Computer Science & Engineering

Course Outcome

Basic Computer Engineering- 100203	
CO1	Define the fundamentals of computer system.
CO2	Outline the various components of computer system.
CO3	Design, implement, test and debug the computer programs using programming language.
CO4	Analyze the usage of various system & application softwares to manage computer system and data.
CO5	Develop the ability to design computer programs to solve real world problems.
CO6	Elaborate the working of Internet.
Basic Computer Engineering- 100203(Lab)	
CO1	Demonstrate the fundamentals of computer programming
CO2	Read, understand and trace the execution of program
CO3	Develop Conditional and Iterative Statements
CO4	Design the program using functions
CO5	Implement the programs using Derived and User defined data types
CO6	Design program for a given problem using computer programming
BCSL-302: Digital Electronics	
CO1	Illustrate various number systems, Binay codes and its application in digital design.
CO2	Identify the logic functions, circuits, truth tables and also apply the laws of Boolean algebra to simplify circuits and expressions.
CO3	Develop the formal procedures for the analysis and design of combinational circuits.
CO4	Analyse sequential circuit's components and their usability in digital circuits.
CO5	Compare the concept of memories, programmable devices and digital ICs.
CO6	Design and analyze circuits for digital arithmetic.
BCSL-302: Digital Electronics (lab)	
CO1	Demonstrate the basic logic gates.
CO2	Illustrate basic sequential logic circuits such as flip flop and counter.
CO3	Experiment with standard arithmetic combinational and sequential circuits.
CO4	Examine the laws of Boolean algebra to simplify circuits and expressions.
CO5	Design and implement combinational logic circuits using programmable logic device.
CO6	Formulate different logic circuits using logic gates.
BCSL-303: OOPs and methodology	
CO1	Relate the concepts and significance of OOPs in real world.
CO2	Demonstrate adeptness of object oriented programming to solve problems using Object oriented concepts
CO3	Apply object oriented programming to develop solutions of problems using standard language constructs.
CO4	Analyze data flow diagrams and flow charts for small/ moderate problems
CO5	Determine how to simulate the problem in field of Operating system, Computer networks and real world problems.
CO6	Develop software using concepts of objects, associations and integrity constraint.
BCSL-303: OOPs and methodology (lab)	
CO1	Select proper arithmetic, logical, relational, and string manipulation expressions to process data.
CO2	Demonstrate the use of various OOPs concepts with the help of programs.
CO3	Apply validation techniques to build a reliable solution to a given problem.
CO4	Analyze and write programs to solve more complicated problems using the concepts of Object Oriented Methodology.

CO5	Choose appropriate programming concepts as and when required in the future application development.
CO6	Construct a complete class definition with in the class definition, write class and instance methods including the constructor and overloaded methods.
BCSL-304: Computer Graphics	
CO1	Illustrate the fundamental concepts of Computer Graphics, hardware & software components and its applications.
CO2	Explain various graphical image genration & manipulation methods and algorithms.
CO3	Apply various methods of generation & manipulation of images for creating graphical images and color models.
CO4	Explain various rendering, illumination and color models of realistic image or pictures using image processing techniques.
CO5	Discuss various methods to create natural seen & realistic images in 2D &3D space.
CO6	Design & analysis of various graphical image processing techniques and animation.
BCSL-304: Computer Graphics (Lab)	
CO1	Demonstrates the fundamental concepts of Computer Graphics and its applications.
CO2	Explain and use hardware's and software's component of computer graphics
CO3	Apply various image generation, manipulations and color model techniques in coding.
CO4	Implement algorithms for create and manipulate image in programs.
CO5	Develop the ability to write computer programs for create image and animation using graphics concepts.
CO6	Develop application programs and projects in terms of image and animation using computer graphics.
BCSL-305:Operating System	
CO1	Outline the basic concept of operating systems
CO2	Analyze the working of operating system
CO3	Examine the working of various scheduling/allocation approaches
CO4	Measure the performance of various scheduling/allocation approaches
CO5	Compare the various operating system problems/issues
CO6	Develop the Solution of various operating system problems/issues
BCSP-306:Hardware Lab	
CO1	Explain basics of different computer peripherals and interfaces.
CO2	Demonstrate architecture of various computer hardware devices and their functioning.
CO3	Demonstrate the details of system buses, memory system, and I/O interfaces.
CO4	Identify the existing configuration of the computers peripherals and creating wireless network through the access point.
CO5	Analyze progress in contemporary peripherals and bus systems.
CO6	construct a networking based on IPv4 address scheme.
Semester 4	
Design & Analysis of Algorithms (BCSL 402)	
CO1	Define the basic properties of algorithm.
CO2	Analyze the complexity of an algorithm.
CO3	Apply mathematical preliminaries to analyse and design stages of different types of algorithms.
CO4	Examine algorithms for a number of important computational problems.
CO5	Compare different design techniques to develop algorithms for various computational problems.
CO6	Build the general principles and good algorithm design techniques to develop efficient computer algorithms.
Design & Analysis of Algorithms(BCSL 402) LAB	

