MAR ATHANASIUS COLLEGE OF ENGINEERING

KOTHAMANGALAM

COMPUTER SCIENCE ENGINEERING DEPARTMENT

LIST OF COURSE OUTCOMES

B.TECH 2015 SCHEME

SEMESTER	SUBJECT CODE	SUBJECT NAME	CO NO:	CO DESCRIPTION
S1	MA 101	CALCULUS	1	Check convergence of infinite series.
			2	Find maxima and minima of functions two variables.
			3	Apply calculus of vector valued functions in physical applications.
			4	Find area and volume using multiple integrals.
			5	To apply different differential operators to various vector valued functions .
			6	To evaluate different integrals using Green's, Divergence, Stokes' theorem.
S1	PH 100	ENGINEERING PHYSICS	1	Familiarity with the theory of oscillations and the ability to apply it to various systems
			2	Ability to analyze interference in optical systems, ability to apply interferometric techniques in material science
			3	Ability to apply optical polarization in material analysis; familiarity with superconductors and their technical applications
			4	Ability to apply the principles of statistical mechanics and quantum mechanics in order to calculate various physical parameters
			5	To enable the student to utilize ultrasonic waves in material analysis; to gain an ability to determine relevant architectural parameters during the design of rooms having optimal acoustic profile
			6	Familiarity with the theory and applications of laser and optical

				fibres; an ability to utilize optical fibres and optical detectors in various design of devices for sensing
S1	BE 110	ENGINEERING GRAPHICS	1	Draw the projection of points and lines located in different quadrants
			2	Prepare multiview orthographic projections of objects by visualizing them in different positions
			3	Draw sectional views and develop surfaces of a given object
			4	Prepare pictorial drawings using the principles of isometric and perspective projections to visualize objects in three dimensions.
			5	Convert 3D views to orthographic views and vice versa
			6	Obtain multiview projections and solid models of objects using CAD tools
S1	BE 101-05	INTRODUCTION TO COMPUTING AND PROBLEM SOLVING	1	Ability to design algorithmic solution to problems
			2	Ability to convert algorithms to Python programs
			3	Ability to design modular Python programs using functions
			4	Ability to design programswith Interactive input & output,utilizing arithematic expression repetitions,decision arrays
			5	Ability to design programs using File input and File output
			6	Ability to develop recursive solutions
S1	BE 103	INTRODUCTION TO SUSTAINABLE ENGINEERING	1	Students will be able to understand the concept of sustainability
			2	Able to understand the different types of environmental poliution problems and their sustainable solution
			3	Students will be able to calculate the lifecycle analysis and be aware about the various act generated by govt. Of India

			4	Having a broder perspective in thinking for sustainable practies by utilizing the engineeringknowledge and principles gained from this course
			5	Able to get awareness about varoius energy resources especially non renewable.
			6	Students will be aware about the problem faced by urbanisation, industriallisation and povery.
S1	EE 100	BASICS OF ELECTRICAL ENGINEERING	1	An ability to analyze electric circuits (resistive).
			2	Have a basic knowledge about electric and magnetic circuits and their interactions.
			3	Understand AC circuits (both single phase and three phases) and solve any RLC circuits and power measurements in a circuit.
			4	Familiarized with conventional and non conventional sources, their importance and different generation systems and power transmission scheme.
			5	Insight about the principle of operation, construction types and applications of transformers and DC machines.
			6	Gain the knowledge about the principle of operation, construction types and applications of AC machines.
S1	PH 110	ENGINEERING PHYSICS LAB	1	Ability to measure signal parameters using CRO.
			2	Insight into the various features of the Newton's Rings system.
			3	Familiarity with the diffraction pattern of a transmission grating and Familiarity with the diffraction pattern of a reflection grating
			4	Insight into thermo electric effect.
			5	Familiarity with polarizers and analyzers and Familiarity with the working of polarimeters.
S1	CS 110		1	Students are familiarised with basic hardware and software tools

