AALIM MUHAMMED SALEGH COLLEGE OF ENGINEERING					
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING (Regulation 2017)					
COURSE OUTCOMES					
R2017	**HS8151 COMMUNICATIVE ENGLISH**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**4**
At the end of the course, learners will be able to:					
CO 1	Read articles of a general kind in magazines and newspapers.				
CO 2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English				
CO 3	Comprehend conversations and short talks delivered in English				
CO 4	Write short essays of a general kind and personal letters and emails in English.				

R2017	**MA8151 ENGINEERING MATHEMATICS – I**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**4**
After completing this course, students should demonstrate competency in the following skills:					
CO 1	Use both the limit definition and rules of differentiation to differentiate functions.				
CO 2	Apply differentiation to solve maxima and minima problems.				
CO 3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.				
CO 4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.				
CO 5	Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.				
CO 6	Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.				
CO 7	Apply various techniques in solving differential equations.				

R2017	**PH8151 ENGINEERING PHYSICS**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**
Upon completion of this course,					
CO 1	The students will gain knowledge on the basics of properties of matter and its applications				
CO 2	The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,				
CO 3	The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,				
CO 4	The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes				
CO 5	The students will understand the basics of crystals, their structures and different crystal growth techniques.				

R2017	**CY8151 ENGINEERING CHEMISTRY**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**
CO 1	The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.				

R2017	GE8151 PROBLEM SOLVING AND PYTHON PROGRAMMING	L	T	P	C
		3	0	0	3
Upon completion of the course, students will be able to					
CO 1	Develop algorithmic solutions to simple computational problems				
CO 2	Read, write, execute by hand simple Python programs.				
CO 3	Read, write, execute by hand simple Python programs.				
CO 4	Structure simple Python programs for solving problems.				
CO 5	Decompose a Python program into functions				
CO 6	Represent compound data using Python lists, tuples, dictionaries				
CO 7	Read and write data from/to files in Python Programs.				

R2017	GE8152 ENGINEERING GRAPHICS	L	T	P	C
		2	0	4	4
On successful completion of this course, the student will be able to:					
CO 1	Familiarize with the fundamentals and standards of Engineering graphics				
CO 2	Perform freehand sketching of basic geometrical constructions and multiple views of objects.				
CO 3	Project orthographic projections of lines and plane surfaces.				
CO 4	Draw projections and solids and development of surfaces.				
CO 5	Visualize and to project isometric and perspective sections of simple solids.				

R2017	GE8161 PROBLEM SOLVING ANDPYTHON PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2
Upon completion of the course, students will be able to:					
CO 1	Write, test, and debug simple Python programs.				
CO 2	Implement Python programs with conditionals and loops.				
CO 3	Develop Python programs step-wise by defining functions and calling them.				
CO 4	Use Python lists, tuples, dictionaries for representing compound data.				
CO 5	Read and write data from/to files in Python.				

R2017	BS8161 PHYSICS AND CHEMISTRY LABORATORY	L	T	P	C
		0	0	4	2
Upon completion of the course, the students will be able to:					
CO 1	Apply principles of elasticity, optics and thermal properties for engineering applications.				
CO 2	The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.				

R2017	HS8251 TECHNICAL ENGLISH	L	T	P	C
		4	0	0	4
At the end of the course learners will be able to:					
CO 1	Read technical texts and write area- specific texts effortlessly.				
CO 2	Listen and comprehend lectures and talks in their area of specialisation successfully.				
CO 3	Speak appropriately and effectively in varied formal and informal contexts.				
CO 4	Write reports and winning job applications.				

R2017	MA8251 ENGINEERING MATHEMATICS – II	L	T	P	C
		4	0	0	4
After successfully completing the course, the student will have a good understanding of the following topics and their applications:					
CO 1	Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.				
CO 2	Gradient, divergence and curl of a vector point function and related identities.				
CO 3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.				
CO 4	Analytic functions, conformal mapping and complex integration.				
CO 5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.				

R2017	PH8253 PHYSICS FOR ELECTRONICS ENGINEERING	L	T	P	C
		3	0	0	3
At the end of the course, the students will able to:					
CO 1	Gain knowledge on classical and quantum electron theories, and energy band structuues,				
CO 2	Acquire knowledge on basics of semiconductor physics and its applications in various devices,				
CO 3	Get knowledge on magnetic and dielectric properties of materials,				
CO 4	Have the necessary understanding on the functioning of optical materials for optoelectronics,				
CO 5	Understand the basics of quantum structures and their applications in spintronics and carbon electronics.				

R2017	BE8254 BASIC ELECTRICAL AND INSTRUMENTATION ENGINEERING	L	T	P	C
		3	0	0	3
At the end of the course the students will be able to:					
CO 1	Understand the concept of three phase power circuits and measurement.				
CO 2	Comprehend the concepts in electrical generators, motors and transformers				
CO 3	Choose appropriate measuring instruments for given application				

R2017	EC8251 CIRCUIT ANALYSIS	L	T	P	C
		4	0	0	4
At the end of the course, the student should be able to:					
CO 1	Develop the capacity to analyze electrical circuits, apply the circuit theorems in real time				
CO 2	Design and understand and evaluate the AC and DC circuits.				

R2017	EC8252 ELECTRONIC DEVICES	L	T	P	C
		3	0	0	3
At the end of the course the students will be able to:					
CO 1	Explain the V-I characteristic of diode, UJT and SCR				
CO 2	Describe the equivalence circuits of transistors				
CO 3	Operate the basic electronic devices such as PN junction diode, Bipolar and Field effect Transistors, Power control devices, LED, LCD and other Opto-electronic devices				

R2017	EC8261 CIRCUITS AND DEVICES LABORATORY	L	T	P	C
		0	0	4	2
At the end of the course, the student should be able to:					
CO 1	Analyze the characteristics of basic electronic devices				
CO 2	Design RL and RC circuits				
CO 3	Verify Thevinin & Norton theorem KVL & KCL, and Super Position Theorems				

R2017	GE8261 ENGINEERING PRACTICES LABORATORY	L	T	P	C
		0	0	4	2
On successful completion of this course, the student will be able to:					
CO 1	Fabricate carpentry components and pipe connections including plumbing works.				
CO 2	Use welding equipments to join the structures.				
CO 3	Carry out the basic machining operations				
CO 4	Make the models using sheet metal works				
CO 5	Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings				
CO 6	Carry out basic home electrical works and appliances				
CO 7	Measure the electrical quantities				
CO 8	Elaborate on the components, gates, soldering practices.				

R2017	MA8352 LINEAR ALGEBRA AND PARTIAL DIFFERENTIAL EQUATIONS	L	T	P	C
		4	0	0	4
Upon successful completion of the course, students should be able to:					
CO 1	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.				
CO 2	Demonstrate accurate and efficient use of advanced algebraic techniques.				
CO 3	Demonstrate their mastery by solving non - trivial problems related to the concepts and by proving simple theorems about				
CO 4	Able to solve various types of partial differential equations.				
CO 5	Able to solve engineering problems using Fourier series.				

R2017	EC8393 FUNDAMENTALS OF DATA STRUCTURES IN C	L	T	P	C
		3	0	0	3
Upon completion of the course, students will be able to:					
CO 1	Implement linear and non-linear data structure operations using C				
CO 2	Suggest appropriate linear / non-linear data structure for any given data set.				
CO 3	Apply hashing concepts for a given problem				
CO 4	Modify or suggest new data structure for an application				

CO 5	Appropriately choose the sorting algorithm for an application

R2017	EC8351 ELECTRONIC CIRCUITS I	L	T	P	C
		3	0	0	3
After studying this course, the student should be able to:					
CO 1	Acquire knowledge of ● Working principles, characteristics and applications of BJT and FET ● Frequency response characteristics of BJT and FET amplifiers				
CO 2	Analyze the performance of small signal BJT and FET amplifiers - single stage and multi stage amplifiers				
CO 3	Apply the knowledge gained in the design of Electronic circuits				

R2017	EC8352 SIGNALS AND SYSTEMS	L	T	P	C
		4	0	0	4
At the end of the course, the student should be able to:					
CO 1	To be able to determine if a given system is linear/causal/stable				
CO 2	Capable of determining the frequency components present in a deterministic signal				
CO 3	Capable of characterizing LTI systems in the time domain and frequency domain				
CO 4	To be able to compute the output of an LTI system in the time and frequency domains				

R2017	EC8392 DIGITAL ELECTRONICS	L	T	P	C
		3	0	0	3
At the end of the course:					
CO 1	Use digital electronics in the present contemporary world				
CO 2	Design various combinational digital circuits using logic gates				
CO 3	Do the analysis and design procedures for synchronous and asynchronous sequential circuits				
CO 4	Use the semiconductor memories and related technology				
CO 5	Use electronic circuits involved in the design of logic gates				

R2017	EC8391 CONTROL SYSTEMS ENGINEERING	L	T	P	C
		3	0	0	3
Upon completion of the course, the student should be able to:					
CO 1	Identify the various control system components and their representations.				
CO 2	Analyze the various time domain parameters.				
CO 3	Analysis the various frequency response plots and its system.				
CO 4	Apply the concepts of various system stability criterions.				
CO 5	Design various transfer functions of digital control system using state variable models.				

R2017	EC8381 FUNDAMENTALS OF DATA STRUCTURES IN C LABORATORY	L	T	P	C
		0	0	4	2
Upon completion of the course, the students will be able to:					
CO 1	Write basic and advanced programs in C				
CO 2	Implement functions and recursive functions in C				
CO 3	Implement data structures using C				
CO 4	Choose appropriate sorting algorithm for an application and implement it in a modularized way				

R2017	EC8361 ANALOG AND DIGITAL CIRCUITS LABORATORY	L	T	P	C
		0	0	4	2
On completion of this laboratory course, the student should be able to:					
CO 1	Design and Test rectifiers, filters and regulated power supplies.				
CO 2	Design and Test BJT/JFET amplifiers.				
CO 3	Differentiate cascode and cascade amplifiers				
CO 4	Analyze the limitation in bandwidth of single stage and multi stage amplifier				
CO 5	Measure CMRR in differential amplifier				
CO 6	Simulate and analyze amplifier circuits using PSpice.				
CO 7	Design and Test the digital logic circuits.				

R2017	HS8381 INTERPERSONAL SKILLS/LISTENING&SPEAKING	L	T	P	C
		0	0	2	1
At the end of the course Learners will be able to:					
CO 1	Listen and respond appropriately.				
CO 2	Participate in group discussions				
CO 3	Make effective presentations				
CO 4	Participate confidently and appropriately in conversations both formal and informal				

R2017	MA8451 PROBABILITY AND RANDOM PROCESSES	L	T	P	C
		4	0	0	4
Upon successful completion of the course, students should be able to:					
CO 1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.				
CO 2	Understand the basic concepts of one and two dimensional random variables and apply in engineering applications				
CO 3	Apply the concept of random processes in engineering disciplines.				
CO 4	Understand and apply the concept of correlation and spectral densities.				
CO 5	The students will have an exposure of various distribution functions and help in acquiring skills in handling situations involving more than one variable. Able to analyze the response of random inputs to linear time invariant systems.				

R2017	EC8452 ELECTRONIC CIRCUITS II	L	T	P	C
		3	0	0	3
Upon completion of the course, the student should be able to:					
CO 1	Analyze different types of amplifier, oscillator and multivibrator circuits				
CO 2	Design BJT amplifier and oscillator circuits				
CO 3	Analyze transistorized amplifier and oscillator circuits				
CO 4	Design and analyze feedback amplifiers				
CO 5	Design LC and RC oscillators, tuned amplifiers, wave shaping circuits, multivibrators, power amplifier and DC convertors.				

R2017	EC8491 COMMUNICATION THEORY	L	T	P	C
		3	0	0	3
At the end of the course, the student should be able to:					
CO 1	Design AM communication systems				
CO 2	Design Angle modulated communication systems				
CO 3	Apply the concepts of Random Process to the design of Communication systems				
CO 4	Analyze the noise performance of AM and FM systems				
CO 5	Gain knowledge in sampling and quantization				

R2017	EC8451 ELECTROMAGNETIC FIELDS	L	T	P	C
		4	0	0	4
By the end of this course, the student should be able to:					
CO 1	Display an understanding of fundamental electromagnetic laws and concepts				
CO 2	Write Maxwell's equations in integral, differential and phasor forms and explain their physical meaning				
CO 3	Explain electromagnetic wave propagation in lossy and in lossless media				
CO 4	Solve simple problems requiring estimation of electric and magnetic field quantities based on,these concepts and laws				

R2017	EC8453 LINEAR INTEGRATED CIRCUITS	L	T	P	C
		3	0	0	3
Upon completion of the course, the student should be able to:					
CO 1	Design linear and non linear applications of OP – AMPS				
CO 2	Design applications using analog multiplier and PLL				
CO 3	Design ADC and DAC using OP – AMPS				
CO 4	Generate waveforms using OP – AMP Circuits				
CO 5	Analyze special function Ics				

R2017	GE8291 ENVIRONMENTAL SCIENCE AND ENGINEERING	L	T	P	C
		3	0	0	3
CO 1	Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.				
CO 2	Public awareness of environmental is at infant stage.				
CO 3	Ignorance and incomplete knowledge has lead to misconceptions				

CO 4	Development and improvement in std. of living has lead to serious environmental disasters

R2017	EC8461 CIRCUITS DESIGN AND SIMULATION LABORATORY	L	T	P	C
		0	0	4	2
On completion of this laboratory course, the student should be able to:					
CO 1	Analyze various types of feedback amplifiers				
CO 2	Design oscillators, tuned amplifiers, wave-shaping circuits and multivibrators				
CO 3	Design and simulate feedback amplifiers, oscillators, tuned amplifiers, wave-shaping circuits and multivibrators using SPICE Tool.				

R2017	EC8462 LINEAR INTEGRATED CIRCUITS LABORATORY	L	T	P	C
		0	0	4	2
On completion of this laboratory course, the student should be able to:					
CO 1	Design amplifiers, oscillators, D-A converters using operational amplifiers.				
CO 2	Design filters using op-amp and performs an experiment on frequency response.				
CO 3	Analyze the working of PLL and describe its application as a frequency multiplier.				
CO 4	Design DC power supply using ICs.				
CO 5	Analyze the performance of filters, multivibrators, A/D converter and analog multiplier using SPICE.				

R2017	EC8501 DIGITAL COMMUNICATION	L	T	P	C
		3	0	0	3
Upon completion of the course, the student should be able to:					
CO 1	Design PCM systems				
CO 2	Design and implement base band transmission schemes				
CO 3	Design and implement band pass signaling schemes				
CO 4	Analyze the spectral characteristics of band pass signaling schemes and their noise performance				
CO 5	Design error control coding schemes				

R2017	EC8553 DISCRETE-TIME SIGNAL PROCESSING	L	T	P	C
		4	0	0	4
At the end of the course, the student should be able to:					
CO 1	Apply DFT for the analysis of digital signals and systems				
CO 2	Design IIR and FIR filters				
CO 3	Characterize the effects of finite precision representation on digital filters				
CO 4	Design multirate filters				
CO 5	Apply adaptive filters appropriately in communication systems.				

R2017	EC8552 COMPUTER ARCHITECTURE AND ORGANIZATION	L	T	P	C
		3	0	0	3
At the end of the course, the student should be able to:					
CO 1	Describe data representation, instruction formats and the operation of a digital computer				
CO 2	Illustrate the fixed point and floating-point arithmetic for ALU operation				
CO 3	Discuss about implementation schemes of control unit and pipeline performance				
CO 4	Explain the concept of various memories, interfacing and organization of multiple processors				

CO 5	Discuss parallel processing technique and unconventional architectures

R2017	**EC8551 COMMUNICATION NETWORKS**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**
At the end of the course, the student should be able to:					
CO 1	Identify the components required to build different types of networks				
CO 2	Choose the required functionality at each layer for given application				
CO 3	Identify solution for each functionality at each layer				
CO 4	Trace the flow of information from one node to another node in the network				

R2017	TOTAL QUALITY MANAGEMENT	L	T	P	C
		3	0	0	3
CO 1	The student would be able to apply the tools and techniques of quality management tomanufacturing and services processes.				

