Program: B.Sc - Computer Science, Mathematics, Electronics (CME)				
Computer Science				
PO Code	**Programme Outcomes**			
PO1	Gain theoretical and practical knowledge in the core areas of Computer Science including open source software, application packages and other resources, apply them effectively to design and develop solutions to diverse problems.			
PO2	Inculcate life-long learning, work in teams effectively, equip with moral values and professional ethics to take-up responsibilities and reach out to the societal needs.			
Semester	**CourseCode**	**CourseName**	**COCode**	**CO**
I	COM1CFPA	Computer Fundamentals and Problem Solving	CO1	Understand the fundamentals of Computers and apply the principles of number system, binary codes, Boolean algebra to minimize logic expressions
			CO2	Understand the working of Flip-Flops , Decoders, Encoders, Multiplexers, Adders, Registers and Counters
			CO3	Analyze the problem and design efficient algorithms using problem solving techniques
			CO4	Analyze control structures and functions to solve the given problem
			CO5	Understand and implement different Operations on arrays, pointers, structures and unions
			CO6	Implement file Operations in C programming for a given application
II	COM2DSA	Data Structures	CO1	Understand fundamental concepts of data structures, space and time complexity
			CO2	Design algorithms for various operations (creation,

					insertion, deletion and traversal) on linear data structures
			CO3		Design algorithms for various operations (creation, insertion, deletion and traversal) on non-linear data structures
			CO4		Explain the applications of data structures
			CO5		Implement various searching and sorting techniques
			CO6		Implement the data structures using a programming language
III	COM3OSUPA	Operating Systems and Unix Programming	CO1		Understand the structure and functionalities of an Operating System and use system calls to perform process operations in UNIX.
			CO2		Understand CPU Scheduling algorithms.
			CO3		Describe different memory management techniques.
			CO4		Describe different disk space allocation methods and free space management techniques.
			CO4		Learn basic UNIX commands and apply to manage file processing operations, filters and system administration.
			CO5		Write and execute shell scripts to perform different tasks.
IV	COM4SDA	Software Engineering and Database Masnagement Systems	CO1		Understand software characteristics and process models
			CO2		Explore different phases of Software Development Life Cycle
			CO3		Understand and apply software testing methods on simple applications
			CO4		Understand DBMS architecture and data models
			CO5		Gain knowledge of relational data base concepts and build normalized databases

			CO6	Design DML, DCL,TCL queries to extract information from the databases
V	COM5OOPCA	Object Oriented Programming Concepts using Java	CO1	Understand object oriented principles and analyze language fundamentals
			CO2	Apply the principles of Object oriented programming and write simple java programs, debug and execute them
			CO3	Handle exceptions efficiently and apply threading techniques to improve program efficiency
			CO4	Understand the hierarchy of I/O streams and write programs to handle file operations
			CO5	Design dynamic and interactive applets and implement event handling mechanism
			CO6	Design and develop applications with Graphical User Interface
	COM5WPA	Web Programming	CO1	Design and develop web pages using HTML, Javascript, DHTML and XML
			CO2	Understanding the .net architecture and apply Object Oriented programming concepts to model real world objects
			CO3	Understand C# concepts
			CO4	Getting introduced to ASP.net techniques and controls
			CO5	Gain knowledge of state management and data binding
VI	COM6CGA	Computer Graphics	CO1	Familiarize with graphics display devices and its applications
			CO2	Understand OpenGL application programming interface to build graphics applications
			CO3	Learn basic graphics algorithms to build simple objects and apply geometric

				transformations on 2D & 3D objects
			CO4	Understand clipping algorithms and apply it for line, point and text clipping
			CO5	Comprehend graphics visualization techniques in 3D scenes
			CO6	Learn various graphics interactive programming techniques to create animations
	COM6ECNC	Computer Networks	CO1	Understand the evolution of computer networks through OSI model and protocols
			CO2	Know the physical layer and procedures involved in data transmission, signal encoding, multiplexing and switching mechanisms
			CO3	Familiarize the role of Media Access Control(MAC) Sub layer, IEEE standards for LANs and Error Detection and Correction of codes through the Data Link Layer
			CO4	Understand the importance of Routing Algorithms, Congestion Control and elements of Internet transfer protocols in the transport layer
			CO5	Understand the purpose of DNS, Cryptography and Firewalls to demonstrate security and authentication
Mathematics				
PO Code	**Programme Outcomes**			
PO1	Enables the students to take up advanced studies in the core subjects and enable them to find opportunities in careers in Science and Technology and Management where a high level of competence and dependence on many of the science subjects is demanded.			

