Department of Computer Science & Engineering

Course Outcome of courses of B. Tech Second Year to Final Year for the year 2022-23

1. Course Name with code: ETU 331 Analog and Digital Integrated Circuit

After completion of the course students will able to-
ETU331.1 Describe the functioning and selection of OP-AMP as per application.

ETU331.2 Design and testing of OP-AMP based circuits.

ETU331.3 Design and implement Combinational and Sequential logic circuits.

ETU331.4 Describe the functioning of memories and their application

2. Course Name with code: CSU 321 Data Structure and Algorithm

CSU321.1 Understand basic terminology of data organization with the available data structures and their behaviour.
CSU321.2 Analysing and understanding, the implementation of data structures on computer memory so that, one must able to choose appropriate data structure for a given specific problem.
CSU321.3 After implementation a student must be capable of doing quantitative analysis of algorithm.
CSU321.4 Demonstrate ability to devise an efficient algorithm and transform into efficient code

3. Course Name with code: CSU 322 Discrete Mathematics

CSU322.1 For a given logic sentence express it in terms of predicates, quantifiers, and logical connectives
CSU322.2 For a given a problem, derive the solution using deductive logic and prove the solution based on logical inference
CSU322.3 Students would be able to classify its algebraic structure for a given a mathematical problem.
CSU322.4 Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra. To develop the given problem as graph networks and solve with techniques of graph theory.

4. Course Name with code: ETU 332 Analog and Digital Integrated Circuit Lab

After completion of the course students will able to-
ETU332.1 Describe the functioning and selection of OP-AMP as per application.

ETU332.2 Design and testing of OP-AMP based circuits.

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ETU332.3 Design and implement Combinational and Sequential logic circuits.

ETU332.4 Describe the functioning of memories and their application

5. Course Name with code: CSU 323 Data structure and Algorithms Lab

CSU323.1 Understand basic terminology of data organization with the available data structures and their behaviour.
CSU323.2 Analysing and understanding, the implementation of data structures on computer memory so that, one must able to choose appropriate data structure for a given specific problem.
CSU323.3 After implementation a student must be capable of doing quantitative analysis of algorithm.
CSU323.4 Demonstrate ability to devise an efficient algorithm and transform into efficient code.

6. Course Name with code: CSU 324 IT Workshop (Sci Lab/MATLAB)

CSU324.1 students will able to understand the basic of matlab and design the project using matlab

7. Course Name with code: CSU 421 Object Oriented Programming

CSU421.1   Understand the relative merits of C++ as an object oriented programming language to produce object-oriented software using C++

CSU421.2   Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism

CSU421.3   Understand advanced features of C++ specifically stream I/O, templates and operator overloading

8. Course Name with code: CSU 422 Computer Organization and Architecture

CSU422.1 Students will learn the fundamentals of computer organization and its relevance to classical and modern problems of computer design.

CSU422.2 Students will be able to identify where, when and how enhancements of computer performance can be accomplished.

CSU422.3 Students will learn the sufficient background necessary to read more advance texts as well as journal articles on the field.

CSU422.4 Student will see how to use concepts of computer organization in real-life settings using various PC performance improvements, more recent applications of computer organization in advanced digital systems

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9. Course Name with code: CSU 423 Operating System

CSU423.1 lean, Describe, contrast and compare differing structures for operating systems

CSU423.2 Understand the process management policies and scheduling of processes by CPU

CSU423.3 Evaluate the requirement for Process synchronization, deadlock and memory management.

CSU423.4 Interpret various OS functions used in Linux

10. Course Name with code: CSU 424 Design and Analysis of Algorithms

CSU424.1 Students will be Analyze the asymptotic performance of algorithms.
CSU424.2 Students will be understood the rigorous correctness proofs for algorithms.
CSU424.3 Students will be Demonstrate a familiarity with major algorithms and data structures.
CSU424.4 Students will be Apply important algorithmic design paradigms and methods of analysis.

