LED.
3. Develop programs using Arduino IDE and Arduino Board for RGB Led, RFID, NFC, MQTT Protocoland LED bilking using Raspberry Pi.

PREDICTIVE ANALYTICS - B58PE1

COURSE OUTCOMES:

After completion of the course, students will be able to

1. Describe the terminology of predictive analytics frame work and its Applications. –
2. Apply Logistic regression techniques.
3. Implement objective segmentation for performing prediction tasks for business needs. –
4. Apply time series methods for analyzing and predicting the business needs. –
5. Implement standard process for working with documents. –

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DESIGN PATTERNS - B58PE1

COURSE OUTCOMES:

After completion of the course the student will be able to
1. Explain about Design Pattern.
2. Design a document with all patterns for a given task.
3. Demonstrate structural pattern.
4. Analyze behavioral pattern.
5. Design a document with advanced behavioral patterns.

AD HOC WIRELESS NETWORKS - B58PE1

COURSE OUTCOMES:

After completion of the course the student will be able to

1.List and explain the various issues and applications of Ad hoc wireless networks.

2.Classify and Explain the working of MAC protocols for Ad-hoc wireless networks.

3.Discuss the issues in designing routing protocols and working of Table-Driven Routing protocols.

4.Analyze the challenges in designing Transport layer Protocols for Ad-hoc networks, Compare and contrastthe working of Transport protocols.

5.Identify the issues in designing Security Protocols for Ad-hoc networks focusing on the workingperformance of various security protocols.

SOFTWARE TESTING METHODOLOGIES - B58PE2

COURSE OUTCOMES:
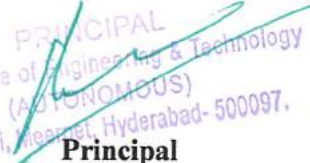
After completion of the course the student will be able to
1.Understand the purpose of testing and taxonomy of bugs, explaining flow graphs and path testingprocess
2.Explain the process involved in testing transaction flow and data flow scenarios
3.Classify and compare domain testing
4.Illustrate regular expression and flow anomaly detection
5.Develop graph matrices and its applications

OPERATION RESEARCH - B58PE2

COURSE OUTCOME:

Understanding the problem, identifying variables & constants, formulas of optimization model andapplying appropriate optimization Tech.

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STORAGE AREA NETWORKS - B58PE2

COURSE OUTCOMES:

After completion of the course the student will be able to

1. Learn storage area networks characteristics and components, become familiar with SAN vendorsAnd their products. –

2. Compare and contrast integrated and modular storage systems.

3. Analyze various planned and unplanned outages.

4. Discuss various recovery topologies. –

5. Identify and manage the key areas of data to store.

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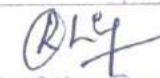Mobile: 9100377790, Email: info@tkrcet.ac.in, Website: www.tkrcet.ac.in

EEE- B. Tech - VII Semester (R18)

S. No	Course Code	Course Title	Hour per week			Total	Credits
			Lecture	Tutorial	Practical		
1	B27PC1	Power System Operation and Control	3	0	0	3	3
2	B27PE2	Professional Elective-III 1. Wind and Solar Energy Systems 2. Hybrid Electrical Vehicles 3. Flexible AC Transmission Systems	3	0	0	3	3
3	B27PC3	Power System Protection	3	0	0	3	3
4		Open Elective – III	3	0	0	3	3
5	B27PC5	Power systems Lab	0	0	3	3	1.5
6	B27PW6	Project Stage-I	0	0	8	8	4
					Total		17.5

EEE- B. Tech - VIII Semester (R18)

S. No	Course Code	Course Title	Hour per week			Total	Credits
			Lecture	Tutorial	Practical		
1	B28PE1	Professional Elective-IV 1. HVDC Transmission Systems 2. Computational Electromagnetics 3. Electromagnetic Waves	3	0	0	3	3
2	B28PE2	Professional Elective-V 1. Industrial Electrical Systems 2. Modern Control Theory 3. Electrical Drives	3	0	0	3	3
3	B28PE3	Professional Elective-VI 1. Utilization of Electrical Energy 2. High Voltage Engineering 3. Computer Aided Design of Electrical Machines	3	0	0	3	3
4	B28PW4	Project Stage-II	0	0	16	16	8
5	B28CT5	Comprehensive Test	0	0	0	0	3
					Total		20

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Subject Name: POWER SYSTEM OPERATION AND CONTROL

Subject Code: B27PC1

Course outcomes	Cognitive level
1. Understand economic operation of power systems	L2
2. Analyseoptimal scheduling of hydrothermal system and modelling of speed governing system	L4
3. Understand and analysesingle area & two area load frequency control	L4
4. Analyse reactive power control and reactive power compensation in transmission systems	L4
5. Analysecomputer control of power system	L4

Subject Name: POWER SYSTEM PROTECTION

Subject Code: B27PC3

Course outcomes	Cognitive level
1. Understand principles of power system protection,	L2
2. Analyse over current protection over current relay co-ordination and protection of parallel feeders.	L4 / L2
3. Analyse Protection schemes of generator, transformer and transmission	L4
4. Develop computer-aided protection and microprocessor-basedprotection schemes.	L3
5. Analyse the effect of power swings on distance relaying	L4

Subject Name: HVDCTRANSMISSION SYSTEMS

Subject Code: B28PE1

Course outcomes	Cognitive level
1. Understand necessity of HVDC systemsandanalyze various HVDC converters	L4
2. Analyse various HVDC system control methods	L4
3. Analyse power flow in AC/DC systems.	L4
4. Understand various faults and protection methods in HVDC systems.	L2
5. Analyse the harmonics generation and design different types of filters	L4

Subject Name:COMPUTATIONAL ELECTROMAGNETICS

Subject Code: B28PE1

Course outcomes	Cognitive level
1. Understand conventional design methodology and computer aided design aspects.	L2
2. Understand analytical methods of solving field equations, method of separation of variables	L4
3. Analysefinite difference method (FDM) andfinite element method (FEM)	L4
4. Understand the back ground of experimental methods likeelectrolytic tank, R-C network solution and Field plotting methods.	L2
5. Understandstatic, time-harmonic and transient problems in transformersand rotating machines	L2

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Subject Name: ELECTROMAGNETICWAVES

Subject Code: B28PE1

Course outcomes	Cognitive level
1. Analyse transmission line in terms of admittances,	L4
2. Understand basic laws of electromagnetic like Gauss's law, Ampere's Circuital law and Maxwell's equations.	L2
3. Analysewave equation for time harmonic fields and uniform plane wave,	L4
4. Analyse plane wave in arbitrary direction and power flow at media interface.	
5. Analyse wave guides and antennas	L4
	L4

Subject Name: INDUSTRIAL ELECTRICAL SYSTEMS

Subject Code: B28PE2

Course outcomes	Cognitive level
1. Understand the basic concepts of electrical system components	L2
2. Understand various residential and commercial electrical systems	L2
3. Understand and analyse various Illumination systemsandlighting schemes.	L4
4. Analyse various industrial electrical systems	
5. Analyse industrial electrical system automation	L4
	L4

Subject Name: MODERN CONTROL THEORY

Subject Code: B28PE2

Course outcomes	Cognitive level
1. Understand mathematical preliminariesof vectors and vector Spaces	L2
2. Model linear Continuous time physical systems and non-linearsystems	L3
3. Describing function analysis of nonlinear systems and stability analysis of non-linear systems	L4
4. Describe Phase-plane analysis of nonlinear control systems	L4
5. Stability analysis of the linear continuous time invariant systems by Lyapunov method	L4

Subject Name: UTILIZATION OF ELECTRICAL ENERGY

Subject Code: B28PE3

Course outcomes	Cognitive level
1. Understand starting and running characteristics, speed control, temperature rise and particular applications of electric drives	L2
2.Analysevarious Electric Heating and Welding methods	L4
3.Analyselaws of illumination and various Illumination methods	L4
4.Understand mechanics of train movement and analyze speed-time curves for different services	L4
5.Analyse tractive effort, specific energy consumption for given runand effect of varying acceleration and braking retardation	L4

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Subject Name: ELECTRICAL DRIVES

Subject Code: B28PE3

Course outcomes	Cognitive level
1. Understand control of dc motors through phase-controlled rectifiers	L
2. Analyse four quadrant operation of dc drives through dual converters	L4
3. Analyse control of dc motors by choppers	L4
4. Analyse control of induction motor by ac voltage controllers and variable frequency control.	L4
5. Understand and analyse control of synchronous motors	L4

