



**S.P.B. PATEL
ENGINEERING COLLEGE**
SAFFRONY INSTITUTE OF TECHNOLOGY CAMPUS

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**CYCLE 1
NAAC Accreditation 2023**

Computer Engineering Course Outcome

Submitted to



NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL

BACHELOR OF COMPUTER Engg.(BE)	
SEMESTER I	
3110003	PROGRAMMING FOR PROBLEM SOLVING
	Course Outcomes
CO1	Formulate algorithm/flowchart for given arithmetic and logical problem
CO2	Translate algorithm/flowchart into C program using correct syntax and and execute it
CO3	Write programs using conditional, branching, iteration, and recursion
CO4	Decompose a problem into function
CO5	Develop an application using the concepts of array, pointer,structure, and file management to solve engineering and/or scientific problems
CO6	
3110007	ENVIRONMENTAL SCIENCE
	Course Outcomes
CO1	Identify the types of pollution in society along with their sources
CO2	Realize the global environmental issues
CO3	Conceptualize the principles of Green Buildings and Smart cities
CO4	Implement the concept of recycle and reuse in all fields of engineering
CO5	
CO6	
3110016	BASIC ELECTRONICS
	Course Outcomes
CO1	Analyze the general – and special-Purpose diode circuits
CO2	Design biasing circuits for BJT
CO3	Analyze BJT Circuits in small-signal domain
CO4	Analyze basic FET Circuits
CO5	Verify the functionalities of basic digital gates and logic families
CO6	Construct and test circuit using basic electronic devices in a group
3110006	BASIC MECHANICAL ENGINEERING
	Course Outcomes
CO1	Discuss the various sources of energy and basic terminology of Mechanical engineering
CO2	Make calculations for commonly used working fluids i.e. ideal gases and steam
CO3	Analyze various heat engine cycles and understand construction and working of IC engines
CO4	Discuss working and applications of steam boilers and various energy conversion systems
CO5	Discuss various power transmission elements and properties of various engineering materials with their applications
CO6	
3110014	Mathematics-1
	Course Outcomes

CO1	To apply differential and integral calculus to improper integrals and to determine applications of definite integral. Apart from some other applications they will have a basic understanding of indeterminate forms, Beta and Gamma functions.
CO2	To apply the various tests of convergence to sequence, series and the tool of power series and fourier series for learning advanced
CO3	To compute directional derivative, maximum or minimum rate of change and optimum value of functions of several variables.
CO4	To compute the areas and volumes using multiple integral techniques.
CO5	To perform matrix computation in a comprehensive manner.
CO6	
BACHELOR OF COMPUTER Engg.(BE)	
SEMESTER II	
3110013	ENGINEERING GRAPHICS & DESIGN
	Course Outcomes
CO1	know and understand the conventions and the methods of engineering drawing
CO2	Interpret engineering drawings using fundamental technical mathematics
CO3	Construct basic and intermediate geometry and comprehend the theory of projection
CO4	Improve their visualization skills so that they can apply these skills in developing new products
CO5	Improve their technical communication skill in the form of communicative drawings
CO6	Use computer software for engineering drawing
3110015	Mathematics-2
	Course Outcomes
CO1	To apply mathematical tools needed in evaluating vector calculus and their usage like Work, Circulation and Flux.
CO2	To apply the laplace transform as tools which are used to solve differential equations and fourier integral representation.
CO3	To apply effective mathematical tools for the solutions of first order ordinary differential equations
CO4	To apply effective mathematical methods for the solutions of higher order ordinary differential equations.
CO5	To use series solution methods and special functions like Bessels' functions.
CO6	
3110005	BASIC ELECTRICAL ENGINEERING
	Course Outcomes
CO1	Apply fundamental electrical laws and circuit theorems to electrical circuits.
CO2	Analyze single phase and three phase AC circuits.
CO3	Describe operating principle and applications of static and rotating electrical machines.
CO4	Comprehend electrical installations, their protection and personnel safety.
CO5	
CO6	
3110012	WORKSHOP/MANUFACTURING PRACTICES