11. Course Name with code: CSU 425 Organizational Behaviour

CSU425.1 Students will learn the principles of Management in management system.
 CSU425.2 Students will be able to Organizational Behavior.
CSU425.3 Students will learn the Concept of Motivation.
CSU425.4 Students will learn the Understanding Individual Behavior, Qualities of good Leader,
Change Management – Conflict Management

12. Course Name with code: CSU 426 Object Oriented Programming Lab

CSU426.1 Understand the relative merits of C++ as an object oriented programming language
CSU426.2 to produce object-oriented software using C++
CSU426.3 Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism
CSU426.4 Understand advanced features of C++ specifically stream I/O, templates and operator overloading

13. Course Name with code: CSU 427 Computer Organization and Architecture Lab

CSU427.1 Students will learn the fundamentals of computer organization and its relevance to classical and modern problems of computer design.

CSU427.2 Students will be able to identify where, when and how enhancements of computer performance can be accomplished.

CSU427.3 Students will learn the sufficient background necessary to read more advance texts as well as journal articles on the field.

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CSU427.4 Student will see how to use concepts of computer organization in real-life settings using various PC performance improvements, more recent applications of computer organization in advanced digital systems

14. Course Name with code: CSU 428 Operating Systems Lab

CSU428.1 lean, Describe, contrast and compare differing structures for operating systems

CSU428.2 Understand the process management policies and scheduling of processes by CPU

CSU428.3 Evaluate the requirement for Process synchronization, deadlock and memory management.

CSU428.4 Interpret various OS functions used in Linux

15. Course Name with code: CSU 429 Design and Analysis of Algorithms Lab

CSU429.1 Students will be Analyze the asymptotic performance of algorithms.
CSU429.2 Students will be understood the rigorous correctness proofs for algorithms.
CSU429.3 Students will be Demonstrate a familiarity with major algorithms and data structures.
CSU429.4 Students will be Apply important algorithmic design paradigms and methods of analysis.

16. Course Name with code: CSU 521 Database Management Systems

CSU521.1 Identify and describe various components of DBMS.
CSU521.2 Apply the basics of SQL and construct queries using SQL.
CSU521.3 Illustrate sound knowledge in the theory, principles and applications of   database management system.
CSU521.4 Apply and identify issues in data storage, transaction, and concurrency control of DBMS

17. Course Name with code: CSU 522 Formal Language and Automata Theory

CSU522.1   Write a formal notation for strings, languages and machines.
CSU522.2   Design finite automata to accept a set of strings of a language.
CSU522.3   Determine whether the given language is regular or not.
CSU522.4   Design context free grammars to generate strings of context free language.
CSU522.5   Identify the associations between language classes and machine models.

18. Course Name with code: CSU 523 Java and Python Programming

CSU523.1- Use an integrated development environment to write, compile, run, and test simple object-oriented Java and Python programs.
CSU523.2- Analyze the problem statement and use object oriented programming concepts to solve these problems.
CSU523.3- Analyze the run time exceptions and able to handle those runtime exceptions.
CSU523.4- Create fully functional, usable, interactive and real time applications (desktop,   mobile, web, mathematical, scientific, data science applications), games and much more.

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19. Course Name with code: CSU 524 Computer Networks

CSU524.1. Understand the concepts of computer networking.
CSU524.2. Understand core data communication protocols, in particular, the mechanisms required to achieve reliable data communication.
CSU524.3. Understand core routing algorithms.
CSU524.4. Understand flow control and congestion control used in the Transmission Control Protocol.
CSU524.5.Design and implement simple networked applications.