Subject Name: HIGH VOLTAGE ENGINEERING

Subject Code: B28PE3

Course outcomes	Cognitive level
1. Understand high voltage technology and applications	L2
2. Analyse breakdown in gaseous, solid and liquid dielectrics	L3
3. Understand generation and measurements of high voltages and currents	L2
4. Analyse the causes of over voltage phenomenon and insulation coordination.	L4
5. Analyse the non-destructive and high voltage testing of material and electrical apparatus	L4

Subject Name: COMPUTER AIDED ANALYSIS & DESIGN

Subject Code: B28PE3

Course outcomes	Cognitive level
1. Understand the concepts of computer-aided design and optimization	L2
2. Understand basic concepts of design.	L2
3. Understand application of finite element method in design	L3
4. Analyse computer aided design of electrical apparatus	L4
5. Analyse computer aided design of dc machines and transformers	L4

III SEMESTER (R20)

S.No.	Class	Course Code	NameoftheSubject	L	T	P	C
1	BS	CBSM12	Probability, Numerical Methods and Complex Analysis	3	1	0	4
2	PC	C23PC1	Electrical Circuit Analysis	3	1	0	4
3	PC	C23PC2	Analog Electronics	3	0	0	3
4	PC	C23PC3	Electrical Machines-I	3	1	0	4
5	PC	C23PC4	Electro Magnetic Fields	3	0	0	3
6	PC	C23PC5	Analog Electronics Lab	0	0	2	1
7	PC	C23PC6	Electrical Machines Lab-1	0	0	2	1
8	PC	C23PC7	Electrical Circuit Analysis Lab	0	0	2	1
9	MC	MC003	Cultural Activity	0	0	0	Satisfactory
Total Credits				15	3	6	21

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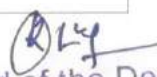(AUTONOMOUS)
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Subject Name : PROBABILITY, NUMERICAL METHODSANDCOMPLEX ANALYSIS

Subject Code : CBSM12

Course outcomes	Cognitive level
1. Apply the concept of Random variables and various discrete and continuous probability distribution and their properties to solve related problems.	L3 L4
2. Utilizing the concept of sampling and hypothesis theoryCalculate mean, of sampling distributions and make important decisions for few samples which are taken from a large data.	L4
3. Solve problems to Find the root of a given equation using numerical methods.	L3
4. Choose the methods based on equal and unequal intervals to solve problems of interpolation.	L5
5. Analyse the complex functions with reference to their analyticity, integration using Cauchy's integral theorem& formula.	

Subject Name : ELECTRICAL CIRCUIT ANALYSIS

Subject Code : C23PC1

Course outcomes	Cognitive level
1.Understand different electrical network topologies.	L2
2.Solving first and second order electrical circuit using differential equations	L3
3.Analyze electrical circuits using Laplace Transforms	L4
4.Apply various analysis techniques for characterizing two-port networks.	L3
5. Develop analysis techniques to evaluate the performance of different filters	L3

Subject Name : ANALOG ELECTRONICS

Subject Code : C23PC2

Course outcomes	Cognitive level
1. Apply the knowledge of BJT to design practical amplifier circuits.	L2
2. Design electronic sub systems such as Feedback amplifiers, Oscillators.	L4 L4
3. Design Power amplifiers.	
4. Design Linear and nonlinear wave shaping circuits with different inputs.	L4 L3
5. Analyze Multi vibrators using transistors.	

Subject Name : ELECTRICAL MACHINES- I

Subject Code : C23PC3

Course outcomes	Cognitive level
1.Understand the basic principles of electromagnetism and their application in electrical machines.	L2

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2.Analyze the construction, operation, and characteristics of DC generators	L4
3.Analyze the construction, operation, and characteristics of DC motors.	L4
4.Analyze the construction and operation of single-phase transformers.	L4
5.Analyze the construction and operation of three-phase transformers.	L4
	L4

Subject Name : ELECTRO MAGNETIC FIELDS

Subject Code : C23PC4

Course outcomes	Cognitive level
1. Understanding of vector fundamentals, including vector notation, vector addition, and scalar multiplication.	L2
2. Analyze the electrostatics, including Coulomb's Law and Gauss's Law.	L4
3. Analyze the behavior of dielectrics in response to static magnetic fields	L4
4. Analyze the magnetic force between differential current elements.	L4
5.Derive and apply the integral and point forms of Maxwell's equations.	L4
	L3

Subject Name : AnalogElectronicsLab

Subject Code :C23PC5

Course outcomes	Cognitive level
CO1:AnalyzeSinglestage amplifiers.	
CO2:AnalyzeFeedbackandPoweramplifiers.	
CO3:AnalyzeDiodeapplications.	
CO4:Analyzethedifferent typesofFETAmplifiers.	
CO5:AnalyzeTransistor applications	

Subject Name : ElectricalMachines Lab-I

Subject Code :C23PC6

Course outcomes	Cognitive level
1. StartandcontroltheDifferentDC Machines.	L3
2. Assesstheperformanceofdifferentmachinesusingdifferenttestingmethods	L5
	L2
3. Identifydifferentconditionsrequiredtobesatisfiedforself-excitationofDCGenerators.	L2
4. SeparateironlossesofDCmachinesintodifferentcomponents.	L4
5. Analyze the construction, operation, and characteristics of DC motors.	

Subject Name : ElectricalCircuitAnalysisLab

Subject Code :C23PC7

Course outcomes	Cognitive level
1. Applysuitabletheoremstofindvoltage,current&powerinelectricalcircuits.	L2
	L3
2. Understandtimeresponseof RC/RL network.	L4
3. DetermineCircuitparametersfortwoport network.	

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IV SEMESTER (R20)

S.No.	Class	Course Code	NameoftheSubject	L	T	P	C
1	ES	CESEM1	Engineering Mechanics	3	1	0	4
2	PC	C24PC1	DigitalElectronics	3	0	0	3
3	PC	C24PC2	ElectricalMachines-II	3	1	0	4
4	PC	C24PC3	Control Systems	3	1	0	4
5	PC	C24PC4	PowerSystem-I	3	0	0	3
6	PC	C24PC5	DigitalElectronicsLab	0	0	2	1
7	PC	C24PC6	ElectricalMachinesLab–II	0	0	2	1
8	PC	C24PC7	Control Systems Lab	0	0	2	1
9	MC	MC004	VideoswithSocial Messages	0	0	0	Satisfactory
Total Credits				15	3	6	21

Subject Name : ENGINEERING MECHANICS	
Subject Code : CESEM1	
Course outcomes	Cognitive level
1. Estimate the resultant forces acting on a body and assess the equilibrium of a body under the influence of a system of forces.	L5
2. Utilize advanced problem-solving strategies to address and resolve complex scenarios involving bodies subjected to frictional forces.	L3
3. Apply advanced mathematical techniques to ascertain the precise coordinates of the centroid and rigorously calculate the moment of inertia for the specified section.	L3 L4
4. Analyze and synthesize the dynamics and kinematics of a body engaged in rectilinear, curvilinear, rotatory motion, and rigid body motion.	L3
5. Solve problems using work energy equations for translation, fixed axis rotation, and plane motion and solve problems of vibration.	