PO2	Know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand.			
PO3	Formulate and develop mathematical arguments in a logical manner.			
PO4	Acquire good knowledge and understanding in advanced areas of mathematics and statistics, chosen by the student from the given courses.			
PO5	Understand, formulate and use quantitative models arising in physical sciences, business and other contexts.			
Semester	**CourseCode**	**CourseName**	**COCode**	**CO**
I	MAT1MAI	Mathematical Analysis-I	CO1	. Define and recognize the basic properties of the field of real numbers. Define and recognize the basic properties of the field of real numbers
			CO2	Improve and outline the logical thinking.
			CO3	. Have the knowledge of the series of real numbers and convergence.
			CO4	Define and recognize the series of real numbers and convergence
			CO5	Shown the ability of working independently and with groups.
			CO6	Studying Leibnitz theorem – Roll's theorem, Langrange's Mean Value theorem, Taylor's theorem- Maclarurin's expansion. theorem and Cauchy criteria.
II	MAT2MAIIA	Mathematical Analysis-II	CO1	. Define and recognize the differentiability of real functions and its related theorems
			CO2	Have the knowledge of real functions-limits of functions and their properties. Interpret how to Know the differentiability and related theorems

			CO3	Define and recognize the basic topological properties of R Define and recognize the continuity of real functions ,
			CO4	Interpret how to Know the continuity using the internet.
			CO5	. Studying the differentiability of real functions and related theorems .
			CO6	Skill of solving problems on Fourier series.
III	MAT3DEA	Differential Equations	CO1	Apply the concepts of Ordinary Differential Equations and Partial Differential Equations for their resolution and developed the knowledge to solve problems in higher order ordinary linear differential equations, Methods of finding Complementary function and Particular integral.
			CO2	Understand the difficulty of solving problems analytically and capable to formulate and solve problems in concepts like simultaneous differential equations, Legendre's linear differential equation and Cauchy's linear differential equation.
			CO3	Recognize and work with problems in Second Order Ordinary Differential Equations with variable coefficient with various methods and developed skills to understand concepts like Special functions.
			CO4	Able to work and apply concepts in Second order linear partial differential equations, canonical form for parabolic, elliptic and hyperbolic equations.
			CO5	Use computational tools to formulate and solve problems of one-dimensional heat and wave equation and

				two-dimensional Laplace equation using Fourier series
			CO6	Analyze real world problems and recognize when partial differential equations are appropriate, formulate problems about them, creatively model these (using technology, if appropriate) to solve the problems using multiple approaches, judge if the results are reasonable, and then interpret and clearly communicate the results.
IV	MAT4AGR	Algebra - Groups and Rings	CO1	Assess properties implied by the definitions of groups and rings.
			CO2	Use various canonical types of groups (including cyclic groups) and canonical types of rings (including Quotient rings).
			CO3	Analyze and demonstrate examples and theorems of subgroups, normal subgroups and quotient groups.
			CO4	Analyze and demonstrate examples of Subring, Integral domains, Ideals, Maximal Ideals and quotient rings.
			CO5	Use the concepts of isomorphism and homomorphism for groups and rings.
			CO6	Produce rigorous proofs of propositions arising in Fundamental theorem of homomorphism in groups and rings.
			CO7	Apply problem-solving using advanced algebraic techniques applied to diverse situations in physics, engineering and other mathematical contexts.
V	MAT5CA	Complex Analysis	CO1	The student realizes the imporatnace of fundamental concepts of complex analysis