CO1	Label basic algorithms and different problem solving strategies.
CO2	Demonstrate methods to solve non-conventional problems and expertise for analysing existing solutions.
CO3	Experiment with the algorithms as a precise mathematical concept.
CO4	Examine the design algorithms; establish their correctness, their efficiency and memory requirements.
CO5	Solve the problems using different algorithm solving paradigm.
CO6	Develop programming skills to practice well-known algorithms and design data structures to solve real-life problems.
Database Management System (BCSL 403)	
CO1	Demonstrate the concepts of different type of database system.
CO2	Apply Relational algebra concepts to design database system.
CO3	Make use of queries to design and access database system.
CO4	Analyze the evaluation of transaction processing and concurrency control.
CO5	Determine the optimize database for real world applications.
CO6	Design a database system for a real world application.
Database Management System(BCSL 403) (lab)	
CO1	Construct database schema for a given problem domain.
CO2	Apply integrity constraints on a database schema using a state-of-the-art RDBMS.
CO3	Apply SQL queries using DDL and DML to design and access database system.
CO4	Make use of operators and functions used in query.
CO5	Distinguish Tables and Views for database system.
CO6	Develop a small project for real world scenario.
Computer Networks (BCSL 404)	
CO1	Explain the basic concept of computer network.
CO2	Classify topologies of network and protocols.
CO3	Develop the skills of subnetting and various routing techniques.
CO4	Compare the different types of networking devices and their functions within a network..
CO5	Determine the security issues in data transfer in network.
CO6	Design the network environment with all the necessary data communication components, procedure and techniques that make it functional.
Computer Networks (Lab) (BCSL 404)	
CO1	Tell the role of protocols in networking and to analyze the services and features of the various layers in the protocol stack.
CO2	Classify different networking commands e.g. PING, TRACEROUTE. Learning remote login using telnet session.
CO3	Develop the skills of subnetting and various routing techniques.
CO4	Analyze the different types of networking devices and their functions within a network.
CO5	Explain network topology using packet tracer software.
CO6	Design the network environment with all the necessary data communication components, procedure and techniques that make it functional.
Computer System Organization(BCSL 405)	
CO1	Demonstrate the computer architecture for defining basic component and functional unit.
CO2	Recall different number system and solve the basic arithmetic operations of signed and unsigned
CO3	Develop the fundamental concept to understand the working of microprocessor.
CO4	Explain the basic concept of input output organization.
CO5	Compare various memory and mapping techniques.
C06	Develop the skill of writing assembly language programming.
BCSP-406:Unix & Linux Lab	