Course Outcomes	
CO1	Understand various manufacturing processes in machine shop and perform basic operations of welding, fitting, smithy and carpentry work a) perform basic operations of welding, fitting, smithy and carpentry work b) Explain various manufacturing processes in machine shop
CO2	Discuss application of plumbing fitting, masonry items and about electric welding and glass cutting for various engineering
CO3	Measure different electrical quantities and trouble shoot electrical and electronics appliances
CO4	Conduct experiments with various kits such as Raspberry and Arduino for embedded system development
CO5	Use basic commands of computer operating systems
CO6	
3110018	PHYSICS
	Course Outcomes
CO1	The student will gain knowledge of basic theoretical and mathematical concept of electronic materials.
CO2	The student will demonstrate understanding of basic principles, properties and applications associated with semiconducting materials.
CO3	The student will demonstrate understanding of basic theory and properties associated with optoelectronic materials.
CO4	The student will gain knowledge of the different measurements techniques to characterize various semiconducting, electrical and
CO5	The student will demonstrate understanding of basic theory, properties and applications of Superconductivity.
CO6	
3110002	ENGLISH
	Course Outcomes
CO1	Use various forms of vocabulary in varied situations in oral and written communication.
CO2	Understand the phonetics and the transcription pattern to learn correct pronunciation.
CO3	Comprehend the dynamics of various rules of grammar and check its validation while they speak and write language
CO4	Use grammar effectively to make themselves competent Listener, Speaker, Reader and Writer by exposing to various set of situations.
CO5	Write various formal and informal documents of day to day life and professional set up.
CO6	Demonstrate the qualities of writing in diverse situation by using the nuances such as conciseness, clarity, accuracy, organization, and coherence.
Average	

BACHELOR OF COMPUTER Engg.(BE)
SEMESTER III

3130006	Subject Name
	Probability & Statistics(3130006)
C01	understand the terminologies of basic probability, two types of random variables and their probability functions
C02	observe and analyze the behavior of various discrete and continuous probability distributions
C03	understand the central tendency, correlation and correlation coefficient and also regression
C04	apply the statistics for testing the significance of the given large and small sample data by using t- test, F- test and Chi-square test
C05	understand the fitting of various curves by method of least square
C06	

	Data Structures(3130702)
	Course Outcomes
C01	Define and classify various data structures, storage structures and common operations on them.
C02	Create various linear data structures with their representation and perform different operations on them
C03	Create various nonlinear data structures with their representation and perform different operations on them.
C04	Apply various searching sorting techniques on data set.
C05	Solve the given a problem using an appropriate data structure to achieve optimal performance and compare its performance with other possible data structures
C06	

	Effective Technical Communication(3130004)
	Course Outcomes
C01	Define and discuss dynamics of Verbal and Non Verbal aspects of Communication
C02	Write various formal documents of technical and professional communication
C03	Communicate in diverse formal situations taking place in organizations
C04	Illustrate and examine the knowledge of ethical aspects of engineering

C05	Demonstrate and explain social and professional etiquettes
C06	Plan self-development and practice self-assessment

Database Management Systems(3130703)	
Course Outcomes	
C01	Recognize the various elements of Database Management Systems
C02	Given a problem statement, identify the entities and their relations and draw an E-R diagram and design database applying normalization
C03	Solve the given problem using Relational Algebra, Relational Calculus, SQL and PL/SQL
C04	Apply and relate the concepts of transaction, concurrency control, recovery and security in database
C05	Recognize the purpose of query processing, optimization and demonstrate the SQL query evaluation
C06	

Digital Fundamentals(3130704)	
Course Outcomes	
C01	Solve the given problem using fundamentals of Number systems and Boolean algebra
C02	Analyze working of logic families and logic gates and design the simple circuits using various gates for a given problem
C03	Design and implement Combinational and Sequential logic circuits and verify its working
C04	Examine the process of Analog to Digital conversion and Digital to Analog conversion
C05	Implement PLDs for the given logical problem
C06	

