Course Outcomes (CO) (R 2013)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Course Code: C101 Course Name:HS6151 Technical English – I

C101.1	Speak clearly, confidently, comprehensibly
C101.2	Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
C101.3	Read different genres of texts adopting various reading strategies.
C101.4	Listen/view and comprehend different spoken discourses/excerpts in different accents
C101.5	communicate with one or many listeners using appropriate communicative strategies.

Course Code: C102 Course Name:MA6151 MATHEMATICS – I

C102.1	This course equips students to have basic knowledge and understanding in one fields of materials, integral and differential calculus.
C102.2	To develop the use of matrix algebra techniques this is needed by engineers for practical applications.
C102.3	To familiarize the student with functions of several variables. This is needed in many branches of engineering.
C102.4	To introduce the concepts of improper integrals, Gamma, Beta and Error functions which are needed in engineering applications.
C102.5	Apply various techniques in solving differential equations.

Course Code: C103 Course Name:PH6151 ENGINEERING PHYSICS I

C103.1	The students will have knowledge on the basics of physics related to properties of matter, optics, acoustics etc
C103.2	To impart knowledge on crystal structure and growing techniques.
C103.3	To understand the response and characteristics of matter for external forces.
C103.4	To understand the principle of laser & Fiber Optics action, types and its applications.
C103.5	Apply fundamental principles to solve practical problems related to materials used for engineering applications

Course Code: C104 Course Name:CY6151 ENGINEERING CHEMISTRY I

C104.1	To make the students conversant with basics of polymer chemistry
C104.2	To acquaint the student with concepts of important photo physical and photochemical processes and spectroscopy.
C104.3	To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys
C104.4	To acquaint the students with the basics of nano materials, their properties and applications.
C104.5	To make the student acquire sound knowledge of second law of thermodynamics and second law based derivations of importance in engineering applications.

Course Code: C105 Course Name:GE6151 COMPUTER PROGRAMMING

C105.1	Design C Programs for problems.
C105.2	Write and execute C programs for simple applications
C105.3	Learn the organization of a digital computer.
C105.4	Learn to use arrays, strings, functions, pointers, structures and unions in C.
C105.5	Convert the number system and their representation.

Course Code: C106 Course Name:GE6152 ENGINEERING GRAPHICS

C106.1	Perform free hand sketching of basic geometrical constructions and multiple views of objects
C106.2	Do orthographic projection of lines and plane surfaces.
C106.3	Draw projections and solids and development of surfaces.
C106.4	Prepare isometric and perspective sections of simple solids
C106.5	Demonstrate computer aided drafting.

Course Code: C107 Course Name:GE6161 COMPUTER PRACTICES LABORATORY

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C107.1	Be familiar with the use of Office software
C107.2	Be exposed to presentation and visualization tools
C107.3	Be exposed to problem solving techniques and flow charts
C107.4	Be familiar with programming in C and Learn to use Arrays, strings, functions, structures and unions.
C107.5	Be familiar with the use of Office software

Course Code: C108 Course Name:GE6162 ENGINEERING PRACTICES LABORATORY

C108.1	To provide exposure to the students with hands on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.
C108.2	Ability to fabricate carpentry components and pipe connections including plumbing works.
C108.3	Ability to use welding equipments to join the structures.
C108.4	Ability to fabricate electrical and electronics circuits.
C108.5	Ability to Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings

Course Code: C109 Course Name:GE6163 PHYSICS & CHEMISTRY LABORATORY

C109.1	To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics and properties of
C109.2	The students will be outfitted with hands0on knowledge in the quantitative chemical analysis of water quality related parameters
C109.3	To make the student to acquire practical skills in the determination of water quality parameters through volumetric and instrumental an
C109.4	To acquaint the students with the determination of molecular weight of a polymer by vacometry
C109.5	To provide the basic practical exposure to all the engineering and technological streams in the field of chemistry.

Course Code: C110 Course Name:HS6251 TECHNICAL ENGLISH II

C110.1	Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, argue using appropriate communicative strategies.
C110.2	Write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
C110.3	Read different genres of texts, infer implied meanings and critically analyse and evaluate them for ideas as well as for method of prese
C110.4	Listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.
C110.5	Initiate a discussion, negotiate, argue using appropriate communicative strategies.

Course Code: C111 Course Name:MA6251 MATHEMATICS II

C111.1	To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problem
C111.2	To acquaint the student with the concepts of vector calculus, needed for problems in all engineering disciplines.
C111.3	To develop an understanding of the standard techniques of complex variable theory so as to enable the student to apply them with confidence, in application areas such as heat conduction, elasticity, fluid dynamics and flow the of electric current.
C111.4	To make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.
C111.5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

Course Code: C112 Course Name:PH6251 ENGINEERING PHYSICS II

C112.1	The students will have the knowledge on physics of materials and that knowledge will be used by them in different engineering and technology applications
C112.2	To enrich the understanding of various types of materials and their applications in engineering and technology.
C112.3	To learn the properties of magnetic and superconducting materials.
C112.4	To impart knowledge on modern engineering materials.
C112.5	Modern engineering materials, Nano materials and Carbon nano tubes.

Course Code: C113 Course Name:CY6251 ENGINEERING CHEMISTRY II

C113.1	To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
C113.2	Principles of electrochemical reactions, redox reactions in corrosiion of materials and methods for corrosion prevention and protection
C113.3	Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.
C113.4	Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.
C113.5	Preparation, properties and applications of engineering materials.

Course Code: C114 Course Name:CS6201 DIGITAL PRINCIPLES & SYSTEM DESIGN

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C114.1	Perform arithmetic operations in any number system.
C114.2	Simplify the Boolean expression using K0Map and Tabulation techniques.
C114.3	Use boolean simplification techniques to design a combinational hardware circuit.
C114.4	Design and Analysis of a given digital circuit – combinational and sequential.
C114.5	Design using PLD.

Course Code: C115 Course Name:CS6202 PROGRAMMING & DATA STRUCTURES I

C115.1	Be familiar with the basics of C programming language.
C115.2	Be exposed to the concepts of ADTs
C115.3	Learn linear data structures – list, stack, and queue.
C115.4	Be exposed to sorting, searching algorithms
C115.5	Apply different Hashing and set algorithms

Course Code: C116 Course Name:GE6262 PHYSICS & CHEMISTRY LABORATORY II

C116.1	To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics and properties of
C116.2	Ability to test materials by using their knowledge of applied physics principles in optics and properties of matter
C116.3	To make the student acquire practical skills in the wet chemical and instrumental methods for quantitative estimation of hardness, alkalinity, metal ion content, corrosion in metals and cement analysis.
C116.4	To conversant with hands0on knowledge in the quantitative chemical analysis of water quality related parameters, corrosion measurement and cement analysis.
C116.5	To develop the knowledge of spectrophotometry.

Course Code: C117 Course Name:CS6211 DIGITAL LABORATORY

C117.1	Understand the various logic gates.
C117.2	Be familiar with various combinational circuits
C117.3	Understand the various components used in the design of digital computers.
C117.4	Be exposed to sequential circuits
C117.5	Learn to use HDL
C117.6	Design and Implement a simple digital system.

Course Code: C118 Course Name:CS6212 PROGRAMMING & DATA STRUCTURES LABORATORY

C118.1	Be familiar with c programming
C118.2	Be exposed to implementing abstract data types
C118.3	Apply the different data structures for implementing solutions to practical problems.
C118.4	Develop searching and sorting programs.
C118.5	

Course Code: C201 Course Name:MA6351 TRANSFORMS & PARTIAL DIFFERENTIAL EQUATIONS

C201.1	The understanding of 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.
C201.2	Able to understand of Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems
C201.3	To acquaint the student with Fourier transform techniques used in wide variety of situations
C201.4	Apply effective mathematical tools for the solutions of partial differential equations that model several physical processes and to develop Z transform techniques for discrete time systems.
C201.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time

Course Code: C202 Course Name:CS6301 PROGRAMMING AND DATA STRUCTURES II

C202.1	Design problem solutions using Object Oriented Techniques.
C202.2	Apply the concepts of data abstraction, encapsulation and inheritance for problem solutions.
C202.3	Use the control structures of C++ appropriately.
C202.4	Critically analyse the various algorithms.
C202.5	Apply the different data structures to problem solutions.

Course Code: C203 Course Name:CS6302 DATABASE MANAGEMENT SYSTEMS

C203.1	Design Databases for applications.
C203.2	Use the Relational model, ER diagrams.

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C203.3	Apply concurrency control and recovery mechanisms for practical problems.
C203.4	Design the Query Processor and Transaction Processor.
C203.5	Apply security concepts to databases

Course Code: C204 Course Name:CS6303 COMPUTER ARCHITECTURE

C204.1	Design arithmetic and logic unit.
C204.2	Design and analyze pipelined control units
C204.3	Evaluate performance of memory systems.
C204.4	Understand parallel processing architectures
C204.5	Understand the various memory systems and I/O communication

Course Code: C205 Course Name:CS6304 ANALOG AND DIGITAL COMMUNICATION

C205.1	Apply analog and digital communication techniques.
C205.2	Use data and pulse communication techniques.
C205.3	Analyze Source and Error control coding.
C205.4	Utilize multiuser radio communication.
C205.5	Analyze Source and Error control coding.

Course Code: C206 Course Name:GE6351 ENVIRONMENTAL SCIENCE & ENGINEERING

C206.1	Public awareness of environment at infant stage.
C206.2	Ignorance and incomplete knowledge has lead to misconceptions.
C206.3	Development and improvement in standard of living has lead to serious environmental disasters.
C206.4	Able to apply integrated themes and biodiversity.
C206.5	Able to apply natural resources, pollution control and waste management.

Course Code: C207 Course Name:CS6311: PROGRAMMING AND DATA STRUCTURES LABORATORY II

C207.1	Design and implement C++ programs for manipulating stacks, queues, linked lists, trees, and graphs.
C207.2	Develop recursive programs using trees and graphs.
C207.3	Apply the different data structures for implementing solutions to practical problems.
C207.4	Apply good programming design methods for program development.
C207.5	Develop recursive programs using trees and graphs.

Course Code: 208 Course Name: CS6312 DATABASE MANAGEMENT SYSTEMS LABORATORY

C208.1	Design and implement a database schema for a given problem domain
C208.2	Populate and query a database
C208.3	Prepare reports.
C208.4	Create and maintain tables using PL/SQL.
C208.5	Critically analyze the use of Tables, Views, Functions and Procedures

Course Code: 209 Course Name: HS8381 INTERPERSONAL SKILLS/LISTENING&SPEAKING

C209.1	Listen and respond appropriately.
C209.2	Participate in group discussions
C209.3	Make effective presentations
C209.4	Participate confidently and appropriately in conversations both formal and informal
C209.5	Ability to give information and converse with accuracy

Course Code: 210 Course Name:MA6453 PROBABILITY AND QUEUING THEORY

C210.1	The students will have a fundamental knowledge of the probability concepts.
C210.2	It also helps to understand and characterize phenomenon which evolve with respect to time in a probabilistic manner.
C210.3	Acquire skills in analyzing queueing models.
C210.4	Able to understand the mathematical support for real world
C210.5	Have the notion of sampling distributions and statistical techniques used in engineering and management problems.

Course Code: 211 Course Name:CS6551 COMPUTER NETWORKS

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C211.1	Identify the components required to build different types of networks
C211.2	Choose the required functionality at each layer for given application
C211.3	Identify solution for each functionality at each layer
C211.4	Trace the flow of information from one node to another node in the network
C211.5	Demonstrate various types of routing techniques

Course Code: 212 Course Name:CS6401 OPERATING SYSTEMS

C212.1	Design various Scheduling algorithms.
C212.2	Perform administrative tasks on Linux Servers.
C212.3	Apply the principles of concurrency.
C212.4	Design deadlock, prevention and avoidance algorithms.
C212.5	Compare iOS and Android Operating Systems.