Subject Name : DIGITAL ELECTRONICS	
Subject Code : C24PC1	
Course outcomes	Cognitive level
1. Apply their knowledge of numeric information in various forms to demonstrate in different bases, signed integers and codes.	L3
2. Apply theorems and postulates to minimize combinational functions in digital circuits.	L3 L5
3. Analyze and design the combinational logic circuits.	L5
4. Analyze and design the sequentiallogiccircuits.	
5. Design synchronous sequential finite state machines using mealy and moore models.	L5

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Subject Name : ELECTRICAL MACHNIES – II

Subject Code : C24PC2

Course outcomes	Cognitive level
1. Identify and understand different parts of Induction motor and specify their operations.	L2
2. Analyze the characteristics and speed control of Induction motor.	L4
3. Understand and analyze the construction, operation and characteristics of synchronous generator.	L4
4. Understand the parallel operation of synchronous machines and working principle of synchronous motor.	L4
5. Analyze the construction and working of single phase and special motors.	L4

Subject Name : CONTROL SYSTEMS

Subject Code : C24PC3

Course outcomes	Cognitive level
1. Demonstrate a comprehensive understanding of fundamental concepts in control systems, including feedback, stability, and control system components.	L2
2. Analyze and interpret the time response of linear time-invariant systems, including transient and steady-state responses.	L3
3. Apply stability analysis techniques like Routh criterion to understand and predict the behaviour of control systems.	L4
4. Apply frequency domain analysis techniques like Polar Plots and Nyquist Plots to assess system stability, gain and phase margins, and to design controllers.	L4
5. Understand and apply state-space representation for modelling dynamic systems.	L3

Subject Name : POWER SYSTEM-I

Subject Code : C24PC4

Course outcomes	Cognitive level
1. To Understand and Analyzethe operation of conventional generating stations and renewable sources of electrical power.	L2
2. To understand the economic aspects of energy and tariff methods.	L2
3. To Develop the electrical circuit parameters of transmission lines	L3
4. To Asses the electrical circuit parameters of transmission lines.	L5
5. To analyze various DC and AC distribution system circuits.	L4

Subject Name :DIGITALELECTRONICSLAB

Subject Code :C24PC5

Course outcomes	Cognitive level
1. Understand and analyzetheknowledgeof74XXIC's:	L4
2. Designvariouscombinational circuits usingvariousDigitalICs.	L5
3. DesignvarioussequentialcircuitsusingvariousDigitalICs.	L5

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Subject Name : ELECTRICALMACHINESLAB–II	
Subject Code : C24PC6	
Course outcomes	**Cognitive level**
1. Assess the performance of different machines using different testing methods	L5 L4
2. To convert the Phase from three phase to two phase and vice versa	L5
3. Compensate the changes in terminal voltages of synchronous generator after estimating the change by different methods	
4. Control the active and reactive power flows in synchronous machines	L6 L3
5. Start different machines and control the speed and power factor	

Subject Name : CONTROLSYSTEMSLAB	
Subject Code : C24PC7	
Course outcomes	**Cognitive level**
1. How to improve the system performance by selecting a suitable controller and/or a compensator for a specific application.	L3
2. Applyvarioustime domainandfrequency domaintechniques toassessthesystemperformance	L3
3. Apply various control strategies todifferent applications (example: Power systems, electrical drivesetc).	L3
4. TestsystemcontrollabilityandObservabilityusingstatespacerepresentatio nandapplications of state space representation to various systems.	L4

S. No.	Class	CourseCode	Name of the Subject	L	T	P	Credits
1	PC	C25PC1	Power Electronics	3	1	0	4
2	PC	C25PC2	Electrical Measurements and Instrumentation	3	0	0	3
3	PE	C25PE3	Professional Elective-I	3	0	0	3
4	PC	C25PC4	Power System-II	3	0	0	3
5	OE	C25OE5	Open Elective-I	3	0	0	3
6	PC	C25PC6	Electrical Systems Simulation Lab	0	0	2	1
7	PC	C25PC7	Power Electronics Lab	0	0	2	1
9	HS	CHSE3	Advanced English Communication Skills Lab	0	0	4	2
8	PC	C25PC8	Electrical Measurements and Instrumentation Lab	0	0	2	1

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10	MC	MC005	MOOCs/Online Course	0	0	0	S
			TotalCredits				21

V SEMESTER (R20)

Professional Elective-I(Semester–V)

1. Electrical Machine Design
2. Power System Dynamics and Control
3. Digital Signal Processing

Open Elective–I(Semester– V)

1. Smart Grid Technologies
2. Electrical Engineering Materials
3. Nanotechnology

Subject Name :POWER SYSTEMS-II

Subject Code :C25PC4

Course outcomes	Cognitive level
1. Understand various parameters of types of transmission	L2
2. Understand and analyze, the performance of short and medium transmission lines.	L4
3. Analyze the performance of long transmission lines	L4
4. Understand and analyze travelling wave phenomenon, power system transients and various factors governing the performance of transmission line	L4
5. Analyze sag and tension calculations and overhead line insulators	L4

Subject Name :POWER ELECTRONICS

Subject Code :C25PC1

Course outcomes	Cognitive level
1. Understand the characteristics and performance of various power electronic devices	L2
2.Analyze single-phase and three phase half-wave, full-wave and semi controlled rectifiers with R-load and highly inductive load;	L4
3. Understand and analyze DC-DC Converters and AC voltage controllers	L4
4.Analyze single-phase voltage source inverters	L4
5 Analyze three-phase voltage source inverter in 180^0 and 120^0 modes	L4

Subject Name : ELECTRICAL MEASUREMENTS AND INSTRUMENTATION

Subject Code :C25PC2

Course outcomes	Cognitive level
1. Understand different types of measuring instruments, their construction, working principle and characteristics.	L2
2. Understand and analyze potentiometers & instrument transformers	L3
3. Analyze the energy and power measuring instruments.	L4
4. Apply the suitable bridge to measure unknown resistance, inductance and capacitance	L3
5. Understand and analyze various transducers and measurement of non-electrical quantities	L4

Subject Name : ELECTRICAL SYSTEMS SIMULATION LAB

Subject Code :C25PC6

Course outcomes	Cognitive level

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1. Design and Analyze electrical systems in time and frequency domain	L4	
2. Analyze various transmission lines and perform fault analysis	L4	
	L6	
3. Model Load frequency control of Power Systems	L6	
4. Design various Power Electronic Converters and Drives.		

Subject Name : POWER ELECTRONICS LAB

Subject Code :C25PC7

Course outcomes	Cognitive level
1. Understand the operating principles of various power electronic converters.	L2
2. Use power electronic simulation packages & hardware to develop the power Converters.	L5
	L4
3. Analyze and choose the appropriate converters for various applications	

Subject Name : ADVANCED ENGLISH COMMUNICATION SKILLS LAB

Subject Code : CHSE3

Course outcomes	Cognitive level
1. Apply acquired vocabulary proficiently within diverse contexts to demonstrate advanced language usage.	L3
	L3
2. Develop Listening and Speaking skills Effectively.	L5
3. Create advanced competence in academic reading and writing skills	L4
4. Categorize and Expand Job Prospects	L4
5. Distinguish yourself by effectively communicating in both formal and informal settings.	

Subject Name : ELECTRICAL MESEARUEMENTS AND INSTRUMENTATION LAB

Subject Code :C25PC8

Course outcomes	Cognitive level
1. Design and validate DC and AC bridges.	L3
2. Analyze the dynamic response and the calibration of few instruments.	L4
3. Learn about various measurement devices ,their characteristics, their operation and their limitations.	L3
	L2
4. Understand statistical data analysis.	L2
5. Understand computerized data acquisition.	

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CO's of offered Professional Electives

Subject Name : ELECTRICAL MACHINE DESIGN	
Subject Code :C25PE-I	
Course outcomes	Cognitive level
1.Understand major considerations in electrical machine design and electrical engineering materials	L2
2.Understand and analyze sizing and main dimensions of a transformer.	L4
3.Understand and analyze sizing and main dimensions, of induction motor	L4
4.Analyze sizing and main dimensions, of synchronous machine	
5.Apply Computer aided Design (CAD) for electrical machines	L4
	L3

Subject Name :POWER SYSTEM DYNAMICS AND CONTROL	
Subject Code :C25PE-I	
Course outcomes	Cognitive level
1. Understand power system stability and stability problems in power system and its impact on power system operations and control	L2
2. Analyse linear dynamical systems and use of numerical methods.	
3. Modeling of synchronous machines and associated controllers	L4
4. Modeling of various power system components	L3
5. Understanding stability analysis and enhancing system stability	L3
	L4

Subject Name : DIGITAL SIGNAL PROCESSING	
Subject Code :C25PE-I	
Course outcomes	Cognitive level
1. Understand basics of digital signal processing and applications.	L2
2. Analyze discrete Fourier transforms and fast Fourier transforms:	L4
3. Analyze IIR digital filters	L4
4. Analyze FIR digital filters	L4
5. Understand multirate digital signal processing and finite word length effects.	L2

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CO's of offered Open Electives

Subject Name : SMART GRID TECHNOLOGIES	
Subject Code : C25OE5	
Course outcomes	**Cognitive level**
1. Identify the difference between smart grid& conventional grid	L2
2. Applysmartmeteringconceptstoindustrialandcommercialinstallations	L3
3. Develop the solutions in the areas of smart substations, distributed generation and wide area measurements	L3
	L5
4. Asses with smart grid solutions using modern communication technologies.	L4
5. Analyze system network security and data management.	