R2017	BASIC OF BIOMEDICAL INSTRUMENTATION	L	T	P	C
		3	0	0	3
At the end of the course, the student should be able to:					
CO 1	To Learn the different bio potential and its propagation.				
CO 2	To get Familiarize the different electrode placement for various physiological recording				
CO 3	Students will be able design bio amplifier for various physiological recording				
CO 4	Students will understand various technique non electrical physiogical measurements				
CO 5	Understand the different biochemical measurements				

R2017	EC8562 DIGITAL SIGNAL PROCESSING LABORATORY	L	T	P	C
		0	0	4	2
At the end of the course, the student should be able to:					
CO 1	Carryout basic signal processing operations				
CO 2	Demonstrate their abilities towards MATLAB based implementation of various DSP systems				
CO 3	Analyze the architecture of a DSP Processor				
CO 4	Design and Implement the FIR and IIR Filters in DSP Processor for performing filtering operation over real-time signals				
CO 5	Design a DSP system for various applications of DSP				

R2017	EC8561 COMMUNICATION SYSTEMS LABORATORY	L	T	P	C
		0	0	4	2
At the end of the course, the student should be able to:					
CO 1	Simulate & validate the various functional modules of a communication system				
CO 2	Demonstrate their knowledge in base band signaling schemes through implementation of digital modulation schemes				
CO 3	Apply various channel coding schemes & demonstrate their capabilities towards the improvement of the noise performance of communication system				
CO 4	Simulate end-to-end communication Link				

R2017	EC8563 COMMUNICATION NETWORKS LABORATORY	L	T	P	C
		0	0	4	2
At the end of the course, the student should be able to:					
CO 1	Communicate between two desktop computers				
CO 2	Implement the different protocols				
CO 3	Program using sockets.				
CO 4	Implement and compare the various routing algorithms				
CO 5	Use the simulation tool.				

R2017	EC8691 MICROPROCESSORS AND MICROCONTROLLERS	L	T	P	C
		3	0	0	3
At the end of the course, the students should be able to:					
CO 1	Understand and execute programs based on 8086 microprocessor.				
CO 2	Design Memory Interfacing circuits.				
CO 3	Design and interface I/O circuits.				
CO 4	Design and implement 8051 microcontroller based systems.				

R2017	EC8095 VLSI DESIGN	L	T	P	C
		3	0	0	3
Upon completion of the course, the student should be able to:					
CO 1	Realize the concepts of digital building blocks using MOS transistor.				
CO 2	Design combinational MOS circuits and power strategies.				
CO 3	Design and construct Sequential Circuits and Timing systems.				
CO 4	Design arithmetic building blocks and memory subsystems.				
CO 5	Apply and implement FPGA design flow and testing.				

R2017	EC8652 WIRELESS COMMUNICATION	L	T	P	C
		3	0	0	3
The student should be able to:					
CO 1	Characterize a wireless channel and evolve the system design specifications				
CO 2	Design a cellular system based on resource availability and traffic demands				
CO 3	Identify suitable signaling and multipath mitigation techniques for the wireless channel and system under consideration.				

R2017	MG8591 PRINCIPLES OF MANAGEMENT	L	T	P	C
		3	0	0	3
Upon completion of the course, students will be able to have clear understanding of:					
CO 1	Managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management				

R2017	EC8651 TRANSMISSION LINES AND RF SYSTEMS	L	T	P	C
		3	0	0	3
Upon completion of the course, the student should be able to:					
CO 1	Explain the characteristics of transmission lines and its losses				
CO 2	Write about the standing wave ratio and input impedance in high frequency transmission lines				
CO 3	Analyze impedance matching by stubs using smith charts				
CO 4	Analyze the characteristics of TE and TM waves				
CO 5	Design a RF transceiver system for wireless communication				

R2017	EC8681 MICROPROCESSORS AND MICROCONTROLLERS LABORATORY	L	T	P	C
		0	0	4	2
At the end of the course, the student should be able to:					
CO 1	Write ALP Programmes for fixed and Floating Point and Arithmetic operations				
CO 2	Interface different I/Os with processor				
CO 3	Generate waveforms using Microprocessors				
CO 4	Execute Programs in 8051				
CO 5	Explain the difference between simulator and Emulator				

R2017	EC8661 VLSI DESIGN LABORATORY	L	T	P	C
		0	0	4	2
At the end of the course, the student should be able to:					
CO 1	Write HDL code for basic as well as advanced digital integrated circuit				
CO 2	Import the logic modules into FPGA Boards				
CO 3	Synthesize Place and Route the digital Ips				
CO 4	Design, Simulate and Extract the layouts of Digital & Analog IC Blocks using EDA tools				

R2017	EC8701 ANTENNAS AND MICROWAVE ENGINEERING	L	T	P	C
		3	0	0	3
The student should be able to:					
CO 1	Apply the basic principles and evaluate antenna parameters and link power budgets				
CO 2	Design and assess the performance of various antennas				
CO 3	Design a microwave system given the application specifications				

R2017	EC8751 OPTICAL COMMUNICATION	L	T	P	C
		3	0	0	3
At the end of the course, the student should be able to:					
CO 1	Realize basic elements in optical fibers, different modes and configurations.				
CO 2	Analyze the transmission characteristics associated with dispersion and polarization techniques.				
CO 3	Design optical sources and detectors with their use in optical communication system.				
CO 4	Construct fiber optic receiver systems, measurements and coupling techniques.				
CO 5	Design optical communication systems and its networks.				

R2017	EC8791 EMBEDDED AND REAL TIME SYSTEMS	L	T	P	C
		3	0	0	3
At the end of the course, the student should be able to:					
CO 1	Describe the architecture and programming of ARM processor				
CO 2	Outline the concepts of embedded systems				
CO 3	Explain the basic concepts of real time operating system design				
CO 4	Model real-time applications using embedded-system concepts				

R2017	EC8702 AD HOC AND WIRELESS SENSOR NETWORKS	L	T	P	C
		3	0	0	3
At the end of the course, the student would be able to:					
CO 1	Know the basics of Ad hoc networks and Wireless Sensor Networks				
CO 2	Apply this knowledge to identify the suitable routing algorithm based on the network and user requirement				
CO 3	Apply the knowledge to identify appropriate physical and MAC layer protocols				
CO 4	Understand the transport layer and security issues possible in Ad hoc and sensor networks.				
CO 5	Be familiar with the OS used in Wireless Sensor Networks and build basic modules				

R2017	EC8711 EMBEDDED LABORATORY	L	T	P	C
		0	0	4	2
At the end of the course, the student would be able to:					
CO 1	Write programs in ARM for a specific Application				
CO 2	Interface memory, A/D and D/A convertors with ARM system				
CO 3	Analyze the performance of interrupt				
CO 4	Write program for interfacing keyboard, display, motor and sensor.				
CO 5	Formulate a mini project using embedded system				

R2017	EC8761 ADVANCED COMMUNICATION LABORATORY	L	T	P	C
		0	0	4	2
On completion of this lab course, the student would be able to:					
CO 1	Analyze the performance of simple optical link by measurement of losses and Analyzing the mode characteristics of fiber				
CO 2	Analyze the Eye Pattern, Pulse broadening of optical fiber and the impact on BER				
CO 3	Estimate the Wireless Channel Characteristics and Analyze the performance of Wireless Communication System				
CO 4	Understand the intricacies in Microwave System design				

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (Regulation 2017)

COURSE OUTCOMES

R2017	HS8151 COMMUNICATIVE ENGLISH	L	T	P	C
		4	0	0	4
CO 1	Read articles of a general kind in magazines and newspapers.				
CO 2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English				
CO 3	Comprehend conversations and short talks delivered in English				
CO 4	Write short essays of a general kind and personal letters and emails in English.				

R2017	MA8151 ENGINEERING MATHEMATICS – I	L	T	P	C
		4	0	0	4
CO 1	Use both the limit definition and rules of differentiation to differentiate functions.				
CO 2	Apply differentiation to solve maxima and minima problems.				
CO 3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.				
CO 4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.				
CO 5	Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.				
CO 6	Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.				
CO 7	Apply various techniques in solving differential equations.				
R2017	PH8151 ENGINEERING PHYSICS	L	T	P	C
		3	0	0	3
CO 1	The students will gain knowledge on the basics of properties of matter and its applications				
CO 2	The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,				
CO 3	The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,				
CO 4	The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes				
CO 5	The students will understand the basics of crystals, their structures and different crystal growth techniques.				

R2017	CY8151 ENGINEERING CHEMISTRY	L	T	P	C
		3	0	0	3
CO 1	The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.				
R2017	GE8151 PROBLEM SOLVING AND PYTHON PROGRAMMING	L	T	P	C
		3	0	0	3
CO 1	Develop algorithmic solutions to simple computational problems				
CO 2	Read, write, execute by hand simple Python programs.				
CO 3	Read, write, execute by hand simple Python programs.				
CO 4	Structure simple Python programs for solving problems.				
CO 5	Decompose a Python program into functions				
CO6	Represent compound data using Python lists, tuples, dictionaries				
CO7	Read and write data from/to files in Python Programs.				

R2017	MA8351 DISCRETE MATHEMATICS	L	T	P	C
		4	0	0	4

CO 1	Have knowledge of the concepts needed to test the logic of a program.
CO 2	Have an understanding in identifying structures on many levels.
CO 3	Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.
CO 4	Be aware of the counting principles.
CO 5	Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.

R2017	**CS8351 DIGITAL PRINCIPLES AND SYSTEM DESIGN**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**4**
CO 1	Simplify Boolean functions using Kmap				
CO 2	Design and Analyze Combinational and Sequential Circuits				
CO 3	Implement designs using Programmable Logic Devices				
CO 4	Write HDL code for combinational and Sequential Circuits				

R2017	**CS8391 DATA STRUCTURES**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**
CO 1	Implement abstract data types for linear data structures.				
CO 2	Apply the different linear and non-linear data structures to problem solutions.				
CO 3	Critically analyze the various sorting algorithm				

R2017	**CS8392 OBJECT ORIENTED PROGRAMMING**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**
CO 1	Develop Java programs using OOP principles				
CO 2	Develop Java programs with the concepts inheritance and interfaces				
CO 3	Build Java applications using exceptions and I/O streams				
CO 4	Develop Java applications with threads and generics classes				
CO 5	Develop interactive Java programs using swings				

R2017	**EC8395 COMMUNICATION ENGINEERING**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**
CO 1	Ability to comprehend and appreciate the significance and role of this course in the present contemporary world				
CO 2	Apply analog and digital communication techniques.				
CO 3	Use data and pulse communication techniques.				
CO 4	Analyze Source and Error control coding.				

R2017	**CS8381 DATA STRUCTURES LABORATORY**	**L**	**T**	**P**	**C**
		0	**0**	**4**	**2**
CO 1	Write functions to implement linear and non-linear data structure operations				
CO 2	Suggest appropriate linear / non-linear data structure operations for solving a given problem				
CO 3	Appropriately use the linear / non-linear data structure operations for a given problem				
CO 4	Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval				

R2017	CS8383 OBJECT ORIENTED PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2
CO 1	Develop and implement Java programs for simple applications that make use of classes, packages and interfaces.				
CO 2	Develop and implement Java programs with arraylist, exception handling and multithreading .				
CO 3	Design applications using file processing, generic programming and event handling.				

R2017	CS8382 DIGITAL SYSTEMS LABORATORY	L	T	P	C
		0	0	4	2
CO 1	Implement simplified combinational circuits using basic logic gates				
CO 2	Implement combinational circuits using MSI devices				
CO 3	Implement sequential circuits like registers and counters				
CO 4	Simulate combinational and sequential circuits using HDL				

R2017	HS8381 INTERPERSONAL SKILLS/LISTENING&SPEAKING	L	T	P	C
		0	0	2	1
CO 1	Listen and respond appropriately.				
CO 2	Participate in group discussions				
CO 3	Make effective presentations				
CO 4	Make effective presentations				
CO 5	Participate confidently and appropriately in conversations both formal and informal				

R2017	MA8402 PROBABILITY AND QUEUING THEORY	L	T	P	C
		4	0	0	4
CO 1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon				
CO 2	Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.				
CO 3	Apply the concept of random processes in engineering disciplines.				
CO 4	Acquire skills in analyzing queueing models.				
CO 5	Understand and characterize phenomenon which evolve with respect to time in a probabilistic manner				

R2017	CS8491 COMPUTER ARCHITECTURE	L	T	P	C
		3	0	0	3
CO 1	Understand the basics structure of computers, operations and instructions.				
CO 2	Design arithmetic and logic unit.				
CO 3	Understand pipelined execution and design control unit.				
CO 4	Understand parallel processing architectures.				
CO 5	Understand the various memory systems and I/O communication.				

R2017	CS8492 DATABASE MANAGEMENT SYSTEMS	L	T	P	C
		3	0	0	3
CO 1	Classify the modern and futuristic database applications based on size and complexity				
CO 2	Map ER model to Relational model to perform database design effectively				
CO 3	Write queries using normalization criteria and optimize queries				

CO 4	Compare and contrast various indexing strategies in different database systems
CO 5	Appraise how advanced databases differ from traditional databases.

R2017	**CS8451 DESIGN AND ANALYSIS OF ALGORITHMS**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**
CO 1	Design algorithms for various computing problems.				
CO 2	Analyze the time and space complexity of algorithms				
CO 3	Critically analyze the different algorithm design techniques for a given problem.				
CO 4	Modify existing algorithms to improve efficiency.				

R2017	**CS8493 OPERATING SYSTEMS**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**
CO 1	Analyze various scheduling algorithms.				
CO 2	Understand deadlock, prevention and avoidance algorithms.				
CO 3	Compare and contrast various memory management schemes.				
CO 4	Understand the functionality of file systems.				
CO 5	Perform administrative tasks on Linux Servers				
CO 6	Compare iOS and Android Operating Systems.				

R2017	**CS8494 SOFTWARE ENGINEERING**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**
CO 1	Identify the key activities in managing a software project.				
CO 2	Compare different process models.				
CO 3	Concepts of requirements engineering and Analysis Modeling.				
CO 4	Apply systematic procedure for software design and deployment.				
CO 5	Compare and contrast the various testing and maintenance.				
CO 6	Compare and contrast the various testing and maintenance and Compare and contrast the various testing and maintenance.				
CO 7	Manage project schedule, estimate project cost and effort required.				

R2017	**MA8551 ALGEBRA AND NUMBER THEORY**	**L**	**T**	**P**	**C**
		4	**0**	**0**	**4**
CO 1	Apply the basic notions of groups, rings, fields which will then be used to solve related problems.				
CO 2	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.				
CO 3	Demonstrate accurate and efficient use of advanced algebraic techniques.				
CO 4	Demonstrate their mastery by solving non - trivial problems related to the concepts, and by proving simple theorems about the, statements proven by the text				
CO 5	Apply integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject.				

R2017	**CS8591 COMPUTER NETWORKS**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**
CO 1	Understand the basic layers and its functions in computer networks.				
CO 2	Evaluate the performance of a network				
CO 3	Understand the basics of how data flows from one node to another.				

CO 4	Analyze and design routing algorithms
CO 5	Design protocols for various functions in the network and Understand the working of various application layer protocols.

R2017	**EC8691 MICROPROCESSORS AND MICROCONTROLLERS**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**
CO 1	Understand and execute programs based on 8086 microprocessor.				
CO 2	Design Memory Interfacing circuits.				
CO 3	Design and interface I/O circuits.				
CO 4	Design and implement 8051 microcontroller based systems.				