Course Code: 213 Course Name:CS6402 DESIGN AND ANALYSIS OF ALGORITHMS

C213.1	Design algorithms for various computing problems.
C213.2	Analyze the time and space complexity of algorithms.
C213.3	Critically analyze the different algorithm design techniques for a given problem.
C213.4	Modify existing algorithms to improve efficiency.
C213.5	

Course Code: 214 Course Name:EC6504 MICROPROCESSOR AND MICROCONTROLLER

C214.1	Design and implement programs on 8086 microprocessor.
C214.2	Design I/O circuits.
C214.3	Design Memory Interfacing circuits.
C214.4	Design and implement 8051 microcontroller based systems.
C214.5	Modify existing algorithms to improve efficiency

Course Code: 215 Course Name:CS6403 SOFTWARE ENGINEERING

C215.1	Identify the key activities in managing a software project.
C215.2	Compare different process models.
C215.3	Concepts of requirements engineering and Analysis Modeling.
C215.4	Apply systematic procedure for software design and deployment.
C215.5	Compare and contrast the various testing and maintenance.

Course Code: 216 Course Name:CS6411 NETWORKS LABORATORY

C216.1	Use simulation tools
C216.2	Implement the various protocols.
C216.3	Analyse the performance of the protocols in different layers.
C216.4	Analyze various routing algorithms
C216.5	Trace the flow of information from one node to another node in the network

Course Code: 217 Course Name:CS6412 MICROPROCESSOR & MICROCONTROLLER LABORATORY

C217.1	Write ALP Programmes for fixed and Floating Point and Arithmetic
C217.2	Interface different I/Os with processor
C217.3	Generate waveforms using Microprocessors
C217.4	Execute Programs in 8051
C217.5	Explain the difference between simulator and Emulator

Course Code: 218 Course Name:CS6413 OPERATING SYSTEMS LABORATORY

C218.1	Implement deadlock avoidance, and Detection Algorithms
C218.2	Compare the performance of various CPU Scheduling Algorithm
C218.3	Critically analyze the performance of the various page replacement algorithms
C218.4	Create processes and implement IPC
C218.5	Implement File Organization and File Allocation Strategies

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Course Code: 301 Course Name:MA6566 DISCRETE MATHEMATICS

C301.1	Have knowledge of the concepts needed to test the logic of a program.
C301.2	Have an understanding in identifying structures on many levels.
C301.3	Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in compu
C301.4	Be aware of the counting principles.
C301.5	Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.

Course Code: 302 Course Name:CS6501 INTERNET PROGRAMMING

C302.1	Implement Java programs.
C302.2	Create a basic website using HTML and Cascading Style Sheets.
C302.3	Design and implement dynamic web page with validation using JavaScript objects and by applying different event handling mechanisn
C302.4	Design rich client presentation using AJAX.
C302.5	Design and implement simple web page in PHP, and to present data in XML format.

Course Code: 303 Course Name:CS6502 OBJECT ORIENTED ANALYSIS AND DESIGN

C303.1	Design and implement projects using OO concepts.
C303.2	Use the UML analysis and design diagrams.
C303.3	Apply appropriate design patterns.
C303.4	Create code from design.
C303.5	Compare and contrast various testing techniques.

Course Code: 304 Course Name:CS6503 THEORY OF COMPUTATION

C304.1	Design Finite State Machine, Pushdown Automata, and Turing Machine.
C304.2	Explain the Decidability or Undecidability of various problems
C304.3	Solve the Computational Problems using formal languages
C304.4	Understand the basic concepts of complexity theory.
C304.5	Derive whether a problem is decidable or not.

Course Code: 305 Course Name:CS6504 COMPUTER GRAPHICS

C305.1	Design two dimensional graphics.
C305.2	Apply two dimensional transformations.
C305.3	Design three dimensional graphics.
C305.4	Apply three dimensional transformations.
C305.5	Apply Illumination and color models.

Course Code: 306 Course Name:CS6511 CASE TOOLS LABORATORY

C306.1	Design and implement projects using OO concepts.
C306.2	Use the UML analysis and design diagrams.
C306.3	Apply appropriate design patterns.
C306.4	Create code from design.
C306.5	Compare and contrast various testing techniques

Course Code: 307 Course Name:CS6512 INTERNET PROGRAMMING LABORATORY

C307.1	Design Web pages using HTML/XML and style sheets
C307.2	Create user interfaces using Java frames and applets.
C307.3	Create dynamic web pages using server side scripting.
C307.4	Write Client Server applications.
C307.5	Use the frameworks JSP Strut, Hibernate, Spring

Course Code: 308 Course Name:CS6513 COMPUTER GRAPHICS LABORATORY

C308.1	Create 3D graphical scenes using open graphics library suits
C308.2	Implement image manipulation and enhancement
C308.3	Create 2D animations using tools
C308.4	Apply clipping techniques to graphics.

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C308.5	Design Basic 3d Scenes using Blender

Course Code: 309 Course Name:CS6601 DISTRIBUTED SYSTEMS

C309.1	Discuss trends in Distributed Systems.
C309.2	Apply network virtualization.
C309.3	Apply remote method invocation and objects.
C309.4	Design process and resource management systems.
C309.5	Describe the features of peer-to-peer and distributed shared memory systems

Course Code: 310 Course Name:IT6601 MOBILE COMPUTING

C310.1	Explain the basics of mobile telecommunication system
C310.2	Choose the required functionality at each layer for given application
C310.3	Identify solution for each functionality at each layer
C310.4	Use simulator tools and design Ad hoc networks
C310.5	Develop a mobile application.

Course Code: 311 Course Name:CS6660 COMPILER DESIGN

C311.1	Design and implement a prototype compiler.
C311.2	Apply the various optimization techniques.
C311.3	Use the different compiler construction tools.
C311.4	Learn the design principle of a compiler
C311.5	Design and implement a scanner and a parser using LEX and YACC tools

Course Code: 312 Course Name:IT6502 DIGITAL SIGNAL PROCESSING

C312.1	Perform frequency transforms for the signals.
C312.2	Design IIR and FIR filters.
C312.3	Finite word length effects in digital filters
C312.4	Apply the relevant theoretical knowledge to design the digital IIR/FIR filters for the given analog specifications
C312.5	Transform the time domain signal into frequency domain signal and vice-versa

Course Code:313 Course Name:CS6659 ARTIFICIAL INTELLIGENCE

C313.1	Identify problems that are amenable to solution by AI methods.
C313.2	Identify appropriate AI methods to solve a given problem.
C313.3	Formalise a given problem in the language/framework of different AI methods.
C313.4	Implement basic AI algorithms.
C313.5	Design and carry out an empirical evaluation of different algorithms on a problem

Course Code: 314 Course Name:CS6001 C# AND .NET PROGRAMMING

C314.1	List the major elements of the .NET frame work.
C314.2	Explain how C# fits into the .NET platform.
C314.3	Analyze the basic structure of a C# application
C314.4	Design and develop Web based applications on .NET
C314.5	Develop programs using C# on .NET

Course Code: 315 Course Name:IT6702 DATAWAREHOUSING & DATA MINING

C315.1	Apply data mining techniques and methods to large data sets
C315.2	Use data mining tools
C315.3	Compare and contrast the various classifiers.
C315.4	Apply appropriate classification and clustering techniques for data analysis
C315.5	Apply frequent pattern and association rule mining techniques for data analysis

Course Code: 316 Course Name:CS6611 MOBILE APPLICATION DEVELOPMENT LABORATORY

C316.1	Design and Implement various mobile applications using emulators.
C316.2	Deploy applications to handheld devices

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C316.3	Able to use GPS in Mobile Application
C316.4	Able to apply application and business logic together
C316.5	Develop mobile applications using RSS Feed, Internal/External Storage, SMS, Multithreading and GPS.

Course Code: 317 Course Name:CS6612 COMPILER LABORATORY

C317.1	Implement the different Phases of compiler using tools
C317.2	Analyze the control flow and data flow of a typical program
C317.3	Optimize a given program
C317.4	Generate an assembly language program equivalent to a source language program
C317.5	Design and implement a scanner and a parser using LEX and YACC tools.

Course Code: 318 Course Name:GE6674 COMMUNICATION AND SOFT SKILLS LABORATORY BASED

C318.1	Take international examination such as IELTS and TOEFL
C318.2	Make presentations and Participate in Group Discussions.
C318.3	Successfully answer questions in interviews.
C318.4	Participate confidently and appropriately in conversations both formal and informal
C318.5	Make effective presentations

Course Code: 401 Course Name:CS6701 CRYPTOGRAPHY AND NETWORK SECURITY

C401.1	Understand OSI security architecture and classical encryption techniques.
C401.2	Acquire fundamental knowledge on the concepts of finite fields and number theory.
C401.3	Understand various block cipher and stream cipher models.
C401.4	Describe the principles of public key cryptosystems, hash functions and digital signature.
C401.5	Understand various Security practices and System security standards

Course Code: 402 Course Name:CS6702 GRAPH THEORY AND APPLICATIONS

C402.1	Be familiar with the most fundamental Graph Theory topics and results.
C402.2	Be exposed to the techniques of proofs and analysis.
C402.3	Use a combination of theoretical knowledge and independent mathematical thinking in creative investigation of questions in graph theo
C402.4	Validate and critically assess a mathematical proof.
C402.5	Apply suitable graph model and algorithm for solving applications.

Course Code: 403 Course Name:CS6703 GRID AND CLOUD COMPUTING

C403.1	Understand how Grid computing helps in solving large scale scientific problems.
C403.2	Gain knowledge on the concept of virtualization that is fundamental to cloud computing.
C403.3	Learn how to program the grid and the cloud.
C403.4	Understand the security issues in the grid and the cloud environment.
C403.5	Evaluate and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.

Course Code: 404 Course Name:CS6704 RESOURCE MANAGEMENT TECHNIQUES

C404.1	Learn to solve problems in linear programming and Integer programming.
C404.2	Be familiar with resource management techniques.
C404.3	Be exposed to CPM and PERT.
C404.4	Apply integer programming and linear programming to solve real-life applications.
C404.5	students will be able to have clear understanding of managerial functions like planning, organizing

Course Code: 405 Course Name:CS6003 ADHOC AND SENSOR NETWORKS

C405.1	Understand the design issues in ad hoc and sensor networks.
C405.2	Learn the different types of MAC protocols.
C405.3	Be familiar with different types of adhoc routing protocols.
C405.4	Learn the architecture and protocols of wireless sensor networks.
C405.5	To identify and understand security issues in ad hoc and sensor networks.

Course Code: 406 Course Name:IT6005 DIGITAL IMAGE PROCESSING

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C406.1	Learn digital image fundamentals.
C406.2	Be exposed to simple image processing techniques.
C406.3	Be familiar with image compression and segmentation techniques.
C406.4	Learn to represent image in form of features.
C406.5	Learn the basics of segmentation, features extraction, compression and recognition methods for color models.

Course Code: 407 Course Name:IT6006 DATA ANALYTICS

C407.1	Apply the statistical analysis methods.
C407.2	Compare and contrast various soft computing frameworks.
C407.3	Design distributed file systems.
C407.4	Apply Stream data model.
C407.5	Use Visualisation techniques

Course Code: 408 Course Name:CS6711 SECURITY LABORATORY

C408.1	Be exposed to the different cipher techniques
C408.2	Learn to implement the algorithms DES, RSA,MD5,SHA-1
C408.3	Learn to use network security tools like GnuPG, KF sensor, Net Strumbler
C408.4	Use different open source tools for network security and analysis
C408.5	Demonstrate the network security system using open source tools

Course Code: 409 Course Name:CS6712 GRID AND CLOUD COMPUTING LABORATORY

C409.1	Be exposed to tool kits for grid and cloud environment.
C409.2	Be familiar with developing web services/Applications in grid framework
C409.3	Learn to run virtual machines of different configuration.
C409.4	Learn to use Hadoop
C409.5	Manipulate large data sets in a parallel environment.

Course Code: 410 Course Name:CS6801 MULTI-CORE ARCHITECTURES AND PROGRAMMING

C410.1	Understand the challenges in parallel and multi-threaded programming.
C410.2	Learn about the various parallel programming paradigms, and solutions.
C410.3	Develop programs using OpenMP and MPI.
C410.4	Compare and contrast programming for serial processors and programming for parallel processors.
C410.5	Design parallel programming solutions to common problems.

Course Code: 411 Course Name:IT6011 KNOWLEDGE MANAGEMENT

C411.1	Use the knowledge management tools
C411.2	Develop knowledge management Applications
C411.3	Design and develop enterprise applications
C411.4	
C411.5	

Course Code: 412 Course Name:GE6075 PROFESSIONAL ETHICS

C412.1	Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society
C412.2	Judge the role of engineer in environmental issues, computer applications, weapons development, multinational corporations and Corporate Social Responsibility.
C412.3	Distinguish between Moral and Ethics.
C412.4	Helps to discuss the ethical issues related to engineering
C412.5	Realize the responsibility & rights in the society.