20. Course Name with code: CSU 525 Program Elective-I

CSU525 (A).1 Apply principles and concepts of graph theory in practical situations
CSU525 (A).2 Thorough understanding of the concepts in digraph, domination, perfect graphs and random graphs
CSU525 (A).3 Implement the acquired knowledge of graph matching, coloring, surface use and network flow appropriately
CSU525 (A).4 Mastery in executing various proof techniques on different graphs

CSU525(B).1 A firm basis for understanding the life cycle of a systems development project.
CSU525(B).2 An understanding of the analysis and development techniques required as a team member of a medium-scale information systems development project.
CSU525(B).3 An understanding of the ways in which an analyst's interaction with system sponsors and users play a part in information systems development.
CSU525(B).4 Experience in developing systems project documentation

CSU 525 (C).1. Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.
CSU 525 (C).2. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
CSU 525 (C).3 Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, artificial neural networks.
CSU 525 (C).4 Demonstrate ability to share in discussions of AI, its current scope and limitations, and societal implications
CSU525 (D).1 Evaluate the quality of a design mapping and mapping approach
CSU525 (D).2 Design and develop modular programming skills
CSU525 (D).3 Implement design automation algorithms
CSU525 (D).4 Understand and utilize the concepts of digital circuit and system modelling

21. Course Name with code: CSU 526 Database Management Systems Lab

CSU 526.1 Design and implement a database schema for a given problem-domain.
CSU 526.2 Normalize a database.
 CSU 526.3 Populate and query a database using SQL DML/DDL commands.

22. Course Name with code: CSU 527 Java and Python Programming Lab

 CSU527.1- Use an integrated development environment to write, compile, run, and test simple object-

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oriented Java and Python programs.

CSU527.2- Analyze the problem statement and use object oriented programming concepts to solve these problems.

CSU527.3- Analyze the run time exceptions and able to handle those runtime exceptions.

CSU527.4- Create fully functional, usable, interactive and real time applications (desktop, mobile, web, mathematical, scientific, data science applications), games and much more.

23. Course Name with Code: CSU528 Computer Network Lab

CSU528.1 Understand fundamental underlying principles of computer networking.

CSU528.2Analyze performance of various communication protocols

24. Course Name with code: CSU 621 Complier Design

CSU621.1   Develop the lexical analyzer for a given grammar specification.

CSU621.2   Design top-down and bottom-up parsers for a given parser specification.

CSU621.3   Develop syntax directed translation schemes.

CSU621.4   Design algorithms to generate code for a target machine

25. Course Name with code: CSU 622 Software Engineering

CSU622.1 Look at the large scale software development from a broader perspective, and function in multidisciplinary teams.

CSU622.2 Apply knowledge gained in the course to practical software development situations in methodical way.

CSU622.3 Design software systems to meet desired needs with realistic constraints.

CSU622.4 Communicate effectively in software development activities.

CSU622.5 Get an idea about contemporary issues in Software development and engage in life-long learning, understand professional and ethical responsibility.

26. Course Name with code: CSU 623 Program Elective-II

CSU623 (A).1 Analyze the complexity/performance of different algorithms.

CSU623 (A).2 Determine the appropriate data structure for solving a particular set of problems.

CSU623 (A).3 Categorize the different problems in various classes according to their complexity.

CSU623 (A).4 Have an insight of recent activities in the field of the advanced data structure.

CSU623 (B).1 Apply knowledge of distributed systems techniques and methodologies.

CSU623 (B).2 Explain the design and development of distributed systems and distributed systems applications.

CSU623 (B).3 Use the application of fundamental Computer Science methods and algorithms in the development of distributed systems and distributed systems applications.

CSU623 (B).4 Understand the importance of security in distributed systems

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CSU623(C).1 Understand fundamental issues and challenges of machine learning, data model selection and model complexity.

CSU623(C).2 Analyze the strengths and weaknesses of many popular machine learning approaches.

CSU623(C).3 Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.

CSU623(C).4 Design and implement various machine learning algorithm in a range of real world applications.

CSU623 (D).1 Describe the graphics environment and graphics devices.
CSU623 (D).2 Implements various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.
CSU623 (D).3 Describes the importance of viewing and projections.
CSU623 (D).4 Defines the fundamentals of animation and its related technologies.