Subject Name : ELECTRICAL ENGINEERING MATERIALS	
Subject Code : C25OE5	
Course outcomes	**Cognitive level**
1. Understand various types of dielectric materials and their properties	L2
2. Understand various types of magnetic materials and their properties	L2
3. Analyze large and very large-scale integration techniques (VLSI)	L4
4. Illustrate the materials for electrical applications	L2
5. Analyze special purpose materials like refractory materials, structural materials, radioactive materials.	L4

Subject Name : NANOTECHNOLOGY	
Subject Code : C25OE5	
Course outcomes	**Cognitive level**
1.Classify and understand nano structured materials	L2
2. Illustrate the properties of microstructure and defects in nano crystalline materials.	L2
3.Analyze the synthesis routes: bottom-up approaches and top-down approaches.	
4. Illustrate the tools to characterize nano materials.	L4
5. Illustrate various applications of nano materials	
	L2
	L2

VI SEMESTER (R20)

S. No.	Class	CourseCode	Name of the Subject	L	T	P	Credits

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1	HS	CHSM1	Business Economics and Financial Analysis	3	0	0	3
2	PC	C26PC1	Power System Protection	3	0	0	3
3	PC	C26PC2	Power System Operation and Control	3	0	0	3
4	PC	C26PC3	Microprocessors &Microcontrollers	2	0	0	2
5	PE	C26PE4	Professional Elective-II	3	0	0	3
6	OE	C26OE5	Open Elective-II	3	0	0	3
7	PC	C26PC6	Power System Lab	0	0	2	1
8	PC	C26PC7	Microprocessors & Microcontrollers Lab	0	0	2	1
9	ES	G26ES8	Python Programming Lab	0	0	4	2
10	MC	MC006	Personality Development/Skill Development Technical Events Internships	0	0	0	S
		TotalCredits					21

Professional Elective-II(Semester – VI)
1. Electrical Energy Conservation and Auditing
2. Computer Architecture
3. Line-Commutated and Active Rectifiers

Open Elective – II (Semester – VI)
1. Reliability Engineering
2. Optimization Techniques
3. Renewable Energy Sources

Subject Name : BUSINESS ECONOMICS AND FINANCIAL ANALYSIS	
Subject Code :CHSM1	
Course outcomes	Cognitive level
1. Analyse the total structure of the business & able to identify and classify the different types of business entities.	L4
2. Asses the demand & supply analyses with the help of various measures and types of Elasticity of demand.	L5
3. Develop the knowledge about production and cost analysis for product and services.	L3
4. Interpret the fundamental concepts related to financial accounting.	L5
5. Predict the financial position by analysing the financial statement of the company through various ratios.	L6

Subject Name :POWER SYSTEM PROTECTION	
Subject Code :C26PC1	
Course outcomes	Cognitive level
1. Understand principles of power system protection,	L2
2. Analyze over current protection over current relay co-ordination and protection of parallel feeders.	L4 L2

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3. Analyze Protection schemes of generator. transformer and transmission	L4 L3
4. Develop computer-aided protection and microprocessor-based protection schemes.	L4
5. Analyze the effect of power swings on distance relaying	

Subject Name :POWER SYSTEM OPERATION AND CONTROL

Subject Code :C26PC2

Course outcomes	Cognitive level
1. Understand economic operation of power systems	L2
2.Analyze optimal scheduling of hydrothermal system and modelling of speed governing system	L4
3.Understand and analyzesingle area & two area load frequency control	L4
4.Analyze reactive power control and reactive power compensation in transmission systems	L4
5. Analyzecomputer control of power system	L4

Subject Name : MICROPROCESSORS&MICROCONTROLLERS

Subject Code :C26PC3

Course outcomes	Cognitive level
1. Acquire the knowledge of internal architecture, organization of 8086 processor and can develop assembly language programming.	
2. Analyze internal architecture, memory organization of 8051 controller and can develop programming.	
3. Construct interfacing techniques to 8086 and 8051 and define various serial communication standards.	
4. Interpret the internal architecture and organization of ARM processor, and can develop programming.	
5. Build the knowledge of the internal architecture and organization of advanced ARM Processors.	

Subject Name : POWER SYSTEM LAB

Subject Code : C26PC6

Course out comes	Cognitive level
1. Test different types of relays and their characteristics.	L2
2. Apply various load flow techniques for the power flow studies.	L3
3. Understand Different protection methods	L2
4. Analyze various faults, ABCD constants, Regulation and transient stability of transmission line.	L4

Subject Name : MICROPROCESSORS & MICROCONTROLLERS LAB

Subject Code :C26PC7

Course outcomes	Cognitive level
1. Acquire the knowledge of internal architecture, organization of 8086 processor and can develop assembly language programming.	L3 L4

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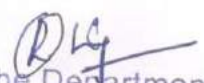
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2. Analyze internal architecture, memory organization of 8051 controller and can develop programming	L3 L4
3. Construct interfacing techniques to 8086 and 8051 and define various serial communication standards.	L3 L4
4. Interpret the internal architecture and organization of ARM processor, and can develop programming.	
5. Build the knowledge of the internal architecture and organization of advanced ARM Processors.	

Subject Name : PYTHON PROGRAMMING LAB

Subject Code : C26ES8

Course outcomes	Cognitive level
1. Implement the fundamental programming elements: operators, statements, conditional and control flow statements.	
2. Use predefined functions and build functions.	
3. Use python modules and implement data structures to solve various computing problems.	
4. Apply oops concepts using python.	

CO's of offered Professional Electives

Subject Name : ELECTRICAL ENERGY CONSERVATION AND AUDITING

Subject Code : B26PE5

Course outcomes	Cognitive level
1. Understand the current energy scenario and importance of energy conservation.	L2
2. Illustrate basics of energy and its various forms	L2
3. Analyze energy management & audit	L4
4. Understand and analyzeenergy efficiency in electrical systems.	L4
5. Analyze energy efficiency in industrial systems	L4

Subject Name : COMPUTER ARCHITECTURE

Subject Code : B26PE5

Course outcomes	Cognitive level
1. Understand the basic concepts of o computer organization.	L2
2. Understand and analyze memory organization.	L4
3. Analyze Input – output Organization	L3
4. Understand and analyze 16 and 32 microprocessors	L4
5. Analyze Pipelining and different architectures	L4

Subject Name : LINE-COMMUTATED AND ACTIVE RECTIFIERS

Subject Code : B26PE5

Course outcomes	Cognitive level
1. Understand Diode rectifiers with passive filtering	L2

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2. Understand Thyristor rectifiers with passive filtering	L2
3. Analyze multi-pulse converter	L4 L4
4. Analyze Single-phase ac-dc single-switch boost converter	L4
5. Understand and analyze AC-DC bidirectional boost converter	

CO's of offered Open Electives

Subject Name : RELIABILITYENGINEERING	
Subject Code : C26OE5	
Course outcomes	**Cognitive level**
1. Understanding the Significance of the terms appearing in Reliability and probability.	L2
2. Understand or become aware of various failures, causes of failures and remedies for failures in practical systems.	L3 L3
3. Apply the fundamental knowledge of Reliability to modeling and analysis of series- parallel and Non-series parallel systems.	
4. Developing expressions for Time dependent and Limiting State Probabilities using Markov models.	L3
5. ApplyF r e q u e n c y and duration techniques to multi state problems.	L3
Subject Name : OPTIMIZATION TECHNIQUES	
Subject Code : C26OE5	
Course outcomes	**Cognitive level**
1. Identify the need of optimization of engineering systems	L2
2. Understand optimization of electrical and electronics engineering problems	L2
3. Apply classical optimization techniques, linear programming, simplex algorithm, transportation problem	L3 L3
4. Develop unconstrained optimization and constrained non-linear programming and dynamic programming	L4 L5
5. Asses optimization problems.	
Subject Name : RENEWABLE ENERGY SOURCES	
Subject Code : C26OE5	
Course outcomes	**Cognitive level**
1. Understand the principles of wind power and solar photovoltaic pow generation, fuel cells.	L3
2. Assess the cost of generation for conventional and renewable energy plants	L4
3. Develop suitable power controller for wind and solar applications	L3