Course Code: 413 Course Name:CS6811 PROJECT WORK

C413.1	Gather, organize, summarize and interpret technical literature with the purpose of formulating a project proposal.
C413.2	Write a technical report summarizing state-of-the-art on an identified topic.
C413.3	Present the study using graphics and multimedia techniques.
C413.4	Define intended future work based on the technical review.

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Course Code: 101 Course Name:HS8151 COMMUNICATIVE ENGLISH

C101.1	Read articles of a general kind in magazines and newspapers.
C101.2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
C101.3	Comprehend conversations and short talks delivered in English
C101.4	Write short essays of a general kind and personal letters and emails in English.
C101.5	Communicate with one or many listeners using appropriate communicative strategies

Course Code: 102 Course Name:MA8151 ENGINEERING MATHEMATICS I

C102.1	Use both the limit definition and rules of differentiation to differentiate functions.
C102.2	Apply differentiation to solve maxima and minima problems.
C102.3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.
C102.4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
C102.5	Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.

Course Code: 103 Course Name:PH8151 ENGINEERING PHYSICS

C103.1	The students will gain knowledge on the basics of properties of matter and its applications,
C103.2	The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,
C103.3	The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,
C103.4	The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes,
C103.5	The students will understand the basics of crystals, their structures and different crystal growth techniques.

Course Code: 104 Course Name:CY8151 ENGINEERING CHEMISTRY

C104.1	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.
C104.2	To make the student acquire sound knowledge of second law of thermodynamics and second law based derivations of importance in engineering applications in all disciplines.
C104.3	To acquaint the student with concepts of important photophysical and photochemical processes and spectroscopy.
C104.4	To develop an understanding of the basic concepts of phase rule and its applications to single and two component system and appreciate the purpose and significance of alloys.
C104.5	To acquaint the students with the basics of nano materials, their properties and applications.

Course Code: 105 Course Name:GE8151 PROBLEM SOLVING AND PYTHON PROGRAMMING

C105.1	Develop simple applications in C using basic constructs
C105.2	Design and implement applications using arrays and strings
C105.3	Develop and implement applications in C using functions and pointers.
C105.4	Develop applications in C using structures.
C105.5	Design applications using sequential and random access file processing.

Course Code: 106 Course Name:GE8152 ENGINEERING GRAPHICS

C106.1	Familiarize with the fundamentals and standards of Engineering graphics
C106.2	Perform freehand sketching of basic geometrical constructions and multiple views of objects.
C106.3	Project orthographic projections of lines and plane surfaces.
C106.4	Draw projections and solids and development of surfaces.
C106.5	Visualize and to project isometric and perspective sections of simple solids.

Course Code: 107 Course Name:GE8161 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY

C107.1	Write, test, and debug simple Python programs.
C107.2	Implement Python programs with conditionals and loops.
C107.3	Develop Python programs step-wise by defining functions and calling them.
C107.4	Use Python lists, tuples, dictionaries for representing compound data.
C107.5	Read and write data from/to files in Python.

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Course Code: 108 Course Name:BS8161 PHYSICS AND CHEMISTRY LABORATORY

C108.1	Apply principles of elasticity, optics and thermal properties for engineering applications.
C108.2	The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.
C108.3	To provide the basic practical exposure to all the engineering and technological streams in the field of chemistry
C108.4	To gain the knowledge about light, sound, laser, fiber optics and magnetism.
C108.5	To develop the knowledge of conductometric titration and viscometry

Course Code: 109 Course Name:HS8251 TECHNICAL ENGLISH

C109.1	Read technical texts and write area- specific texts effortlessly.
C109.2	Listen and comprehend lectures and talks in their area of specialisation successfully.
C109.3	Speak appropriately and effectively in varied formal and informal contexts.
C109.4	Write reports and winning job applications.
C109.5	Initiate a discussion, negotiate, argue using appropriate communicative strategies.

Course Code: 110 Course Name:MA8251 ENGINEERING MATHEMATICS II

C110.1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
C110.2	Gradient, divergence and curl of a vector point function and related identities.
C110.3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
C110.4	Analytic functions, conformal mapping and complex integration.
C110.5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

Course Code: 111 Course Name:PH8252 PHYSICS FOR INFORMATION SCIENCE

C111.1	Gain knowledge on classical and quantum electron theories, and energy band structures,
C111.2	Acquire knowledge on basics of semiconductor physics and its applications in various devices,
C111.3	Get knowledge on magnetic properties of materials and their applications in data storage,
C111.4	Have the necessary understanding on the functioning of optical materials for optoelectronics,
C111.5	Understand the basics of quantum structures and their applications in carbon electronics..

Course Code: 112 Course Name:BE8255 BASIC ELECTRICAL, ELECTRONICS AND MEASUREMENT ENGINEERING

C112.1	Discuss the essentials of electric circuits and analysis.
C112.2	Discuss the basic operation of electric machines and transformers
C112.3	Introduction of renewable sources and common domestic loads.
C112.4	Introduction to measurement and metering for electric circuits.
C112.5	

Course Code: 113 Course Name:GE8291 ENVIRONMENTAL SCIENCE AND ENGINEERING

C113.1	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.
C113.2	Public awareness of environmental is at infant stage.
C113.3	Ignorance and incomplete knowledge has lead to misconceptions
C113.4	Development and improvement in std. of living has lead to serious environmental disasters
C113.5	Introduction to measurement and metering for electric circuits.

Course Code: 114 Course Name:CS8251 PROGRAMMING IN C

C114.1	Develop simple applications in C using basic constructs
C114.2	Design and implement applications using arrays and strings
C114.3	Develop and implement applications in C using functions and pointers.
C114.4	Develop applications in C using structures.
C114.5	Design applications using sequential and random access file processing.

Course Code: 115 Course Name:GE8261 ENGINEERING PRACTICES LABORATORY

C115.1	Fabricate carpentry components and pipe connections including plumbing works.
C115.2	Use welding equipments to join the structures.
C115.3	Carry out the basic machining operations
C115.4	Make the models using sheet metal works
C115.5	Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings

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Course Code: 116 Course Name:CS8261 C PROGRAMMING LABORATORY

C116.1	Develop C programs for simple applications making use of basic constructs, arrays and strings.
C116.2	Develop C programs involving functions, recursion, pointers, and structures.
C116.3	Design applications using sequential and random access file processing
C116.4	Develop applications in C using structures.
C116.5	Develop simple applications in C using basic constructs

Course Code: 201 Course Name:MA8351 DISCRETE MATHEMATICS

C201.1	Have knowledge of the concepts needed to test the logic of a program.
C201.2	Have an understanding in identifying structures on many levels.
C201.3	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.
C201.4	Be aware of the counting principles.
C201.5	Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.

Course Code: 202 Course Name:CS8351 DIGITAL PRINCIPLES AND SYSTEM DESIGN

C202.1	Simplify Boolean functions using KMap
C202.2	Design and Analyze Combinational and Sequential Circuits
C202.3	Implement designs using Programmable Logic Devices
C202.4	Write HDL code for combinational and Sequential Circuits
C202.5	Implement sequential circuits like registers and counters

Course Code: 203 Course Name:CS8391 DATA STRUCTURES

C203.1	Implement abstract data types for linear data structures.
C203.2	Apply the different linear and non-linear data structures to problem solutions.
C203.3	Demonstrate advantages and disadvantages of specific algorithms and data structures
C203.4	Critically analyze the various sorting algorithms.
C203.5	Ability to have knowledge of tree and graph concepts

Course Code: 204 Course Name:CS8392 OBJECT ORIENTED PROGRAMMING

C204.1	Develop Java programs using OOP principles
C204.2	Develop Java programs with the concepts inheritance and interfaces
C204.3	Build Java applications using exceptions and I/O streams
C204.4	Develop Java applications with threads and generics classes
C204.5	Develop interactive Java programs using swings

Course Code: 205 Course Name:COMMUNICATION ENGINEERING

C205.1	Ability to comprehend and appreciate the significance and role of this course in the present contemporary world
C205.2	Apply analog and digital communication techniques.
C205.3	Use data and pulse communication techniques.
C205.4	Analyze Source and Error control coding.
C205.5	Use data and pulse communication techniques.

Course Code: 206 Course Name:CS8381 DATA STRUCTURES LABORATORY

C206.1	Write functions to implement linear and non-linear data structure operations
C206.2	Suggest appropriate linear / non-linear data structure operations for solving a given problem
C206.3	Appropriately use the linear / non-linear data structure operations for a given problem
C206.4	Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval
C206.5	analyze the various sorting algorithms.

Course Code: 207 Course Name:CS8383 OBJECT ORIENTED PROGRAMMING LABORATORY

C207.1	Develop and implement Java programs for simple applications that make use of classes, packages and interfaces.
C207.2	Develop and implement Java programs with arraylist, exception handling and multithreading.
C207.3	Design applications using file processing, generic programming and event handling.
C207.4	Develop interactive Java programs using swings
C207.5	Develop Java applications with threads and generics classes

Course Code: 208 Course Name:CS8382 DIGITAL SYSTEMS LABORATORY

C208.1	Implement simplified combinational circuits using basic logic gates

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C208.2	Implement combinational circuits using MSI devices
C208.3	Implement sequential circuits like registers and counters
C208.4	Simulate combinational and sequential circuits using HDL
C208.5	Implement designs using Programmable Logic Devices

Course Code: 209 Course Name:HS8381 INTERPERSONAL SKILLS/LISTENING & SPEAKING

C209.1	Listen and respond appropriately.
C209.2	Participate in group discussions
C209.3	Make effective presentations
C209.4	Participate confidently and appropriately in conversations both formal and informal
C209.5	Make effective presentations.

Course Code: 210 Course Name:MA8402 PROBABILITY & QUEUING THEORY

C210.5	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
C210.6	Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.
C210.7	Apply the concept of random processes in engineering disciplines.
C210.8	Acquire skills in analyzing queueing models
C210.9	Understand and characterize phenomenon which evolve with respect to time in a probabilistic manner

Course Code: 211 Course Name:CS8491 COMPUTER ARCHITECTURE

C211.1	Understand the basics structure of computers, operations and instructions.
C211.2	Design arithmetic and logic unit.
C211.3	Understand pipelined execution and design control unit.
C211.4	Understand parallel processing architectures.
C211.5	Understand the various memory systems and I/O communication

Course Code: 212 Course Name:CS8492 DATABASE MANAGEMENT SYSTEMS

C212.1	Classify the modern and futuristic database applications based on size and complexity
C212.2	Map ER model to Relational model to perform database design effectively
C212.3	Write queries using normalization criteria and optimize queries
C212.4	Compare and contrast various indexing strategies in different database systems
C212.5	Appraise how advanced databases differ from traditional databases

Course Code: 213 Course Name:CS8451 DESIGN AND ANALYSIS OF ALGORITHMS

C213.1	Design algorithms for various computing problems
C213.2	Analyze the time and space complexity of algorithms
C213.3	Critically analyze the different algorithm design techniques for a given problem.
C213.4	Modify existing algorithms to improve efficiency.
C213.5	Categorize the problem as P,NP and NP complete problems , assess the complexity and design solutions using backtracking or branch and bound approach.

Course Code: 214 Course Name:CS8493 OPERATINGS SYSTEMS

C214.1	Analyze various scheduling algorithms.
C214.2	Understand deadlock, prevention and avoidance algorithms.
C214.3	Compare and contrast various memory management schemes.
C214.4	Understand the functionality of file systems.
C214.5	Perform administrative tasks on Linux Servers.

Course Code: 215 Course Name:CS8494 SOFTWARE ENGINEERING

C215.1	Identify the key activities in managing a software project.
C215.2	Compare different process models.
C215.3	Concepts of requirements engineering and Analysis Modeling.
C215.4	Apply systematic procedure for software design and deployment.
C215.5	Compare and contrast the various testing and maintenance.