		COMPUTER SCIENCE WORKSHOP	2	Able to write algorithms based on Introduction to computing and problem solving
			3	Able to implement control structures, iterations and recursive functions
			4	Able to implement LISTS,TUPLES AND DICTIONERIES
			5	To implement operation on files
			6	To implement a small micro project using python
S1	EE 110	ELECTRICAL ENGINEERING WORKSHOP	1	Gain knowledge about Electrical wiring accessories cables, wires, switches, fuses. MCB, ELCB, MCCB, etc.
			2	Ability to wire up Fluorescent lamp and light circuit and to use house hold appliances
			3	Ability to wire up conventional house and various wiring schemes like stair case wiring, go down wiring etc
			4	Acquisition of knowledge in power wiring with protecting devices
			5	To wire up inverter connection with all protective measures
			6	Ability to measure up different parameters like voltage, current, power, resistance with conventional meters and equipments
S2	MA102	DIFFRENTIAL EQUATIONS	1	Understand the application of differential equations in engineering problems.
			2	Learn the concepts of solving non – homogeneous linear ODE and apply in various engineering problems.
			3	Understand concepts of Fourier series representation of functions appearing in various engineering problems.
			4	Analyse solution of partial differential equations and utilize it for solving problems.
			5	Ability to analyse one dimensional wave equation and its solution.
			6	Ability to analyse heat transfer equations and its solution.

S2	CY100	ENGINEERING CHEMISTRY	1	Understand the basic concepts of spectroscopy which will be useful in the analysis of new materials for engineering applications.
			2	Understand the basic concepts of electrochemistry to explore the possibilities of electrochemical machining and the applications of batteries.
			3	Learn about the various thermal analysis methods which will be useful in understanding the behavior of engineering materials at various temperatures, also learn the principles of chromatographic methods.
			4	Learn about polymers and nanomaterials, and understand the principles, applications, and limitations of these cutting-edge materials in various designs.
			5	Gain knowledge about the properties of fuels and lubricants to develop new fuels and lubricants to increase the efficiency of automobiles.
			6	Study various types of water treatment methods including sewage waste water to develop skill for treating industrial waste water.
S2	BE100	ENGINEERING MECHANICS	1	Understand fundamental principles and laws of engineering mechanics.
			2	Apply principles of statics to practical engineering problems.
			3	Determine centroid and moment of inertia of different areas.
			4	Apply concepts of friction to engineering problems.
			5	Apply concept of virtual work to engineering problems.
			6	Understand theories of kinetics & kinematics and energy methods
S2	BE102	DESIGN AND ENGINEERIG	1	Students will be able to identify various problems, define them with clarity and generate creative ideas.
			2	They will be aware of different processes involved in design.
			3	They will be capable of developing a model from the prototypes while

				considering various organizational standards.
			4	They will be able to design quality products by considering safety standards and minimizing the waste generated.
			5	They will be able to follow a product centred approach to make its attributes more user friendly.
			6	They will be aware of the post production aspects of a product.
S2	EC100	BASICS OF ELECTRONICS ENGINEERING	1	Students will be able to identify active and passive components and their specifications.
			2	Student will be able to understand different types of diodes and transistors.
			3	Students will be able to design simple rectifier circuits and will get an idea about oscillators and amplifiers.
			4	Students will be able to design simple amplifier circuits using op-amp and will get the basic concepts about DSO, function generator and multimeter.
			5	Students will be able to understand the concept of radio communication.
			6	Student can understand the mobile and optical communication. Also will be able to get the basic idea about TV, CCTV and DTH.
S2	CS100	COMPUTER PROGRAMMING	1	Identify appropriate C Language constructs to solve problems
			2	Use arrays for matrix multiplication and structures for comples data handling
			3	Analyse problems, identify subtasks and implimenting them as functions / procedures
			4	Impliment algorithms using efficient C programming technics
			5	Explai the concepts of file systems for handling data storage ad apply it for solving problems
			6	Apply sorting and searching technics to solve application programms

S2	CS120	COMPUTER PROGRAMMING LAB	1	Develope and use C programms to impliment various algorithms, and develops the baic concepts and terminology of programming in general
			2	Choose the appropriate loops and decision making statements to handle the situation
			3	Impliment different operations on arrays, strings and use matrices to solve problems
			4	Use structures, union,functions and ponters for real world applications
			5	Impliment file operations and sorting in C programming for database management
S2	CY110	ENGINEERING CHEMISTRY LAB	1	Learn the estimation of hardness by complexometric titration and understand the working of PH meter
			2	Understand the basic principles of spectroscopy and the use of Colorimeter in the estimation of unknown concentration and in the determination of molar absorptivityabsorptivity
			3	Learn titration using potentiometer for the estimation of Fe2+ in Mohr's salt Solution
			4	Understand the estimation of Cl- ions in the given sample of water
			5	Understand the working of conductivity meter and the determination of conductivity of unknown solutions
S2	EC110	BASIC ENGINEERING WORKSHOPS	1	The course helps in identifying different active and passive components and testing of those components
			2	It provides a basic idea on how to use an EDA tool and interpretation of data sheets
			3	It provides knowledge on how to use different electronic instruments.
			4	The workshop helps in attaining knowledge on interconnection of different components on breadboard as well as on PCB using soldering methods