Indian Constitution(3130007)	
Course Outcomes	
C01	Enhance human values , create awareness about law enactment and importance of Consitution
C02	To Understand the Fundamental Rights and Fundamental Duties of the Indian Citizen to instill morality, social values, honesty, dignity of life and their social Responsibilities

C03	Create Awareness of their Surroundings, Society, Social problems and their suitable solutions while keeping rights and duties of the citizen keeping in mind.
C04	Understand distribution of powers and functions of Local Self Government
C05	Understand the National Emergency, Financial Emergency and their impact on Economy of the country
C06	
BACHELOR OF COMPUTER Engg.(BE)	
SEMESTER IV	

PRINCIPLES OF ECONOMICS AND MANAGEMENT(3140709)	
Course Outcomes	
C01	Analyze how elasticity affects revenue.
C02	Relate production function and cost function.
C03	Analyze the optimal quantity and pricing decisions of firms in different market structures (perfect competition, monopoly, monopolistic competition) to achieve profit maximization.
C04	Describe the basic principles of management: planning, organizing, controlling, and directing.
C05	Analyze ethical dilemmas faced by business and managers.

Computer Organization & Architecture (3140707)	
Course Outcomes	
C01	Identify and explain the basic structure and functional units of a digital computer.
C02	Identify the role and working of various functional units of a computer for execution of instruction.
C03	Design processing unit using the concepts of ALU and control logic design.
C04	Design interfacing of memory and I/O modules with CPU.
C05	Implement assembly language programs and execute them.
C06	Compare performance of different types of computer architectures

Object Oriented Programming -I (3140705)	
Course Outcomes	
C01	Use various Java constructs, features and libraries for simple problems.

C02	Demonstrate how to define and use classes, interfaces, create objects and methods, how to override and overload methods, compile and execute programs.
C03	Write a program using exception handling, multithreading with synchronization.
C04	Write a program using Files, binary I/O, collection Frameworks for a given problem.
C05	Design and develop GUI based applications in a group using modern tools and frameworks.
C06	

	Operating System (3140702)
	Course Outcomes
C01	Analyze the structure of OS and basic architectural components involved in OS design
C02	Compare and contrast various CPU scheduling algorithms.
C03	Evaluate the requirements for the process synchronization and co-ordination in contemporary operating system.
C04	Analyze various algorithms for memory management, I/O management and security aspects of operating system.
C05	Write shell scripts in Unix/Linux O.S and write simple programs using kernel system calls. Also understand virtualization concept.
C06	

3140708	Discrete Mathematics(3140708)
	Course Outcomes
C01	To understand the basic principles of sets and operations in sets and apply counting principles to determine probabilities. To determine the domain and range of a function, identify one-to-one functions, perform the composition of functions and apply the properties of functions to application problems.
C02	To write an argument using logical notation and determine if the argument is or is not valid. To simplify and evaluate basic logic statements including compound statements, implications, inverses, converses, and contrapositives using truth tables and the properties of logic. To express a logic sentence in terms of predicates, quantifiers, and logical connectives.
C03	To demonstrate an understanding of relations and to determine their properties. Be familiar with recurrence relations.
C04	To understand and use the properties of algebraic structures.

C05	To demonstrate different traversal methods for trees and graphs. Model problems in Computer Science using graphs and trees.
C06	
BACHELOR OF COMPUTER Engg.(BE)	
SEMESTER V	

Professional Ethics(3150709)	
Course Outcomes	
C01	Awareness of types of ethical challenges and dilemmas confronting members of a range of professions (business, media, police, law, medicine, research).
C02	Identify and describe relevant theoretical concepts related to professional ethics in engineering.
C03	Understand the basic perception of profession, professional ethics, various moral issues & uses of ethical theories.
C04	Distinguish among morals, values, ethics, and the law and to explore how they each impact engineering practice.
C05	Apply learning from Indian history and ethos to ethical practices in engineering.