R2017	**CS8501 THEORY OF COMPUTATION**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**
CO 1	Construct automata, regular expression for any pattern.				
CO 2	Write Context free grammar for any construct.				
CO 3	Design Turing machines for any language.				
CO 4	Propose computation solutions using Turing machines.				
CO 5	Derive whether a problem is decidable or not.				

R2017	**CS8592 OBJECT ORIENTED ANALYSIS AND DESIGN**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**
CO 1	Express software design with UML diagrams				
CO 2	Design software applications using OO concepts.				
CO 3	Identify various scenarios based on software requirements				
CO 4	Transform UML based software design into pattern based design using design patterns				
CO 5	Understand the various testing methodologies for OO software				

R2017	**CS8651 INTERNET PROGRAMMING**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**
CO 1	Construct a basic website using HTML and Cascading Style Sheets.				
CO 2	Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms.				
CO 3	Develop server side programs using Servlets and JSP.				
CO 4	Construct simple web pages in PHP and to represent data in XML format.				
CO 5	Use AJAX and web services to develop interactive web applications				

R2017	**CS8691 ARTIFICIAL INTELLIGENCE**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**
CO 1	Use appropriate search algorithms for any AI problem				
CO 2	Represent a problem using first order and predicate logic				
CO 3	Provide the apt agent strategy to solve a given problem				
CO 4	Design software agents to solve a problem				
CO 5	Design applications for NLP that use Artificial Intelligence.				

R2017	CS8601 MOBILE COMPUTING	L	T	P	C
		3	0	0	3
CO 1	Explain the basics of mobile telecommunication systems				
CO 2	Illustrate the generations of telecommunication systems in wireless networks				
CO 3	Determine the functionality of MAC, network layer and Identify a routing protocol for a given Ad hoc network				
CO 4	Explain the functionality of Transport and Application layers				
CO 5	Develop a mobile application using android/blackberry/ios/Windows SDK				

R2017	CS8602 COMPILER DESIGN	L	T	P	C
		3	0	2	4
CO 1	Understand the different phases of compiler.				
CO 2	Design a lexical analyzer for a sample language.				
CO 3	Apply different parsing algorithms to develop the parsers for a given grammar				
CO 4	Understand syntax-directed translation and run-time environment.				
CO 5	Learn to implement code optimization techniques and a simple code generator.				
CO 6	Design and implement a scanner and a parser using LEX and YACC tools.				

R2017	CS8603 DISTRIBUTED SYSTEMS	L	T	P	C
		3	0	0	3
CO 1	Elucidate the foundations and issues of distributed systems				
CO 2	Understand the various synchronization issues and global state for distributed systems.				
CO 3	Understand the Mutual Exclusion and Deadlock detection algorithms in distributed systems				
CO 4	Describe the agreement protocols and fault tolerance mechanisms in distributed systems.				
CO 5	Describe the features of peer-to-peer and distributed shared memory systems				

R2017	MG8591 PRINCIPLES OF MANAGEMENT	L	T	P	C
		3	0	0	3
CO 1	Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management				

R2017	CS8792 CRYPTOGRAPHY AND NETWORK SECURITY	L	T	P	C
		3	0	0	3

CO 1	Understand the fundamentals of networks security, security architecture, threats and vulnerabilities
CO 2	Apply the different cryptographic operations of symmetric cryptographic algorithms
CO 3	Apply the different cryptographic operations of public key cryptography
CO 4	Apply the various Authentication schemes to simulate different applications.
CO 5	Understand various Security practices and System security standards

R2017	**CS8791 CLOUD COMPUTING**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**
CO 1	Articulate the main concepts, key technologies, strengths and limitations of cloud computing.				
CO 2	Learn the key and enabling technologies that help in the development of cloud.				
CO 3	Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.				
CO 4	Explain the core issues of cloud computing such as resource management and security.				
CO 5	Be able to install and use current cloud technologies.				
CO 6	Evaluate and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.				

R2017	**IT8075 SOFTWARE PROJECT MANAGEMENT**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**
CO 1	Understand Project Management principles while developing software.				
CO 2	Gain extensive knowledge about the basic project management concepts, framework and the process models.				
CO 3	Obtain adequate knowledge about software process models and software effort estimation techniques.				
CO 4	Estimate the risks involved in various project activities.				
CO 5	Define the checkpoints, project reporting structure, project progress and tracking mechanisms using project management principles.				
CO 6	Learn staff selection process and the issues related to people management				

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING (Regulation 2017)

COURSE OUTCOMES

R2017	HS8151 COMMUNICATIVE ENGLISH	L	T	P	C
		4	0	0	4
CO 1	Read articles of a general kind in magazines and newspapers.				
CO 2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.				
CO3	Comprehend conversations and short talks delivered in English				
CO 4	Write short essays of a general kind and personal letters and emails in English.				

R2017	MA8151 ENGINEERING MATHEMATICS - I	L	T	P	C
		4	0	0	4
CO 1	Use both the limit definition and rules of differentiation to differentiate functions.				
CO 2	Apply differentiation to solve maxima and minima problems.				
CO 3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.				
CO 4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.				
CO 5	Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts				
CO 6	Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.				
CO 7	Apply various techniques in solving differential equations.				

R2017	PH8151 ENGINEERING PHYSICS - I	L	T	P	C
		3	0	0	3
CO 1	The students will gain knowledge on the basics of properties of matter and its applications				
CO 2	The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,				
CO 3	The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers				
CO 4	The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes,				
CO 5	The students will understand the basics of crystals, their structures and different crystal growth techniques.				

R2017	CY8151 ENGINEERING CHEMISTRY - I	L	T	P	C
		3	0	0	3
CO 1	The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.				

R2017	GE8151 PROBLEM SOLVING AND PYTHON PROGRAMMING	L	T	P	C
		3	0	0	3
CO 1	Develop algorithmic solutions to simple computational problems				
CO 2	Read, write, execute by hand simple Python programs.				
CO 3	Structure simple Python programs for solving problems.				
CO 4	Decompose a Python program into functions.				
CO 5	Represent compound data using Python lists, tuples, dictionaries.				
CO 6	Read and write data from/to files in Python Programs.				

R2017	GE8152 ENGINEERING GRAPHICS	L	T	P	C
		2	0	4	4
CO 1	familiarize with the fundamentals and standards of Engineering graphics				
CO 2	perform freehand sketching of basic geometrical constructions and multiple views of objects.				
CO 3	project orthographic projections of lines and plane surfaces				
CO 4	draw projections and solids and development of surfaces.				
CO 5	visualize and to project isometric and perspective sections of simple solids				

R2017	HS8251 TECHNICAL ENGLISH	L	T	P	C
		4	0	0	4
CO 1	Read technical texts and write area- specific texts effortlessly.				
CO 2	Listen and comprehend lectures and talks in their area of specialisation successfully.				
CO3	Speak appropriately and effectively in varied formal and informal contexts.				
CO 4	Write reports and winning job applications.				

R2017	MA8251 ENGINEERING MATHEMATICS – II	L	T	P	C
		4	0	0	4
CO 1	Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices				
CO 2	Gradient, divergence and curl of a vector point function and related identities.				
CO 3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.				
CO 4	Analytic functions, conformal mapping and complex integration				
CO 5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.				

R2017	PH8253 PHYSICS FOR ELECTRONICS ENGINEERING	L	T	P	C
		3	0	0	3
CO 1	Gain knowledge on classical and quantum electron theories, and energy band structuues				
CO 2	Acquire knowledge on basics of semiconductor physics and its applications in various devices,				
CO 3	Get knowledge on magnetic and dielectric properties of materials,				
CO 4	Have the necessary understanding on the functioning of optical materials for optoelectronics,				
CO 5	Understand the basics of quantum structures and their applications in spintronics and carbon electronics.				

R2017	BE8252 BASIC CIVIL AND MECHANICAL ENGINEERING	L	T	P	C
		4	0	0	4
CO 1	Appreciate the Civil and Mechanical Engineering components of Projects.				
CO 2	Explain the usage of construction material and proper selection of construction materials.				
CO 3	Measure distances and area by surveying				
CO 4	identify the components used in power plant cycle.				
CO 5	Demonstrate working principles of petrol and diesel engine.				
CO 6	Elaborate the components of refrigeration and Air conditioning cycle.				

R2017	EE8251 CIRCUIT THEORY	L	T	P	C
		2	2	0	3
CO 1	Ability analyse electrical circuits				
CO 2	Ability to apply circuit theorems				
CO 3	Ability to analyse transients.				

R2017	GE8291 ENVIRONMENTAL SCIENCE AND ENGINEERING	L	T	P	C
		3	0	0	3
CO 1	Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.				
CO 2	Public awareness of environmental is at infant stage.				
CO 3	Ignorance and incomplete knowledge has lead to misconceptions				
CO 4	Development and improvement in std. of living has lead to serious environmental disasters				

R2017	MA8353 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	L	T	P	C
		4	0	0	4
CO 1	Understand how to solve the given standard partial differential equations				
CO 2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.				
CO 3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.				
CO 4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.				

CO 5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

R2017	**EE8351 DIGITAL LOGIC CIRCUITS**	**L**	**T**	**P**	**C**
		2	**2**	**0**	**3**
CO 1	Ability to design combinational and sequential Circuits.				
CO 2	Ability to simulate using software package.				
CO 3	Ability to study various number systems and simplify the logical expressions using Boolean functions				
CO 4	Ability to design various synchronous and asynchronous circuits.				
CO 5	Ability to introduce asynchronous sequential circuits and PLDs				
CO 6	Ability to introduce digital simulation for development of application oriented logic circuits.				

R2017	**EE8391 ELECTROMAGNETIC THEORY**	**L**	**T**	**P**	**C**
		2	**2**	**0**	**3**
CO 1	Ability to understand the basic mathematical concepts related to electromagnetic vector fields.				
CO 2	Ability to understand the basic concepts about electrostatic fields, electrical potential, energy density and their applications.				
CO 3	Ability to acquire the knowledge in magneto static fields, magnetic flux density, vector potential and its applications				
CO 4	Ability to understand the different methods of emf generation and Maxwell’s equations				
CO 5	Ability to understand the basic concepts electromagnetic waves and characterizing parameters				

CO 6	Ability to understand and compute Electromagnetic fields and apply them for design and analysis of electrical equipment and systems

R2017	**EE8301 ELECTRICAL MACHINES-I**	**L**	**T**	**P**	**C**
		2	**2**	**0**	**3**
CO 1	Ability to analyze the magnetic-circuits				
CO 2	Ability to acquire the knowledge in constructional details of transformers.				
CO 3	Ability to understand the concepts of electromechanical energy conversion.				
CO 4	Ability to acquire the knowledge in working principles of DC Generator.				
CO 5	Ability to acquire the knowledge in working principles of DC Motor				
CO 6	Ability to acquire the knowledge in various losses taking place in D.C. Machines				

R2017	**EC8353 ELECTRON DEVICES AND CIRCUITS**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**
CO 1	Explain the structure and working operation of basic electronic devices.				
CO 2	Able to identify and differentiate both active and passive elements				
CO 3	Analyze the characteristics of different electronic devices such as diodes and transistors				
CO 4	Choose and adapt the required components to construct an amplifier circuit.				
CO 5	Employ the acquired knowledge in design and analysis of oscillators				

R2017	ME8792 POWER PLANT ENGINEERING	L	T	P	C
		3	0	0	3
CO 1	Explain the layout, construction and working of the components inside a thermal power plant.				
CO 2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.				
CO 3	and Combined cycle power plants. CO3 Explain the layout, construction and working of the components inside nuclear power plants				
CO 4	Explain the layout, construction and working of the components inside Renewable energy power plants.				
CO 5	Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.				

R2017	MA 8491 NUMERICAL METHODS	L	T	P	C
		4	0	0	4
CO 1	Understand the basic concepts and techniques of solving algebraic and transcendental equations				
CO 2	Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations.				
CO 3	Apply the numerical techniques of differentiation and integration for engineering problems				
CO 4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations				
CO 5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.				

R2017	EE8401 ELECTRICAL MACHINES -II	L	T	P	C
		2	2	0	3
CO 1	Ability to understand the construction and working principle of Synchronous Generator				
CO 2	Ability to understand MMF curves and armature windings.				
CO 3	Ability to acquire knowledge on Synchronous motor.				
CO 4	Ability to understand the construction and working principle of Three phase Induction Motor				
CO 5	Ability to understand the construction and working principle of Special Machines				
CO 6	Ability to predetermine the performance characteristics of Synchronous Machines.				

R2017	EE8402 TRANSMISSION AND DISTRIBUTION	L	T	P	C
		3	0	0	3
CO 1	To understand the importance and the functioning of transmission line parameters.				
CO 2	To understand the concepts of Lines and Insulators.				
CO 3	To acquire knowledge on the performance of Transmission lines				
CO 4	To understand the importance of distribution of the electric power in power system.				
CO 5	To acquire knowledge on Underground Cabilitys				
CO 6	To become familiar with the function of different components used in Transmission and Distribution levels of power system and modelling of these components.				

R2017	EE8403 MEASUREMENTS AND INSTRUMENTATION	L	T	P	C
		3	0	0	3
CO 1	To acquire knowledge on Basic functional elements of instrumentation				
CO 2	To understand the concepts of Fundamentals of electrical and electronic instruments				
CO 3	Ability to compare between various measurement techniques				
CO 4	To acquire knowledge on Various storage and display devices				
CO 5	To understand the concepts Various transducers and the data acquisition systems				
CO 6	Ability to model and analyze electrical and electronic Instruments and understand the operational features of display Devices and Data Acquisition System.				

R2017	EE8451 LINEAR INTEGRATED CIRCUITS AND APPLICATIONS	L	T	P	C
		3	0	0	3
CO 1	Ability to acquire knowledge in IC fabrication procedure				
CO 2	Ability to analyze the characteristics of Op-Amp				
CO 3	To understand the importance of Signal analysis using Op-amp based circuits.				
CO 4	Functional blocks and the applications of special ICs like Timers, PLL circuits, regulator Circuits				
CO 5	To understand and acquire knowledge on the Applications of Op-amp				
CO 6	Ability to understand and analyse, linear integrated circuits their Fabrication and Application.				

R2017	IC8451 CONTROL SYSTEMS	L	T	P	C
		3	2	0	4
CO 1	Ability to develop various representations of system based on the knowledge of Mathematics, Science and Engineering fundamentals.				
CO 2	Ability to do time domain and frequency domain analysis of various models of linear system				
CO 3	Ability to interpret characteristics of the system to develop mathematical model.				
CO 4	Ability to design appropriate compensator for the given specifications.				
CO 5	Ability to come out with solution for complex control problem.				
CO 6	Ability to understand use of PID controller in closed loop system.				

R2017	EE8412 TECHNICAL SEMINAR	L	T	P	C
		0	0	2	1
CO 1	Ability to review, prepare and present technological developments				
CO 2	Ability to face the placement interviews				

R2017	EE8501 POWER SYSTEM ANALYSIS	L	T	P	C
		3	0	0	3
CO 1	Ability to model the power system under steady state operating condition				
CO 2	Ability to understand and apply iterative techniques for power flow analysis				
CO 3	Ability to model and carry out short circuit studies on power system				
CO 4	Ability to model and analyze stability problems in power system				
CO 5	Ability to acquire knowledge on Fault analysis.				
CO 6	Ability to model and understand various power system components and carry out power flow, short circuit and stability studies.				

R2017	EE8551 MICROPROCESSORS AND MICROCONTROLLERS	L	T	P	C
		3	0	0	3
CO 1	Ability to acquire knowledge in Addressing modes & instruction set of 8085 & 8051.				
CO 2	Ability to need & use of Interrupt structure 8085 & 8051.				