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4. Design different energy storage methods	L3	
5. Analyze the issues involved in the integration of renewable energy sources to the grid	L4	

SEMESTER I(R22)

S.No	Class	Course Code	Name of the Subject	L	T	P	C
1	BS	D1BSM1	Linear Algebra and Ordinary Differential Equations	3	1	0	4
2	ES	D1ESCP1	C Programming for Problem Solving	3	0	0	3
3	BS	D1BSEP1	Engineering Physics	3	1	0	4
4	ES	D1ESEC1	Electrical Circuits	2	0	0	2
5	BS	D1BSEP2	Engineering Physics Lab	0	0	3	1.5
6	ES	D1ESCP2	C Programming for Problem Solving Lab	0	0	3	1.5
7	ES	D1ESCEG	Computer Aided Engineering Graphics	1	0	4	3
8	ES	D1ESEC2	Electrical Circuits Lab	0	0	2	1
Total Credits				12	2	12	20

SEMESTER II (R22)

S.No	Class	Course Code	Name of the Subject	L	T	P	C
1	BS	D2BSM3	Mathematical Transforms	3	1	0	4
2	BS	D2BSAC1	Applied Chemistry	3	1	0	4
3	ES	D2ESNA1	Network Analysis	3	0	0	3
4	HS	D2HSE1	English for Skill Enhancement	2	0	0	2
5	ES	D2ESBW1	Basic Workshop	0	0	3	1.5

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6	BS	D2BSAC2	Applied Chemistry Lab	0	0	3	1.5
7	HS	D2HSE2	English Language and Communication Skills Lab	0	0	2	1
8	ES	D2ESNA2	Network Analysis Lab	0	0	2	1
9	ES	D2ESPP1	Python programming Lab	0	1	2	2
10	MC	MC001	Environmental Science*	3	0	0	0
Total Credits				14	3	12	20

Subject Name : LINEAR ALGEBRA AND ORDINARY DIFFRENTIAL EQUATIONS

Subject Code : D1BSM1

Course outcomes	Cognitive level
1. Discuss the matrix representation of a set of linear equations and to analyses the solution of the system of equations.	L2
2. Reduce the quadratic form to canonical form using orthogonal transformation.	L3
3. Identify whether the given DE of first order is exact or not.	L3
4. Can find applications of first order ODE.	L2
5. Solve higher differential equation and apply the concept of differential equation to real world problems.	L4
6. Evaluating double integrals and applying them to compute the area so fregions.	L4

Subject Name : C PROGRAMMING FOR PROBLEM SOLVING

Subject Code : D1ESCP1

Course outcomes	Cognitive level
1. Learn the taxonomy of computers and C fundamentals (L2)	L2
2. Demonstrate arrays and functions to write c programming (L3)	L3
3. Write C programs using pointers and strings (L3)	L3
4. Analyze and write C programs using structures and unions (L4)	L4
5. Develop C programs for various applications using file I/O functions. (L5)	L5

Subject Name : ENGINEERING PHYSICS

Subject Code : D1BSEP1

Course outcomes	Cognitive level
1. Analyze the concepts of quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.	L4
2. Identify the role of semiconductor devices in science and engineering applications.	L4
3. Explore the fundamental properties of dielectric and energy materials for their applications.	L4 / L3

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		L4	
4.	Knowing the concepts related to magnetic and superconducting materials for different engineering applications.		
5.	Explore the various aspects of lasers and optical fiber and their applications in diverse fields.		

Subject Name : ELECTRICAL CIRCUITS

Subject Code : D1ESEC1	Cognitive level
Course outcomes	L2
1. Understand network analysis , techniques using mesh and node analysis.	L4
2. EvaluatesteadystateandtransientbehaviorofcircuitsforDCandACexcitations.	L3
3. Analyze electriccircuitsusingnetworktheoremsandconceptsofcoupledcircuits.	

Subject Name : COMPUTER AIDED ENGINEERING GRAPHICS

Subject Code : D1ESCEG	Cognitive level
Course outcomes	L3
1. Apply computer aided drafting tools to create 2D and 3D objects	L4
2. Sketch conics and different types of solids	L4
3. Appreciate the need of Sectional views of solids and Development of surfaces of solids	L2
4. Read and interpret engineering drawings	L4
5. Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting	

Subject Name : MATHEMATICAL TRANSFORMS

Subject Code : D2BSM3	Cognitive level
Course outcomes	L2
1. Select and use the appropriate shift theorems in finding Laplace and inverse Laplace transforms.	
2. Use Laplace transforms techniques for solving differential equations.	L3
3. One will be able to find the expansion of a given function by Fourier series.	L3
4. Evaluating any periodic function in term of sines and cosines.	L4
5. Evaluating a non-periodic function in terms ofsine and cosine transforms.	L4
6. Understanding and apply Z-transforms, Inverse Z-transforms to solve Difference equations.	L4

Subject Name : APPLIED CHEMISTRY

Subject Code : D2BSAC1	Cognitive level
Course outcomes	L1
1. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.	
2. They will acquire the Knowledge of chemistry in Batteries.	L2
3. They can learn the fundamentals and general properties of polymers and their engineering materials.	L2
4. Students are able to understand the functioning of Engineering Materials.	L3
5. They can predict potential applications of chemistry and practical utility in	L4

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order to become good engineers and entrepreneurs.	
Subject Name : NETWORK ANALYSIS	
Subject Code : D2ESNA1	
Course outcomes	**Cognitive level**
1. Observe the response of various R, L and C circuits for different excitations.	L2 L4
2. Examine the behavior of circuits using Fourier, Laplace transforms and transfer function of single port network.	L3
3. Obtain two port network parameters and applications and design of various filters	
Subject Name : ENGLISH FOR SKILL ENHANCEMENT	
Subject Code : D1HSE1	
Course outcomes	**Cognitive level**
1. Understand the importance of vocabulary and sentence structures.	L2
2. Choose appropriate vocabulary and sentence structures for their oral and written communication.	L3
3. Demonstrate their understanding of the rules of functional grammar.	L4
4. Develop comprehension skills from the known and unknown passages.	L4
5. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports invarious contexts.	L3 L2
6. Acquire basic proficiency in reading and writing modules of English.	

Program Specific Outcomes (PSO):

R20

1. Comprehending and conceptualizing principles of operation, design, performance and testing of static and dynamic rotating machines and power electronics based electric drives.

2. Procuring knowledge in analysis, operation, control, protection, and simulation of electrical power systems for generation (hydro, thermal, nuclear and new renewable sources of energy), transmission, distribution and utilization

R18

1. Knowledge of principles of operation, design, performance and testing of static and dynamic rotating machines and power electronics based electric drives.
2. Knowledge of analysis, operation, control, protection, and simulation of electrical power systems for generation (hydro, thermal, nuclear and new& renewable sources of energy), transmission, distribution and utilization.

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B.TECH – CSE (DATA SCIENCE)
2022-2023 Academic year COs

INTRODUCTION TO OBJECT-ORIENTED PROGRAMMING & DATA STRUCTURES USING JAVA (CESOP1)

Course Outcomes:

1. Understand fundamentals of object-oriented programming in Java which includes defining classes, invoking methods
2. Implement the inheritance concept
3. Solve the exceptions in programs and recursion
4. Implement the Basic data structures and operations
5. Apply the ADT's and use the collections in Java

DATABASE MANAGEMENT SYSTEMS C83PC1

Course Outcomes:

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

1. Demonstrate the basic elements of a relational database management system, and identify the datamodels for relevant problems.
2. Design entity relationship model and convert entity relationship diagrams into RDBMS and formulateSQL queries on the data.
3. Apply normalization for the development of application software.
4. Understand transaction processing, concurrency control and recovery techniques.
5. Understand the indexing data structures and hashing.

R PROGRAMMING C83PC3

Course Outcomes:
After competition of this course, the students will be able to

1. Understand the basic functions of R and Create vectors in R.
2. Gain knowledge on creation of matrices and arrays in R.
3. Gain knowledge on creation of Factors and Data frames in R.
4. Understand and implement the searching and sorting techniques in R. and the file concepts in R.
5. Automate analyses and create new functions that extend the existing language features. Incorporatesfeatures found in object-oriented and functional programming languages.