CO1	Demonstrate the basics concepts/commands/tools for installation and usage of UNIX & Linux environment.
CO2	Apply the file handling, problem solving and networking concepts for doing the UNIX programming projects.
CO3	Develop an application program or shell script for solving real world problems using Linux & UNIX programming.
CO4	Make use of the Linux commands/internal tools for basic user, file and system level operations for both single and multi-user environments.
CO5	Examine different ways for Scheduling, Inter process Communication, Address Mapping in a Virtual Storage UNIX System, Working with UNIX C Files and Graphics.
CO6	Build moderate programs utilizing common UNIX system calls using graphical and command line environments.
Semester 5	
BCSL501: Principles of Management & Economics	
CO1	To impart knowledge and awareness regarding internal and external environment of management
CO2	To develop spoken ability in a student so that he may acquire the ability to organise and express his ideas
CO3	To predict the situation and to be good decision maker through the case studies and role plays based on actual situation
CO4	To develop a sound knowledge about economy and economics and to be able to understand how money and finance is to be handled
CO5	To be able to work out needs so as to develop a working knowledge about starting and managing an enterprise
CO6	To be able to find out ways of solving/overcoming hurdles that crop up while establishing/ managing his own enterprise
BCSL502: Theory of Computation	
CO1	Explain the basic concepts of switching and finite automata theory and languages.
CO2	Relate practical problems to languages, automata, computability, and complexity.
CO3	Construct abstract models of computing and analyse their power to recognize the languages.
CO4	Construct and analyze the grammar.
CO5	Apply mathematical models and descriptors in various computing theories
CO6	Solve problems in computer science using mathematical and formal techniques.
BCSL502: Theory of Computation (lab)	
CO1	Judge various model of computation.
CO2	Construct abstract models of computing.
CO3	Infer the power of abstract models in computing to recognize the languages.
CO4	Demonstrate analytical thinking and intuition for problem solving situations in related areas of theory of computation.
CO5	Explain the limitations of computation in solving problems.
CO6	Define set of rules for syntax verification
BCSL503: Software Engineering	
CO1	List various software models with respect to their accuracy and needs of the customer requirement.
CO2	Explain the real world problems using software engineering concepts.

CO3	Develop the technique and results with customer expectations.
CO4	Identify and how to use various cost estimation techniques used in software engineering.
CO5	Compare design of a system, component, or process to meet desired needs within realistic constraints
CO6	Develop the techniques, skills and software engineering tools necessary for engineering domain.
BCSL503: Software Engineering (Lab)	
CO1	Define basic concepts of UML.
CO2	Illustrate the software development process using different tools.
CO3	Apply the UML to solve different common modeling problems.
CO4	Utilize the knowledge of Software engineering and project management.
CO5	Analyze the vocabulary, rules, and idioms of the UML and learn how to model it effectively.
CO6	Design the systems, from concept to executable artifact, using object oriented techniques.
BCSL504: Microprocessor & Interfacing	
CO1	Classify the concepts of different advanced microprocessors and microcontroller.
CO2	Illustrate the various peripheral interfaces, controllers and bus standards.
CO3	Build a system using peripheral devices and controllers for 8086 microprocessor.
CO4	Distinguish the interface with various devices to the microprocessor.
CO5	Design an interface for various devices on 8086/8051 based systems.
CO6	Develops skills in assembly language programming for 8051 & 8086 applications.
BCSL504: Microprocessor & Interfacing (lab)	
CO1	Explain types of instructions and addressing modes.
CO2	Make use of Hex code needed in assembly language
CO3	Experiment with various peripheral devices to interface with microprocessor.
CO4	Simplify the arithmetic, Logical, etc. problems using instruction set of 8086/8051 microprocessor.
CO5	Determine the process required in interfacing with 8086/8051.
CO6	Develop the assembly language programs in 8086/8051 to solve a real world problem.
BCSL505:Networking with TCP/IP	
CO1	Define the basic concept of computer network and various layered architecture.
CO2	Identify the different types of network devices and their functions within a network
CO3	Identify and evaluate the Classless and Class full addressing.
CO4	Explain various protocols of computer networks and how they can be used to assist in network design and implementation.
CO5	Explain Client server paradigm and their protocols
CO6	Elaborate various security issues and their protocol
BCSL506:Java Programming	
CO1	Define the fundamentals, features, packages and functionalities of java programming.
CO2	Explain exceptional handling, thread, multithreading, database connectivity and networking concepts.
CO3	Outline the block diagram of control statements.
CO4	Construct programs using concepts of java.
CO3	Analyze and compare the existing programs for improvement.
CO4	Create java programs/ project for real problems.
Semester 6	
Mobile Computing (BCSL601)	
CO1	Define basic concepts and principles in mobile computing systems.