CO 3	Ability to understand the importance of Interfacing
CO 4	Ability to explain the architecture of Microprocessor and Microcontroller.
CO 5	Ability to write the assembly language programme.
CO 6	Ability to develop the Microprocessor and Microcontroller based applications.

R2017	**EE8552 POWER ELECTRONICS**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**
CO 1	Ability to analyse AC-AC and DC-DC and DC-AC converters.				
CO 2	Ability to choose the converters for real time applications.				

R2017	**EE8591 DIGITAL SIGNAL PROCESSING**	**L**	**T**	**P**	**C**
		2	**2**	**0**	**3**
CO 1	Ability to understand the importance of Fourier transform, digital filters and DS Processors				
CO 2	Ability to acquire knowledge on Signals and systems & their mathematical representation.				
CO 3	Ability to understand and analyze the discrete time systems				
CO 4	Ability to analyze the transformation techniques & their computation.				
CO 5	Ability to understand the types of filters and their design for digital implementation				
CO 6	Ability to acquire knowledge on programmability digital signal processor & quantization effects.				

R2017	CS8392 OBJECT ORIENTED PROGRAMMING	L	T	P	C
		3	0	0	3
CO 1	Develop Java programs using OOP principles				
CO 2	Develop Java programs with the concepts inheritance and interfaces				
CO 3	Build Java applications using exceptions and I/O streams				
CO 4	Develop interactive Java programs using swings				

R2017	OMD551 BASICS OF BIOMEDICAL INSTRUMENTATION	L	T	P	C
		3	0	0	3
CO 1	To Learn the different bio potential and its propagation.				
CO 2	To get Familiarize the different electrode placement for various physiological recording				
CO 3	Students will be able design bio amplifier for various physiological recording				
CO 4	Students will understand various technique non electrical physiological measurements				
CO 5	Understand the different biochemical measurements				

R2017	HS8581 PROFESSIONAL COMMUNICATION	L	T	P	C
		0	0	2	1
CO 1	Make effective presentations				
CO 2	Participate confidently in Group Discussions.				
CO 3	Attend job interviews and be successful in them.				
CO 4	Develop adequate Soft Skills required for the workplace				

R2017	EE8601 SOLID STATE DRIVES	L	T	P	C
		3	0	0	3
CO 1	Ability to understand and suggest a converter for solid state drive.				
CO 2	Ability to select suitability drive for the given application				
CO 3	Ability to study about the steady state operation and transient dynamics of a motor load system.				
CO 4	Ability to analyze the operation of the converter/chopper fed dc drive.				
CO 5	Ability to analyze the operation and performance of AC motor drives.				
CO 6	Ability to analyze and design the current and speed controllers for a closed loop solid state DC motor drive.				

R2017	EE8602 PROTECTION AND SWITCHGEAR	L	T	P	C
		3	0	0	3
CO 1	Ability to understand and analyze Electromagnetic and Static Relays.				
CO 2	Ability to suggest suitability circuit breaker.				
CO 3	Ability to find the causes of abnormal operating conditions of the apparatus and system				
CO 4	Ability to analyze the characteristics and functions of relays and protection schemes				
CO 5	Ability to study about the apparatus protection, static and numerical relays.				
CO 6	Ability to acquire knowledge on functioning of circuit breaker.				

R2017	EE8691 EMBEDDED SYSTEMS	L	T	P	C
		3	0	0	3
CO 1	Ability to understand and analyze Embedded systems				
CO 2	Ability to suggest an embedded system for a given application.				
CO 3	Ability to operate various Embedded Development Strategies				
CO 4	Ability to study about the bus Communication in processors.				
CO 5	Ability to acquire knowledge on various processor scheduling algorithms				
CO 6	Ability to understand basics of Real time operating system.				

R2017	EE8002 DESIGN OF ELECTRICAL APPARATUS	L	T	P	C
		3	0	0	3
CO 1	Ability to understand basics of design considerations for rotating and static electrical machines				
CO 2	Ability to design of field system for its application.				
CO 3	Ability to design sing and three phase transformer.				
CO 4	Ability to design armature and field of DC machines.				
CO 5	Ability to design stator and rotor of induction motor.				
CO 6	Ability to design and analyze synchronous machines				

R2017	EE8006 POWER QUALITY	L	T	P	C
		3	0	0	3
CO 1	Ability to understand and analyze Embedded systems				
CO 2	Ability to suggest an embedded system for a given application.				
CO 3	Ability to operate various Embedded Development Strategies				
CO 4	Ability to study about the bus Communication in processors.				
CO 5	Ability to acquire knowledge on various processor scheduling algorithms				
CO 6	Ability to understand basics of Real time operating system.				

R2017	EE8701 HIGH VOLTAGE ENGINEERING	L	T	P	C
		3	0	0	3
CO 1	Ability to understand various sources, causes and effects of power quality issues, electrical systems and their measures and mitigation.				
CO 2	Ability to analyze the causes & Mitigation techniques of various PQ events.				
CO 3	Ability to study about the various Active & Passive power filters				
CO 4	Ability to understand the concepts about Voltage and current distortions, harmonics.				
CO 5	Ability to analyze and design the passive filters.				
CO 6	Ability to acquire knowledge on compensation techniques.				
CO 7	Ability to acquire knowledge on DVR.				

R2017	EE8702 POWER SYSTEM OPERATION AND CONTROL	L	T	P	C
		3	0	0	3
CO 1	Ability to understand the day-to-day operation of electric power system.				
CO 2	Ability to analyze the control actions to be implemented on the system to meet the minute-to-minute variation of system demand.				
CO 3	Ability to understand the significance of power system operation and control.				
CO 4	Ability to acquire knowledge on real power-frequency interaction.				
CO 5	Ability to understand the reactive power-voltage interaction.				
CO 6	Ability to design SCADA and its application for real time operation.				

R2017	EE8703 RENEWABLE ENERGY SYSTEMS	L	T	P	C
		3	0	0	3
CO 1	Ability to create awareness about renewable Energy Sources and technologies				
CO 2	Ability to get adequate inputs on a variety of issues in harnessing renewable Energy.				
CO 3	Ability to recognize current and possible future role of renewable energy sources.				
CO 4	Ability to explain the various renewable energy resources and technologies and their applications.				
CO 5	Ability to understand basics about biomass energy				
CO 6	Ability to acquire knowledge about solar energy.				

R2017	EE8010 POWER SYSTEM TRANSIENTS	L	T	P	C
		3	0	0	3
CO 1	Ability to understand and analyze switching and lightning transients.				
CO 2	Ability to acquire knowledge on generation of switching transients and their control.				
CO 3	Ability to analyze the mechanism of lighting strokes.				
CO 4	Ability to understand the importance of propagation, reflection and refraction of travelling waves.				
CO 5	Ability to find the voltage transients caused by faults.				
CO 6	Ability to understand the concept of circuit breaker action, load rejection on integrated power system.				

R2017	MG8591 PRINCIPLES OF MANAGEMENT	L	T	P	C
		3	0	0	3
CO 1	Upon completion of the course, students will be ability to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management				

R2017	EE8017 HIGH VOLTAGE DIRECT CURRENT TRANSMISSION	L	T	P	C
		3	0	0	3
CO 1	Ability to understand the principles and types of HVDC system.				
CO 2	Ability to analyze and understand the concepts of HVDC converters.				
CO 3	Ability to acquire knowledge on DC link control.				
CO 4	Ability to understand the concepts of reactive power management, harmonics and power flow analysis.				
CO 5	Ability to get knowledge about Planning of DC power transmission and comparison with AC power transmission.				
CO 6	Ability to understand the importance of power flow in HVDC system under steady state.				

DEPARTMENT OF INFORMATION TECHNOLOGY

REGULATIONS – 2017

CHOICE BASED CREDIT SYSTEM

COURSE OUTCOMES 2017

SEMESTER I

HS8151 COMMUNICATIVE ENGLISH

CO1 Read articles of a general kind in magazines and newspapers.
CO2 Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
CO3 Comprehend conversations and short talks delivered in English
CO4 Write short essays of a general kind and personal letters and emails in English.

MA8151 ENGINEERING MATHEMATICS – I

CO1 Use both the limit definition and rules of differentiation to differentiate functions.
CO2 Apply differentiation to solve maxima and minima problems.
CO3 Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.
CO4 Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
CO5 Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.
CO6 Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.
CO7 Apply various techniques in solving differential equations.

PH8151 ENGINEERING PHYSICS

CO1 The students will gain knowledge on the basics of properties of matter and its applications,
CO2 The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,
CO3 The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,
CO4 The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and
CO5 The students will understand the basics of crystals, their structures and different crystal growth techniques.

CY8151 ENGINEERING CHEMISTRY

CO1 The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.

GE8151 PROBLEM SOLVING AND PYTHON PROGRAMMING

CO1 Develop algorithmic solutions to simple computational problems.
CO2 Read, write, execute by hand simple Python programs.
CO3 Structure simple Python programs for solving problems.
CO4 Decompose a Python program into functions.
CO5 Represent compound data using Python lists, tuples, dictionaries.
CO6 Read and write data from/to files in Python Programs.

GE8152 ENGINEERING GRAPHICS

CO1 Familiarize with the fundamentals and standards of Engineering graphics.
CO2 Perform freehand sketching of basic geometrical constructions and multiple views of objects.
CO3 Project orthographic projections of lines and plane surfaces.
CO4 Draw projections and solids and development of surfaces.
CO5 Visualize and to project isometric and perspective sections of simple solids.

GE8161 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY

CO1 Write, test, and debug simple Python programs.
CO2 Implement Python programs with conditionals and loops.
CO3 Develop Python programs step-wise by defining functions and calling them.
CO4 Use Python lists, tuples, dictionaries for representing compound data.
CO5 Read and write data from/to files in Python.

BS8161 PHYSICS AND CHEMISTRY LABORATORY

CO1 Apply the principles of elasticity.
CO2 The knowledge on optics.
CO3 Understood the thermal properties for engineering applications.
CO4 Understood the basic principles of laser.
CO5 Determine the Thermal conductivity of a bad conductor.
CO6 Estimate the Iron content and molecular weight.
CO7 Knowledge on the quantitative chemical analysis of water quality.

SEMESTER II

HS8251 TECHNICAL ENGLISH

CO1 Read technical texts and write area- specific texts effortlessly.
CO2 Listen and comprehend lectures and talks in their area of specialisation successfully.
CO3 Speak appropriately and effectively in varied formal and informal contexts.
CO4 Write reports and winning job applications.

MA8251 ENGINEERING MATHEMATICS – II

CO1 Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
CO2 Gradient, divergence and curl of a vector point function and related identities.
CO3 Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
CO4 Analytic functions, conformal mapping and complex integration.
CO5 Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

PH8252 PHYSICS FOR INFORMATION SCIENCE

CO1 Gain knowledge on classical and quantum electron theories, and energy band structuues.

CO2 Acquire knowledge on basics of semiconductor physics and its applications in various devices.

CO3 Get knowledge on magnetic properties of materials and their applications in data storage.

CO4 Have the necessary understanding on the functioning of optical materials for optoelectronics.

CO5 Understand the basics of quantum structures and their applications in carbon electronics.

BE8255 BASIC ELECTRICAL, ELECTRONICS AND MEASUREMENT ENGINEERING

CO1 Discuss the essentials of electric circuits and analysis.

CO2 Discuss the basic operation of electric machines and transformers

CO3 Introduction of renewable sources and common domestic loads.

CO4 To understand the fundamentals of electronic circuit constructions.

CO5 Introduction to measurement and metering for electric circuits.

CO6 Understand the concepts of Electrical circuits.

IT8201 INFORMATION TECHNOLOGY ESSENTIALS

CO1 Design and deploy web-sites
CO2 Design and deploy simple web-applications
CO3 Create simple database applications
CO4 Develop information system
CO5 Describe the basics of networking and mobile communications

CS8251 PROGRAMMING IN C

CO1 Develop simple applications in C using basic constructs
CO2 Design and implement applications using arrays and strings
CO3 Develop and implement applications in C using functions and pointers.
CO4 Develop applications in C using structures.
CO5 Design applications using sequential and random access file processing

GE8261 ENGINEERING PRACTICES LABORATORY

CO1 Fabricate carpentry components and pipe connections including plumbing works.
CO2 Use welding equipments to join the structures.
CO3 Carry out the basic machining operations.
CO4 Make the models using sheet metal works.
CO5 Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings.
CO6 Carry out basic home electrical works and appliances.
CO7 Measure the electrical quantities.
CO8 Elaborate on the components, gates, soldering practices.

CS8261 C PROGRAMMING LABORATORY

CO1 Develop C programs for simple applications making use of basic constructs, arrays and strings.
CO2 Develop C programs involving functions, recursion, pointers, and structures.
CO3 Design applications using sequential and random access file processing.

IT8211 INFORMATION TECHNOLOGY ESSENTIAL SLABORATORY

CO1 Design interactive websites using basic HTML tags, different styles, links and with all
CO2 Basic control elements.
CO3 Create client side and server side programs using scripts using PHP.
CO4 Design dynamic web sites and handle multimedia components
CO5 Create applications with PHP connected to database.
CO6 Create Personal Information System
CO7 Implement the technologies behind computer networks and mobile communication

SEMESTER III

MA8351 DISCRETE MATHEMATICS

CO1 Have knowledge of the concepts needed to test the logic of a program.
CO2 Have an understanding in identifying structures on many levels.
CO3 Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.
CO4 Be aware of the counting principles. Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.

CS8351 DIGITAL PRINCIPLES AND SYSTEM DESIGN

CO1 Simplify Boolean Functions using Kmap
CO2 Design and Analyze Combinational and Sequential Circuits
CO3 Implement designs using Programmable Logic Devices
CO4 Write HDL code for Combinational and Sequential Circuits

CS8391 DATA STRUCTURES

CO1 Implement abstract data types for linear data structures.
CO2 Apply the different linear and non-linear data structures to problem solutions.
CO3 Critically analyze the various sorting algorithms.

CS8392 OBJECT ORIENTED PROGRAMMING

CO1 Develop Java programs using OOP principles.
CO2 Develop Java Programs with the concepts inheritance and interfaces.
CO3 Build Java applications using exceptions and IO Streams.
CO4 Develop Java Applications with threads and generic classes.
CO5 Develop interactive Java programs using swings.

EC8394 ANALOG AND DIGITAL COMMUNICATION

CO1 Apply analog and digital communication techniques.
CO2 Use data and pulse communication techniques.
CO3 Analyze Source and Error control coding.
CO4 Utilize multi-user radio communication.

CS8381 DATA STRUCTURES LABORATORY

CO1 Write functions to implement linear and non-linear data structure operations
CO2 Suggest appropriate linear / non-linear data structure operations for solving a given problem
CO3 Appropriately use the linear / non-linear data structure operations for a given problem
CO4 Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval

CS8383 OBJECT ORIENTED PROGRAMMING LABORATORY

CO1 Develop and implement Java programs for simple applications that make use of classes, Packages and interfaces.
CO2 Develop and implement Java programs with arraylist, exception handling and multithreading.

CO3 Design applications using file processing, generic programming and event handling.

CS8382 DIGITAL SYSTEMS LABORATORY

CO1 Implement simplified combinational circuits using basic logic gates
CO2 Implement combinational circuits using MSI devices
CO3 Implement sequential circuits like registers and counters
CO4 Simulate combinational and sequential circuits using HDL

HS8381 INTERPERSONAL SKILLS / LISTENING & SPEAKING

CO1 Listen and respond appropriately.
CO2 Participate in group discussions
CO3 Make effective presentations
CO4 Participate confidently and appropriately in conversations both formal and informal

SEMESTER IV

MA8351 PROBABILITY AND STATISTICS

CO1 Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
CO2 Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.
CO3 Apply the concept of testing of hypothesis for small and large samples in real life problems.
CO4 Apply the basic concepts of classifications of design of experiments in the field of agriculture and statistical quality control.
CO5 Have the notion of sampling distributions and statistical techniques used in engineering and management problems.