27. Course Name with code: CSU 624 Program Elective-III

CSU 624 (A).1. Design and analyze the parallel algorithms for real world problems and implement them on available parallel computer systems.
CSU 624 (A).2. Analyze the concepts and issues related to distributed systems.
CSU 624 (A).3. Design and develop the programs for distributed environment.
CSU 624 (A).4. Identify the advantages and challenges in designing distributed algorithms for different primitives like mutual exclusion, deadlock detection, agreement, etc.
CSU 624 (A).5. Differentiate between different types of faults and fault handling techniques in order to implement fault tolerant systems.
CSU624 (B).1 Understand hardware and software design requirements of embedded systems.

CSU624 (B).2 Analyze the embedded system's specification and develop software programs.

CSU624 (B).3 Evaluate the requirements of programming Embedded Systems, related software architectures and tool chain for Embedded Systems.

CSU624 (C).1 Analyze and evaluate performance of algorithms for Association Rules.

CSU624 (C).2 Analyze Classification and Clustering algorithms.

CSU624 (C).3 Apply the techniques of clustering, classification, association finding.

CSU624 (C).4 Apply techniques for feature selection and visualization to real world data.

CSU624 (D).1 Apply knowledge to gain insight about basic technology behind the Cloud.
CSU624 (D).2 Apply to comprehend the Cloud computing applications.
CSU624 (D).3 Identify the appropriate cloud services for a given application.

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CSU624 (D).4 Illustrate the fundamental concepts of cloud storage and demonstrate their use in storage systems such as Amazon S3 and HDFS

CSU624 (D).5 Analyze various cloud programming models and apply them to solve problems

28. Course Name with code: CSU 633 Open Elective-I

CSU 633 (A).1- Use different languages to develop the web pages

CSU 633 (A).2- Analyze the requirements from web site owner and deliver to their satisfaction

CSU 633 (A).3- Play a role as UI and UX designer

CSU 633 (A).4- Create fully functional, usable, interactive, user friendly and responsive Web Sites.

CSU 633 (B).1- Understand basic terminology of data organization with the available data structures and their behavior.

CSU 633 (B).2- Analyze, understand and implement appropriate data structure for a given specific problem.

CSU 633 (B).3- Perform quantitative analysis of algorithm.

CSU 633 (B).4- Demonstrate ability to devise an efficient algorithm and transform into efficient code.

29. Course Name with code: CSU 626 Complier Design Lab

CSU626.1 Design Lexical analyzer for given language using C and LEX tools.
CSU626.2 Design and convert BNF rules into YACC form to generate various parsers.
CSU626.3 Generate machine code from the intermediate code forms
CSU626.4 Implement Symbol table

30. Course Name with code: CSU 627 Minor Project

CSU 627.1 Apply the software development cycle with emphasis on different processes - requirements, design, and implementation phases for the development of the identified project work.
CSU 627.2 Work as a team and to focus on getting project done within time with each student being held accountable for their part of the project.
CSU 627.3 Present technical report of project work clearly defining work objectives, process to achieve objectives, development methodology, objectives reached, contribution, implications and findings, visualize results and conclusions.

31. Course Name with code: CSU 721 Digital Signal Processing
CSU 721.1 Use concepts of trigonometry, complex algebra, Fourier transform, z-transform to analyse the operations on signals and acquire knowledge about systems.
CSU721.2 Design, implementation, analysis and comparison of digital filters for processing of discrete time signals.
CSU721.3 Integrate computer-based tools for engineering applications.
CSU721.4 Employ signal processing strategies at multidisciplinary team activities.

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CSU721.5Assess the techniques, skills, and modern engineering tools necessary for analysis of different electrical signals and filtering out noise signals in engineering practice. Also develop creative and innovative designs that achieve desired performance criteria within specified objectives and constraints, understand the need for lifelong learning and continuing professional education.