CO2	Explain various protocol and markup languages of wireless communication system.
CO3	Identify vision, services and its quality of third generation mobile communication.
CO4	Analyze the different architecture, technologies inter-networking challenges and solutions in fixed and mobile versions of mobile networks.
CO5	Compare the characteristics of different multiple access techniques of mobile communication systems.
CO6	Elaborate different infrastructure to face the challenges and solutions in wireless mobile network
Software Project Management (BCSL 602)	
CO1	Choose and initiation of individual projects and portfolios of projects in the enterprise
CO2	Explain and Recognize the Conduction of project planning activities.
CO3	Apply estimating and risk management techniques to projects.
CO4	Analyze effective project execution and control techniques that result in successful projects.
CO5	Justify the adaptive project management practices to meet the needs of stakeholders from multiple sectors of the economy.
CO6	Develop a business plan for a start-up software business to be presented to a venture capitalist.
Software Project Management (Lab) (BCSL 602)	
CO1	Define various software application domains and remember different process model used in software development.
CO2	Explain needs for software specifications also they can classify different types of software requirements and their gathering techniques.
CO3	Analyze the role of SDLC in Software Project Development and its importance.
CO4	Compare among different testing strategies and tactics.
CO5	Create the design model from the requirements and demonstrate the use of software and user interface design principles.
CO6	Propose the project schedule as per cost and Risk impact factor.
Compiler Design (BCSL 603)	
CO1	Outline the major concept areas of language translation and compiler design and acquire the knowledge of modern compiler & its features.
CO2	Identify the similarities and differences among various parsing techniques and grammar transformation techniques.
CO3	Apply the knowledge of lex tool & yacc tool to develop a scanner & parser and apply ideas and techniques discussed to various software designs.
CO4	Implement various parsing, conversion, optimization and code generation algorithms for the design of a compiler
CO5	Develop program to solve complex problems in compiler and learn the new code optimization techniques to improve the performance of a program in terms of speed & space
CO6	Analyze the problems and limitations of modern compiler and learn & use the new tools and technologies used for designing a compiler.
Compiler Design (BCSL 603) lab	
CO1	Generate the machine code by considering all the functionalities involved in different phases of the compilation process
CO2	Demonstrate the knowledge of patterns, tokens & regular expressions in programming for solving a problem.
CO3	Operate different types of compiler tools to meet the requirements of the realistic constraints of compilers.