Course Code: 216 Course Name:CS8481 DATABASE MANAGEMENT SYSTEMS LABORATORY

C216.1	Use typical data definitions and manipulation commands.
C216.2	Design applications to test Nested and Join Queries
C216.3	Implement simple applications that use Views

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C216.4	Implement applications that require a Front-end Tool
C216.5	Critically analyze the use of Tables, Views, Functions and Procedures

Course Code: CS8461 Course Name: OPERATING SYSTEMS LABORATORY	
C217.1	Compare the performance of various CPU Scheduling Algorithms
C217.2	Implement Deadlock avoidance and Detection Algorithms
C217.3	Implement Semaphores
C217.4	Create processes and implement IPC
C217.5	Analyze the performance of the various Page Replacement Algorithms

Course Code: 218 Course Name:HS8461 ADVANCED READING & WRITING

C218.1	Compare the performance of various CPU Scheduling Algorithms
C218.2	Implement Deadlock avoidance and Detection Algorithms
C218.3	Implement Semaphores
C218.4	Create processes and implement IPC
C218.5	Analyze the performance of the various Page Replacement Algorithms

Course Code: 301 Course Name:MA8551 ALGEBRA AND NUMBER THEORY

C301.1	Apply the basic notions of groups, rings, fields which will then be used to solve related problems.
C301.2	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.
C301.3	Demonstrate accurate and efficient use of advanced algebraic techniques.
C301.4	Demonstrate their mastery by solving non - trivial problems related to the concepts, and by proving simple theorems about the, statements proven by the text.
C301.5	Apply integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject.

Course Code: 302 Course Name:CS8591 COMPUTER NETWORKS

C302.1	Understand the basic layers and its functions in computer networks.
C302.2	Evaluate the performance of a network.
C302.3	Understand the basics of how data flows from one node to another
C302.4	Analyze and design routing algorithms.
C302.5	Design protocols for various functions in the network.

Course Code: 303 Course Name:EC8691 MICROPROCESSORS AND MICROCONTROLLERS

C303.1	Understand and execute programs based on 8086 microprocessor.
C303.2	Design Memory Interfacing circuits.
C303.3	Design and interface I/O circuits.
C303.4	Design and implement 8051 microcontroller based systems.
C303.5	Design a microcontroller based system

Course Code: 304 Course Name:CS8501 THEORY OF COMPUTATION

C304.1	Construct automata, regular expression for any pattern.
C304.2	Write Context free grammar for any construct.
C304.3	Design Turing machines for any language.
C304.4	Propose computation solutions using Turing machines.
C304.5	Derive whether a problem is decidable or not.

Course Code: 305 Course Name:CS8592 OBJECT ORIENTED ANALYSIS AND DESIGN

C305.1	Express software design with UML diagrams
C305.2	Design software applications using OO concepts.
C305.3	Identify various scenarios based on software requirements
C305.4	Transform UML based software design into pattern based design using design patterns
C305.5	Understand the various testing methodologies for OO software

Course Code: 306 Course Name:OMD553 TELEHEALTH TECHNOLOGY

C306.1	Apply multimedia technologies in telemedicine.
C306.2	Explain Protocols behind encryption techniques for secure transmission of data.
C306.3	Apply telehealth in healthcare.
C306.4	
C306.5	

Course Code: 307 Course Name:EC8681 MICROPROCESSORS AND MICROCONTROLLERS LABORATORY

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C307.1	Write ALP Programmes for fixed and Floating Point and Arithmetic operations
C307.2	Interface different I/Os with processor
C307.3	Generate waveforms using Microprocessors
C307.4	Execute Programs in 8051
C307.5	Explain the difference between simulator and Emulator

Course Code: 308 Course Name:CS8582 OBJECT ORIENTED ANALYSIS AND DESIGN LABORATORY

C308.1	Perform OO analysis and design for a given problem specification.
C308.2	Identify and map basic software requirements in UML mapping.
C308.3	Improve the software quality using design patterns and to explain the rationale behind applying specific design patterns
C308.4	Test the compliance of the software with the SRS.
C308.5	To test the software against its requirements specification

Course Code: 309 Course Name:CS8581 NETWORKS LABORATORY

C309.1	Implement various protocols using TCP and UDP.
C309.2	Compare the performance of different transport layer protocols.
C309.3	Use simulation tools to analyze the performance of various network protocols.
C309.4	Analyze various routing algorithms.
C309.5	Implement error correction codes.

Course Code: 310 Course Name:CS8651 INTERNET PROGRAMMING

C310.1	Construct a basic website using HTML and Cascading Style Sheets.
C310.2	Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms.
C310.3	Develop server side programs using Servlets and JSP.
C310.4	Construct simple web pages in PHP and to represent data in XML format.
C310.5	Use AJAX and web services to develop interactive web applications

Course Code: 311 Course Name:CS8691 ARTIFICIAL INTELLIGENCE

C311.1	Use appropriate search algorithms for any AI problem
C311.2	Represent a problem using first order and predicate logic
C311.3	Provide the apt agent strategy to solve a given problem
C311.4	Design software agents to solve a problem
C311.5	Design applications for NLP that use Artificial Intelligence.

Course Code: 312 Course Name:CS8601 MOBILE COMPUTING

C312.1	Explain the basics of mobile telecommunication systems
C312.2	Illustrate the generations of telecommunication systems in wireless networks
C312.3	Determine the functionality of MAC, network layer and Identify a routing protocol for a given Ad hoc network
C312.4	Explain the functionality of Transport and Application layers
C312.5	Develop a mobile application using android/blackberry/ios/Windows SDK

Course Code: 313 Course Name:CS8602 COMPILER DESIGN

C313.1	Understand the different phases of compiler.
C313.2	Design a lexical analyzer for a sample language.
C313.3	Apply different parsing algorithms to develop the parsers for a given grammar.
C313.4	Understand syntax-directed translation and run-time environment.
C313.5	Learn to implement code optimization techniques and a simple code generator.
C313.6	Design and implement a scanner and a parser using LEX and YACC tools.

Course Code: 314 Course Name:CS8603 DISTRIBUTED SYSTEMS

C314.1	Elucidate the foundations and issues of distributed systems
C314.2	Understand the various synchronization issues and global state for distributed systems.
C314.3	Understand the Mutual Exclusion and Deadlock detection algorithms in distributed systems
C314.4	Describe the agreement protocols and fault tolerance mechanisms in distributed systems
C314.5	Describe the features of peer-to-peer and distributed shared memory systems

Course Code: 315 Course Name:CS8075 DATA WAREHOUSING AND DATA MINING

C315.1	Design a Data warehouse system and perform business analysis with OLAP tools.

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C315.2	Apply suitable pre-processing and visualization techniques for data analysis
C315.3	Apply association rule mining techniques for data analysis
C315.4	Apply appropriate classification and clustering techniques for data analysis
C315.5	To study algorithms for finding hidden and interesting patterns in data

Course Code: 316 Course Name:CS8661 INTERNET PROGRAMMING LABORATORY

C316.1	Construct Web pages using HTML/XML and style sheets.
C316.2	Build dynamic web pages with validation using Java Script objects and by applying different event handling mechanisms.
C316.3	Develop dynamic web pages using server side scripting
C316.4	Use PHP programming to develop web applications.
C316.5	Construct web applications using AJAX and web services

Course Code: 317 Course Name:CS8662 MOBILE APPLICATION DEVELOPMENT LABORATORY

C317.1	Develop mobile applications using GUI and Layouts.
C317.2	Develop mobile applications using Event Listener.
C317.3	Develop mobile applications using Databases.
C317.4	Develop mobile applications using RSS Feed, Internal/External Storage, SMS, Multi-threading and GPS.
C317.5	Analyze and discover own mobile app for simple needs.

Course Code: 318 Course Name:HS8581 PROFESSIONAL COMMUNICATION

C318.1	Make effective presentations
C318.2	Participate confidently in Group Discussions.
C318.3	Attend job interviews and be successful in them.
C318.4	Develop adequate Soft Skills required for the workplace
C318.5	To equip students with effective speaking and listening skills in English.

Course Code: 401 Course Name:MG8591 PRINCIPLES OF MANAGEMENT

C401.1	Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling.
C401.2	Able to direct a group and control the group.
C401.3	have same basic knowledge on international aspect of management
C401.4	The students are exposed to the basic knowledge on international aspect of management
C401.5	to learn the application of the principles in an organization .

Course Code: 402 Course Name:CS8792 CRYPTOGRAPHY AND NETWORK SECURITY

C402.1	Understand the fundamentals of networks security, security architecture, threats and vulnerabilities
C402.2	Apply the different cryptographic operations of symmetric cryptographic algorithms
C402.3	Apply the different cryptographic operations of public key cryptography
C402.4	Apply the various Authentication schemes to simulate different applications.
C402.5	Understand various Security practices and System security standards

Course Code: 403 Course Name:CS8791 CLOUD COMPUTING

C403.1	Articulate the main concepts, key technologies, strengths and limitations of cloud computing.
C403.2	Learn the key and enabling technologies that help in the development of cloud.
C403.3	Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.
C403.4	Explain the core issues of cloud computing such as resource management and security.
C403.5	Be able to install and use current cloud technologies.

Course Code: 404 Course Name:SOFTWARE PROJECT MANAGEMENT

C404.1	At the end of the course the students will be able to practice Project Management principles while developing a software.
C404.2	Gain extensive knowledge about the basic project management concepts, framework and the process models.
C404.3	Obtain adequate knowledge about software process models and software effort estimation techniques.
C404.4	Estimate the risks involved in various project activities.
C404.5	Learn staff selection process and the issues related to people management

Course Code: 405 Course Name:CS8088 WIRELESS ADHOC AND SENSOR NETWORKS

C405.1	Identify different issues in wireless ad hoc and sensor networks .
C405.2	To analyze protocols developed for ad hoc and sensor networks
C405.3	To identify and understand security issues in ad hoc and sensor networks

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C405.4	To learn about the Transport Layer protocols and their QoS for ad hoc and sensor networks
C405.5	To understand the working of MAC and Routing Protocols for ad hoc and sensor networks

Course Code:406 Course Name:OBM752 HOSPITAL MANAGEMENT

C406.1	Explain the principles of hospital administration
C406.2	identify the importance of human resource management
C406.3	list various marketing research techniques
C406.4	identify information management systems and its uses
C406.5	understand safety procedures followed n hospitals

Course Code: 407 Course Name:CS8711 CLOUD COMPUTING LABORATORY

C407.1	Configure various virtualization tools such as Virtual Box, VMware workstation.
C407.2	Design and deploy a web application in a PaaS environment.
C407.3	Learn how to simulate a cloud environment to implement new schedulers.
C407.4	Install and use a generic cloud environment that can be used as a private cloud.
C407.5	Manipulate large data sets in a parallel environment.

Course Code: 408 Course Name:SECURITY LABORATORY

C408.1	Develop code for classical Encryption Techniques to solve the problems.
C408.2	Build cryptosystems by applying symmetric and public key encryption algorithms.
C408.3	Construct code for authentication algorithms.
C408.4	Develop a signature scheme using Digital signature standard.
C408.5	Demonstrate the network security system using open source tools

Course Code: 409 Course Name:CS8080 INFORMATION RETRIEVAL TECHNIQUES

C409.1	Use an open source search engine framework and explore its capabilities
C409.2	Apply appropriate method of classification or clustering.
C409.3	Design and implement innovative features in a search engine.
C409.4	Design and implement a recommender system.
C409.5	To learn different techniques of recommender system

Course Code: 410 Course Name:GE8076 PROFESSIONAL ETHICS IN ENGINEERING

C410.1	Upon completion of the course, the student should be able to apply ethics in society.
C410.2	Distinguish between Moral and Ethics.
C410.3	Helps to discuss the ethical issues related to engineering
C410.4	Realize the responsibility & rights in the society.
C410.5	discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.

Course Code: 411 Course Name:CS8811 PROJECT WORK

C411.1	Gather, organize, summarize and interpret technical literature with the purpose of formulating a project proposal.
C411.2	Write a technical report summarizing state-of-the-art on an identified topic.
C411.3	Present the study using graphics and multimedia techniques.
C411.4	Define intended future work based on the technical review.
C411.5	Select and apply modern tools and technologies.

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Course Outcomes (CO) (R 2013)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING(PG)

Course Code: 101 Course Name:MA7155 APPLIED PROBABILITY AND STATISTICS

C101.1	Basic probability axioms and rules and the moments of discrete and continuous random variables.
C101.2	Consistency, efficiency and unbiasedness of estimators, method of maximum likelihood estimation and Central Limit Theorem.
C101.3	Use statistical tests in testing hypotheses on data.
C101.4	Perform exploratory analysis of multivariate data, such as multivariate normal density, calculating descriptive statistics, testing for multivariate normality.
C101.5	The students should have the ability to use the appropriate and relevant, fundamental and applied mathematical and statistical knowledge, methodologies and modern computational tools.