			5	Students will be able to fabricate single sided PCB for simple circuit using manual etching
			6	Students attain knowledge on how to assemble and dismantle desktop computer and also to set up and identify the subsystems of a PA system and TV
S3	MA201	LINEAR ALGEBRA & COMPLEX ANALYSIS	1	Identify analytic functions and harmonic functions.
			2	Identify conformal mappings and some important transformations
			3	Evaluation of integrals using Cauchy integral formula.
			4	Evaluate real definite integrals as application of residue theorem.
			5	Solve any given system of linear equations.
			6	Find the eigenvalues of a matrix and how to diagonalize a matrix.
S3	CS201	DISCRETE COMPUTATIONAL STRUCTURES	1	Identify and apply operations on discrete structures such as sets, relations and functionsin different areas of computing.
			2	Verify the validity of an argument using propositional and predicate logic.
			3	Construct proofs using direct proof, proof by contraposition, proof by contradiction and proof by cases, and by mathematical induction.
			4	Solve problems using algebraic structures.
			5	Solve problems using counting techniques and combinatorics.
			6	Apply recurrence relations to solve problems in different domains
S3	CS202	DISCRETE COMPUTATIONAL STRUCTURES	1	To have clear understanding of positive & negative number representation in computer involving arithematic operations
			2	To impart an understanding of the basic concepts of Boolean algebra and digital systems.
			3	To impart the concept of combinational logic & Implementation of combinational logic

			4	To impart familiarity with the design and implementation of different types of practically used Sequential circuits
			5	To familiarize with design of Registers & Counters
			6	To provide an introduction to use Hardware Description Language
S3	CS203	DISCRETE COMPUTATIONAL STRUCTURES	1	Compare different programming methodologies and define asymptotic notations to analyze performance of algorithms.
			2	Use appropriate data structures like arrays, linked list, stacks and queues to solve real world problems efficiently
			3	Represent and manipulate data using nonlinear data structures like trees and graphs to design algorithms for various applications.
			4	Illustrate and compare various techniques for searching and sorting.
			5	Appreciate different memory management techniques and their significance
			6	Illustrate various hashing techniques.
S3	CS204	DISCRETE COMPUTATIONAL STRUCTURES	1	Students will be aware of the fundamental concepts of electronic devices and circuits for engineering applications.
			2	Students will be able to analyze and design various analog circuits using electronic devices.
			3	Students will understand the working principle, operation and applications of electronic circuits.
			4	The fundamental concepts of operational amplifiers will be known to the students.
			5	Students will be able to analyze and design various operational amplifier circuits for a wide range of applications.
			6	Students will be familiar with the fundamental concepts of various analog ics.

S3	HS210	LIFE SKILLS	1	Communicate effectively (Individual ,mass communication, GD) and write effectively (Report, Letters etc)
			2	Think creatively and critically to solving problems
			3	Work in groups and teams
			4	Exert engineering ethics and values
			5	Become effective leader
S3	CS231	DATA STRUCTURES LAB	1	Appreciate the importance of structures , structural data type &their basic usability in different applications.
			2	Analyse & differentiate different algorithms based on their time complexity.
			3	Implement linear & non linear data structures using linked lists.
			4	Understand & apply various data structures such as stacks ,queues,trees,graphs to solve various computing problems.
			5	Implement various kind of searching & sorting techniques & decide when to choose which technique.
			6	Identify & use suitable data structures & algorithms to solve a real world problem.
S3	CS232	ELECTRONICS CIRCUITS LAB	1	To introduce the working of analog electronic circuits.
			2	To design, implement and demonstrate analog circuits using electronic components.
			3	To provide hands-on experience to the students so that they are able to put theoretical concepts to practice.
			4	To use computer simulation tools such as PSPICE, or Multisim to the simulation of electronic circuits.
			5	To create an ability to develop descriptions, explanations, predictions and models using evidence.
			6	To create an ability to communicate effectively the scientific procedures and explanations about the experiments in oral/report forms.