32. Course Name with code: CSU 722 Cyber Security
CSU722.1 Analyse and Evaluate the cyber security needs of an organization
CSU 722.2 Implement cyber security solutions and use of cyber security, information assurance, and cyber/computer forensics software/tools
CSU 722.3 Design and develop a security architecture for an organization
CSU 722.4 Determine and analyse software vulnerabilities and security solutions to reduce the risk of exploitation
CSU722.5 Synthesize the Application by using encryption algorithm

33. Course Name with code: CSU 723 Software Project Management
CSU723.1 Understand Project Management principles while developing software.
CSU723.2 Gain extensive knowledge about the basic project management concepts, framework and the process models.
CSU723.3 Obtain adequate knowledge about software process models and software effort estimation techniques.
CSU723.4 Estimate the risks involved in various project activities.
CSU723.5 Define the checkpoints, project reporting structure, project progress and tracking mechanisms using project management principles.

34. Course Name with code: CSU 724 Program Elective-IV
CSU724 (A).1 Classify decision problems into appropriate complexity classes, including P, NP, PSPACE and complexity classes based on randomised machine models.
CSU724 (A).2 State precisely what it means to reduce one problem to another, and construct reductions for simple examples.
CSU724 (A).3 Classify optimisation problems into appropriate approximation complexity classes.
CSU724 (A).4 Use the concept of interactive proofs in the analysis of optimisation problems.
CSU724 (A).5 Define the recurring methods used to prove the relationship between complexity classes.

CSU724 (B).1 Capability to recognize advanced issues in VLSI systems, specific to the deep-submicron silicon technologies.
CSU724 (B).2 Understand deep sub-micron CMOS technology and digital CMOS design styles.
CSU724 (B).3 Design chips used for battery-powered systems and high performance circuits.
CSU724 (B).4 Utilize logic simulation methods to design Low Power VLSI circuits.
CSU724 (B).5 Implement practical and state of the art Low Power VLSI design, suitable for real life and Industry applications

CSU 724(C) .1. Demonstrate fundamental understanding of Evolutionary algorithms, ANN and its foundations.
CSU 724(C) 2. Apply basic principles of soft computing and its applications.
CSU 724(C).3 Solving single-objective optimization problems using GAs.
CSU 724(C).4 Determine the application of ANN and Implementation of various ANN Classifier

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CSU 724(C).5 Differentiate between Genetic Algorithm (GA) And Artificial Neural Network Algorithms

CSU724 (D).1 Analyse Human-Computer Interaction principle and designs in Information Systems.
CSU724 (D).2 Compare various HCI designs to gain knowledge on user-centric interfaces.
CSU724 (D).3 Evaluate the Internet sites considering; usability and user appreciation designs.
CSU724 (D).4 Design effective HCI for individuals and persons with disabilities.
CSU724 (D).5 Develop meaningful user interface.

35. Course Name with code: CSU 725 Open Elective-II
CSU725 (A).1 Ability to determine appropriate mechanisms for protecting the network.
CSU725 (A).2 Ability to design and develop security solutions for a given application or system.
CSU725 (A).3 Ability to develop a secure network stack.
CSU725 (A).4 Ability to determine security and authentications.
CSU725 (A).5 Ability to analyse models for internet work security.

CSU725 (B).1 Ability to comprehend the complex query processing techniques.
CSU725 (B).2 Ability to design and implement multimedia databases and writing query structure.
Ability to install, configure and interact with a relational database management system.
CSU725 (B).3 Ability to master the basics of SQL and construct queries using SQL.
CSU725 (B).4 Ability to develop skill set in file organization, Query Optimization, Transaction management, and database administration techniques.
CSU725 (B).5 Ability to understand concepts of transaction processing.

36. Course Name with code: CSU 726 Seminar

CSU726.1 To study research papers for understanding of a new field, in the absence of a textbook, to summaries and review them.
CSU726.2 To identify promising new directions of various cutting edge technologies
CSU726.3 To impart skills in preparing detailed report describing the topic and results
CSU726.4 To effectively communicate by making an oral presentation before an evaluation committee.
CSU726.5 To develop the interpersonal skills for presentation of topic.