Course Code: 102 Course Name:CP7102 ADVANCED DATA TRUCTURES AND ALGORITHMS

C102.1	Design data structures and algorithms to solve computing problems
C102.2	Design algorithms using graph structure and various string matching algorithms to solve real-life problems
C102.3	Apply suitable design strategy for problem solving
C102.4	To study about NP Completeness of problems
C102.5	To select and design data structures and algorithms that is appropriate for problems.

Course Code: 103 Course Name:CP7103 MULTICORE ARCHITECTURES

C103.1	Identify the limitations of ILP
C103.2	Discuss the issues related to multiprocessing and suggest solutions
C103.3	Point out the salient features of different multicore architectures and how they exploit Parallelism
C103.4	Discuss the various techniques used for optimising the cache performance
C103.5	Design hierarchal memory system
C103.6	Point out how data level parallelism is exploited in architectures

Course Code: 104 Course Name:CP7101 DESIGN AND MANAGEMENT OF COMPUTER NETWORKS

C104.1	Identify the components required to build different types of networks
C104.2	Choose the required functionality at each layer for given application
C104.3	Identify solution for each functionality at each layer
C104.4	Trace the flow of information from one node to another node in the network
C104.5	Demonstrate various types of routing techniques

Course Code: 105 Course Name:CP7004 IMAGE PROCESSING AND ANALYSIS

C105.1	Design and implement algorithms for image processing applications that incorporates different concepts of medical Image Processing
C105.2	Familiar with the use of MATLAB and its equivalent open source tools
C105.3	Critically analyze different approaches to image processing applications
C105.4	Explore the possibility of applying Image processing concepts in various applications
C105.5	To appreciate the use of image processing in various applications

Course Code: 106 Course Name:CP7009 MACHINE LEARNING TECHNIQUES

C106.1	Distinguish between, supervised, unsupervised and semi-supervised learning
C106.2	Apply the appropriate machine learning strategy for any given problem

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C106.3	Suggest supervised, unsupervised or semi-supervised learning algorithms for any given problem
C106.4	Design systems that uses the appropriate graph models of machine learning
C106.5	Modify existing machine learning algorithms to improve classification efficiency

Course Code: 107 Course Name:CP7111 DATA STRUCTURES LABORATORY

C107.1	Design and implement basic and advanced data structures extensively.
C107.2	Design algorithms using graph structures
C107.3	Design and develop efficient algorithms with minimum complexity using design techniques.
C107.4	Design data structures and algorithms to solve computing problems
C107.5	Design and develop heap structures.

Course Code: 108 Course Name:CP7112 CASE STUDY - NETWORK DESIGN (TEAM WORK)(

C108.1	Identify the components required for designing a network
C108.2	Design a network at a high-level using different networking technologies
C108.3	Analyze the various protocols of wireless and cellular networks
C108.4	Discuss the features of 4G and 5G networks
C108.5	Experiment with software defined networks

Course Code: 109 Course Name:CP7201 THEORETICAL FOUNDATIONS OF COMPUTER SCIENCE

C109.1	To explain sets, relations, functions
C109.2	To conduct proofs using induction, pigeonhole principle, and logic
C109.3	To apply counting, permutations, combinations, and recurrence relations
C109.4	To apply recursive functions and lambda calculus
C109.5	To explain logic programming and functional programming principles

Course Code: 110 Course Name:CP7202 ADVANCED DATABASES

C110.1	To develop skills on databases to optimize their performance in practice.
C110.2	To analyze each type of databases and its necessity
C110.3	To design faster algorithms in solving practical database problems
C110.4	To understand the emerging databases like Mobile, XML, Cloud and Big Data
C110.5	To study the usage and applications of Object Oriented and Intelligent databases

Course Code: 111 Course Name:CP7203 PRINCIPLES OF PROGRAMMING LANGUAGES

C111.1	Describe syntax and semantics of programming languages
C111.2	Explain data, data types, and basic statements of programming languages
C111.3	Design and implement subprogram constructs
C111.4	Apply object-oriented, concurrency, and event handling programming constructs
C111.5	Develop programs in Scheme, ML, and Prolog

Course Code: 112 Course Name:CP7204 ADVANCED OPERATING SYSTEMS

C112.1	To explain the functionality of a large software system by reading its source
C112.2	To revise any algorithm present in a system.
C112.3	To design a new algorithm to replace an existing one
C112.4	To apypropriately modify and use the data structures of the linux kernel for a different software system.
C112.5	To understand how program execution happens in Linux.

Course Code: 113 Course Name:CP7014 SOFTWARE ARCHITECTURES

C113.1	Explain key architectural drivers
C113.2	Explain the influence of architecture on business and technical activities
C113.3	Identify key architectural structures
C113.4	Adopt good practices for documenting the architecture
C113.5	Explain how to use formal languages to specify architecture

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C205.1	Gather, organize, summarize and interpret technical literature with the purpose of formulating a project proposal.
C205.2	Write a technical report summarizing state-of-the-art on an identified topic.
C205.3	Present the study using graphics and multimedia techniques.
C205.4	Define intended future work based on the technical review.
C205.5	Select and apply modern tools and technologies.

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Course Outcomes (CO) (R 2017)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING(PG)

Course Code: 101 Course Name:MA5160 APPLIED PROBABILITY AND STATISTICS

C101.1	Basic probability axioms and rules and the moments of discrete and continuous random variables.
C101.2	Consistency, efficiency and unbiasedness of estimators, method of maximum likelihood estimation and Central Limit Theorem.
C101.3	Use statistical tests in testing hypotheses on data.
C101.4	Perform exploratory analysis of multivariate data, such as multivariate normal density, calculating descriptive statistics, testing for multivariate normality.
C101.5	The students should have the ability to use the appropriate and relevant, fundamental and applied mathematical and statistical knowledge, methodologies and modern computational tools.

Course Code: 102 Course Name:CP5151 ADVANCED DATA STRUCTURES AND ALGORITHMS

C102.1	Design data structures and algorithms to solve computing problems
C102.2	Design algorithms using graph structure and various string matching algorithms to solve real-life problems
C102.3	Apply suitable design strategy for problem solving
C102.4	To study about NP Completeness of problems
C102.5	To select and design data structures and algorithms that is appropriate for problems.

Course Code: 103 Course Name:CP5152 ADVANCED COMPUTER ARCHITECTURE

C103.1	Identify the limitations of ILP
C103.2	Discuss the issues related to multiprocessing and suggest solutions
C103.3	Point out the salient features of different multicore architectures and how they exploit Parallelism
C103.4	Discuss the various techniques used for optimising the cache performance
C103.5	Design hierarchal memory system
C103.6	Point out how data level parallelism is exploited in architectures

Course Code: 104 Course Name:CP5153 OPERATING SYSTEMS INTERNALS

C104.1	To explain the functionality of a large software system by reading its source
C104.2	To revise any algorithm present in a system.
C104.3	To design a new algorithm to replace an existing one
C104.4	To apypropriately modify and use the data structures of the linux kernel for a different software system.
C104.5	To understand how program execution happens in Linux.

Course Code: 105 Course Name:CP5154 ADVANCED SOFTWARE ENGINEERING

C105.1	Understand the advantages of various Software Development Lifecycle Models
C105.2	Gain knowledge on project management approaches as well as cost and schedule estimation strategies
C105.3	Perform formal analysis on specifications
C105.4	Use UML diagrams for analysis and design
C105.5	Architect and design using architectural styles and design patterns
C105.6	Understand software testing approaches
C105.7	Understand the advantages of DevOps practices

Course Code: 106 Course Name:CP5191 MACHINE LEARNING TECHNIQUES

C106.1	Distinguish between, supervised, unsupervised and semi-supervised learning

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C106.2	Apply the appropriate machine learning strategy for any given problem
C106.3	Suggest supervised, unsupervised or semi-supervised learning algorithms for any given problem
C106.4	Design systems that uses the appropriate graph models of machine learning
C106.5	Modify existing machine learning algorithms to improve classification efficiency

Course Code: 107 Course Name:CP5161 DATA STRUCTURES LABORATORY

C107.1	Design and implement basic and advanced data structures extensively.
C107.2	Design algorithms using graph structures
C107.3	Design and develop efficient algorithms with minimum complexity using design techniques.
C107.4	Design data structures and algorithms to solve computing problems
C107.5	Design and develop heap structures.

Course Code: 108 Course Name:CP5201 NETWORK DESIGN AND TECHNOLOGIES

C108.1	Identify the components required for designing a network
C108.2	Design a network at a high-level using different networking technologies
C108.3	Analyze the various protocols of wireless and cellular networks
C108.4	Discuss the features of 4G and 5G networks
C108.5	Experiment with software defined networks

Course Code: 109 Course Name:CP5291 SECURITY PRACTICES

C109.1	Understand the core fundamentals of system security
C109.2	Apply the security concepts related to networks in wired and wireless scenario
C109.3	Implement and Manage the security essentials in IT Sector
C109.4	Able to explain the concepts of Cyber Security and encryption Concepts
C109.5	Able to attain a through knowledge in the area of Privacy and Storage security and related Issues.

Course Code: 110 Course Name:CP5292 INTERNET OF THINGS

C110.1	Analyze various protocols for IoT
C110.2	Develop web services to access/control IoT devices.
C110.3	Design a portable IoT using Rasperry Pi
C110.4	Deploy an IoT application and connect to the cloud
C110.5	Analyze applications of IoT in real time scenario

Course Code: 111 Course Name:CP5293 BIG DATA ANALYTICS

C111.1	Understand how to leverage the insights from big data analytics
C111.2	Analyze data by utilizing various statistical and data mining approaches
C111.3	Perform analytics on real-time streaming data
C111.4	Understand the various NoSql alternative database models
C111.5	To gain knowledge on Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data analytics

Course Code: 112 Course Name:IF5191 ADVANCED DATABASES

C112.1	To develop skills on databases to optimize their performance in practice.
C112.2	To analyze each type of databases and its necessity
C112.3	To design faster algorithms in solving practical database problems
C112.4	To understand the emerging databases like Mobile, XML, Cloud and Big Data
C112.5	To study the usage and applications of Object Oriented and Intelligent databases

Course Code: 113 Course Name:CP5071 IMAGE PROCESING AND ANALYSIS

C113.1	Design and implement algorithms for image processing applications that incorporates different concepts of medical Image Processing
C113.2	Familiar with the use of MATLAB and its equivalent open source tools

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C113.3	Critically analyze different approaches to image processing applications
C113.4	Explore the possibility of applying Image processing concepts in various applications
C113.5	To appreciate the use of image processing in various applications

Course Code: 114 Course Name:CP5092 CLOUD COMPUTING TECHNOLOGIES

C114.1	Employ the concepts of storage virtualization, network virtualization and its management
C114.2	Apply the concept of virtualization in the cloud computing
C114.3	Identify the architecture, infrastructure and delivery models of cloud computing
C114.4	Develop services using Cloud computing
C114.5	Apply the security models in the cloud environment

Course Code: 115 Course Name:CP5261 DATA ANALYTICS LABORATORY

C115.1	Process big data using Hadoop framework
C115.2	Build and apply linear and logistic regression models
C115.3	Perform data analysis with machine learning methods
C115.4	Perform graphical data analysis
C115.5	To implement Map Reduce programs for processing big data

Course Code: 201 Course Name:CP5005 SOFTWARE QUALITY ASSURANCE AND TESTING

C201.1	Perform functional and nonfunctional tests in the life cycle of the software product
C201.2	Understand system testing and test execution process.
C201.3	Identify defect prevention techniques and software quality assurance metrics.
C201.4	Apply techniques of quality assurance for typical applications.
C201.5	To learn the techniques for quality assurance and applying for applications

Course Code: 202 Course Name:CP5074 SOCIAL NETWORK ANALYSIS

C202.1	Work on the internals components of the social network
C202.2	Model and visualize the social network
C202.3	Mine the behaviour of the users in the social network
C202.4	Predict the possible next outcome of the social network
C202.5	Apply social network in real time applications

Course Code: 203 Course Name:CP5007 BIO-INSPIRED COMPUTING

C203.1	Implement and apply bio-inspired algorithms
C203.2	Explain random walk and simulated annealing
C203.3	Implement and apply genetic algorithms
C203.4	Explain swarm intelligence and ant colony for feature selection
C203.5	Apply bio-inspired techniques in image processing.