Python for Data Science(3150713)	
Course Outcomes	
C01	Apply various Python data structures to effectively manage various types of data
C02	.Explore various steps of data science pipeline with role of Python.
C03	Design applications applying various operations for data cleansing and transformation.
C04	Use various data visualization tools for effective interpretations and insights of data
C05	Perform data Wrangling with Scikit-learn applying exploratory data analysis.
C06	

Analysis and Design of Algorithms(3150703)	
Course Outcomes	
C01	Analyze the asymptotic performance of algorithms
C02	Derive and solve recurrences describing the performance of divide-and-conquer algorithms.
C03	Find optimal solution by applying various methods.

C04	Apply pattern matching algorithms to find particular pattern.
C05	Differentiate polynomial and nonpolynomial problems.
C06	Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems, when appropriate.

Computer Networks(3150710)	
Course Outcomes	
C01	Explain the basic terminologies used in networking and layered architecture of computer network
C02	Comprehend basic protocols of application layer and how they can be used to assist in network design and implementation.
C03	Describe and implement the essential principles of a connectionless and connection-oriented protocols used for reliable data transfer, flow control and congestion control
C04	Design network architecture, assign IP addressing and apply various routing algorithms to find shortest paths for network-layer packet delivery.
C05	Illustrate different link layer terminologies like error detection-correction, Multiple access protocol and Link layer addressing used in network.
C06	

Software Engineering(3150711)	
Course Outcomes	
C01	Prepare SRS (Software Requirement Specification) document and SPMP (Software Project Management Plan) document
C02	Apply the concept of Functional Oriented and Object Oriented Approach for Software Design
C03	Recognize how to ensure the quality of software product, different quality standards and software review techniques
C04	Apply various testing techniques and test plan in
C05	Able to understand modern Agile Development
C06	

Integrated Personality Development Course(3150005)	

Course Outcomes	
CO1	To provide students with a holistic value-based education that will enable them to be successful in their academic, professional, and social lives
CO2	To give the students the tools to develop effective habits, promote personal growth, and improve their wellbeing, stability, and productivity
CO3	To allow students to establish a stronger connection with their family through critical thinking and devolvement of qualities such as unity, forgiveness, empathy, and effective communication.
CO4	To provide students with soft skills that complement their hard skills, making them more marketable when entering the workforce.
CO5	To enhance awareness of India's glory and global values, and to create considerate citizens who strive for the betterment of their family, college, workforce, and nation
CO6	To inspire students to strive for a higher sense of character by learning from role models who have lived principled, disciplined, and value-based lives
BACHELOR OF COMPUTER Engg.(BE)	
SEMESTER VI	

Microprocessor and Interfacing (3160712)	
CO1	Demonstrate the various features of microprocessor, memory and I/O devices including concepts of system bus.
CO2	Identify the hardware elements of 8085 microprocessor including architecture and pin functions and programming model including registers, instruction set and addressing modes.
CO3	Select appropriate 8085 instructions based on size and functions to write a given assembly language program.
CO4	Design a given interfacing system using concepts of memory and I/O interfacing.
CO5	Demonstrate the features of advance microprocessors.

Web Programming(3160713)	
Course Outcomes	

C01	Use the various HTML tags with appropriate styles to display the various types of contents effectively
C02	Develop the dynamic web pages using HTML, CSS and JavaScript applying web design principles to make pages effective.
C03	Develop the server side PHP scripts using various features for creating customized web services.
C04	Write the server side scripts for designing web based services with database connectivity.
C05	Develop a web application using advanced web programming features including AJAX and JQuery using concepts of Web API.
C06	

	Theory Of computation(3160704)
	Course Outcomes
C01	Use the concepts and techniques of discrete mathematics for theoretical computer science.
C02	Identify different formal languages and their relationship.
C03	Classify and construct grammars for different languages and vice-versa.
C04	Build finite automata, push down automata and turing machine.
C05	Analyze various concepts of undecidability and Computable Function and Discuss analytically and intuitively for problem-solving situation.
C06	

	IOT and Applications (3160716)
	Course Outcomes
C01	Demonstrate the architecture and functioning of IoT systems including the sensors and microcontrollers with their interfacing and software need considering application areas.
C02	Diagnose the various IoT protocols with detailing of their elements and overall functioning within IoT systems for efficient communication.
C03	Design an IoT system to take the benefit of the Clouds for computing and storage considering security issues.
C04	Leverage the benefits of IoT technologies for automating the various real-life challenges in various application areas.
C05	Develop the software components of IoT system using Arduino/Raspberry Pi Programming.
C06	