S4	MA202	PROBABILITY DISTRIBUTIONS, TRANSFORMS AND NUMERICAL METHODS	1	To have a concept of discrete probability density functions and probability distributions like binomial distribution and Poisson distribution
			2	To have a concept of continuous probability density functions and probability distributions like Normal, Gamma and Exponential distribution
			3	To use Fourier integrals and Fourier transforms in solving various engineering problems
			4	To understand the concept of Laplace and inverse Laplace transforms and apply them to solve ordinary differential equations .
			5	To use the iteration and interpolation methods to solve engineering problems
			6	To use the concept of numerical methods and their applications to solve linear systems and first order ODE's
S4	CS202	COMPUTER ORGANIZATION AND ARCHITECTURE	1	Familiarize the student the basic structure of digital computer
			2	Students should get a clear idea about the various algorithm used inside the system.
			3	Handling of various I/O device and connection to the processor are discussed.
			4	Various memory component and the mapping concepts are delivered to the student.
			5	Get a clear idea of design of processor logic and ALU compounds
			6	Make the student able to design a control logic for the various problems
S4	CS204	OPERATING SYSTEMS	1	Identify the significance of operating system in computing devices and demonstarate the use of system calls
			2	To implement concepts related to process management
			3	To understand how critical section works and to implement classic problems of synchronisation

			4	Compare and illustrate various process scheduling algorithms and methods to avoid deadlocks
			5	Apply appropriate memory and file management schemes.
			6	Illustrate various disk scheduling algorithms and appreciate the need of access control and protection in Operating System.
S4	CS206	OBJECT ORIENTED DESIGN AND PROGRAMMING	1	To apply Object Oriented Principles in Software design process
			2	To develop Java programs for real applications using Java Constructs and Libraries
			3	To understandand apply various Object Oriented features like inheritance,data abstraction, encapsulation and polymorphism to solve various computing problems using Java language.
			4	To implement Exception Handling in Java
			5	To use graphical user interface and Event Handling in Java
			6	To develop and deploy Applet in Java
S4	CS208	PRINCIPLES OF DATABASE DESIGN	1	Students will be able to define, explain and illustrate the fundamental concepts of databases
			2	Students will be able to construct an Entity-Relationship (E-R) model from specifications and to perform the transformation of the conceptual model into corresponding logical data structures.
			3	Students will be able to model and design a relational database following the design principles.
			4	Students will be able to develop queries for relational database in the context of practical applications
			5	Students will be able to define, explain and illustrate fundamental principles of data organization, query optimization and concurrent transaction processing.
			6	Students will be able to appreciate the latest trends in databases

				Course Outcomes
S4	HS200	BUSINESS ECONOMICS	1	Make investment decisions based on capital budgeting methods in alignment microeconomic and macroeconomic theories.
			2	Able to analyse the profitability of the firm, economy of operation, determination of price under various market situations with good grasp on the effect of trade cycles in business.
			3	Gain knowledge on monetary theory, measures by RBI in controlling interest rate and emerging concepts like bitcoin.
			4	Gain knowledge of elementary accounting concepts used for preparing balance sheet and its interpretation.
			5	Identify the need for various credit control methods and the significance of national income concepts.
			6	Understand the functioning of the Indian capital and money markets and the tax system.
S4	CS232	FREE AND OPEN SOURCE SOFTWARE LAB	1	Identify and apply various Linux commands
			2	Develop shell scripts and GUI for specific needs
			3	To implement advanced Linux commands
			4	To implement version control using GIT.
			5	To implement text evaluation using Per,Awk
			6	To get introduced with virtualisation environment and to install software packages.
S4	CS234	DIGITAL SYSTEMS LAB	1	Students will be familiarized with basic gates ,universal gates and axioms and laws of Boolean Algebra
			2	An ability to design and implement adders and subtratctos using logic gates and ICS
			3	An ability to understand ,analyse and design various combinational circuits like code converters ,mulitplexers

			4	Studenbts will be familiarised with the implementation of flip flops and logic gates and flip flop IC
			5	Students will develop an ability to design sequential circuit such as counters usinf flip flop IC
			6	Students will have a basic idea of implementing circuits using hardware description language such as VHDL
S5	CS301	THEORY OF COMPUTATION	1	Classify formal languages regular,context free, context sensitive and unrestricted languages
			2	Design of finite automata, regular grammar, regular expression and Myhill_Nerode relation for regular languages
			3	Properties of regular sets and context free grammar
			4	Design of push down automata and context free grammar representaions for CFL
			5	Design tms for accepting recursively enumerable languages
			6	Understand the notations of decidablity and undecidability of problems
S5	CS303	SYSTEM SOFTWARE	1	Students will be able to distinguish different categories of system software
			2	Students will be able to employ the features of an assembler
			3	Students will be able to design, analyze and implement one pass, two pass or multi pass assembler
			4	Students will be able to design, analyze and implement loader and linker
			5	Students will be able to design, analyze and implement macro processor
			6	Students will be able to critique the features of modern editing/ debugging tools
S5	CS305	MICROPROCESSO RS AND MICROCONTROL LERS	1	Describe the different modes of operation of 8086
			2	Design and develop assembly level programming in 8086