Course Code: 204 Course Name:CP5076 INFORMATION STORAGE MANAGEMENT

C204.1	Select from various storage technologies to suit for required application.
C204.2	Apply security measures to safeguard storage & farm.
C204.3	Analyse QoS on Storage
C204.4	Able to apply integrated themes and biodiversity, natural resources, pollution control and waste management.
C204.5	To learn security aspects of storage & data center

Course Code: 205 Course Name:CP7411 PROJECT WORK

C205.1	Gather, organize, summarize and interpret technical literature with the purpose of formulating a project proposal.
C205.2	Write a technical report summarizing state-of-the-art on an identified topic.
C205.3	Present the study using graphics and multimedia techniques.

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C205.4	Define intended future work based on the technical review.
C205.5	Select and apply modern tools and technologies.

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Course Outcomes (CO)

(R 2013)

Branch: B.E, Electrical and Electronics Engineering

Course Code: C101 Course Name:HS6151 Technical English – I

C101.1	Read different genres of texts adopting various reading strategies.
C101.2	Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
C101.3	Listen/view and comprehend different spoken discourses/excerpts in different accents.
C101.4	Speak clearly, confidently, comprehensibly.
C101.5	Communicate with one or many listeners using appropriate communicative strategies.

Course Code: C102 Course Name: MA6151 Mathematics – I

C102.1	Use both the limit definition and rules of differentiation to differentiate functions
C102.2	Apply differentiation to solve maxima and minima problems.
C102.3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.
C102.4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
C102.5	Apply various techniques in solving differential equations.

Course Code:C103 Course Name: PH6151 Engineering Physics – I

C103.1	Acoustics, Production and the applications of Ultrasonics in Engineering and Medical Fields.
C103.2	Interference, different types of lasers and its application in various fields.
C103.3	Fiber optics and optical fiber and its applications.
C103.4	Development of quantum mechanics and its necessary, wave equations and its applications, X - Ray.
C103.5	Crystallography and can able to calculate the crystal parameters

Course Code: C104 Course Name:CY 6151 Engineering Chemistry – I

C104.1	To make the students conversant with basics of polymer chemistry.
C104.2	To make the student acquire sound knowledge of second law of thermodynamics and second law based derivations of importance in engineering applications.
C104.3	To acquaint the student with concepts of important photophysical and photochemical processes and spectroscopy.
C104.4	To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
C104.5	To acquaint the students with the basics of nano materials, their properties and applications.

Course Code: C105 Course Name:GE6151 Computer Programming

C105.1	Explain the components of computer and logical operations.
C105.2	Convert the number system and their representation.
C105.3	Discuss hardware and software devices
C105.4	Summarize network fundamentals.

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C105.5	Plan the logic using flowchart and develop algorithm to write a C Program.

Course Code: C106 Course Name: GE6152 Engineering Graphics

C106.1	Ability to familiarize with the fundamentals and standards of Engineering graphics
C106.2	Ability to perform freehand sketching of basic geometrical constructions and multiple views of objects
C106.3	Ability to Project orthographic projections of lines and plane surfaces
C106.4	Ability to draw projections of solids and development of surfaces
C106.5	Ability to visualize and to project isometric and perspective sections of simple solids

Course Code: C107 Course Name:GE6161 Computer Practices Laboratory

C107.1	Prepare data using MS-word & Excel to visualize graphs, charts in MS-Excel.
C107.2	Outline the logic using flowchart for a given problem and to program using Switch case & Control structures
C107.3	Develop logic using decision making & looping statements
C107.4	Apply passing parameters using Arrays & Functions
C107.5	Construct structure and Union for a given database and to bring out the importance of Unions over structure

Course Code:C108 Course Name: GE6162 Engineering Practices Laboratory

C108.1	Ability to Fabricate carpentry components and pipe connections including plumbing works
C108.2	Ability to Use welding equipments to join the structures
C108.3	Ability to Carry out the basic machining operations
C108.4	Ability to Make the models using sheet metal works
C108.5	Ability to Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings

Course Code:C109 Course Name:GE6163 Physics and Chemistry Laboratory - I

C109.1	To provide the basic practical exposure to all the engineering and technological streams in the field of physics.
C109.2	To provide the basic practical exposure to all the engineering and technological streams in the field of chemistry.
C109.3	The students are able to know about the water containing impurities and some physical parameters.
C109.4	To gain the knowledge about light, sound, laser, fiber optics and magnetism.
C109.5	To develop the knowledge of conductometric titration and viscometry

Course Code:C110 Course Name:HS6251 Technical English – II

C110.1	Read different genres of texts, infer implied meanings and critically analyse and evaluate them for ideas as well as for method of presentation.
C110.2	Write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
C110.3	Listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.
C110.4	Speak convincingly, express their opinions clearly.
C110.5	Initiate a discussion, negotiate, argue using appropriate communicative strategies.

Course Code:C111 Course Name:MA6251 Mathematics – II

C111.1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
C111.2	Gradient, divergence and curl of a vector point function and related identities.
C111.3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
C111.4	Analytic functions, conformal mapping and complex integration.
C111.5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

Course Code:C112 Course Name:PH6251 Engineering Physics – II

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C112.1	Electric conduction, electrical conductivity, carrier concentration of metals.
C112.2	Semiconductors, carrier concentration of semiconductors, Hall effect and semiconductor devices.
C112.3	Types of magnetic materials, ferro magnetic materials, magnetic storage devices, Super conductors and their properties and applications.
C112.4	Dielectrics, properties and its applications, ferro electricity.
C112.5	Modern engineering materials, Nano materials and Carbon nano tubes.

Course Code:C113 Course Name:CY6251 Engineering Chemistry – II

C113.1	To make the students conversant with boiler feed water requirements, related problem and water treatment techniques.
C113.2	Principles of electrochemical reactions, redox reactions in corrosion of materials and methods for corrosion prevention and protection of materials.
C113.3	Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.
C113.4	Preparation, properties and applications of engineering materials.
C113.5	Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.

Course Code:C114 Course Name:GE6251 Basic Civil and Mechanical Engineering

C114.1	Ability to explain the usage of construction material and proper selection of construction materials.
C114.2	Ability to design building structures.
C114.3	Ability to identify the components use in power plant cycle.
C114.4	Ability to demonstrate working principles of petrol and diesel engine.
C114.5	Ability to explain the components of refrigeration and Air conditioning cycle.

Course Code:C115 Course Name:EE6201 Circuit Theory

C115.1	To introduce electric circuits and its analysis
C115.2	To impart knowledge on solving circuits using network theorems
C115.3	Understand the Resonance and Coupled circuits
C115.4	Ability to analyse transients response of circuits
C115.5	Ability to analyse three phase circuits

Course Code:C116 Course Name:GE6262 Physics and Chemistry Laboratory -II

C116.1	To provide the basic practical exposure to all the engineering and technological streams in the field of physics. .
C116.2	To provide the basic practical exposure to all the engineering and technological streams in the field of chemistry.
C116.3	The students are able to know about the water containing impurities and some physical parameters.
C116.4	To gain the knowledge about properties of matter, semiconductors and solar cells
C116.5	To develop the knowledge of spectrophotometry.

Course Code:C117 Course Name:GE6263 Computer Programming Laboratory

C117.1	Able to Use Shell commands
C117.2	Able to Design of Implement Unix shell scripts
C117.3	Able to Write and execute C programs on Unix

Course Code:C118 Course Name:EE6211 Electric Circuits Laboratory

C118.1	Ability to Understand the concept of Kirchhoff's law
C118.2	Ability to Understand the concept of Cicuit theorems
C118.3	Able to measure sinusoidal voltage, frequency and power factor.
C118.4	Able to design resonance cicuits
C118.5	Abilitty to Understand the three phase balanced and unbalanced star, delta networks circuits.

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Course Code:C201Course Name:MA6351Transforms and Partial Differential Equations

C201.1	Understand how to solve the given standard partial differential equations.
C201.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
C201.3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
C201.4	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
C201.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

Course Code:C202 Course Name:EE6301 Digital Logic Circuits

C202.1	Ability to study various number systems and digital logic families
C202.2	Ability to design combinational Circuits.
C202.3	Ability to design various synchronous circuits.
C202.4	Ability to introduce asynchronous sequential circuits and PLDs
C202.5	Ability to introduce digital simulation for development of application oriented logic circuits

Course Code:C203 Course Name:EEEE6302 Electromagnetic Theory

C203.1	Ability to understand the basic mathematical concepts related to electromagnetic vector fields
C203.2	Ability to understand the basic concepts about electrostatic fields, electrical potential, energy density and their applications.
C203.3	Ability to acquire the knowledge in magneto static fields, magnetic flux density, vector potential and its applications.
C203.4	Ability to understand the different methods of emf generation and Maxwell's equations
C203.5	Ability to understand the basic concepts electromagnetic waves and characterizing parameters

Course Code:C204 Course Name:GE6351 Environmental Science and Engineering

C204.1	Public awareness of environment at infant stage.
C204.2	Pollution controlling aids
C204.3	Development and improvement in standard of living has lead to serious environmental disasters.
C204.4	Ignorance and incomplete knowledge has lead to misconceptions. Knowledge about water conservation methods.
C204.5	World's Population related problems and AIDS

Course Code:C205 Course Name:EC6202 Electronic Devices and Circuits

C205.1	Able to analyse the characteristics of PN junction devices and its applications
C205.2	Able to Explain the structure and working operation of transistors and thyristors
C205.3	Ability to choose and adapt the required components to construct an amplifier circuit
C205.4	Ability to cdesign and analysis of Multistage and differential amplifier circuits.
C205.5	Ability to employ the acquired knowledge in design and analysis of feedback amplifiers and oscillators

Course Code:C206 Course Name:EE6303 Linear Integrated Circuits and Applications

C206.1	Ability to acquire knowledge in IC fabrication procedure
C206.2	Ability to analyze the characteristics of Op-Amp
C206.3	To understand and acquire knowledge on the Applications of Op-amp
C206.4	Functional blocks and the applications of special ICs like Timers, PLL circuits, regulator Circuits.
C206.5	Ability to understand the Application of IC.

Course Code:C207 Course Name:EC6361 Electronics Laboratory

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C207.1	Ability to understand the Characteristics of Semiconductor diode and Zener diode
C207.2	Ability to understand the Characteristics of BJT,JFET,UJT,
C207.3	Able to design Common Emitter amplifier,RC phase shift and LC oscillators
C207.4	Able to design Single Phase rectifiers with inductive and capacitive filters
C207.5	Ability to understand the frequency and phase measurements using CRO

Course Code:C208 Course Name:EE6311 Linear and Digital Integrated Circuits Laboratory

C208.1	Ability to understand and implement Boolean Functions.
C208.2	Ability to understand the importance of code conversion
C208.3	Ability to Design and implement 4-bit shift registers
C208.4	Ability to acquire knowledge on Application of Op-Amp
C208.5	Ability to Design and implement counters using specific counter IC.

Course Code:C209 Course Name:MA6459 Numerical Methods

C209.1	Understand the basic concepts and techniques of solving algebraic and transcendental equations.
C209.2	Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations.
C209.3	Apply the numerical techniques of differentiation and integration for engineering problems.
C209.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
C209.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

Course Code:C210 Course Name:EE6401 Electrical Machines - I

C210.1	Ability to analyze the magnetic-circuits.
C210.2	Ability to acquire the knowledge in constructional details of transformers.
C210.3	Ability to understand the concepts of electromechanical energy conversion.
C210.4	Ability to acquire the knowledge in working principles of DC Generator.
C210.5	Ability to acquire the knowledge in working principles of DC Motor

Course Code:C211 Course Name:CS6456 Object Oriented Programming

C211.1	To gain the basic knowledge on overview Object Oriented concepts.
C211.2	To understand the basic characteristics of Object Oriented progrramming
C211.3	To gain the knowledge of adanced progrramming
C211.4	To gain the basic knowledge on java
C211.5	To gain the knowledge of exception handling

Course Code:C212 Course Name:EE6402 Transmission and Distribution

C212.1	Ability to understand structure of power system
C212.2	To understand the importance and the functioning of transmission line parameters.
C212.3	To acquire knowledge on the modeling and performance of Transmission lines.
C212.4	To acquire knowledge on Insulators and Underground Cables
C212.5	To acquire knowledge on the Mechanical design of over head Transmission lines.