					and their role in modern mathematics and applied contexts
			CO2		The student will be able to analyze the ideas of complex differentiation and complex integration in a coherent and meaningful manner and use appropriate techniques for solving related problems and for establishing theoretical results.
			CO3		The student gains knowledge about Complex Number System and understands the relation to other existing number systems
			CO4		The student will develop the critical thinikng ability by proving mathematical conjectures and establishing theorems
			CO5		The student gains competence to understand the operations with complex numbers, use the complex derivatives function, use and operate analytic functions, demonstrate knowledge of integration in the complex plane, use the Cauchy integral theorem and Cauchy integral formula, manipulate and use power series, understand residues and their use in integration, demonstrate the understanding of conformal mappings
			CO6		6. The student will be able to appreciate the significance of differentiability for complex functions and be familiar with the Cauchy-Riemann equations
V	MAT5LAA	Linear Algebra	CO1		Use computational techniques and algebraic skills essential for the study of systems of linear equations, matrix algebra, vector spaces, Eigenvalues

				and eigenvectors, orthogonality and diagonalization. (Computational and Algebraic Skills).
			CO2	Use visualization, spatial reasoning, as well as geometric properties and strategies to model, solve problems, and view solutions, especially in R2 and R3 , as well as conceptually extend these results to higher dimensions. (Geometric Skills).
			CO3	Critically analyze and construct mathematical arguments that relate to the study of introductory linear algebra. (Proof and Reasoning).
			CO4	Use technology, where appropriate, to enhance and facilitate mathematical understanding, as well as an aid in solving problems and presenting solutions (Technological Skills).
			CO5	Communicate and understand mathematical statements, ideas and results, both verbally and in writing, with the correct use of mathematical definitions, terminology and symbolism (Communication Skills).
			CO6	Work collaboratively with peers and instructors to acquire mathematical understanding and to formulate and solve problems and present solutions (Collaborative Skills).
VI	MAT6EEDG	Elementary Differential Geometry	CO1	Compute the curvature and torsion of space curves.
			CO2	Understand the notion of Serret-Frenet frame for space curves.

			CO3	Understand definition of directional derivative and gradient and illustrate geometric meanings with the aid of sketches.
			CO4	Calculate directional derivatives and gradients and apply gradient to solve problems involving steepest ascent and normal vectors to level curves.
			CO5	Compute double integrals and triple integrals and change of variables. Can compute triple integrals in rectangular, cylindrical and spherical coordinates and illustrate its geometric meaning with the aid of sketches, and apply it to compute integrals over regions.
			CO6	Understand the integral theorems: Green's , Gauss divergence and Stoke's and also its applications.
VI	MAT6EOTC	Optimization Techniques	CO1	The student will understand the importance of optimization of industrial process management
			CO2	The student will be able to apply basic concepts of mathematics to formulate an optimization problem
			CO3	The student will analyze and appreciate variety of performance measures for various optimization problems
			CO4	The student can develop and promote research interest in applying optimization techniques in problems of Engineering and Technology
			CO5	The student will be able to solve a multi-objective problem through weighted and constrained methods
VI	MAT6NAA	Numerical Analysis	CO1	Understand the importance of computers and the role of approximations and errors in

				the implementation and development of numerical methods.
			CO2	Gain sufficient information to successfully approach a wide variety of problems dealing with roots of equations.
			CO3	Solve problems involving linear algebraic equations and appreciate the application of these equations in many fields.
			CO4	Approach a wide variety of engineering problems dealing with optimization
			CO5	Enhance their capability to fit curves to data
			CO6	Solve ordinary differential equations and eigenvalue problems
Electronics				
PO Code	**Programme Outcomes**			
PO1	Apply knowledge and skill in the design and development of Electronicscircuits to cater to the needs of Electronic Industry.			
PO2	Acquire in-depth knowledge of Electronic devices, Linear and digital electronics, behaviour of linear and non-linear circuits, Hardware description Language, Microprocessors and Microcontrollers in wider and global perspective, with an ability to discriminate, evaluate, analyze, synthesize and integrate for enhancement of knowledge.			
Semester	**CourseCode**	**CourseName**	**COCode**	**CO**
I	ELE1ECA	Electronic Devices & Circuit Analysis	CO1	Learning about how oscillations can be produced with different frequencies.
			CO2	Analyze a series and parallel resonant circuit.
			CO3	Apply network theorems to analyze the complex electrical circuits.