			3	Familarice the students with the concept of interrupt
			4	Interface the microprocessor with the various external devices
			5	Analyze and compare the fectures os and microcontrollersf microprocessor
			6	Design and develop assembly level programming in 8051
S5	CS307	DATA COMMUNICATION	1	Student is able to apply time domain and frequency domain concepts of signals in data communication.
			2	Student is able to compare and select transmission media based on transmission impairments and channel capacity.
			3	Student is able to select and use appropriate signal encoding techniques for a given transmission scenario.
			4	Student is able to select and use appropriate signal multiplexing techniques for a given scenario.
			5	Design suitable error detection and error correction algorithms to achieve error free data communication.
			6	Student is able to understand spread spectrum and different switching techniques.
S5	CS309	GRAPH THEORY AND COMBINATORICS	1	Demonstrate the knowledge of fundamental concepts in graph theory, including properties and characterization of graphs and trees
			2	Use graphs for solving real life problems.
			3	Distinguish between planar and non-planar graphs and solve problems.
			4	Develop efficient algorithms for graph related problems in different domains of engineering and science
			5	Develop algorithms for finding the cut-set vertices and fundamental circuits for solving engineering problems

			6	Develop algorithms for finding spanning tree of a graph
S5	CS361	ELECTIVE 1 (SOFT COMPUTING)	1	Basic knowledge of awareness about neural network
			2	Ability to deal with application and architecture of artificial neural networks to formulate intelligent solutions
			3	Basic knowledge about fuzzy sets and operations
			4	Apply knowledge in fuzzy systems
			5	Identify and select fuzzy inference system
			6	Understand the genetic algorithm concepts and their applications
S5	CS341	DESIGN PROJECT	1	Make them analyse a problem
			2	Increase communicato skill by interacting with others for opinion collection
			3	Familarise with the preparation for presentation
			4	Develop their presentational skill
			5	Make them able to present a product in a appretiatable form
			6	Improve their technical writing skills
S5	CS331	SYSTEM SOFTWARE LAB	1	Implement memory management ,page replacement & file allocation techniques
			2	Implement deadlock avoidance algorithms such as bankers algorithm
			3	Implement synchronization techniques using semaphore
			4	Implement system software such as two pass assembler
			5	Implement system software such as single pass assembler
			6	Implement system software such as loaders and macro processor
S5	CS333	APPLICATION SOFTWARE	1	Implement a database for a given problem using database design principles

		DEVELOPMENT LAB	2	Apply stored programming concepts (PL-SQL) using cursors and triggers
			3	Use GUI, event handling and database connectivity to develop and deploy applications and applets
			4	Analyze problems using logical thinking and develop solutions in database
			5	Students can extract complex connections and consraintsin a given scenario based on which they develop large scale systems
			6	Work together in a group to solve problems developing medium sized projects
S6	CS302	DESIGN AND ANALYSIS OF ALGORITHM	1	Analyze a given algorithm and express its time and space complexities in asymptotic notations
			2	Solve recurrence equations using Iteration Method, Recurrence Tree Method and Master's Theorem. Such as binding, scope and referenceing environment
			3	Compare Dynamic Programming and Divide and Conquer Strategies.design algorithms for various applications
			4	Solve Optimization problems using Greedy strategy.
			5	Design efficient algorithms using Back Tracking and Branch Bound Techniques for solving problems
			6	Classify computational problems into P, NP, NP-Hard and NP-Complete
S6	CS304	COMPILER DESIGN	1	Explain the concept and different phases of compilation with compile time error handling
			2	Represent language tokens using regular expressions, context free grammor and finite automata and design lexical analysis for a language
			3	Compare top down with bottom up parses and develop appropriate

				parsesto produce parse tree representation of the input
			4	Bulid intermediate code for statements in high level language
			5	Design syntax directed translation schemes for a given context free grammar
			6	Apply optimization techniques to intermediate code and generate machine code for high level language programm
S6	CS306	COMPUTER NETWORKS	1	Summarise the various concepts of computer networks and form an outline of the different tasks involved in a device connected to a network.
			2	Analyze various data link layer design issues and protocols
			3	Examine and compare various routing protocols.
			4	Anaze and inspect various congestion control algorithms.
			5	Analyze and assess various network layer protocols.
			6	List and assess various transport layer and application layer protocols.
S6	CS308	SOFTWARE ENGINEERIG AND PROJECT MANAGEMENT	1	Identify suitable life cycle models to be used.
			2	Analyze a problem and identify abd define computing requirements to the problem
			3	Translate a requirement specification to a design using using an appropriate software engineering technology
			4	Formulate appropriate testing testing strategy for the given software system
			5	Develop software projects based on current technology,by managing resources economically and keeping ethical values
			6	To familiarize the students with the concepts of software configuration management and CASE tools