Course Code:C213 Course Name:EEE6403 Discrete Time Systems and Signal Processing

C213.1	Ability to understand the signals,systems and quantization effects.
C213.2	Ability to understand and analyze the discrete time systems.
C213.3	Ability to analyze the discrete fourier transform & their computation.

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C213.4	Ability to understand the types of filters and their design for digital implementation
C213.5	Ability to acquire knowledge on programmability digital signal processors

Course Code:C214 Course Name:EE6404 Measurements and Instrumentation

C214.1	To acquire knowledge on Basic functional elements of instrumentation
C214.2	To understand the concepts of Fundamentals of electrical and electronic instruments
C214.3	Ability to compare between various measurement techniques
C214.4	To acquire knowledge on Various storage and display devices
C214.5	To understand the concepts Various transducers and the data acquisition systems

Course Code:C215 Course Name:ECS6461 Object Oriented Programming Laboratory

C215.1	Gain the basic knowledge on Object Oriented concepts.
C215.2	Ability to develop applications using Object Oriented Programming Concepts.
C215.3	Ability to implement features of object oriented programming to solve real world problems.

Course Code:C216 Course Name:EE6411 Electrical Machines Laboratory - I

C216.1	Ability to understand and analyze DC Generator
C216.2	Ability to understand and analyze DC Motor
C216.3	Ability to understand and analyse Transformers.

Course Code:C301 Course Name:EE6501 Power System Analysis

C301.1	Ability to model and understand various power system components
C301.2	Ability to understand and apply iterative techniques for power flow analysis
C301.3	Ability to acquire knowledge on Symmetrical Fault analysis.
C301.4	Ability to acquire knowledge on UnSymmetricaFault analysis.
C301.5	Ability to understand and analyse stability

Course Code:C302 Course Name:EE6502 Microprocessors and Microcontrollers

C302.1	Ability to explain the architecture of Microprocessor and acquire knowledge on interrupts,memory and timing diagram
C302.2	Ability to acquire knowledge in Addressing modes & instruction set of 8085 and to write the assembly language programme.
C302.3	Ability to explain the architecture of Microcontroller.and acquire knowledge on interrupts,memory and timing diagram
C302.4	Ability to understand the importance of Interfacing
C302.5	Ability to understand and develop the Microcontroller based applications.

Course Code:C303 Course Name:ME6701 Power Plant Engineering

C303.1	Explain the layout, construction and working of the components inside a thermal power plant.
C303.2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.
C303.3	Explain the layout, construction and working of the components inside nuclear power plants.
C303.4	Explain the layout, construction and working of the components inside Renewable energy power plants.
C303.5	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.

Course Code:C304 Course Name:EE6503 Power Electronics

C304.1	Ability to understand the characteristics of semiconductor devices
C304.2	Ability to analyse phase controlled converters and its applications
C304.3	Ability to analyse DC - DC converters and its applications

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C304.4	Ability to analyse Inverters and its applications
C304.5	Ability to analyse AC - AC converters and its applications

Course Code:C305 Course Name:EE6504 Electrical Machines - II

C305.1	Ability to understand the construction and working principle of Synchronous Generator
C305.2	Ability to acquire knowledge on Synchronous motor.
C305.3	Ability to understand the construction and working principle of Three phase Induction Motor
C305.4	Ability to understand the starting and speed control of Three phase Induction Motor
C305.5	Ability to understand the construction and working principle of Special Machines

Course Code:C306 Course Name:IC6501 Control Systems

C306.1	Ability to develop various representations of system based on the knowledge of Mathematics, Science and Engineering fundamentals
C306.2	Ability to do time domain analysis of various models of linear system
C306.3	Ability to do frequency domain analysis of various models of linear system
C306.4	Ability to design appropriate compensator for the given specifications.
C306.5	Ability to understand the concept of state variables

Course Code:C307 Course Name:EE6511 Control and Instrumentation Laboratory

C307.1	Ability to understand and apply basic science, circuit theory, Electro-magnetic field theory,control theory and apply them to electrical engineering problems.

Course Code:C308 Course Name:GE6674 Communication and Soft Skills- Laboratory Basedy

C308.1	Able to Take international examination such as IELTS and TOEFL
C308.2	Able to Make presentations and Participate in Group Discussions.
C308.3	Able to Successfully answer questions in interviews.

Course Code:C309 Course Name:EE6512 Electrical Machines Laboratory - II

C309.1	Ability to model and analyze electrical apparatus and their application to power system

Course Code:C310 Course Name:EC6651 Communication Engineering

C310.1	Able to gain knowledge on anolog communication
C310.2	Able to gain knowledge on digital communication
C310.3	Able to undestand souce codes,line codes and error control
C310.4	Able to gain knowledge on multiple access techniques
C310.5	Able to gain knowledge on satellite and optical ffiber

Course Code:C311 Course Name:EE6601 Solid State Drives

C311.1	Ability to study about the steady state operation and transient dynamics of a motor load system
C311.2	Ability to analyze the operation of the converter/chopper fed dc drive.
C311.3	Ability to analyze the operation and performance of Induction motor drives
C311.4	Ability to analyze the operation and performance of Synchronous motor drives
C311.5	Ability to analyze and design the current and speed controllers for a closed loop solid state DC motor drive.

Course Code:C312 Course Name:EE6602 Embedded Systems

C312.1	Ability to understand and analyze Embedded systems

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C312.2	Ability to study about the bus Communication in processors.
C312.3	Ability to operate various Embedded Development Strategies
C312.4	Ability to understand basics of Real time operating system.
C312.5	Ability to suggest an embedded system for a given application

Course Code:C313 Course Name:EE6603 Power System Operation and Control

C313.1	Ability to understand the significance of power system operation and control.
C313.2	Ability to acquire knowledge on real power-frequency interaction.
C313.3	Ability to understand the reactive power-voltage interaction
C313.4	Ability to understand the economic operation of power systems
C313.5	Ability to design SCADA and its application for real time operation

Course Code:C314 Course Name:EE6604 Design of Electrical Machines

C314.1	Ability understtand the considerattions in Electrical machine design
C314.2	Ability to design armature and field of DC machines.
C314.3	Ability to design single and three phase transformer.
C314.4	Ability to design stator and rotor of induction motor.
C314.5	Ability to design and analyze synchronous machines

Course Code:C315 Course Name:EE6002 Power System Transients

C315.1	Ability to understand the importance of transients
C315.2	Ability to understand the over voltages due to switching transients
C315.3	Ability to understand the lighting transients
C315.4	Ability to understand the computation of transients
C315.5	Ability to understand the transients in integrated power sytsem

Course Code:C316 Course Name:EE6611 Power Electronics and Drives Laboratory

C316.1	Ability to understand and analyse, linear and digital electronic circuits.

Course Code:C317 Course Name:EE6612 Microprocessors and Microcontrollers Laboratory

C317.1	Ability to understand and analyse, linear and digital electronic circuits.
C317.2	To understand and apply computing platform and software for engineering problems.

Course Code:C318 Course Name:EE6613 Presentation Skills and Technical Seminar

C318.1	Ability to review, prepare and present technological developments
C318.2	Ability to face the placement interviews

Course Code:C401 Course Name:EE6701 High Voltage Engineering

C401.1	Ability to understand the over voltages in electrical power system
C401.2	Ability to understand the dielectric breakdown
C401.3	Ability to understand Generation of high voltages and high currents
C401.4	Ability to measure high voltages and high currents
C401.5	Ability to test power apparatus and insulation coordination

Course Code:C402 Course Name:EE6702 Protection and Switchgear

C402.1	Ability to find the causes of abnormal operating conditions of the apparatus and system.

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C402.2	Ability to understand and analyze Electromagnetic Relays.
C402.3	Ability to study about the apparatus protection
C402.4	Ability to study about the static and numerical relays.
C402.5	Ability to acquire knowledge on functioning of circuit breakers

Course Code:C403 Course Name:EE6703 Special Electrical Machines

C403.1	Ability to acquire the knowledge on construction,operation of synchronous reluctance motor
C403.2	Ability to acquire the knowledge on construction,operation of stepper motor.
C403.3	Ability to construction,operation of switched reluctance motors and design of controllers
C403.4	Ability to acquire the knowledge on construction,operation of permanent magnet brushless D.C. motors and design of controllers
C403.5	Ability to acquire the knowledge on construction,operation of permanent magnet synchronous motors.and design of controllers

Course Code:C404 Course Name:MG6851 Principles of Management

C404.1	Able to undestand the management and organizations
C404.2	Able to undestand the purpose of planning and its tools
C404.3	Able to undestand the purpose of organisation and human resource department
C404.4	Able to understand motivational techniques and process of communication
C404.5	Able to undesand the management control and performance

Course Code:C405 Course Name:EI6704 Biomedical Instrumentation

C405.1	Ability to understand the fundamentals of biomedical engineering
C405.2	Ability to understand the procedures for diagnostic and measurement of non electrical parameters
C405.3	Ability to analyse the electrical parameters and acquisition
C405.4	Ability to understand the imaging modalities and analysis of digital images
C405.5	Ability to understand the robitics devices and life assisting surgical techniques

Course Code:C406 Course Name:EE6008 Microcontroller Based System Design

C406.1	Ability to understand the basics of PIC microcontroller
C406.2	Ability to understand the need of interrupts and timers
C406.3	Ability to understand the need of interfacing
C406.4	Ability to understand the basics of ARM processorr
C406.5	Ability to understand the ARM organisations and its applications

Course Code:C407 Course Name:EE6711 Power System Simulation Laboratory

C407.1	Ability to understand and analyze power system operation, stability, control and protection.

Course Code:C408 Course Name:EE6712 Comprehension

C408.1	Ability to review, prepare and present technological developments

Course Code:C409 Course Name:EE6801 Electric Energy Generation, Utilization and Conservation

C409.1	Ability to evaluate the performance of a traction unit and understand the main aspects of Traction.
C409.2	Ability to design of illumination for residential, commercial, street lighting, factory lighting and flood lighting
C409.3	Ability to identify an appropriate method of heating for any particular industrial application.
C409.4	Ability to understand solar radiation and solar energy collectors

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C409.5	Ability to gain the knowledge of wind energy

Course Code:C410 Course Name:EE6009 Power Electronics for Renewable Energy Systems

C410.1	Ability to understand the various renewable energy sources and its impacts on environment
C410.2	Ability to understand the electrical machines for enewable energy conversion
C410.3	Ability to understand the power converters for solar and wind
C410.4	Ability to analyse wind and solar PV systems
C410.5	Ability to understand the hybrid renewable energy systems

Course Code:C411 Course Name:GE6075 Professional Ethics in Engineering

C411.1	Ability to understand the human values and stress management
C411.2	Ability to understand the senses and uses of ethics
C411.3	Ability to understand the engineering as social experimentation
C411.4	Ability to understand the safety and Human rights
C411.5	Ability to understand the global issues in society

Course Code:C412 Course Name:EE6811 Project Work

C412.1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

Course Outcomes (CO)

(R 2017)

Branch: B.E, Electrical and Electronics Engineering

Course Code: C101 Course Name: HS8151 Communicative English

C101.1	Read articles of a general kind in magazines and newspapers.
C101.2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
C101.3	Comprehend conversations and short talks delivered in English.
C101.4	Write short essays of a general kind.
C101.5	Write personal letters and emails in English.

Course Code: C102 Course Name: MA8151 Engineering Mathematics-I

C102.1	Use both the limit definition and rules of differentiation to differentiate functions
C102.2	Apply differentiation to solve maxima and minima problems.
C102.3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus. Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts. Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.
C102.4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
C102.5	Apply various techniques in solving differential equations.

Course Code: C103 Course Name: PH8151 Engineering Physics

C103.1	The students will gain knowledge on the basics of properties of matter and its applications
C103.2	The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics

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C103.3	The students will have adequate knowledge on the concepts of thermal properties of the materials and their applications in expansion joints and heat exchangers.
C103.4	The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunnelling microscopes,
C103.5	The students will understand the basics of crystals their structures and different crystal growth techniques.

Course Code: C104 Course Name: CY8151 Engineering Chemistry

C104.1	To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
C104.2	To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
C104.3	Preparation, properties and applications of engineering materials.
C104.4	Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.
C104.5	Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.