CO4	Design and Implement the parsing techniques including Bottom-up and Top-down parsing.
CO5	Develop program for implementing code optimization techniques and apply it to improve the performance of a program.
CO6	Build symbol table and intermediate code.
Network & Web Security (BCSL 604)	
CO1	Define Security and its requirement at different levels & in different cases.
CO2	What are security principles and how they can be achieved.
CO3	Outline the characteristics and working of infected/ malicious system or person.
CO4	Analyze the different attacks and perform security algorithm/ solution accordingly.
CO5	Explain the mechanisms/ techniques for various attacks against security or more specifically principles of security.
CO6	Justify the role of Government and thirty party in security.
BCSL 604: Network & Web Security (Lab)	
CO1	Describe the Installation, configuration, use and manage offensive/defensive security tools on a working network
CO2	Evaluate best practices in security concepts to maintain confidentiality, integrity and availability of computer systems
CO3	Gain the experience in the use of intrusion detection and prevention systems and techniques.
CO4	Acquire the practical knowledge to secure computers and networks including the setup of policies and security assessment.
CO5	Demonstrate competence in detecting potential security vulnerabilities, and demonstrate ways of recovering from the effects of attacks
CO6	Compare and contrast symmetric and asymmetric encryption systems and their vulnerability to attack, and explain the characteristics of hybrid systems.
BCSL605:Parallel Processing	
CO1	Recall fundamental concepts of parallelism.
CO2	Illustrate the performance of different computer structures.
CO3	Develop the ability to design shared memory parallel program concepts for a specified performance.
CO4	Analyze the parallel algorithms for real world problems and implement them on available parallel computer systems.
CO5	Assess the communication and the computing possibilities of parallel system architecture.
CO6	Design contemporary parallel algorithms.
BCSP 606: Minor Project	
CO1	Able to formulate a real problem
CO2	Express the technical ideas, strategies and methodologies
CO3	Utilize the new tools, algorithms, techniques to obtain solution of the project
CO4	Test and validate the develop the prototype/results
CO5	Write a project report
CO6	Present the oral demonstration
Semester 7	
CSL-701: Artificial Intelligence and Expert Systems	
CO1	Tell the fundamental concepts of Artificial Intelligence and its real-world applications.
CO2	Illustrate the various seraching algorithms used to solve AI problems.
CO3	Utilize the several techniques of Knowledge Representation to deal with AI problems.
CO4	Analyze the performance of various algorithm used in AI.
CO5	Evaluate programming methods and algorithmic principles in puzzle solving techniques.

CO6	Formulate an strategy to solve the real-world problems by various applications of AI.
CSL-701: Artificial Intelligence and Expert Systems (Lab)	
CO1	Find out the real-world problems based on AI.
CO2	Demonstarte the knowledge of the building blocks of AI.
CO3	Apply the concepts of Natural Language Processing to solve AI problems.
CO4	Inspect intelligent system for Game palying.
CO5	Choose different search or game based techniques to solve real world problems.
CO6	Develop intelligent algorithms for constraint satisfaction problem.
CSL702: Compiler Design & Translator	
CO1	Outline the major concept areas of language translation and compiler design and acquire the knowledge of modern compiler & its features
CO2	Identify the similarities and differences among various parsing techniques and grammar transformation techniques.
CO3	Apply the knowledge of lex tool & yacc tool to develop a scanner & parser and apply ideas and techniques discussed to various software designs.
CO4	Implement various parsing, conversion, optimization and code generation algorithms for the design of a compiler
CO5	Develop program to solve complex problems in compiler and learn the new code optimization techniques to improve the performance of a program in terms of speed & space
CO6	Analyze the problems and limitations of modern compiler and learn & use the new tools and technologies used for designing a compiler.
CSL702: Compiler Design & Translator (Lab)	
CO1	Generate the machine code by considering all the functionalities involved in different phases of the compilation process
CO2	Demonstrate the knowledge of patterns, tokens & regular expressions in programming for solving a problem.
CO3	Operate different types of compiler tools to meet the requirements of the realistic constraints of compilers.
CO4	Design and Implement the parsing techniques including Bottom-up and Top-down parsing.
CO5	Develop program for implementing code optimization techniques and apply it to improve the performance of a program.
CO6	Build symbol table and intermediate code.
CSL703: Parallel Processing	
CO1	Explain the organization of basic computer, its design and the design of control unit.
CO2	Demonstrate the working of central processing unit and RISC and CISC Architecture.
CO3	Distinguish the operations and language of the register transfer, micro operations and input-output organization.
CO4	Explain the organization of memory and memory management hardware.
CO5	Elaborate advanced concepts of computer architecture, Parallel Processing, inter-processor communication and Synchronization.
CO6	Design contemporary parallel algorithms.
CSL704: Networking with TCP/IP	
CO1	Define various types of networks.
CO2	Explain different types of network devices and their function within a network.
CO3	Build the concept of IP addressing and building the skills of subnetting, supernetting and routing mechanism.
CO4	List and classify network services, protocol and architecture and choose key internet applications and their protocols and apply to develop their own application.