CS8491 COMPUTER ARCHITECTURE

CO1 Understand the basics structure of computers, operations and instructions.
CO2 Design arithmetic and logic unit.
CO3 Understand pipelined execution and design control unit.
CO4 Understand parallel processing architectures.
CO5 Understand the various memory systems and I/O communication.

CS8492 DATABASE MANAGEMENT SYSTEMS

CO1 Classify the modern and futuristic database applications based on size and complexity
CO2 Map ER model to Relational model to perform database design effectively
CO3 Write queries using normalization criteria and optimize queries
CO4 Compare and contrast various indexing strategies in different database systems
CO5 Appraise how advanced databases differ from traditional databases.

CS8451 DESIGN AND ANALYSIS OF ALGORTIHMS

CO1 Design algorithms for various computing problems.
CO2 Analyze the time and space complexity of algorithms.
CO3 Critically analyze the different algorithm design techniques for a given problem.
CO4 Modify existing algorithms to improve efficiency.

CS8493 OPERATING SYSTEMS

CO1 Analyze various scheduling algorithms.
CO2 Understand deadlock, prevention and avoidance algorithms.
CO3 Compare and contrast various memory management schemes.
CO4 Understand the functionality of file systems.
CO5 Perform administrative tasks on Linux Servers.
CO6 Compare iOS and Android Operating Systems.

GE8291 ENVIRONMENTAL SCIENCE AND ENGINEERING

CO1 Public awareness of environment at infant stage.
CO2 Ignorance and incomplete knowledge has lead to misconceptions.
CO3 Development and improvement in standard of living has lead to serious environmental disasters.

CS8481 DATABASE MANAGEMENT SYSTEMS LABORATORY

CO1 Use typical data definitions and manipulation commands.
CO2 Design applications to test Nested and Join Queries
CO3 Implement simple applications that use Views
CO4 Implement applications that require a Front-end Tool
CO5 Critically analyze the use of Tables, Views, Functions and Procedures

CS8461 OPERATING SYSTEMS LABORATORY

CO1 Compare the performance of various CPU Scheduling Algorithms
CO2 Implement Deadlock avoidance and Detection Algorithms
CO3 Implement Semaphores
CO4 Create processes and implement IPC
CO5 Analyze the performance of the various Page Replacement Algorithms
CO6 Implement File Organization and File Allocation Strategies

HS8461 ADVANCED READING AND WRITING

CO1 Write different types of essays
CO2 Write winning job applications
CO3 Read and evaluate texts critically.
CO4 Display critical thinking in various professional contexts.

SEMESTER V

MA8551 ALGEBRA AND NUMBER THEORY

CO1 Apply the basic notions of groups, rings, fields which will then be used to solve related problems.
CO2 Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.
CO3 Demonstrate accurate and efficient use of advanced algebraic techniques.
CO4 Demonstrate their mastery by solving non - trivial problems related to the concepts, and by proving simple theorems about the, statements proven by the text.
CO5 Apply integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject.

CS8591 COMPUTER NETWORKS

- **CO1** Understand the basic layers and its functions in computer networks
- **CO2** Evaluate the performance of a network.
- **CO3** Understand the basics of how data flows from one node to another.
- **CO4** Analyze and design routing algorithms.
- **CO5** Design protocols for various functions in the network.
- **CO6** Understand the working of various application layer protocols

EC8691 MICROPROCESSORS AND MICRO CONTROLLERS

- **CO1** Understand and execute programs based on 8086 microprocessor.
- **CO2** Design Memory Interfacing circuits.
- **CO3** Design and interface I/O circuits.
- **CO4** Design and implement 8051 microcontroller based systems.

IT8501 WEB TECHNOLOGY

- **CO1** Design simple web pages using markup languages like HTML and XHTML.
- **CO2** Create dynamic web pages using DHTML and java script that is easy to navigate and use.
- **CO3** Program server side web pages that have to process request from client side web pages.
- **CO4** Represent web data using XML and develop web pages using JSP.
- **CO5** Understand various web services and how these web services interact.

CS8494 SOFTWARE ENGINEERING

- **CO1** Identify the key activities in managing a software project.
- **CO2** Compare different process models.
- **CO3** Concepts of requirements engineering and Analysis Modeling.
- **CO4** Apply systematic procedure for software design and deployment.
- **CO5** Compare and contrast the various testing and maintenance.
- **CO6** Manage project schedule, estimate project cost and effort required.

EC8681 MICROPROCESSORS AND MICROCONTROLLERS LABORATORY

- **CO1** Write ALP Programmes for fixed and Floating Point and Arithmetic operations
- **CO2** Interface different I/Os with processor
- **CO3** Generate waveforms using Microprocessors
- **CO4** Execute Programs in 8051
- **CO5** Explain the difference between simulator and Emulator

CS8581 NETWORKS LABORATORY

- **CO1** Implement various protocols using TCP and UDP.
- **CO2** Compare the performance of different transport layer protocols.
- **CO3** Use simulation tools to analyze the performance of various network protocols.
- **CO4** Analyze various routing algorithms.
- **CO5** Implement error correction codes.

IT8581 WEB TECHNOLOGY LABORATORY

CO1 Design simple web pages using markup languages like HTML and XHTML.
CO2 Create dynamic web pages using DHTML and java script that is easy to navigate and use.
CO3 Program server side web pages that have to process request from client side web pages.
CO4 Represent web data using XML and develop web pages using JSP.
CO5 Understand various web services and how these web services interact.

SEMESTER VI

IT8601 COMPUTATIONAL INTELLIGENCE

CO1 Provide a basic exposition to the goals and methods of Computational Intelligence.
CO2 Study of the design of intelligent computational techniques.
CO3 Apply the Intelligent techniques for problem solving
CO4 Improve problem solving skills using the acquired knowledge in the areas of, reasoning, natural language understanding, computer vision, automatic programming and machine learning.

CS8592 OBJECT ORIENTED ANALYSIS AND DESIGN

CO1 Express software design with UML diagrams
CO2 Design software applications using OO concepts.
CO3 Identify various scenarios based on software requirements
CO4 Transform UML based software design into pattern based design using design patterns
CO5 Understand the various testing methodologies for OO software

IT8602 MOBILE COMMUNICATION

CO1 Explain the basics of mobile telecommunication system
CO2 Illustrate the generations of telecommunication systems in wireless network
CO3 Understand the architecture of Wireless LAN technologies
CO4 Determine the functionality of network layer and Identify a routing protocol for a given Ad hoc networks
CO5 Explain the functionality of Transport and Application layer

CS8091 BIG DATA ANALYTICS

CO1 Work with big data tools and its analysis techniques
CO2 Analyze data by utilizing clustering and classification algorithms
CO3 Learn and apply different mining algorithms and recommendation systems for large volumes of data
CO4 Perform analytics on data streams
CO5 Learn NoSQL databases and management.

CS8092 COMPUTER GRAPHICS AND MULTIMEDIA

CO1 Design two dimensional graphics.
CO2 Apply two dimensional transformations.
CO3 Design three dimensional graphics.
CO4 Apply three dimensional transformations.
CO5 Apply Illumination and color models.
CO6 Apply clipping techniques to graphics.

CO7 Understood Different types of Multimedia File Format
CO8 Design Basic 3d Scenes using Blender

CS8662 MOBILE APPLICATION DEVELOPMENT LABORATORY

CO1 Develop mobile applications using GUI and Layouts.
CO2 Develop mobile applications using Event Listener.
CO3 Develop mobile applications using Databases.
CO4 Develop mobile applications using RSS Feed, Internal/External Storage, SMS, Multi-threading and GPS.
CO5 Analyze and discover own mobile app for simple needs.

CS8582 OBJECT ORIENTED ANALYSIS AND DESIGN LABORATORY

CO1 Perform OO analysis and design for a given problem specification.
CO2 Identify and map basic software requirements in UML mapping.
CO3 Improve the software quality using design patterns and to explain the rationale behind applying specific design patterns
CO4 Test the compliance of the software with the SRS

HS8581 PROFESSIONAL COMMUNICATION

CO1 Make effective presentations.
CO2 Participate confidently in Group Discussions.
CO3 Attend job interviews and be successful in them.
CO4 Develop adequate Soft Skills required for the workplace.

SEMESTER VII

MG8591 PRINCIPLES OF MANAGEMENT

CO1 Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management.

CS8792 CRYPTOGRAPHY AND NETWORK SECURITY

CO1 Understand the fundamentals of networks security, security architecture, threats and vulnerabilities
CO2 Apply the different cryptographic operations of symmetric cryptographic algorithms
CO3 Apply the different cryptographic operations of public key cryptography
CO4 Apply the various Authentication schemes to simulate different applications.
CO5 Understand various Security practices and System security standards

CS8791 CLOUD COMPUTING

CO1 Articulate the main concepts, key technologies, strengths and limitations of cloud computing.
CO2 Learn the key and enabling technologies that help in the development of cloud. Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.
CO3 Explain the core issues of cloud computing such as resource management and security.
CO4 Be able to install and use current cloud technologies.
CO5 Evaluate and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.

IT8711 FOSS AND CLOUD COMPUTING LABORATORY

CO1 Configure various virtualization tools such as Virtual Box, VMware workstation.
CO2 Design and deploy a web application in a PaaS environment.
CO3 Learn how to simulate a cloud environment to implement new schedulers.
CO4 Install and use a generic cloud environment that can be used as a private cloud.
CO5 Manipulate large data sets in a parallel environment.

IT8761 SECURITY LABORATORY

CO1 Develop code for classical Encryption Techniques to solve the problems.
CO2 Build cryptosystems by applying symmetric and public key encryption algorithms.
CO3 Construct code for authentication algorithms.
CO4 Develop a signature scheme using Digital signature standard.
CO5 Demonstrate the network security system using open source tools.

PROFESSIONAL ELECTIVES (PE)

SEMESTER VI
ELECTIVE -I

IT8076 SOFTWARE TESTING

CO1 Design test cases suitable for a software development for different domains.
CO2 Identify suitable tests to be carried out.
CO3 Prepare test planning based on the document.
CO4 Document test plans and test cases designed.
CO5 Use automatic testing tools.
CO6 Develop and validate a test plan.

CS8077 GRAPH THEORY AND APPLICATIONS

CO1 Understand the basic concepts of graphs, and different types of graphs
CO2 Understand the properties, theorems and be able to prove theorems.
CO3 Apply suitable graph model and algorithm for solving applications.

IT8071 DIGITAL SIGNAL PROCESSING

CO1 Perform mathematical operations on signals.
CO2 Understand the sampling theorem and perform sampling on continuous-time signals to get discrete time signal by applying advanced knowledge of the sampling theory.
CO3 Transform the time domain signal into frequency domain signal and vice-versa.
CO4 Apply the relevant theoretical knowledge to design the digital IIR/FIR filters for the given analog specifications.

IT8001 INFORMATION STORAGE MANAGEMENT

CO1 Understand the logical and physical components of a Storage infrastructure.
CO2 Evaluate storage architectures, including storage subsystems, DAS, SAN, NAS, and CAS.
CO3 Understand the various forms and types of Storage Virtualization.
CO4 Describe the different role in providing disaster recovery and business continuity capabilities.
CO5 Distinguish different remote replication technologies.

CS8072 AGILE METHODOLOGIES

CO1 Realize the importance of interacting with business stakeholders in determining the requirements for a software system
CO2 Perform iterative software development processes: how to plan them, how to execute them.
CO3 Point out the impact of social aspects on software development success.
CO4 Develop techniques and tools for improving team collaboration and software quality.
CO5 Perform Software process improvement as an ongoing task for development teams.
CO6 Show how agile approaches can be scaled up to the enterprise level.

IT8072 EMBEDDED SYSTEMS

CO1 Describe the architecture and programming of ARM processor.
CO2 Explain the concepts of embedded systems
CO3 Understand the Concepts of peripherals and interfacing of sensors.
CO4 Capable of using the system design techniques to develop firmware
CO5 Illustrate the code for constructing a system

GE8075 INTELLECTUAL PROPERTY RIGHTS

CO1 Ability to manage Intellectual Property portfolio to enhance the value of the firm.

ELECTIVE-II

IT8002 WEB DEVELOPMENT FRAMEWORKS

CO1 Analyze the fundamentals of web framework
CO2 Use the concept of Java web framework
CO3 Implement the concept using Struts framework
CO4 Apply the concept of python web framework to the problem solutions.
CO5 Critically analyze the various Web frameworks.

CS8082 MACHINE LEARNING TECHNIQUES

CO1 Differentiate between supervised, unsupervised, semi-supervised machine learning approaches
CO2 Apply specific supervised or unsupervised machine learning algorithm for a particular problem
CO3 Analyse and suggest the appropriate machine learning approach for the various types of problem
CO4 Design and make modifications to existing machine learning algorithms to suit an individual application
CO5 Provide useful case studies on the advanced machine learning algorithms

IT8003 FORMAL LANGUAGES AND AUTOMATA THEORY

CO1 Design a finite automaton for a specific language.
CO2 Design a Turing machine.
CO3 Select appropriate grammar for the implementation of compiler phases
CO4 Design a lexical analyzer
CO5 Design a simple parser
CO6 Design and implement techniques used for optimization by a compiler.

CO7 Write a very simple code generator

CS8081 INTERNET OF THINGS

CO1	Explain the concept of IoT.
CO2	Analyze various protocols for IoT.
CO3	Design a PoC of an IoT system using Rasperry Pi/Arduino
CO4	Apply data analytics and use cloud offerings related to IoT.
CO5	Analyze applications of IoT in real time scenario

IT8075 SOFTWARE PROJECT MANAGEMENT

CO1	Understand Project Management principles while developing software.
CO2	Gain extensive knowledge about the basic project management concepts, framework and the process models.
CO3	Obtain adequate knowledge about software process models and software effort estimation techniques.
CO4	Estimate the risks involved in various project activities.
CO5	Define the checkpoints, project reporting structure, project progress and tracking mechanisms using project management principles.
CO6	Learn staff selection process and the issues related to people management

IT8074 SERVICE ORIENTED ARCHITECTURE

CO1	Understand XML technologies
CO2	Understand service orientation, benefits of SOA
CO3	Understand web services and WS standards
CO4	Use web services extensions to develop solutions
CO5	Understand and apply service modeling, service oriented analysis and design for application development

GE8077 TOTAL QUALITY MANAGEMENT

CO1	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.

DEPARTMENT OF MECHANICAL ENGINEERING

REGULATIONS – 2017

CHOICE BASED CREDIT SYSTEM

COURSE OUTCOMES - 2017

SEMESTER I

HS8151 COMMUNICATIVE ENGLISH

HS8151.1 Read articles of a general kind in magazines and newspapers.

HS8151.2 Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.

HS8151.3 Comprehend conversations and short talks delivered in English

HS8151.4 Write short essays of a general kind and personal letters and emails in English.

MA8151 ENGINEERING MATHEMATICS – I

MA8151.1 Use both the limit definition and rules of differentiation to differentiate Functions.

MA8151.2 Apply differentiation to solve maxima and minima problems.

MA8151.3 Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.

MA8151.4 Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.

MA8151.5 Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.

MA8151.6 Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.

MA8151.7 Apply various techniques in solving differential equations.

PH8151 ENGINEERING PHYSICS

PH8151.1 The students will gain knowledge on the basics of properties of matter and its applications,

PH8151.2 The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,

PH8151.3 The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,

PH8151.4 The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunnelling microscopes, and

PH8151.5 The students will understand the basics of crystals, their structures and

different crystal growth techniques.