Advanced Java Programming(3160707)	
Course Outcomes	
CO1	Implement Networking and Data base connectivity in Java for given application
CO2	Implement webpage with dynamic content and server side web application using Servlet and JSP
CO3	Use web application framework JSF to build user interfaces
CO4	Use Object Relation Mapping using Hibernate to build database dependent applications
CO5	Apply Model-View-Controller architecture to build complex client-server applications
CO6	

Integrated Personality Development Course(3160003)	
Course Outcomes	
CO1	To provide students with a holistic value-based education that will enable them to be successful in their academic, professional, and social lives
CO2	To give the students the tools to develop effective habits, promote personal growth, and improve their wellbeing, stability, and productivity
CO3	To allow students to establish a stronger connection with their family through critical thinking and devolvement of qualities such as unity, forgiveness, empathy, and effective communication
CO4	To provide students with soft skills that complement their hard skills, making them more marketable when entering the workforce
CO5	To enhance awareness of India's glory and global values, and to create considerate citizens who strive for the betterment of their family, college, workforce, and nation
CO6	To inspire students to strive for a higher sense of character by learning from role models who have lived principled, disciplined, and value-based lives
BACHELOR OF COMPUTER Engg.(BE)	
SEMESTER VII	

Cloud Computing(3170717)	
Course Outcomes	
CO1	Compare the strengths and limitations of cloud computing

C02	Identify the architecture, infrastructure and delivery models of cloud computing
C03	Apply suitable virtualization concept.
C04	Choose the appropriate cloud player, Programming models and approach
C05	Address the core issues of cloud computing such as security, privacy and interoperability
C06	

	Digital Forensics(3170725)
	Course Outcomes
C01	Describe Forensic science and Digital Forensic concepts
C02	Determine various digital forensic Operandi and motive behind cyber attacks
C03	Interpret the cyber pieces of evidence, Digital forensic process model and their legal perspective.
C04	Demonstrate various forensic tools to investigate the cybercrime and to identify the digital pieces of evidence
C05	Analyze the digital evidence used to commit cyber offences.
C06	

	Compiler Design(3170701)
	Course Outcomes
C01	Understand the basic concepts; ability to apply automata theory and knowledge on formal languages.
C02	Ability to identify and select suitable parsing strategies for a compiler for various cases. Knowledge in alternative methods (top-down or bottom-up, etc).
C03	Understand backend of compiler: intermediate code, Code optimization Techniques and Error Recovery mechanisms
C04	Understand issues of run time environments and scheduling for instruction level parallelism
C05	
C06	

	Artificial Intelligence(3170716)
	Course Outcomes
C01	Understand the search technique procedures applied to real world problems
C02	Understand and use various types of logic and knowledge representation schemes

C03	Understand various Game Playing techniques and apply them in programs
C04	Gain knowledge in AI Applications and advances in Artificial Intelligence
C05	Use Prolog Programming language using predicate logic
C06	

Information security(3170720)	
Course Outcomes	
C01	Explore the basic principles of the symmetric cryptography and techniques with their strengths and weaknesses from perspective of cryptanalysis
C02	Implement and analyze various symmetric key cryptography algorithms and their application in different context.
C03	Compare public key cryptography with private key cryptography and Implement various asymmetric key cryptography algorithms.
C04	Explore the concept of hashing and implement various hashing algorithms for message integrity
C05	Explore and use the techniques and standards of digital signature, key management and authentication
C06	

Machine Learning(3170724)	
Course Outcomes	
C01	Explore the fundamental issues and challenges in Machine Learning including data and model selection and complexity
C02	Appreciate the underlying mathematical relationships within and across Machine Learning algorithms
C03	Evaluate the various Supervised Learning algorithms using appropriate Dataset
C04	Evaluate the various unsupervised Learning algorithms using appropriate Dataset
C05	Design and implement various machine learning algorithms in a range of real-world applications
C06	