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DATA VISUALIZATION C84PC4

Course Outcomes:

After completion of course, the students will be able to

1. Understand the visualization and Data basics
2. Understand the Visualization process and know the representation of Spatial & Geo spatial data
3. Analyze various Visualization techniques for Multivariate data and other structures of data
4. Interacting the different operators and different data spaces
5. Design effective visualization of modern toolkits

PYTHON PROGRAMMING C84PC5

Course Outcomes:

1. Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
2. Demonstrate proficiency in handling Strings and File Systems.
3. Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and useRegular Expressions.
4. Interpret the concepts of Object-Oriented Programming as used in Python.
5. Implement exemplary applications related to Network Programming, Web Services and Databases inPython.

WEB TECHNOLOGIES - C85PC1

COURSE OUTCOMES:

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

1. Gain knowledge on implementing server side scripting using PHP, know how to store andprocess data using XML.
2. Understand how to handle http requests based on the knowledge of servelets
3. Learn to implement server side programming with servelets, JSP
4. Learn to implement client side scripting, validation of forms, JS, AJAX programming.

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MACHINE LEARNING – C85PC2

COURSE OUTCOMES:

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

1. Understand the basic concepts such as decision trees and neural networks.
2. Develop the ability to formulate machine learning techniques to respective problems.
3. Apply machine learning algorithms to solve problems of moderate complexity.

NATURAL LANGUAGE PROCESSING - C86PC

COURSE OUTCOMES:

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

1. Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
2. Understand and carry out proper experimental methodology for training and evaluating empiricalNLP systems.
3. Able to design, implement, and analyze NLP algorithms
4. Able to design different language modeling Techniques.

C PROGRAMMING FOR PROBLEM SOLVING (D!ESCP1)

Course Outcomes:

Upon completion of course the student will be able to

1. Demonstrate the basic knowledge of computer hardware and software.
2. Write algorithms for solving problems.
3. Draw flow charts for solving problems.
4. Code a given logic in C programming language.
5. Gain knowledge in using C language for solving problems.

INTRODUCTION TO OBJECT-ORIENTED PROGRAMMING & DATA STRUCTUR
D2ESIOJ

Course Outcomes:

After completion of course, the students will be able to

1. Understand fundamentals of object-oriented programming in Java which includes defining classes,invoking methods
2. Implement the inheritance concept
3. Solve the exceptions in programs and recursion
4. Implement the Basic data structures and operations
5. Apply the ADTs and use the collections in Java

Program Outcomes (POs)

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PSO 1: Applying the concepts and practical knowledge in data analytical process of computing systems and statistical methods to multi-disciplinary problems.

PSO 2: Storing, processing, analysing and learning from data for effective decision-making while finding solutions for problems.

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DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

COURSE OUTCOMES (2022-23)

SUBJECT NAME: ENGLISH FOR SKILL ENHANCEMENT

SUBJECT CODE: D1HSE1

COURSE OUTCOMES:

1. Understand the importance of vocabulary and sentence structures.
2. Choose appropriate vocabulary and sentence structures for their oral and written communication.
3. Demonstrate their understanding of the rules of functional grammar.
4. Develop comprehension skills from the known and unknown passages.
5. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and
6. reports invarious contexts.
7. Acquire basic proficiency in reading and writing modules of English.

SUBJECT NAME: ENGINEERING CHEMISTRY   **SUBJECT CODE: D1BSEC1**

COURSE OUTCOMES:

1. Students will acquire the basic knowledge of conductance in Metals and Bond Structures.
2. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
3. They will acquire the Knowledge of chemistry in Batteries.
4. They can learn the fundamentals and general properties of polymers and other engineering materials.
5. They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

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SUBJECT NAME: LINEAR ALGEBRA AND ORDINARY DIFFERENTIAL EQUATIONS

SUBJECT CODE: D1BSM1

COURSE OUTCOMES:

1. Discuss the matrix representation of a set of linear equations and to analyses the solution of thesystem of equations.
2. Reduce the quadratic form to canonical form using orthogonal transformation.
3. Identify whether the given DE of first order is exact or not.
4. Can find applications of first order ODE.
5. Solve higher differential equation and apply the concept of differential equation to real worldproblems.
6. Evaluating double integrals and applying them to compute the areas of regions.

SUBJECT NAME: C PROGRAMMING FOR PROBLEM SOLVING

SUBJECT CODE: D1ESCP1

COURSE OUTCOMES:

1. Learn the taxonomy of computers and C fundamentals   (L2)
2. Demonstrate arrays and functions to write c programming (L3)
3. Write C programs using pointers and strings (L3)
4. Analyze and write C programs using structures and unions (L4)
5. Develop C programs for various applications using file I/O functions. (L5)

SUBJECT NAME: IT WORKSHOP AND ELEMENTS OF COMPUTER ENGINEERING
SUBJECT CODE: D1ESCEG

COURSE OUTCOMES:

1. Apply knowledge for computer assembling and software installation. (L3)
2. Solve the trouble shooting problems. (L4)
3. Apply the tools for preparation of PPT, Documentation and budget sheet (L3)
4. Create standard documents and research documents using Latex. (L5)
5. Create project plans. (L5)

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SUBJECT NAME: COMPUTER AIDED ENGINEERING GRAPHICS

SUBJECT CODE: D1ESCEG

COURSE OUTCOMES:

1. Apply computer aided drafting tools to create 2D and 3D objects
2. Sketch conics and different types of solids
3. Appreciate the need of Sectional views of solids and Development of surfaces of solids
4. Read and interpret engineering drawings
5. Conversion of orthographic projection into isometric view and vice versa manually and byusing computer aided drafting

SUBJECT NAME: ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB
SUBJECT CODE: D1HSE2

COURSE OUTCOMES:

1. Understand the nuances of English language through audio- visual experience and groupactivities.
2. Neutralize their accent for intelligibility
3. Speak with clarity and confidence which in turn enhances their employability skills

SUBJECT NAME: ENGINEERING CHEMISTRY LAB

SUBJECT CODE: D1BSEC2

COURSE OUTCOMES:

1. The concepts of error and its analysis and can also develop the skills to tabulate the experimental data and derive valid conclusions.
2. Hands on experience in performing the electro-analytical techniques such as conductometry, potentiometry and pH metry.
3. The ability to prepare polymers.
4. Estimation of Surface tension and viscosity of Lubricant oil.

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SUBJECT NAME: C PROGRAMMING FOR PROBLEM SOLVING LAB
SUBJECT CODE: D1ESCP3

COURSE OUTCOMES:

1. Design and test programs to solve mathematical and scientific problems. (L5)
2. Write structured programs using control structures and functions. (L3)

SUBJECT NAME: BUSINESS ECONOMICS AND FINANCIAL ANALYSIS
SUBJECT CODE: D2HSBF

COURSE OUTCOMES:

1. Analyze the total structure of the business and able to identify and classify the
2. different types of business entities.
3. Asses the demand and supply analyses with the help of various measures and types of elasticity of demand.
4. Infer the knowledge about production and cost analysis for product and services.
5. Interpret the fundamental concepts related to financial accounting.
6. Predict the financial position by analyzing the financial statement of the company through various ratios.

SUBJECT NAME: APPLIED PHYSICS   **SUBJECT CODE: D2HSBF**

COURSE OUTCOMES:

1. Summarize the fundamentals of quantum mechanics to understand the quantum physics in the physical world,
2. By understand the fundamentals of band theory of solids; students will be able to classify the materials on the basis of energy gap.
3. Knowing the physics behind the semiconductors, enables the students to use them in different engineering applications
4. Establishing a strong foundation on the different kinds of opto-electronic, dielectric and display materials and paves a way for them to use in at various technical and engineering applications
5. Knowledge on fiber optics and quantum information enables the students to apply them in systems like optical communications and advanced quantum communication

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SUBJECT NAME: STATISTICAL METHODS AND VECTOR CALCULUS
SUBJECT CODE: D2BSM5

COURSE OUTCOMES:

1. Apply Statistical logic for solving the problems.
2. Analyze the qualitative & quantitative data.
3. Analyze the time series for the given data
4. Explain and compute derivatives of vector valued functions, gradient functions
5. Evaluate the line- surface and volume integrals and converting them from one to another.

SUBJECT NAME: BASIC ELECTRICAL ENGINEERING   **SUBJECT CODE: D2ESBEE**

COURSE OUTCOMES:

1. Understand and analyze DC, AC circuits using basic principles.
2. Analyze and evaluate electrical circuits using various theorems.
3. Understand the characteristics and performance of Electrical Machines and Transformers.
4. Understand the applications of various electrical installations.