CY8151 ENGINEERING CHEMISTRY

CY8151.1 The knowledge gained on Water Treatment techniques to facilitate better understanding of Ion exchange process, Zeolite process, Desalination and Reverse Osmosis.

CY8151.2 The knowledge gained on Surface Chemistry to facilitate better understanding on Adsorption of gases and Catalysis.

CY8151.3 The knowledge gained on Engineering Materials to facilitate better understanding on Alloys and Heat treatment process.

CY8151.4 The knowledge gained on Fuels to facilitate better understanding on its types and Combustion process.

CY8151.5 The knowledge gained on Energy Sources and Storage devices to facilitate better understanding of its processes and applications.

GE8151 PROBLEM SOLVING AND PYTHON PROGRAMMING

GE8151.1 Develop algorithmic solutions to simple computational problems.

GE8151.2 Read, write, execute by hand simple Python programs.

GE8151.3 Structure simple Python programs for solving problems.

GE8151.4 Decompose a Python program into functions.

GE8151.5 Represent compound data using Python lists, tuples, dictionaries.

GE8151.6 Read and write data from/to files in Python Programs.

GE8152 ENGINEERING GRAPHICS

GE8152.1 Familiarize with the fundamentals and standards of Engineering graphics.

GE8152.2 Perform freehand sketching of basic geometrical constructions and multiple views of objects.

GE8152.3 Project orthographic projections of lines and plane surfaces.

GE8152.4 Draw projections and solids and development of surfaces.

GE8152.5 Visualize and to project isometric and perspective sections of simple solids.

GE8161 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY

GE8161.1 Write, test, and debug simple Python programs.

GE8161.2 Implement Python programs with conditionals and loops.

GE8161.3 Develop Python programs step-wise by defining functions and calling them.

GE8161.4 Use Python lists, tuples, dictionaries for representing compound data.

GE8161.5 Read and write data from/to files in Python.

BS8161 PHYSICS AND CHEMISTRY LABORATORY

BS8161.1 Apply the principles of elasticity.

BS8161.2 The knowledge on optics.

BS8161.3 Understood the thermal properties for engineering applications.

BS8161.4 Understood the basic principles of laser.

BS8161.5 Determine the Thermal conductivity of a bad conductor.

BS8161.6 Estimate the Iron content and molecular weight.

BS8161.7 Knowledge on the quantitative chemical analysis of water quality.

SEMESTER II

HS8251 TECHNICAL ENGLISH

HS8251.1 Read technical texts and write area- specific texts effortlessly.

HS8251.2 Listen and comprehend lectures and talks in their area of specialisation successfully.

HS8251.3 Speak appropriately and effectively in varied formal and informal contexts.

HS8251.4 Write reports and winning job applications.

MA8251 ENGINEERING MATHEMATICS – II

MA8251.1 Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.

MA8251.2 Gradient, divergence and curl of a vector point function and related identities.

MA8251.3 Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.

MA8251.4 Analytic functions, conformal mapping and complex integration.

MA8251.5 Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

PH8251 MATERIALS SCIENCE

PH8251.1 The students will have knowledge on the various phase diagrams and their applications.

PH8251.2 The students will acquire knowledge on Fe-Fe3C phase diagram, various microstructures and alloys.

PH8251.3 The students will get knowledge on mechanical properties of materials and their measurement.

PH8251.4 The students will gain knowledge on magnetic, dielectric and superconducting properties of materials.

PH8251.5 The students will understand the basics of ceramics, composites and nanomaterials.

BE8253 BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING

BE8253.1 Understand the concepts of Electrical circuits.

BE8253.2 Understand the concepts of AC circuits.

BE8253.3 Understand electric circuits and working principles of electrical machines.

BE8253.4 Understand the concepts of various electronic devices.

BE8253.5 Choose appropriate instruments for electrical measurement for a specific application.

GE8291 ENVIRONMENTAL SCIENCE AND ENGINEERING

GE8291.1 Public awareness of environment at an infant stage.

GE8291.2 Knowledge about the nature and facts about environment.

GE8291.3 Understand the importance of environment by assessing its impact on the human world.

GE8291.4 Understand the interrelationship between living organism and environment.

GE8291.5 Understand the features of the earth‟s interior and surface.

GE8291.6 The Knowledge on natural resources, pollution control and waste management.

GE8292 ENGINEERING MECHANICS

GE8292.1 Illustrate the vectorial and scalar representation of forces and moments.

GE8292.2 Analyse the rigid body in equilibrium.

GE8292.3 Evaluate the properties of surfaces and solids.

GE8292.4 Calculate dynamic forces exerted in rigid body.

GE8292.5 Determine the friction and the effects by the laws of friction.

GE8261 ENGINEERING PRACTICES LABORATORY

GE8261.1 Fabricate carpentry components and pipe connections including plumbing works.

GE8261.2 Use welding equipments to join the structures.

GE8261.3 Carry out the basic machining operations.

GE8261.4 Make the models using sheet metal works.

GE8261.5 Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings.

GE8261.6 Carry out basic home electrical works and appliances.

GE8261.7 Measure the electrical quantities.

GE8261.8 Elaborate on the components, gates, soldering practices.

BE8261 BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING LABORATORY

BE8261.1 Ability to determine the speed characteristic of different electrical machines.

BE8261.2 Ability to design simple circuits involving diodes.

BE8261.3 Ability to design transistors.

BE8261.4 Ability to use operational amplifiers.

BE8261.5 Ability to use operational sensors.

SEMESTER III

MA8353	**TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS**
MA8353.1	Understand how to solve the given standard partial differential equations.
MA8353.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
MA8353.3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
MA8353.4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
MA8353.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

ME8391	**ENGINEERING THERMODYNAMICS**
ME8391.1	Apply the first law of thermodynamics for simple open and closed systems under steady and unsteady conditions.
ME8391.2	Apply second law of thermodynamics to open and closed systems and calculate entropy and availability.
ME8391.3	Apply Rankine cycle to steam power plant and compare few cycle improvement methods.
ME8391.4	Derive simple thermodynamic relations of ideal and real gases.
ME8391.5	Calculate the properties of gas mixtures and moist air and its use in psychometric processes.

CE8394	**FLUID MECHANICS AND MACHINERY**
CE8394.1	Apply mathematical knowledge to predict the properties and characteristics of a fluid.
CE8394.2	Can analyse and calculate major and minor losses associated with pipe flow in piping networks.
CE8394.3	Can mathematically predict the nature of physical quantities.
CE8394.4	Can critically analyse the performance of pumps.
CE8394.5	Can critically analyse the performance of turbines.

ME8351	**MANUFACTURING TECHNOLOGY – I**
ME8351.1	Explain different metal casting processes, associated defects, merits and demerits.
ME8351.2	Compare different metal joining processes.

ME8351.3	Summarize various hot working and cold working methods of metals.
ME8351.4	Explain various sheet metal making processes.
ME8351.5	Distinguish various methods of manufacturing plastic components.
EE8353	**ELECTRICAL DRIVES AND CONTROLS**
EE8353.1	Understand the basic concepts of different types of electrical machines and their performance.
EE8353.2	Knowledge about D.C motors and induction motors.
EE8353.3	Knowledge about the conventional and solid-state drives.
EE8353.4	Understanding the conventional and solid state speed control of D.C drives.
EE8353.5	Understanding the conventional and solid state speed control of A.C drives.
ME8361	**MANUFACTURING TECHNOLOGY LABORATORY – I**
ME8361.1	Demonstrate the safety precautions exercised in the mechanical workshop.
ME8361.2	Make the workpiece as per given shape and size using Lathe.
ME8361.3	Join two metals using arc welding.
ME8361.4	Use sheet metal fabrication tools and make simple tray and funnel.
ME8361.5	Use different moulding tools, patterns and prepare sand moulds.
ME8381	**COMPUTER AIDED MACHINE DRAWING**
ME8381.1	Ability to draw assembly drawings both manually and using standard CAD packages.
ME8381.2	Understand and interpret drawings of machine components.
ME8381.3	Follow the drawing standards, Fits and Tolerances.
ME8381.4	Re-create part drawings, sectional views and assembly drawings as per standards.
ME8381.5	Knowledge in handling 2D drafting, 3D modeling and Dimensioning.
EE8361	**ELECTRICAL ENGINEERING LABORATORY**
EE8361.1	Ability to perform speed characteristic of different electrical machine.
EE8361.2	Ability to perform Load test on DC Shunt & DC Series motor.
EE8361.3	Ability to perform Speed control of DC shunt motor.
EE8361.4	Ability to perform O.C & S.C Test on a single phase transformer.
EE8361.5	Ability to perform Load test on three phase squirrel cage Induction motor.
EE8361.6	Ability to perform Speed control of three phase slip ring Induction Motor.
HS8381	**INTERPERSONAL SKILLS/LISTENING & SPEAKING**
HS8381.1	Listen and respond appropriately.
HS8381.2	Participate in group discussions
HS8381.3	Make effective presentations

HS8381.4	Participate confidently and appropriately in conversations both formal and informal.

SEMESTER IV

MA8452	**STATISTICS AND NUMERICAL METHODS**
MA8452.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.
MA8452.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.
MA8452.3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
MA8452.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
MA8452.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

ME8492	**KINEMATICS OF MACHINERY**
ME8492.1	Discuss the basics of mechanism.
ME8492.2	Calculate velocity and acceleration in simple mechanisms.
ME8492.3	Develop CAM profiles.
ME8492.4	Solve problems on gears and gear trains.
ME8492.5	Examine friction in machine elements.

ME8451	**MANUFACTURING TECHNOLOGY – II**
ME8451.1	Explain the mechanism of material removal processes.
ME8451.2	Describe the constructional and operational features of centre lathe and other special purpose lathes.
ME8451.3	Describe the constructional and operational features of shaper, planner, milling, drilling, sawing and broaching machines.
ME8451.4	Explain the types of grinding and other super finishing processes apart from gear manufacturing processes.
ME8451.5	Summarize numerical control of machine tools and write a part program.

ME8491	**ENGINEERING METALLURGY**
ME8491.1	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification.
ME8491.2	Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes.
ME8491.3	Clarify the effect of alloying elements on ferrous and non-ferrous metals.

ME8491.4	Summarize the properties and applications of non metallic materials.
ME8491.5	Explain the testing of mechanical properties.

CE8395	**STRENGTH OF MATERIALS FOR MECHANICAL ENGINEERS**
CE8395.1	Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes.
CE8395.2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.
CE8395.3	Apply basic equation of simple torsion in designing of shafts and helical spring.
CE8395.4	Calculate the slope and deflection in beams using different methods.
CE8395.5	Analyze and design thin and thick shells for the applied internal and external pressures.

ME8493	**THERMAL ENGINEERING - I**
ME8493.1	Apply thermodynamic concepts to different air standard cycles and solve problems.
ME8493.2	Solve problems in single stage and multistage air compressors.
ME8493.3	Explain the functioning and features of IC engines, components and auxiliaries.
ME8493.4	Calculate performance parameters of IC Engines.
ME8493.5	Explain the flow in Gas turbines and solve problems.

ME8462	**MANUFACTURING TECHNOLOGY LABORATORY – II**
ME8462.1	Use different machine tools to manufacturing gears.
ME8462.2	Ability to use different machine tools to manufacturing gears.
ME8462.3	Ability to use different machine tools for finishing operations.
ME8462.4	Ability to manufacture tools using cutter grinder.
ME8462.5	Develop CNC part programming.

CE8381	**STRENGTH OF MATERIALS AND FLUID MECHANICS AND MACHINERY LABORATORY**
CE8381.1	Understand the mechanical properties of materials when subjected to different types of loading.
CE8381.2	Ability to perform Tension & Torsion tests on Solid materials.
CE8381.3	Ability to perform Hardness & Compression test on Solid materials.
CE8381.4	Ability to perform Deformation test on Solid materials.

HS8461	**ADVANCED READING AND WRITING**
HS8461.1	Write different types of essays.
HS8461.2	Write winning job applications.
HS8461.3	Read and evaluate texts critically.
HS8461.4	Display critical thinking in various professional contexts.

SEMESTER V

ME8595	**THERMAL ENGINEERING – II**
ME8595.1	Solve problems in Steam Nozzle.
ME8595.2	Explain the functioning and features of different types of Boilers and auxiliaries and calculate performance parameters.
ME8595.3	Explain the flow in steam turbines, draw velocity diagrams for steam turbines and solve problems.
ME8595.4	Summarize the concept of Cogeneration, Working features of Heat pumps and Heat exchangers.
ME8595.5	Solve problems using refrigerant table / charts and psychrometric charts.

ME8593	**DESIGN OF MACHINE ELEMENTS**
ME8593.1	Understand the influence of steady and variable stresses in machine component design.
ME8593.2	Apply the concepts of design to shafts, keys and couplings.
ME8593.3	Apply the concepts of design to temporary and permanent joints.
ME8593.4	Apply the concepts of design to energy absorbing members, connecting rod and crank shaft.
ME8593.5	Apply the concepts of design to bearings.

ME8501	**METROLOGY AND MEASUREMENTS**
ME8501.1	Describe the concepts of measurements to apply in various metrological instruments.
ME8501.2	Outline the principles of linear and angular measurement tools used for industrial applications.
ME8501.3	Explain the procedure for conducting computer aided inspection.
ME8501.4	Demonstrate the techniques of form measurement used for industrial components.
ME8501.5	Discuss various measuring techniques of mechanical properties in industrial applications.

ME8594	**DYNAMICS OF MACHINES**
ME8594.1	Calculate static and dynamic forces of mechanisms.
ME8594.2	Calculate the balancing masses and their locations of reciprocating and rotating masses.
ME8594.3	Compute the frequency of free vibration.
ME8594.4	Compute the frequency of forced vibration and damping coefficient.
ME8594.5	Calculate the speed and lift of the governor and estimate the gyroscopic effect on automobiles, ships and airplanes.

ME8511	**KINEMATICS AND DYNAMICS LABORATORY**
ME8511.1	Explain gear parameters, kinematics of mechanisms, gyroscopic effect and working of lab equipments.
ME8511.2	Determine mass moment of inertia of mechanical element, governor effort and range sensitivity, natural frequency and damping coefficient, torsional frequency, critical speeds of shafts, balancing mass of rotating and reciprocating masses, and transmissibility ratio.

ME8512	**THERMAL ENGINEERING LABORATORY**
ME8512.1	Conduct tests on heat conduction apparatus and evaluate thermal conductivity of materials.
ME8512.2	Conduct tests on natural and forced convective heat transfer apparatus and evaluate heat transfer coefficient.
ME8512.3	Conduct tests on radiative heat transfer apparatus and evaluate Stefan Boltzmann constant and emissivity.
ME8512.4	Conduct tests to evaluate the performance of parallel/counter flow heat exchanger apparatus and reciprocating air compressor.
ME8512.5	Conduct tests to evaluate the performance of refrigeration and airconditioning test rigs.

ME8513	**METROLOGY AND MEASUREMENTS LABORATORY**
ME8513.1	Measure the gear tooth dimensions, angle using sine bar, straightness and flatness, thread parameters, temperature using thermocouple, force, displacement, torque and vibration.
ME8513.2	Calibrate the vernier, micrometer and slip gauges and setting up the comparator for the inspection.