S6	HS300	PRINCIPLES OF MANAGEMENT	1	To develop ability to critically analyse and evaluate a variety of management practices in the contemporary context
			2	To understand and apply a variety of management and organisational theories in practice
			3	To be able to mirror existing practices or to generate their own innovative management competencies, required for today's complex and global workplace
			4	To be able to critically reflect on ethical theories and social responsibility ideologies to create sustainable organisations
			5	Evaluate the global context for taking managerial actions of planning, organizing and controlling
S6	CS368	ELECTIVE 2 (WEB TECHNOLOGY)	1	Understand different components in web technology and to know about CGI and CMS
			2	Develop interactive webpages using HTML/XHTML
			3	Present a professional document using Cascaded Style Sheet
			4	Construct websites for user interaction using Javascript and Jquery
			5	Know the different information interchande formats likexml and json
			6	Develop web applications using PHP
S6	CS332	MICROPROCESSO R LAB	1	Develop assembly language programs using software interrupts and assembly directives
			2	Interface I/O devices to microprocessor through ALP.
			3	Interface I/O devices to microcontrollers through ALP.
			4	Use logical concepts to solve problems in lower level languages
			5	Solve problems analytically and logically working around limitations

			6	Scrutinize problem scenario and select appropriate hardware and program them
S6	CS334	NETWORK PROGRAMMING LAB	1	Students will be able to use network related commands and network configuration files in Linux
			2	Students will be able to develop client-server communication
			3	Students will be able to develop inter process communication mechanisms
			4	Students will be able to use operating system and network application programs
			5	Students will be able to use analyze network traffic using network monitoring tools
			6	Students will be able configure the network with various services
S6	CS352	COMPREHENSIVE EXAM	1	Students will be confident in discussing the fundamental aspects of any engineering problem or situation and give answers dealing with them.
			2	Students are exposed to the recruitment process.
			3	Improve general engineering knowledge.
			4	Improve logical thinking ability of students.
			5	Improve knowledge in basic courses relevant to branch of study.
S7	CS401	COMPUTER GRAPHICS	1	Compare various graphics devices.
			2	Analyze and implement algorithms for line drawing, circle drawing and polygon filling.
			3	Apply geometrical transformation on 2D and 3D objects.
			4	Analyze and implement algorithms for clipping.
			5	Apply various projection techniques on 3D objects.summarize visible surface detection methods.
			6	Interpret various concepts and basic operations of image processing.

S7	CS403	PROGRAMMING PARADIGMS	1	Compare scope and binding of names in different programming languages and to analyze control flow structures in different programming languages
			2	Appraise data types in different programming languages
			3	Analyze different control abstraction mechanisms
			4	Appraise constructs in functional, logic and scripting languages
			5	Analyze object oriented constructs in different programming languages
			6	Compare different concurrency constructs and to interpret the concepts of run-time program management
S7	CS405	COMPUTER SYSTEM ARCHITECTURE	1	Summarize different parallel computer models and to analyze the advanced processor technologie
			2	Interpret memory hierarchy
			3	Compare different multiprocessor system interconnecting mechanisms and interpret the mechanisms for enforcing cache coherence
			4	Analyze different message passing mechanisms
			5	Analyze different pipe lining techniques
			6	Appraise concepts of multithreaded and data flow architectures
S7	CS407	DISTRIBUTED COMPUTING	1	The students have an understanding of the requirement and significance of distributed systems in daily life.
			2	Students are capable of understanding the architecture and functioning of various distributed systems by deriving the details from various models.
			3	Students understand the significance as well as different ways of implementing inter process

				communication in distributed systems
			4	Students know the principles to implement distributed file systems in a distributed system ensuring transparency, consistency and fault tolerance
			5	Students are capable of analyzing the different concurrency control mechanisms in distributed transactional environment and select the appropriate one
			6	Students understand the need for mutual exclusion and election algorithms in distributed systems and know how to implement them
S7	CS409	CRYPTOGRAPHY AND NETWORK SECURITY	1	Summarise the different classical encryption techniques
			2	Identify mathematical ocncept for different cryptographic techniques.
			3	Demonstrate cryptographic algorithm for encryption/key exchange.
			4	Summarise the different authentication techniques & digital signature standards.
			5	Identify security issues to network, transport layers & outlineappropriate security policies
			6	Identify secuirty issues to application layers.
S7	CS463	ELECTIVE 3(DIGITAL IMAGE POCESSING)	1	The students will be able to compare different methods for image acquisition, storage and representation in digital devices and computers
			2	To appreciate roll of image transforms in representing, highlighting and modifying image features.
			3	To perform imgae enhancement in spatial domain.
			4	To perform imgae enhancement in frequency domain.
			5	To apply various methods for segmenting images and identifying image components.