SUBJECT NAME: DATA STRUCTURES   **SUBJECT CODE: D2ESDS**

COURSE OUTCOMES:

1. Analyze time and space complexity of various problems and distinguish various data structures.L4
2. Demonstrate various Abstract Data Types. L3
3. Analyze the Binary tree and Disjoint set ADT L4
4. Analyze and implement various kinds of searching and sorting techniques L4
5. Design programs using a variety of data structures such as graphs and search trees L5

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SUBJECT NAME: APPLIED PHYSICS LAB   **SUBJECT CODE: D2BSAP2**

COURSE OUTCOMES:

1. Identify the V-I characteristics of Laser diode.
2. Evaluate the numerical and bending loss of given optical fiber.
3. Analyze the V-I characteristics of LED and photodiode devices.
4. Identify the type of semiconductor by using Hall Effect experiment.
5. Calculate the Plank's constant using Photocell.

SUBJECT NAME: BASIC ELECTRICAL AND SIMULATION LAB

SUBJECT CODE: D2ESBES

COURSE OUTCOMES:

1. Apply various laws to solve electrical networks.
2. Apply network theorems to solve complex electrical networks.
3. Evaluate the performance of different types of Electrical machines and single phase transformer by conducting various tests
4. Understand and analyze electrical installations using different lamp controlled methods, staircase wiring and different wiring connection

SUBJECT NAME: DATA STRUCTURS LAB   **SUBJECT CODE: D2ESDSL**

COURSE OUTCOMES:

1. After learning the contents of this course, the student will be able to
2. Identify the appropriate data structures and algorithms for solving real world problems. L2
3. Apply various searching and sorting techniques for solving the given problems L3
4. Apply various data structures such as stacks, queues, search trees, and hash tables to solve the computing problems.L3
5. Implement different disjoint set operations and k-d trees.L3

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SUBJECT NAME: Business Economics and Financial Analysis **SUBJECT CODE: CHSM1**

COURSE OUTCOMES:

1. Analyze the total structure of the business & able to identify and classify the different types of business entities.
2. Assess the demand & supply analyses with the help of various measures and types of Elasticity of demand.
3. Infer the knowledge about production and cost analysis for product and services.
4. Interpret the fundamental concepts related to financial accounting.
5. Predict the financial position by analyzing the financial statement of the company through various ratios.

SUBJECT NAME: Statistical Methods   **SUBJECT CODE:** CBSM5

COURSE OUTCOMES:

1. Apply Statistical logic for solving the problems.
2. Analyze the qualitative & quantitative data.
3. Apply the sampling techniques.
4. Find the error in sampling distributions.
5. Test the hypothesis and give the inference to the given data.
6. Predict the value of dependent variable by regression analysis.

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SUBJECT NAME: Logic Circuits Design   **SUBJECT CODE:** CESLC1

COURSE OUTCOMES:

1. Understand the various number systems and logic gates.
2. Solve Boolean expressions using minimization methods and design the sequential and combinational circuits.
3. Study the flip flops and their excitations tables.
4. Learn register transfer language and micro-operations.
5. Understand about memory, RAM and ROM.

SUBJECT NAME: Database Management Systems   **SUBJECT CODE:** C73PC1

COURSE OUTCOMES:

1. Demonstrate the basic elements of a relational database management system, and identify the data models for relevant problems.
2. Design entity relationship model and convert entity relationship diagrams into RDMS and formulate SQL queries on the data.
3. Apply normalization for the development of application software.
4. Understand transaction processing, concurrency control and recovery techniques.
5. Understand the indexing data structures and hashing.

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SUBJECT NAME: Data Structures   **SUBJECT CODE: C73PC2**

COURSE OUTCOMES:

1. Understand the concepts of time and space complexity.
2. Understand the concept of Abstract Data Type.
3. Choose appropriate data structures to represent data structures to represent data items in real world problems.
4. Analyze the search and space complexities of algorithms.
5. Design programs using a variety of data structures such as stacks, queues, hash tables, binary trees, search trees, heaps, graphs and B-trees and implement various searching and sorting techniques.

SUBJECT NAME: Operating Systems   **SUBJECT CODE: C73PC3**

COURSE OUTCOMES:

1. Understand the basic concepts of operating system.
2. Understand the CPU scheduling and process scheduling.
3. Detect deadlocks and recovery the deadlocks using different mechanisms.
4. Understand the virtual memory management and storage file management system.
5. Implementing the file system.

SUBJECT NAME: Logic Circuits Design Lab   **SUBJECT CODE:** CESLC2

COURSE OUTCOMES:

1. Apply the fundamentals of digital logic gates to design combinational and sequential circuits.
2. Analyze and interpret the results obtained for logic gates and various combinational and sequential circuits.

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SUBJECT NAME: Database Management Systems Lab   **SUBJECT CODE:** C73PC4

COURSE OUTCOMES:

1. Design and implement a database schema for a given problem.
2. Apply the normalization techniques for development of application software to realistic problems.
3. Formulate queries using SQL DML/DDL/DCL commands.
4. Develop application programs using PL/SQL.

SUBJECT NAME: Data Structures Lab

SUBJECT CODE: C73PC5

COURSE OUTCOMES:

1. Able to identify the appropriate data structures and algorithms for solving real world problems.
2. Able to implement various kinds of searching and sorting techniques.
3. Able to implement data structures such as stacks, queues, search trees and hash tables to solve various computing problems.
4. Able to implement different disjoint set operations and k-d trees

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NAAC

SUBJECT NAME: Probability &Algebra

SUBJECT CODE: CBSM6

COURSE OUTCOMES:
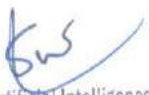
1. Learn the concept of basic probability to solve the real life problems.
2. To solve problems on discrete and continuous random variables.
3. Learn various discrete and continuous probability distribution and their properties.
4. Solve problems based on area properties of standard normal distribution.
5. Illustrate the basic terminology of functions, relations, sets and demonstrate knowledge of their associated operations.
6. Understand the importance of algebraic properties with regard to working within various number systems.

SUBJECT NAME: Introduction to computer vision

SUBJECT CODE: C74PC1

COURSE OUTCOMES:

1. Understanding of the basic knowledge, analysis and design of complex systems.
2. Identify the minimum requirements for the development of application.
3. Understand the objective of designing required process models and architectural styles.
4. Apply the process of validation and verification for a developed application.
5. Understand the process of deploying the quality and risk management for a developed application.

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SUBJECT NAME: Software Engineering   **SUBJECT CODE:** C74PC2

COURSE OUTCOMES:

1. Understanding of the basic knowledge, analysis and design of complex systems.
2. Identify the minimum requirements for the development of application
3. Understand the objective of designing required process models and architectural styles.
4. Apply the process of validation and verification for a developed application.
5. Understand the process of deploying the quality and risk management for a developed application.

SUBJECT NAME: Design and Analysis of Algorithms   **SUBJECT CODE:** C74PC3

COURSE OUTCOMES:

1. Argue the correctness of algorithms using inductive proofs and invariants.
2. Apply important algorithmic design paradigms and methods of analysis.
3. Synthesize efficient algorithms in common engineering design situations such as the greedy, divide and conquer, dynamic programming, backtracking and branch-bound.
4. Explain the different ways to analyze randomized algorithms.
5. Differentiate between tractable and intractable problems.

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SUBJECT NAME: Formal Language & Automata Theory   **SUBJECT CODE:** C74PC4

COURSE OUTCOMES:

1. Understand the concept of abstract machines and build up the ability to recognize the formal languages.
2. Employ finite state machines for modeling and solving computing problems.
3. Design context free grammars for formal languages.
4. Normalizing the context free grammar and design Turing machines.
5. Distinguish between decidability and intractable problems.

SUBJECT NAME: R Programming

SUBJECT CODE: C74PC5

COURSE OUTCOMES:

1. Understand the basic functions of R and create vectors in R.
2. Gain knowledge on creation of matrices and arrays in R.
3. Gain knowledge on creation of factors and Data Frames in R.
4. Understand and implement the searching and sorting techniques in R and the file concepts in R.
5. Automate analyses and create new functions that extend the existing language features, incorporates features found in object oriented and functional programming languages.