SEMESTER VI

ME8651	**DESIGN OF TRANSMISSION SYSTEMS**
ME8651.1	Apply the concepts of design to belts, chains and rope drives.
ME8651.2	Apply the concepts of design to spur, helical gears.
ME8651.3	Apply the concepts of design to worm and bevel gears.
ME8651.4	The concepts of design to gear boxes.
ME8651.5	Apply the concepts of design to cams, brakes and clutches

ME8691	**COMPUTER AIDED DESIGN AND MANUFACTURING**
ME8691.1	Explain the 2D and 3D transformations, clipping algorithm, Manufacturing models and Metrics.
ME8691.2	Explain the fundamentals of parametric curves, surfaces and Solids.
ME8691.3	Summarize the different types of Standard systems used in CAD.
ME8691.4	Apply NC & CNC programming concepts to develop part programme

	for Lathe & Milling Machines.
ME8691.5	Summarize the different types of techniques used in Cellular Manufacturing and FMS.
ME8692	**FINITE ELEMENT ANALYSIS**
ME8692.1	Summarize the basics of finite element formulation.
ME8692.2	Apply finite element formulations to solve one dimensional Problem.
ME8692.3	Apply finite element formulations to solve two dimensional scalar Problems.
ME8692.4	Apply finite element method to solve two dimensional Vector problems.
ME8692.5	Apply finite element method to solve problems on iso parametric element and dynamic Problems.
ME8693	**HEAT AND MASS TRANSFER**
ME8693.1	Apply heat conduction equations to different surface configurations under steady state and transient conditions and solve problems.
ME8693.2	Apply free and forced convective heat transfer correlations to internal and external flows through/over various surface configurations and solve problems.
ME8693.3	Explain the phenomena of boiling and condensation, apply LMTD and NTU methods of thermal analysis to different types of heat exchanger configurations and solve problems.
ME8693.4	Explain basic laws for Radiation and apply these principles to radiative heat transfer between different types of surfaces to solve problems.
ME8693.5	Apply diffusive and convective mass transfer equations and correlations to solve problems for different applications.
ME8694	**HYDRAULICS AND PNEUMATICS**
ME8694.1	Explain the Fluid power and operation of different types of pumps.
ME8694.2	Summarize the features and functions of Hydraulic motors, actuators and Flow control valves.
ME8694.3	Explain the different types of Hydraulic circuits and systems.
ME8694.4	Explain the working of different pneumatic circuits and systems.
ME8694.5	Summarize the various trouble shooting methods and applications of hydraulic and pneumatic systems.
ME8681	**CAD / CAM LABORATORY**
ME8681.1	Draw 3D and Assembly drawing using CAD software.
ME8681.2	Demonstrate manual part programming with G and M codes using CAM.
HS8581	**PROFESSIONAL COMMUNICATION**
HS8581.1	Make effective presentations.
HS8581.2	Participate confidently in Group Discussions.

HS8581.3	Attend job interviews and be successful in them.
HS8581.4	Develop adequate Soft Skills required for the workplace.

SEMESTER VII

ME8791	**MECHATRONICS**
ME8791.1	Discuss the interdisciplinary applications of Electronics, Electrical, Mechanical and Computer Systems for the Control of Mechanical, Electronic Systems and sensor technology.
ME8791.2	Discuss the architecture of Microprocessor and Microcontroller, Pin Diagram, Addressing, Modes of Microprocessor and Microcontroller.
ME8791.3	Discuss Programmable Peripheral Interface, Architecture of 8255 PPI, and various device interfacing.
ME8791.4	Explain the architecture, programming and application of programmable logic controllers to problems and challenges in the areas of Mechatronic engineering.
ME8791.5	Discuss various Actuators and Mechatronics system using the knowledge and skills acquired through the course and also from the given case studies.

ME8792	**POWER PLANT ENGINEERING**
ME8792.1	Explain the layout, construction and working of the components inside a thermal power plant.
ME8792.2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.
ME8792.3	Explain the layout, construction and working of the components inside nuclear power plants.
ME8792.4	Explain the layout, construction and working of the components inside Renewable energy power plants.
ME8792.5	Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.

ME8793	**PROCESS PLANNING AND COST ESTIMATION**
ME8793.1	Select the process, equipment and tools for various industrial products.
ME8793.2	Prepare process planning activity chart.
ME8793.3	Explain the concept of cost estimation.
ME8793.4	Compute the job order cost for different type of shop floor.
ME8793.5	Calculate the machining time for various machining operations.

ME8711	**SIMULATION AND ANALYSIS LABORATORY**
ME8711.1	Simulate the working principle of air conditioning system, hydraulic and pneumatic cylinder and cam follower mechanisms using MATLAB.
ME8711.2	Analyze the stresses and strains induced in plates, brackets and beams

	and heat transfer problems.
ME8711.3	Calculate the natural frequency and mode shape analysis of 2D components and beams.
ME8781	**MECHATRONICS LABORATORY**
ME8781.1	Demonstrate the functioning of mechatronics system with various pneumatic, hydraulic and electrical systems.
ME8781.2	Demonstrate the functioning of control systems with the help of PLC and microcontrollers.
ME8712	**TECHNICAL SEMINAR**
ME8782.1	Ability to communicate effectively and prepare presentations on Technical topics.
MG8591	**PRINCIPLES OF MANAGEMENT**
MG8591.1	Understand the managerial functions like planning, organizing, staffing, leading & controlling. Knowledge on international aspect of management.
ME8811	**PROJECT WORK**
ME8811.1	Ability to solve challenging practical problems and find solution by formulating proper methodology.
ME8091	**AUTOMOBILE ENGINEERING**
ME8091.1	Recognize the various parts of the automobile and their functions and materials.
ME8091.2	Discuss the engine auxiliary systems and engine emission control.
ME8091.3	Distinguish the working of different types of transmission systems.
ME8091.4	Explain the Steering, Brakes and Suspension Systems.
ME8091.5	Predict possible alternate sources of energy for IC Engines.
PR8592	**WELDING TECHNOLOGY**
PR8592.1	Understand the construction and working principles of gas and arc welding process.
PR8592.2	Understand the construction and working principles of resistance welding process.
PR8592.3	Understand the construction and working principles of various solid state welding process.
PR8592.4	Understand the construction and working principles of various special welding processes.
PR8592.5	Understand the concepts on weld joint design, weldability and testing of weldments.
ME8096	**GAS DYNAMICS AND JET PROPULSION**
ME8096.1	Apply the concept of compressible flows in variable area ducts.

ME8096.2	Apply the concept of compressible flows in constant area ducts.
ME8096.3	Examine the effect of compression and expansion waves in compressible flow.
ME8096.4	Use the concept of gas dynamics in Jet Propulsion.
ME8096.5	Apply the concept of gas dynamics in Space Propulsion.

GE8075	**INTELLECTUAL PROPERTY RIGHTS**
GE8075.1	Ability to manage Intellectual Property portfolio to enhance the value of the firm.

GE8073	**FUNDAMENTALS OF NANOSCIENCE**
GE8073.1	Will familiarize about the science of nanomaterials.
GE8073.2	Will demonstrate the preparation of nanomaterials.
GE8073.3	Will develop knowledge in characteristic nanomaterials.

ME8071	**REFRIGERATION AND AIR CONDITIONING**
ME8071.1	Explain the basic concepts of Refrigeration.
ME8071.2	Explain the Vapour compression Refrigeration systems and to solve problems.
ME8071.3	Discuss the various types of Refrigeration systems.
ME8071.4	Calculate the Psychrometric properties and its use in psychrometric processes.
ME8071.5	Explain the concepts of Air conditioning and to solve problems.

ME8072	**RENEWABLE SOURCES OF ENERGY**
ME8072.1	Discuss the importance and Economics of renewable Energy.
ME8072.2	Discuss the method of power generation from Solar Energy.
ME8072.3	Discuss the method of power generation from Wind Energy.
ME8072.4	Explain the method of power generation from Bio Energy.
ME8072.5	Explain the Tidal energy, Wave Energy, OTEC, Hydro energy, Geothermal Energy, Fuel Cells and Hybrid Systems.

ME8098	**QUALITY CONTROL AND RELIABILITY ENGINEERING**
ME8098.1	Summarize the concept of Quality and Process control for variables.
ME8098.2	Apply the process control for attributes.
ME8098.3	Explain the concept of sampling and to solve problems.
ME8098.4	Explain the concept of Life testing.
ME8098.5	Explain the concept Reliability and techniques involved.

ME8073	**UNCONVENTIONAL MACHINING PROCESSES**
ME8073.1	Explain the need for unconventional machining processes and its classification.
ME8073.2	Compare various thermal energy and electrical energy based unconventional machining processes.
ME8073.3	Summarize various chemical and electro-chemical energy based

	unconventional machining processes.
ME8073.4	Explain various nano abrasives based unconventional machining processes.
ME8073.5	Distinguish various recent trends based unconventional machining processes.

MG8491	**OPERATIONS RESEARCH**
MG8491.1	Ability to use the optimization techniques for use engineering and Business problems.

MF8071	**ADDITIVE MANUFACTURING**
MF8071.1	Understand the working principle and construction of Additive Manufacturing technologies.
MF8071.2	Design the additive manufacturing process.
MF8071.3	Potential to support design and manufacturing and modern development in additive manufacturing process.

GE8077	**TOTAL QUALITY MANAGEMENT**
GE8077.1	Ability to apply the tools and techniques of quality management to manufacturing and services processes.

ME8099	**ROBOTICS**
ME8099.1	Explain the concepts of industrial robots, classification, specifications and coordinate systems. Also summarize the need and application of robots in different sectors.
ME8099.2	Illustrate the different types of robot drive systems as well as robot end effectors.
ME8099.3	Apply the different sensors and image processing techniques in robotics to improve the ability of robots.
ME8099.4	Develop robotic programs for different tasks and familiarize with the kinematics motions of robot.
ME8099.5	Examine the implementation of robots in various industrial sectors and interpolate the economic analysis of robots.

ME8095	**DESIGN OF JIGS, FIXTURES AND PRESS TOOLS**
ME8095.1	Summarize the different methods of Locating Jigs and Fixtures and Clamping principles.
ME8095.2	Design and develop jigs and fixtures for given component.
ME8095.3	Discuss the press working terminologies and elements of cutting dies.
ME8095.4	Distinguish between Bending and Drawing dies.
ME8095.5	Discuss the different types of forming techniques.

ME8093	**COMPUTATIONAL FLUID DYNAMICS**
ME8093.1	Derive the governing equations and boundary conditions for Fluid

	dynamics.
ME8093.2	Analyze Finite difference and Finite volume methods for Diffusion.
ME8093.3	Analyze Finite volume method for Convective diffusion.
ME8093.4	Analyze Flow field problems.
ME8093.5	Explain and solve the Turbulence models and Mesh generation techniques.

ME8097	**NON DESTRUCTIVE TESTING AND EVALUATION**
ME8097.1	Explain the fundamental concepts of NDT.
ME8097.2	Discuss the different methods of NDE.
ME8097.3	Explain the concept of Thermography and Eddy current testing.
ME8097.4	Explain the concept of Ultrasonic Testing and Acoustic Emission.
ME8097.5	Explain the concept of Radiography.

ME8092	**COMPOSITE MATERIALS AND MECHANICS**
ME8092.1	Summarize the various types of Fibers, Equations and manufacturing methods for Composite materials.
ME8092.2	Derive Flat plate Laminate equations.
ME8092.3	Analyze Lamina strength.
ME8092.4	Analyze the thermal behaviour of Composite laminates.
ME8092.5	Analyze Laminate flat plates.

GE8074	**HUMAN RIGHTS**
GE8074.1	Basic knowledge of human rights.

GE8071	**DISASTER MANAGEMENT**
GE8071.1	Differentiate the types of disasters, causes and their impact on environment and society.
GE8071.2	Assess vulnerability and various methods of risk reduction measures as well as mitigation.
GE8071.3	Draw the hazard and vulnerability profile of India.
GE8071.4	Scenarios in the Indian context, Disaster damage assessment and management.

IE8693	**PRODUCTION PLANNING AND CONTROL**
IE8693.1	Ability to prepare production planning and control activities such as work study, product planning, production scheduling, Inventory Control.
IE8693.2	Ability to plan manufacturing requirement Planning (MRP II).
IE8693.3	Ability to plan Enterprise Resource Planning (ERP).

MG8091	**ENTREPRENEURSHIP DEVELOPMENT**
MG8091.1	Knowledge and skills needed to run a business successfully.

ME8094	**COMPUTER INTEGRATED MANUFACTURING SYSTEMS**
ME8094.1	Explain the basic concepts of CAD, CAM and computer integrated manufacturing systems.
ME8094.2	Summarize the production planning and control and computerized process planning.
ME8094.3	Differentiate the different coding systems used in group technology.
ME8094.4	Explain the concepts of flexible manufacturing system (FMS) and automated guided vehicle (AGV) system.
ME8094.5	Classification of robots used in industrial applications.

ME8074	**VIBRATION AND NOISE CONTROL**
ME8074.1	Summarize the Basics of Vibration.
ME8074.2	Summarize the Basics of Noise.
ME8074.3	Explain the Sources of Automotive Noise.
ME8074.4	Discuss the Control techniques for vibration.
ME8074.5	Describe the sources and control of Noise.

EE8091	**MICRO ELECTRO MECHANICAL SYSTEMS**
EE8091.1	Ability to understand and apply basic science, circuit theory, Electro-magnetic field theory, control theory and apply them to electrical engineering problems.
EE8091.2	Ability to understand and analyse, linear and digital electronic circuits.

GE8076	**PROFESSIONAL ETHICS IN ENGINEERING**
GE8076.1	Ability to apply ethics in society.
GE8076.2	Knowledge about the ethical issues related to engineering.
GE8076.3	Realize the responsibilities and rights of the individual in the society.

DEPARTMENT OF CIVIL ENGINEERING

REGULATIONS – 2017

CHOICE BASED CREDIT SYSTEM

COURSE OUTCOMES – 2017

MA8353-Transforms and Partial Differential Equations

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Understand how to solve the given standard partial differential equations.
CO2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
CO3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
CO4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
CO5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

CE8301 - STRENGTH OF MATERIALS I

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Understand the concepts of stress and strain, principal stresses and principal planes.
CO2	Determine Shear force and bending moment in beams and understand concept of theory of simple bending.
CO3	Calculate the deflection of beams by different methods and selection of method for determining slope or deflection.
CO4	Apply basic equation of torsion in design of circular shafts and helical springs,
CO5	Analyze the pin jointed plane and space trusses

CE8302-Fluid Mechanics

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Get a basic knowledge of fluids in static, kinematic and dynamic equilibrium.
CO2	Understand and solve the problems related to equation of motion.
CO3	Gain knowledge about dimensional and model analysis.
CO4	Learn types of flow and losses of flow in pipes.
CO5	Understand and solve the boundary layer problems.

CE8351-Surveying

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	The use of various surveying instruments and mapping
CO2	Measuring Horizontal angle and vertical angle using different instruments
CO3	Methods of Leveling and setting Levels with different instruments
CO4	Concepts of astronomical surveying and methods to determine time, longitude, latitude and azimuth
CO5	Concept and principle of modern surveying.

CE8391-Construction Materials

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Compare the properties of most common and advanced building materials.
CO2	understand the typical and potential applications of lime, cement and aggregates
CO3	know the production of concrete and also the method of placing and making of concrete elements.
CO4	understand the applications of timbers and other materials
CO5	Understand the importance of modern material for construction.

CE8392-Engineering Geology

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Will be able to understand the importance of geological knowledge such as earth, earthquake, volcanism and the action of various geological agencies.
CO2	Will get basics knowledge on properties of minerals.
CO3	Gain knowledge about types of rocks, their distribution and uses.
CO4	Will understand the methods of study on geological structure.
CO5	Will understand the application of geological investigation in projects such as dams, tunnels, bridges, roads, airport and harbor

Laboratory

CE8311-Construction Materials Laboratory

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	have the required knowledge in the area of testing of construction materials and components of construction elements experimentally.

CE8361-SurveyingLaboratory

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	have acquired practical knowledge on handling basic survey instruments including Theodolite, Tacheometry, Total Station and GPS
CO2	have adequate knowledge to carryout Triangulation and Astronomical surveying including general field marking for various engineering projects and Location of site etc.