			CO4	Design a power supply for a given specifications with and without filters.
			CO5	Develop various wave shaping circuits using diodes.
			CO6	Understanding different types and transistors and biasing techniques.
II	ELE2BC	Amplifiers	CO1	Able to analyse various small signal and multistage amplifiers
			CO2	Able to understand the working principle of various power devices
			CO3	able to analyse power amplifers of any specifications and type
			CO4	Familiarize with various parameters of OP-AMP
			CO5	Able to learn different OP-AMP configurations
III	ELE3LDEC	Linear Integrated Circuits & Digital Electronics	CO1	Students will be able to design circuits which would perform mathematical operations using OP-AMP.
			CO2	Students will be able to understand filtering concept, design of all types of filters and oscillators.
			CO3	Students will have a thorough understanding of IC 555 timer operation and its applications.
			CO4	Students will be able to design any regulator of any specifications.
			CO5	Students will be able to represent data in digital codes.
			CO6	Students will be able to perform binary and hexadecimal arithmetic.
			CO7	Able to explain the basic logic operations of NOT, AND, OR, NAND, NOR, and XOR.
			CO8	Able to interpret logic functions, circuits, truth tables, and Boolean algebra expressions.

			CO9	Able to apply the laws of Boolean algebra to simplify circuits and Boolean algebra expressions.
			CO10	Able to use the methods of systematic reduction of Boolean algebra expressions including Karnaugh maps.
IV	ELE4DEC	Digital Design and VHDL programming	CO1	Students will be able to Analyze digital circuits and arrive at suitable conclusions.
			CO2	Students will be able to Design a digital circuit for given problem statement by applying the digital circuit concepts.
			CO3	Students will be able to Apply the knowledge of HDL for modeling and functional verification of digital circuits.
			CO4	Students will be able to Analyze digital circuits using suitable VHDL modeling
			CO5	Students will be able to Design and synthesize a digital circuit for complex systems using VHDL at several level of abstractions: behavioral, structural and data flow.
V	ELE5CIA	Communication I	CO1	The student will be able to understand the basics of noise and Modulation techniques.
			CO2	The student will be able to understand the different modulation techniques.
			CO3	The student will be able to understand the working principle of AM & FM Modulation and analysis of Transmitter and Receivers.
			CO4	The student will be able to apply the concept of Transmission lines and the importance of Antennas and Radars.
			CO5	The student will be able to understand the concept of Television ,Transmission and modern trends in Television.

	ELE5MPIC	Microprocessors & Interfacing	CO1	To understand the different language formats used in programming of Microprocessors
			CO2	To gain knowledge about the architecture and programming concepts of the microprocessor.
			CO3	To apply the acquired knowledge and program the processor.
			CO4	To develop hardware using interfacing concepts and analyze the circuits.
VI	ELE6CIIC	Communication II	CO1	The student will be able to understand digital and pulse modulation.
			CO2	The student will be able to analyze the different digital modulation such as PCM,PAM,PPM,ASK,PSK and QPSK
			CO3	The student will be able to understand the working principle of data communication and its analysis.
			CO4	The student will be able to understand the principle of satellite communication and analysis of CDMA,FDMA and TDMA.
			CO5	The student will be able to understand the concept of Optical fibre communication and light sources.
			CO6	The student will be able to acquire knowledge about Mobile Communication and cellular networks.
	ELE6MCC	8051 Microcontroller	CO1	To distinguish between a microprocessor and a microcontroller.
			CO2	To understand the architecture and programming concepts of 8051 microcontroller
			CO3	To apply the acquired knowledge of programming to solve different logical problems

			CO4	To develop hardware using interfacing concepts and analyze the circuits