			6	Aware of the morphological operations to extract image components for representation and description.
S7	CS467	ELECTIVE 3(MACHINE LEARNING)	1	The students will be able to dffrenentiate various leaning approaches and to interpret te concept of supervised learning
			2	The students will be able to compare different dimensionality reduction technique
			3	The students will be able to apply theoritical foundations of Bayesian classifier to label data points
			4	The students will be able to apply theoritical foundations of decision tree to identify the best shift and also illustrates the working of classifier models like neural networks and identify classifier model for typical machine learning application
			5	The students will be able to identify the state sequence and evaluate a sequence emission probability from a given HMM
			6	The students will be able to illustrate and apply clustering algorithms and identify its applicability in real life problems
S7	CS451	SEMINAR & PROJECT PRELIMINARY	1	Analyse a current topic of interest for seminar & project.
			2	Perform literature survey on the topic of interest
			3	Improving presentation skill.
			4	Able to identify an engineering problem, analyse & propose a work plan
			5	Ability to design & implement the project idea
			6	Improve technical writing skill
S7	CS431	COMPILER DESIGN LAB	1	Able to Implement the techniques of lexical analysis
			2	Able to Implement the techniques of syntax analysis

			3	Able to Apply the knowledge of Lex and Yacc tools to develop programs
			4	Able to Generate intermediate code
			5	Able to Implement optimization techniques
			6	Able to generate machine level code
S8	CS402	DATA MINING AND WARE HOUSING	1	Be able to identify the key process of data mining and warehousing
			2	Be able to apply appropriate techniques to convert raw data into suitable format for practical data mining tasks
			3	Be able to analyze and compare various classification algorithms and apply in appropriate domain
			4	Be able to differentiate the performance of various classification methods using performance metrics
			5	Be able to comply the concept of association rule mining in real world scenario
			6	Be able to select appropriate clustering and algorithms for various applications and extend data mining methods to the new domains of data
S8	CS404	EMBEDDED SYSTEMS	1	Demonstrate the role of individual components involved in a typical embedded system.
			2	Analyze the characteristics of different computing elements and select the most appropriate one for an embedded system.
			3	Model the operation of a given embedded system.
			4	Substantiate the role of different software modules in the development of an embedded system.
			5	Develop simple tasks to run on an RTOS.
			6	Examine the latest trends prevalent in embedded system design

S8	CS464	ELECTIVE 4 (ARTIFICIAL INTELLIGENCE)	1	Students will be able to appreciate the scope and limits of the artificial intelligence (AI) field
			2	Assess the applicability, strengths, and weaknesses of the basic knowledge representation
			3	Interpret the role of knowledge representation, problem solving, and learning
			4	Explain various search algorithms (uninformed, informed, and heuristic) for problem solving
			5	Aware about of models of learning.
			6	Comprehend the fundamentals of Natural Language Processing
S8	CS468	ELECTIVE 4 (CLOUD COMPUTING)	1	Identify and apply the most suited visualization technique to be used for a given scenario
			2	Compare the various cloud computing models and services
			3	Build various public cloud platforms and to identify the apprpriate software environment
			4	Apply appropriate cloud computing methods to solve Big Data problems
			5	Identify the cloud security challenges and need of security mechanisms
			6	Identify various cloud services available online
S8	CE494	ENVIRONMENTAL HEALTH AND SAFETY	1	Students will be able to understand various occupational diseases and their effects on environment
			2	Students will become aware regarding noise pollution as well as chemical and biological hazards associated with various industrial activities
			3	Students will become aware regarding air pollution as well as radiation and industrial hazards and the techniques that can be adopted for managing these hazards