HS8381 - Interpersonal Skills / Listening & Speaking

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Listen and respond appropriately.
CO2	Participate in group discussions
CO3	Make effective presentations
CO4	Participate confidently and appropriately in conversations both formal and informal

Fifth Semester B.E

CE8501-Design of Reinforced Concrete Elements

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Understand the various design methodologies for the design of RC elements
CO2	Know the analysis and design of flanged beams by limit state method and sign of beams for shear, bond and torsion.
CO3	design the various types of slabs and staircase by limit state method.
CO4	Design columns for axial, uniaxial and biaxial eccentric loadings.
CO5	Design of footing by limit state method.

CE8502-Structural Analysis I

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Analyze continuous beams, pin-jointed indeterminate plane frames and rigid plane frames by strain energy method
CO2	Analyse the continuous beams and rigid frames by slope defection method.
CO3	Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway
CO4	Analyse the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method.
CO5	Understand the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames.

EN8491-Water Supply Engineering

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	an insight into the structure of drinking water supply systems, including water transport, treatment and distribution
CO2	the knowledge in various unit operations and processes in water treatment
CO3	an ability to design the various functional units in water treatment
CO4	an understanding of water quality criteria and standards, and their relation to public health
CO5	the ability to design and evaluate water supply project alternatives on basis of chosen criteria

CE8591-Foundation Engineering

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Understand the site investigation, methods and sampling.
CO2	Get knowledge on bearing capacity and testing methods.
CO3	Design shallow footings.
CO4	Determine the load carrying capacity, settlement of pile foundation.
CO5	Determine the earth pressure on retaining walls and analysis for stability.

GE8071-Disaster Management (Professional Elective – I)

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Differentiate the types of disasters, causes and their impact on environment and society
CO2	Assess vulnerability and various methods of risk reduction measures as well as mitigation.
CO3	Draw the hazard and vulnerability profile of India, Scenarious in the Indian context, Disaster damage assessment and management.

ORO551-Renewable Energy Sources(Open Elective)

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Understand the physics of solar radiation
CO2	Ability to classify the solar energy collectors and methodologies of storing solar energy
CO3	Knowledge in applying solar energy in a useful way
CO4	Knowledge in wind energy and biomass with its economic aspects
CO5	Knowledge in capturing and applying other forms of energy sources like wind, biogas and geothermal energies

Laboratory

CE8511-Soil Mechanics Laboratory

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Students are able to conduct tests to determine both the index and engineering properties of soils
CO2	Able to characterize the soil based on their properties.

CE8512-Water and Waste water Analysis Laboratory

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Quantify the pollutant concentration in water and wastewater
CO2	Suggest the type of treatment required and amount of dosage required for the treatment
CO3	Examine the conditions for the growth of micro-organisms

CE8513-Survey Camp

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Determine the area of traverse using Total station and GPS
CO2	Plot contours and the undulating ground surface.
CO3	Perform highway alignment and set out curves for new roads.
CO4	Handle total station and do field observation using it.
CO5	Participate as a team and work with fellow mates in carrying out the surveying of Sun observation to determine azimuth

Seventh Semester B.E.

CE6701-Structural Dynamics and Earthquake Engineering

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Implement the theory of vibration, and analyse a single degree of freedom system with and without damping
CO2	Analyze multi degree of freedom system and draw the mode shapes
CO3	Explain the theory of seismology
CO4	Demonstrate the response of RC, Steel and prestressed concrete structures to earthquakes
CO5	Explain the methods of introducing ductility in structures using codal provisions
CO6	Perform dynamic analysis and formulate the design methodology in aseismic design

CE6702-Prestressed Concrete Strcutures

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Describe the fundamental principles of pre and post tensioned concrete and compute loss of stresses and deflection of prestressed members
CO2	Design pre and post tensioned concrete Sections for flexure and shear as per codal provisions
CO3	Design pre and post tensioned water tank and pipes
CO4	Calculate the flexural and shear strength of composite sections
CO5	Design pre and post tensioned Bridges
CO6	Explain the various methods of design of anchorage zones

CE6703-Water Resources and Irrigation Engineering

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Illustrate the water resource potential in India and Tamil Nadu & explain the Importance of National water policy
CO2	Analyze the hydrologic data to design the hydrologic station network using various statistical techniques.
CO3	Distinguish between consumptive and non – consumptive use of water and estimate water requirement for various purposes
CO4	Compare the different types reservoir with their functions and explain the reservoir operation and storage fixation
CO5	Apply various discounting techniques and factors to do economic analysis of water resource projects
CO6	To combine the collection of relevant data & sources for water resources development and management

CE6704-Estimation and Quantity Surveying

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Outline the principles of Estimation, illustrating the various types and methods.
CO2	Estimate the quantities of various items of a work in residential and other major structures.
CO3	Classify the various types of specification relevant to each item of work in a various class of buildings.
CO4	Illustrate the different types of contracts, Tender documents for preparing a new project proposal.
CO5	Examine the capital value and standard rent of a residential and government building.
CO6	Outline the principles of report preparation and summarize a report for various structures.

CE6010-Pavement Engineering (Elective)

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Differentiate between flexible and rigid pavements and its stress distribution characteristics
CO2	Design flexible pavements as per codal provisions
CO3	Design rigid pavements as per codal provisions
CO4	Deduct the distress in flexible and rigid pavements and identify appropriate strengthening methods
CO5	Outline the maintenance strategies of highways. (IRC Standards)
CO6	Classify the choice of stabilizers for improving the performance of pavements.

EN6501-Municipal Solid Waste Management (Elective)

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Classify the sources and characteristics of municipal solid wastes and summarize the regulatory requirements regarding waste management.
CO2	Compare the on-site storage & processing methods and model source reduction & segregation of wastes assessing economic aspects.
CO3	Analyze waste collection systems & collection routes and select transport method suiting source nature.
CO4	Outline off-site waste processing techniques and plan sustainable technique for Indian conditions.
CO5	Design sanitary landfills along with leachate and landfill gas collection systems.
CO6	Summarize all aspects & elements of integrated municipal solid waste management, planning sustainable waste minimization techniques.

Laboratory

CE6711-Computer Aided Design and Drafting Laboratory

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Design and draft the reinforcement details of Cantilever and counterfort retaining wall using IS codes.
CO2	Design and draw reinforcement details of solid slabs and T-beam bridge for IRC loading class.
CO3	Design Intze type water tank and draw the sectional details.
CO4	Design and draw reinforcement details of rectangular and circular water tanks using IS codes
CO5	Design plate girder and truss girder bridges and draw the sectional details as per codal provisions
CO6	Present the drawings both in conventional method and using modern software tool

CE6712-Design Project

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Work as a team and select a design problem for project work
CO2	Review the available literature andformulate the methodology for the chosen design
CO3	Analyse the structure using modern tools applying the theoretical principles.
CO4	Design the structural elements pertaining to the design problem as per the codal provisions.
CO5	Conclude with a optimum design for the structure as a whole.
CO6	Prepare a detailed report and make presentation on the same.

Course Outcomes – EVEN Semester 2019-20

Sl. No.	Semester	Theory/Practical	Course Code / Course Name
1	4	Theory	MA 8491-Numerical Methods
2	4	Theory	CE 8401-Construction Techniques & Practices
3	4	Theory	CE 8402-Strength of Materials II
4	4	Theory	CE 8403-Applied Hydraulic Engineering
5	4	Theory	CE 8404-Concrete Technology
6	4	Theory	CE 8491-Soil Mechanics
7	4	Practical	CE 8481-Strength of Materials Laboratory
8	4	Practical	CE 8461-Hydraulic Engineering Laboratory
9	4	Practical	HS 8461-Advance Reading and Writing
10	6	Theory	CE 8601-Design of Steel Structures
11	6	Theory	CE 8602-Structural Analysis – II
12	6	Theory	CE 8603-Irrigation Engineering
13	6	Theory	CE 8604-Highway Engineering
14	6	Theory	EN8592-Waste Water Engineering
15	6	Theory	CE 8001-Ground Improvement Techniques (Elective 1)
16	6	Practical	CE 8611- Highway Engineering Laboratory
17	6	Practical	CE 8612-Irrigation and Environmental Engineering Drawing
18	6	Practical	HS 8581-Professional Communication
19	8	Theory	MG6851-Principles of Management
20	8	Theory	CE 6016-Prefabricated Structures
21	8	Theory	CE 6021-Repair and Rehabilitation of Structures
22	8	Practical	CE 6811-Project Work

Fourth Semester B.E.

MA 8491-Numerical Methods

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Understand the basic concepts and techniques of solving algebraic and transcendental equations.
CO2	Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations
CO3	Apply the numerical techniques of differentiation and integration for engineering problems.
CO4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
CO5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications

CE 8401-Construction Techniques & Practices

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	know the different construction techniques and structural systems
CO2	Understand various techniques and practices on masonry construction, flooring, and roofing.
CO3	Plan the requirements for substructure construction.
CO4	Know the methods and techniques involved in the construction of various types of super structures Select, maintain and operate hand and power tools and equipment used in the building construction sites.
CO5	know the different construction techniques and structural systems

CE 8402-Strength of Materials II

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Determine the strain energy and compute the deflection of determinate beams, frames and trusses using energy principles.
CO2	Analyze propped cantilever, fixed beams and continuous beams using theorem of three moment equation for external loadings and support settlements.
CO3	find the load carrying capacity of columns and stresses induced in columns and cylinders
CO4	Determine principal stresses and planes for an element in three dimensional state of stress and study various theories of failure
CO5	Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and find the stresses in curved beams.

CE 8403-Applied Hydraulic Engineering

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Apply their knowledge of fluid mechanics in addressing problems in open channels
CO2	Able to identify a effective section for flow in different cross sections
CO3	To solve problems in uniform, gradually and rapidly varied flows in steady state conditions
CO4	Understand the principles, working and application of turbines
CO5	Understand the principles, working and application of pumps

CE 8404-Concrete Technology

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	The various requirements of cement, aggregates and water for making concrete
CO2	The effect of admixtures on properties of concrete
CO3	The concept and procedure of mix design as per IS method
CO4	The properties of concrete at fresh and hardened state
CO5	The importance and application of special concretes.

CE 8491-Soil Mechanics

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	classify the soil and assess the engineering properties, based on index properties.
CO2	Understand the stress concepts in soils
CO3	Understand and identify the settlement in soils.
CO4	Determine the shear strength of soil
CO5	Analyze both finite and infinite slopes.

CE 8481-Strength of Materials Laboratory

COs	Course Outcome : The students, after the completion of the course, are expected to .
CO1	The students will have the required knowledge in the area of testing of materials and components of structural elements experimentally.

CE 8461-Hydraulic Engineering Laboratory

COs	Course Outcome : The students, after the completion of the course, are expected to .
CO1	The students will be able to measure flow in pipes and determine frictional losses
CO2	The students will be able to develop characteristics of pumps and turbines

HS 8461-Advance Reading and Writing

COs	Course Outcome : The students, after the completion of the course, are expected to .
CO1	Write different types of essays
CO2	Write winning job applications
CO3	Read and evaluate texts critically
CO4	Display critical thinking in various professional contexts

Sixth Semester B.E.

CE 8601-Design of Steel Structures

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Understand the concepts of various design philosophies
CO2	Design common bolted and welded connections for steel structures
CO3	Design tension members and understand the effect of shear lag.
CO4	Understand the design concept of axially loaded columns and column base connections.
CO5	Understand specific problems related to the design of laterally restrained and unrestrained steel beams.

CE 8602-Structural Analysis – II

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Draw influence lines for statically determinate structures and calculate critical stress resultants.
CO2	Understand Muller Breslau principle and draw the influence lines for statically indeterminate beams.
CO3	Analyse of three hinged, two hinged and fixed arches.
CO4	Analyse the suspension bridges with stiffening girders
CO5	Understand the concept of Plastic analysis and the method of analyzing beams and rigid frames.

CE 8603-Irrigation Engineering

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Have knowledge and skills on crop water requirements.
CO2	Understand the methods and management of irrigation.
CO3	Gain knowledge on types of Impounding structures
CO4	Understand methods of irrigation including canal irrigation.
CO5	Get knowledge on water management on optimization of water use.

CE 8604-Highway Engineering

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Get knowledge on planning and aligning of highway.
CO2	Geometric design of highways
CO3	Design flexible and rigid pavements.
CO4	Gain knowledge on Highway construction materials, properties, testing methods
CO5	Understand the concept of pavement management system, evaluation of distress and maintenance of pavements.

EN8592-Waste Water Engineering

COs	Course Outcome : The students, after the completion of the course, are expected to .
CO1	An ability to estimate sewage generation and design sewer system including sewage pumping stations
CO2	The required understanding on the characteristics and composition of sewage, self-purification of streams
CO3	An ability to perform basic design of the unit operations and processes that are used in sewage treatment
CO4	Understand the standard methods for disposal of sewage.
CO5	Gain knowledge on sludge treatment and disposal.

CE 8001-Ground Improvement Techniques (Elective 1)

COs	Course Outcome : The students, after the completion of the course, are expected to
CO1	Gain knowledge on methods and selection of ground improvement techniques.
CO2	Understand dewatering techniques and design for simple cases.
CO3	Get knowledge on insitu treatment of cohesionless and cohesive soils.
CO4	Understand the concept of earth renforcement and design of reinforced earth.
CO5	Get to know types of grouts and grouting technique.

Laboratory

CE 8611- Highway Engineering Laboratory

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Student knows the techniques to characterize various pavement materials through relevant tests.

CE 8612-Irrigation and Environmental Engineering Drawing

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	The students after completing this course will be able to design and draw various units of Municipal water treatment plants and sewage treatment plants.

HS 8581-Professional Communication

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Make effective presentations
CO2	Participate confidently in Group Discussions.
CO3	Attend job interviews and be successful in them.
CO4	Develop adequate Soft Skills required for the workplace

Eight Semester B.E.

MG 6851-Principles of Management

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Specify how the managerial tasks of planning, organizing, and controlling can be executed in a variety of circumstances for engineering students
CO2	Understand the managerial practices and choices, the roles and functions of managers both in traditional structures and evolving contemporary organizations.
CO3	Assess the situation, including opportunities and threats that will impact management of an organization.
CO4	Critically analyse the principles and theories to be applied in work environment.
CO5	Integrate management principles into management practices to take the most effective decisions / actions in specific situations.
CO6	Evaluate the work environment for taking managerial actions of planning, organizing, controlling and address the issues of diversity.

CE 6016-Prefabricated Structures

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Describe the principle of prefabrication, along with production and erection techniques.
CO2	Explain the construction of prefabricated structural components.
CO3	Design prefabricated cross sections based on efficiency of members used.
CO4	Identify problems in design and provide allowance for deformation
CO5	Classify joints for different structural connection in prefabricated system
CO6	Illustrate the importance of avoidance of progressive collapse and using Indian codal provisions for prefabricated concrete.

CE 6021-Repair and Rehabilitation of Structures

COs	Course Outcome: The students, after the completion of the course, are expected to ….
CO1	Explain the causes of deterioration in concrete structures & the assessment procedures for evaluating damages in concrete structures
CO2	Identify the construction errors and suggest suitable methods for rectification
CO3	Outline the durability properties of concrete and report on quality of materials for construction
CO4	Suggest materials used in repairing / strengthening existing concrete structures
CO5	Construe the methods of corrosion protection in concrete structures
CO6	Develop cost effective rehabilitation and retrofitting strategies for repairs in buildings

Laboratory

CE 6811-Project Work

COs	Course Outcome : The students, after the completion of the course, are expected to ….
CO1	Work as a team and select a problem for project work
CO2	Review and evaluate the available literature on the chosen problem
CO3	Formulate the methodology to solve the identified problem
CO4	Apply the principles, tools and techniques to solve the problem
CO5	Conclude with a feasible solution which address environment and society
CO6	Prepare a detailed report and make presentation on the same.