37. Course Name with code: CSU 821 Program Elective-V
CSU821 (A).1 Analyse randomized algorithms for small domain problems.
CSU821 (A).2 Use line-point duality to develop efficient algorithms.
CSU821 (A).3 Apply geometric techniques to real-world problems in graphics.
CSU821 (A).4 Solve linear programs geometrically.
CSU821 (A).5 Assess theoretical and practical problems that involve geometry and will adapt efficient methods to solve them.

CSU821 (B).1 Analyse the general aspect of distributed operating system.
CSU821 (B).2 Understand and analysed the interposes communication and clock synchronization
CSU821 (B). 3 Identify, formulate and solve integrative operating system problem
CSU821 (B).4 Analyse the difference between DCOM and JINI

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CSU821 (B).5 Understand and analysed the different AOS related issues.

CSU821 (C).1 Understand how key concepts from NLP are used to describe and analyze language.
CSU821.2 (C) Understand POS tagging and context free grammar for English language
CSU821.3 (C) Analyse semantics of English language for processing.
CSU821.4 (C) Analyse large volume text data generated from a range of real-world applications.
CSU821.5 (C) Understand the various techniques of Machine Translation

CSU 821(D).1 Able to understand building blocks of Internet of Things and characteristics
CSU 821(D).2 Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks.
CSU 821(D).3 Use the IoT technologies in practical domains of society.
CSU 821(D).4 Gain knowledge about the state of the art methodologies in IoT applicationdomains.

38. Course Name with code: CSU 822 Program Elective-VI
CSU822 (A).1Examine the relationship between mathematical models (precise formulas, but limited applicability) and their corresponding simulation models (imprecise experimental data, but greater flexibility and realism)

CSU822 (A).2 Understand the fundamental concepts of probability
CSU822 (A).3 Provide the required mathematical support in real life problems and develop probabilistic models which can be used in several areas of science and engineering
CSU822 (A).4 Apply the concept of queuing model in Engineering
CSU822 (A).5 Understand the basic characteristic features of a queuing system and acquire skills in analysing queuing models.

CSU 822(B).1 Understand the risk of computer failures and their comparison with other equipment failures.
CSU 822(B).2 Know the different advantages and limits of fault avoidance and fault tolerance techniques.
CSU 822(B).3 Gain knowledge in sources of faults and their prevention and forecasting
CSU822 (B).4 Analyze fault-tolerant or non-fault-tolerant on the basis of dependability requirements.

CSU822 (C).1 Understand the essentials of data analytics and the corresponding terminologies.
CSU822 (C).2 Analyse the steps involved in the Analytics process.
CSU822 (C).3 Identify meaningful patters in data.

CSU822 (C).4 Understand use of descriptive, predictive and prescriptive analytics.
CSU822 (C).5 Design efficient algorithms for data analytics.

CSU822 (D).1 Analyse the different types of digital images.
CSU822 (D).2 Perform image enhancement techniques in spatial and frequency domain.
CSU822 (D).3 Elucidate the mathematical modelling of image restoration and compression
CSU822 (D).4 Apply the concept of image segmentation.

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CSU822 (D).5 Analyse object detection and recognition techniques
CSU822 (D).1 Analyse the different types of digital images.
CSU822 (D).2 Perform image enhancement techniques in spatial and frequency domain.
CSU822 (D).3 Elucidate the mathematical modelling of image restoration and compression
CSU822 (D).4 Apply the concept of image segmentation.
CSU822 (D).5 Analyse object detection and recognition techniques

39. Course Name with code: CSU 823 A. Project OR B. Industry Internship Project

CSU823.1 Demonstrate a sound technical knowledge of their selected project topic.
CSU823.2 Undertake problem identification, formulation and solution.
CSU823.3 Design engineering solutions to complex problems utilising a systems approach.CSU823.4 Conduct an engineering project.
CSU823.5 Demonstrate the knowledge, skills and attitudes of a professional engineer.

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