CO5	Explain various protocols of computer networks and how they can be used to assist in network design and implementation.
CO6	Discuss the concept of security mechanism in networking.
CSL-705: Internet Technology & web Designing (Elective-I)	
CO1	Explain the fundamental of Internet technology and protocols.
CO2	Illustrate and implement dynamic websites.
CO3	Develop web appliations from the different perspectives.
CO4	Experiment with programming for client server computing .
CO5	Compare and manipulate data through server side scripting and programming
CO6	Combine multiple web technologies to create advanced web components.
Semester 8	
Advance Operating Systems (CSL 801)	
CO1	Explain the basic concept of operating system.
CO2	Illustrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system
CO3	Develop, test and debug RPC based client-server programs in Unix.
CO4	Design and build newer distributed file systems for any OS.
CO5	Evaluate the performance and reliability of distributed application.
CO6	Formulate the various resource management techniques for distributed systems
Data Warehouse and Data Mining (CSL 802)	
CO1	Illustrate various tools of Data Mining and their techniques to solve the real time problems
CO2	Apply data preprocessing and data quality for construction of data warehouse
CO3	Identify various data bases and modeling of data warehouse and comparing various methods for storing & retrieving data from different data sources/repository.
CO4	Develop various classification algorithms for data using data mining.
CO5	Make use of data mining methods for identification of association for transactional databases.
CO6	Analyse data mining for knowledge discovery & prediction
Data Warehouse and Data Mining (Lab) (CSL 802)	
CO1	Demonstrate the utility of data mining using tools or simulator
CO2	Apply data mining algorithms for finding useful information from large amount of data set.
CO3	Solve real world problems through data mining algorithms
CO4	Analyze the pattern using data mining tools
CO5	Classify algorithms on the basis of various measurement.
CO6	Determine hypotheses based on the analysis of the results obtained and test them
Neural Networks & Fuzzy Systems(CSL 803)	
CO1	Relate the models of brain and ANN with mathematical models.
CO2	Illustrate various algorithms of ANN.
CO3	Apply neural and fuzzy techniques for solving simple/complex, constrained/ unconstrained models.
CO4	Analyse the performance of various types of neural network.
CO5	Explain the concepts of fuzzy systems and its various types.
CO6	Formulate a strategy to solve real world problems by combining the concepts of ANN and fuzzy systems.
Neural Networks & Fuzzy Systems(CSL 803) lab	
CO1	Find the application of traditional algorithms using MATLAB toolboxes.
CO2	Demonstrate the evolutionary approaches for solving complex ANN models.
CO3	Plan a strategy for solving real world problems using ANN modelling techniques.
CO4	Examine the various neural networks and their performance using MATLAB.
CO5	Measure the problems and limitations of different ANN.

CO6	Design the mathematical models for ANN.
Cellular and Mobile communication (Elective-II) CSL 804	
CO1	Explain the cellular basic concepts and how interface between mobiles and base station affects the capacity of cellular system.
CO2	Illustrate the operations, algorithms used in GSM and analyze the different internetworking challenges.
CO3	Describe current and future cellular mobile communication system with advancements of technology.
CO4	Analyze the measures to increase the capacity in GSM system using new mobile features like software and hardware.
CO5	Develop application that are mobile device specific and demonstrate current practice in windows phone application using development platform.
CO6	Implement and understand the various terminology, principles, devices, schemes, concepts, algorithms and different methodologies used in cellular mobile communication for applying in the field of research.
CSD 805:Major Project	
CO1	Able to formulate a real problem
CO2	Express the technical ideas, strategies and methodologies
CO3	Utilize the new tools, algorithms, techniques to obtain solution of the project
CO4	Test and validate the develop the prototype/results
CO5	Write a project report
CO6	Present the oral demonstration
Information Theory and Coding	
CO1	Define different channel concepts, characteristics and performance using information theory.
CO2	Compare various error control code properties.
CO3	Apply linear block codes for detection and correction
CO4	Analyze convolution codes for performance and other codes for error detection and correction.
CO5	Determine different cryptographic techniques used in Information Coding and Theory.
CO6	Elaborate different compression techniques.