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SUBJECT NAME: Scripting Languages Lab

SUBJECT CODE: C74PC6

COURSE OUTCOMES:

1. Write the PHP scripts and execute in Server Environment.
2. Write the RUBY scripts and execute
3. Write the PERL scripts and execute

SUBJECT NAME: R Programming Lab

SUBJECT CODE: C74PC1

COURSE OUTCOMES:

1. Implement empirical economic analyses
2. Participate in online data science challenges.
3. Learn on your own further R, or other programming Languages.

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SUBJECT NAME: Introduction to AI & Neural Networks **SUBJECT CODE:** C75PC1

COURSE OUTCOMES:

1. To gain basic knowledge on understanding the AI phenomenon, use state space representations and apply heuristic techniques
2. To apply knowledge representation issues to build predicate logic and knowledge rules.
3. To understand the uncertainty measures for symbolic reasoning, learn how neural networks are modelled.
4. To develop a learning process based on supervised and unsupervised mechanism.
5. To develop unconstrained optimization techniques, for single layer perceptron, derive output for multilayer perceptron, using decision rule, Feature detection, Back Propagation and differentiation, Hessian Matrix.

SUBJECT NAME: Python Programming   **SUBJECT CODE: C75PC2**

COURSE OUTCOMES:

1. Understand the usage of procedural statements assignments, conditional statements, loops, method calls and different data structures.
2. Design code, and test small python programs.
3. Understand the concepts of object oriented programming as used in Python: classes, subclasses, properties, inheritance and overriding.

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SUBJECT NAME: Natural Language Processing   **SUBJECT CODE: C75PC3**

COURSE OUTCOMES

1. To develop sensitivity to linguistic phenomena and an ability to model them with formal grammars.
2. To understand and carry out proper experimental methodology for training and evaluating empirical NLP Systems.
3. To design, implement and analyse Natural Language Processing Algorithms.
4. To design different language modeling techniques.

SUBJECT NAME: Introduction to Machine Learning   **SUBJECT CODE: C75PC4**

COURSE OUTCOMES:

1. Know how to, design a learning system based on well-posed problems, study perspectives issues in machine learning. Understand how to imply concept learning in general to specific ordering.
2. Implement learning mechanism using decision trees. Understand the basic phenomenon of artificial neural networks and infer the evaluation hypothesis mechanism for learning mechanism.
3. Gain insights how to apply bayes theory, computational theory and instance base on learning mechanism. Classify the learnt information based on hypothesis for predicting probabilities.
4. Learn to apply set of rules and analyse the learning mechanism with perfect domain theories like PROLOG-EGB
5. Know in brief how to combine inductive and Analytical learning approaches.

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SUBJECT NAME: Distributed Databases   **SUBJECT CODE: C75PE5A**

COURSE OUTCOMES:

1) Know the necessity of distributed database concepts, through architecture and design.
2) Learn to process queries, decompose and to optimize them.
3) Understand the control mechanisms and algorithms that are implied through transaction management.
4) Identify issues like reliability, parallelism, associated in developing distributed database system.
5) Understand and relate the concepts of Object oriented design paradigm to Distributed Databases.

SUBJECT NAME: Smart Grid Technologies   **SUBJECT CODE: C25OE5**

COURSE OUTCOMES:

1. Appreciate the difference between smart grid & conventional grid
2. Apply smart metering concepts to industrial and commercial installations.
3. Formulate solutions in the areas of smart substations, distributed generation and wide area measurements
4. Come up with smart grid solutions using modern communication technologies

SUBJECT NAME: ML Lab Using Python   **SUBJECT CODE: C75PC7**

COURSE OUTCOMES:

1. Make use of Data sets in implementing the machine learning algorithms.
2. Implement the machine learning concepts and algorithms in any suitable language of choice.

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SUBJECT NAME: Natural Language Processing Lab   **SUBJECT CODE: C75PC8**

COURSE OUTCOMES:

1. Implementing experimental methodology for training and evaluating empirical NLP systems.
2. Show sensitivity to linguistic phenomenona and an ability to model them with formal grammars
3. Design, implement and analyze NLP algorithms
4. Design different language modeling techniques.
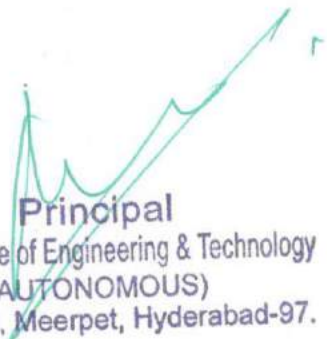
SUBJECT NAME: Fundamentals of Management   **SUBJECT CODE: CHSM2**

COURSE OUTCOMES:

1. To infer the basic knowledge of management functions, levels and evolution of Management
2. To ensure the students in decision making problem solving for the issues in corporate in the organization
3. To acquire the knowledge of entire organization design and structure.
4. To perceive the strategically decision in selection, requirement training and development
5. To enact and impose the qualities of a leader,mentor and coach.

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SUBJECT NAME: Data Warehousing and Data Mining   **SUBJECT CODE:C76PC1**

COURSE OUTCOMES:

1. Gain insights on the necessity of building a data warehouse, and basic operations that can be performed on it.
2. Understand the importance and process of knowledge discovery from data through its functionalities.
3. Analyse the algorithms developed for understanding Association rule functionality
4. Learn how to classify the knowledge based on the information and study different proposed algorithms for classifying the knowledge.
5. Analyse how to group similar knowledge based on the information and study different approaches proposed for grouping the information

SUBJECT NAME: Advanced Computer Vision   **SUBJECT CODE: C76PC2**

COURSE OUTCOMES:

1. To understand the significance of geometric transformations, coordinate parameters of objects that are viewed using 2D and 3D.
2. To implement feature detection and matching concepts, involving segmentation and feature based alignment.
3. To frame structure while the objects are in motion, estimate how dense is the object from the surface in motion.
4. To understand how, images are joined, and aligned; photographs are captured, using mathematical functions.
5. To construct images of objects in 3D representation.

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SUBJECT NAME: Wireless Networks   **SUBJECT CODE: C76PE3B**

COURSE OUTCOMES:

1. List and explain the various issues and applications of Ad hoc wireless networks.
2. Classify and Explain the working of MAC protocols for Ad-hoc wireless networks
3. Discuss the issues in designing routing protocols and working of Table-Driven Routing protocols.
4. Compare and contrast the working of various On-Demand Routing protocols.
5. Analyze the challenges in designing Transport layer Protocols for Ad-hoc networks, Compare and contrast the working of Transport protocols.
6. Identify the issues in designing Security Protocols for Ad-hoc networks focusing on the working performance of various security protocols

SUBJECT NAME: NETWORK SECURITY   **SUBJECT CODE: C76PE4C**

COURSE OUTCOMES:

1. Learn and understand how to apply security mechanisms across transport layer.
2. Understand and learn the security mechanism involved across a wireless network
3. Understand about types of intruders and respective detection mechanism, malicious software, and viruses.
4. Know the need and significance of firewall and its types.
5. Gain knowledge on basic concepts of Network Management System, legal and ethical aspects of establishing a network.

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SUBJECT NAME: ADVANCED COMMUNICATION SKILLS LAB

SUBJECT CODE: CHSE3

COURSE OUTCOMES:

1. Acquire vocabulary and use it contextually
2. Listen and speak effectively
3. Develop proficiency in academic reading and writing
4. Increase possibilities of job prospects
5. Communicate confidently in formal and informal contexts
6. Develop interpersonal communication skills

SUBJECT NAME: DATA WAREHOUSING AND DATA MINING LAB

SUBJECT CODE: C76PC5

COURSE OUTCOMES:

1. Learn how to build a data warehouse and query it (using open source tools like Pentaho Data Integration and Pentaho Business Analytics),
2. Learn to perform data mining tasks using a data mining toolkit (such as open-source WEKA),
3. Understand the data sets and data preprocessing,
4. Demonstrate the working of algorithms for data mining tasks such association rule mining, classification, clustering, and regression,
5. Exercise the data mining techniques with varied input values for different parameters.

SUBJECT NAME: ADVANCED COMPUTER VISION LAB

SUBJECT CODE: C76PC6

COURSE OUTCOMES:

1. To develop novel and efficient techniques for the extraction of quantitative descriptions of viewed objects from a variety of images and image sequences.
2. To translate those techniques into high quality software tools that can be used to address real world problems.

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