			4	Students will able to understand the various electrical hazards and hazards associated with various construction activities
			5	Students will become aware regarding water pollution problems and hazardous waste management
			6	Students will be able to understand the pollution control techniques adopted in various industries
S8	IE488	TOTAL QUALITY MANAGEMENT	1	To Understand the principles and practices of TQM.
			2	To familiarize the use of various TQM tools
			3	Become aware of the latest TQM tools and techniques
			4	To be able to Implement quality standards
			5	To have an understanding of different ISO certifications
S8	MT482	INDUSTRIAL SAFETY	1	Gain a general concept of safety.
			2	Become aware of safety responsibilities of various agencies representation
			3	Know the occupational health hazards and human factors contributing to industrial accidents
			4	Learn the concepts of safety management solving
			5	Understand the need for timely maintenance of equipments, the need and measures for industrial safety control
			6	Become familiar with the general legal rules for an industrial safety practitioner.
S8	CE482	ENVIRONMENTAL IMPACT ASSESSMENT	1	Students will be able to understand various occupational diseases and their effects on environment
			2	Students will become aware regarding noise pollution as well as chemical and biological hazards associated with various industrial activities
			3	Students will become aware regarding air pollution as well as

				radiation and industrial hazards and the techniques that can be adopted for managing these hazards
			4	Students will able to understand the various electrical hazards and hazards associated with various construction activities
			5	Students will become aware regarding water pollution problems and hazardous waste management
			6	Students will be able to understand the pollution control techniques adopted in various industries
S8	EC482	BIOMEDICAL ENGINEERING	1	Remember the anatomy and physiological systems of the body and explain about bioelectric potential, electrode theory and amplifiers in medical instrumentation.
			2	Understand the measurement of different bioelectric potentials and its instrumentation representation
			3	Understand different instruments for clinical laboratory.
			4	Understand different therapeutic and clinical equipments and its basic working.
			5	Recognize the importance of engineering in medical field and understand different imaging systems in medical field.
			6	Identify the importance of telemetry and patient safety in medical engineering and instruments.
S8	MP469	INDUSTRIAL PSYCHOLOGY AND ORGANISATIONAL BEHAVIOUR	1	Students will be able to understand the relevance of psychology
			2	Assess individual and group behaviours
			3	Deal people in a better way
			4	Motivate groups and build teams
			5	Assess leadership qualities and leadership styles
			6	Understand personality traits and environmental influences in moulding human behaviour

S8	CE484	APPLIED EARTH SYSTEMS	1	Gain knowledge on the earth's internal and external processes which modify the morphology of the earth. Analyse the earth as a system and its components. Identify the causes of global climate change.
			2	Understand the exegetic processes of earth that change the surface features of earth.
			3	Identify soil formation process, causes of soil erosion and the methods of soil conservation.
			4	Understand the endogenic processes inside the earth-plate tectonics.
			5	Gain knowledge on the oceanographic phenomenon; ocean currents and its control on global climate.
			6	Understand the atmospheric phenomenon; precipitation and global wind patterns
S8	EE482	ENERGY MANAGEMENT AND AUDITING	1	Able to understand the concept of energy management principles and its planning
			2	Capable of understanding various energy management opportunities in electric motors, lighting and heatig application
			3	Able to analyse boiler and steam system and suggest suitable method for energy reduction
			4	Able to describe various energy saving opportunities in HVAC and WHR systems
			5	Able to understand how to do energy audit and various cogeneration schemes
			6	Able to analyze a new system financially by using different methods
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			6	Able to analyze a new system financially by using different methods
S8	EE494	INSTRUMENTATION SYSTEM	1	Fundamental concepts of measuring systems are obtained
			2	Motion, Force and torque measuremnts are familiarized
			3	Shaft power, Pressure and Sound measurements are familiarized
			4	Apply fundamental concepts in testing pressure and sound systems
			5	Familiarize with temperature measurement systems
			6	Apply fundamental concepts of working of various instruments
S8	BT362	SUSTAINABLE ENERGY PROCESSES	1	Understand different types of nergy sources
			2	Gain knowledge and awareness about the capture, conversion and applications of solar energy
			3	Explain the availability, power plants, turbines, merits and limitations of wind enegy
			4	Describe the conversion of biomass to enegy, various production mecanisms of biomass energy
			5	Understand the basic principles behind the energy from ocean, explain positive and negative attributes of hydro power
			6	Explain different types of fuel cells and energy storage routes
S8	EE484	INSTRUMENTATION SYSTEMS	1	Fundamental concepts of measuring systems are obtained

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			3	Shaft power, Pressure and Sound measurements are familiarized
			4	Apply fundamental concepts in testing pressure and sound systems
			5	Familiarize with temperature measurement systems
			6	Apply fundamental concepts of working of various instruments
S8	CS492	PROJECT	1	Students will be able to apply engineering knowledge in practical problem solving
			2	Think innovatively on the development of components, products, processes or technologies in the engineering field, involving team work
			3	Develop creative thinking in finding viable solutions to engineering problems
			4	Apply knowledge gained in solving real life engineering problems
			5	Students will improve their presentation skills, Conference presentation/Publication in Journal
			6	Students will improve their technical writing skills, Publication in Journal & report in standard format