Course Code: C105 Course Name: GE8151 Problem Solving and Python Programming

C105.1	Develop algorithmic solutions to simple computational problems
C105.2	Read, write, execute by hand simple Python programs.
C105.3	Structure simple Python programs for solving problems.
C105.4	Decompose a Python program into functions.
C105.5	Represent compound data using Python lists, tuples, dictionaries. Read and write data from/to files in Python Programs.

Course Code: C106 Course Name: GE8152 Engineering Graphics

C106.1	Ability to familiarize with the fundamentals and standards of Engineering graphics
C106.2	Ability to perform freehand sketching of basic geometrical constructions and multiple views of objects
C106.3	Ability to Project orthographic projections of lines and plane surfaces
C106.4	Ability to draw projections of solids and development of surfaces
C106.5	Ability to visualize and to project isometric and perspective sections of simple solids

Course Code: C107 Course Name: GE8161 Problem Solving and Python Programming Lab

C107.1	Write, test, and debug simple Python programs.
C107.2	Implement Python programs with conditionals and loops.
C107.3	Develop Python programs step-wise by defining functions and calling them.
C107.4	Use Python lists, tuples, dictionaries for representing compound data.
C107.5	Read and write data from/to files in Python.

Course Code: C108 Course Name: BS8161 Physics & Chemistry Lab

C108.1	To provide the basic practical exposure to all the engineering and technological streams in the field of physics with properties of matter and liquids.
C108.2	To provide the basic practical exposure to all the engineering and technological streams in the field of optics.
C108.3	The students are able to know about the thermal physics .
C108.4	To gain the knowledge about crystalline materials.
C108.5	To develop the knowledge of fiber optics cables optics and its applications

Course Code: C109 Course Name: HS8251 Technical English

C109.1	Read technical texts
C109.2	Write area- specific texts effortlessly.
C109.3	Listen lectures in their area of specialization.
C109.4	Comprehend talks in their area of specialisation

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C109.5	Speak appropriately and effectively in varied formal and informal contexts.

Course Code: C110 Course Name: MA 8251 Engineering Mathematics-II

C110.1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
C110.2	Gradient, divergence and curl of a vector point function and related identities.
C110.3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
C110.4	Analytic functions, conformal mapping and complex integration.
C110.5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

Course Code: C111 Course Name: PH8253 Physics for Electronics Engineering

C111.1	Gain knowledge on classical and quantum electron theories, and energy band structuues,
C111.2	Acquire knowledge on basics of semiconductor physics and its applications in various devices,
C111.3	Get knowledge on magnetic and dielectric properties of materials,
C111.4	Have the necessary understanding on the functioning of optical materials for optoelectronics,
C111.5	Understand the basics of quantum structures and their applications in spintronics and carbon electronics.

Course Code: C112 Course Name: BE8252 Basic Civil and Mechanical Engineering

C112.1	Explain the usage of construction material and proper selection of construction materials.
C112.2	Measure distances and area by surveying
C112.3	Identify the components used in power plant cycle.
C112.4	Demonstrate working principles of petrol and diesel engine.
C112.5	Elaborate the components of refrigeration and Air conditioning cycle.

Course Code: C113 Course Name: EE8251 Circuit Theory

C113.1	Ability to analyse electrical circuits
C113.2	To impart knowledge on solving circuits using network theorems
C113.3	Ability to analyse transients response of circuits
C113.4	Ability to analyse three phase circuits
C113.5	Understand the Resonance and Coupled circuits

Course Code: C114 Course Name: GE8291 Environmental Science and Engineering

C114.1	Public awareness of environment at infant stage.
C114.2	Pollution controlling aids
C114.3	Development and improvement in standard of living has lead to serious environmental disasters.
C114.4	Ignorance and incomplete knowledge has lead to misconceptions. Knowledge about water conservation methods.
C114.5	World's Population related problems and AIDS

Course Code: C115 Course Name: GE8261 Engineering Practices Laboratory

C115.1	Ability to Fabricate carpentry components and pipe connections including plumbing works
C115.2	Ability to Use welding equipments to join the structures
C115.3	Able to measure Electrical quantities like voltae,resisance,power,energy,current
C115.4	Able to carry out various Residenttial wiring
C115.5	Able to measure ripple factor of Rectifier

Course Code: C116 Course Name: EE8261 Electric Circuits Laboratory

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C116.1	Ability to Understand the concept of Kirchhoff's law
C116.2	Ability to Understand the concept of Cicuit theorems
C116.3	Able to measure sinusoidal voltage, frequency and power factor.
C116.4	Able to design resonance cicuits
C116.5	Abilitty to Understand the three phase balanced and unbalanced star, delta networks circuits.

Course Code: C201 Course Name: MA8353 Transforms and Partial Differential Equations

C201.1	Understand how to solve the given standard partial differential equations.
C201.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
C201.3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
C201.4	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
C201.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

Course Code: C202 Course Name: EE8351 Digital Logic Circuits

C202.1	Ability to study various number systems and digital logic families
C202.2	Ability to design combinational Circuits.
C202.3	Ability to design various synchronous circuits.
C202.4	Ability to introduce asynchronous sequential circuits and PLDs
C202.5	Ability to introduce digital simulation for development of application oriented logic circuits

Course Code: C203 Course Name: EE8391 Electromagnetic Theory

C203.1	Ability to understand the basic mathematical concepts related to electromagnetic vector fields
C203.2	Ability to understand the basic concepts about electrostatic fields, electrical potential, energy density and their applications.
C203.3	Ability to acquire the knowledge in magneto static fields, magnetic flux density, vector potential and its applications.
C203.4	Ability to understand the different methods of emf generation and Maxwell's equations
C203.5	Ability to understand the basic concepts electromagnetic waves and characterizing parameters

Course Code: C204 Course Name: EE8301 Electrical Machines - I

C204.1	Ability to analyze the magnetic-circuits.
C204.2	Ability to acquire the knowledge in constructional details of transformers.
C204.3	Ability to understand the concepts of electromechanical energy conversion.
C204.4	Ability to acquire the knowledge in working principles of DC Generator.
C204.5	Ability to acquire the knowledge in working principles of DC Motor

Course Code: C205 Course Name: EC8353 Electron Devices and Circuits

C205.1	Able to analyse the characteristics of PN junction devices and its applications
C205.2	Able to Explain the structure and working operation of transistors and thyristors
C205.3	Ability to choose and adapt the required components to construct an amplifier circuit
C205.4	Ability to cdesign and analysis of Multistage and differential amplifier circuits.
C205.5	Ability to employ the acquired knowledge in design and analysis of feedback amplifiers and oscillators

Course Code: C206 Course Name:ME8792 Power Plant Engineering

C206.1	Explain the layout, construction and working of the components inside a thermal power plant.
C206.2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.

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C206.3	Explain the layout, construction and working of the components inside nuclear power plants.
C206.4	Explain the layout, construction and working of the components inside Renewable energy power plants.
C206.5	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.

Course Code: C207 Course Name:EC8311 Electronics Laboratory

C207.1	Ability to understand the Characteristics of Semiconductor diode and Zener diode
C207.2	Ability to understand the Characteristics of BJT,JFET,UJT,
C207.3	Able to design Common Emitter amplifier,RC phase shift and LC oscillators
C207.4	Able to design Single Phase rectifiers with inductive and capacitive filters
C207.5	Ability to understand the frequency and phase measurements using CRO

Course Code: C208 Course Name: EE8311 Electrical Machines Laboratory - I

C208.1	Ability to understand and analyze DC Generator
C208.2	Ability to understand and analyze DC Motor
C208.3	Ability to understand and analyse Transformers.

Course Code: C209 Course Name: MA8491 Numerical Methods

C209.1	Understand the basic concepts and techniques of solving algebraic and transcendental equations.
C209.2	Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations.
C209.3	Apply the numerical techniques of differentiation and integration for engineering problems.
C209.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
C209.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

Course Code: C210 Course Name: EE8401 Electrical Machines - II

C210.1	Ability to understand the construction and working principle of Synchronous Generator
C210.2	Ability to acquire knowledge on Synchronous motor.
C210.3	Ability to understand the construction and working principle of Three phase Induction Motor
C210.4	Ability to understand the starting and speed control of Three phase Induction Motor
C210.5	Ability to understand the construction and working principle of Special Machines

Course Code: C211 Course Name: EE8402 Transmission and Distribution

C211.1	To understand the importance and the functioning of transmission line parameters.
C211.2	To acquire knowledge on the modeling and performance of Transmission lines.
C211.3	To acquire knowledge on the Mechanical design of over head Transmission lines.
C211.4	To acquire knowledge on Underground Cables
C211.5	To become familiar with the function of AC and DC distribbutions and trends in Transmission and Distribution

Course Code: C212 Course Name: EE8403 Measurements and Instrumentation

C212.1	To acquire knowledge on Basic functional elements of instrumentation
C212.2	To understand the concepts of Fundamentals of electrical and electronic instruments
C212.3	Ability to compare between various measurement techniques
C212.4	To acquire knowledge on Various storage and display devices
C212.5	To understand the concepts Various transducers and the data acquisition systems

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Course Code: C213 Course Name: EE8451 Linear Integrated Circuits and Applications

C213.1	Ability to acquire knowledge in IC fabrication procedure
C213.2	Ability to analyze the characteristics of Op-Amp
C213.3	To understand and acquire knowledge on the Applications of Op-amp
C213.4	Functional blocks and the applications of special ICs like Timers, PLL circuits, regulator Circuits.
C213.5	Ability to understand the Application of IC.

Course Code: C214 Course Name: IC8451 Control Systems

C214.1	Ability to develop various representations of system based on the knowledge of Mathematics, Science and Engineering fundamentals
C214.2	Ability to do time domain analysis of various models of linear system
C214.3	Ability to do frequency domain analysis of various models of linear system
C214.4	Ability to design appropriate compensator for the given specifications.
C214.5	Ability to understand the concept of state variables

Course Code: C215 Course Name: EE8411 Electrical Machines Laboratory - II

C215.1	Ability to understand and analyze EMF and MMF methods
C215.2	Ability to analyze the characteristics of V and Inverted V curves
C215.3	Ability to understand the importance of Synchronous machines
C215.4	Ability to understand the importance of Induction Machines
C215.5	Ability to acquire knowledge on separation of losses

Course Code: C216 Course Name: EE8461 Linear and Digital Integrated Circuits Laboratory

C216.1	Ability to understand and implement Boolean Functions.
C216.2	Ability to understand the importance of code conversion
C216.3	Ability to Design and implement 4-bit shift registers
C216.4	Ability to acquire knowledge on Application of Op-Amp
C216.5	Ability to Design and implement counters using specific counter IC.

Course Code: C217 Course Name: EE8412 Technical Seminar

C217.1	Ability to review, prepare and present technological developments
C217.2	Ability to face the placement interviews

Course Code: C301 Course Name: EE8501 Power System Analysis

C301.1	Ability to model and understand various power system components
C301.2	Ability to understand and apply iterative techniques for power flow analysis
C301.3	Ability to acquire knowledge on Symmetrical Fault analysis.
C301.4	Ability to acquire knowledge on UnSymmetricaFault analysis.
C301.5	Ability to understand and analyse stability

Course Code: C302 Course Name: EE8551 Microprocessors and Microcontrollers

C302.1	Ability to explain the architecture of Microprocessor and acquire knowledge on interrupts,memory and timing diagram
C302.2	Ability to acquire knowledge in Addressing modes & instruction set of 8085 and to write the assembly language programme.
C302.3	Ability to explain the architecture of Microcontroller.and acquire knowledge on interrupts,memory and timing diagram
C302.4	Ability to understand the importance of Interfacing

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C302.5	Ability to understand and develop the Microcontroller based applications.

Course Code: C303 Course Name: EE8552 Power Electronics

C303.1	Ability to understand the characteristics of semiconductor devices
C303.2	Ability to analyse phase controlled converters and its applications
C303.3	Ability to analyse DC - DC converters and its applications
C303.4	Ability to analyse Inverters and its applications
C303.5	Ability to analyse AC - AC converters and its applications

Course Code: C304 Course Name: EE8591 Digital Signal Processing

C304.1	Ability to understand the signals,systems and quantization effects.
C304.2	Ability to understand and analyze the discrete time systems.
C304.3	Ability to analyze the discrete fourier transform & their computation.
C304.4	Ability to understand the types of filters and their design for digital implementation
C304.5	Ability to acquire knowledge on programmability digital signal processors

Course Code: C305 Course Name: CS8392 Object Oriented Programming

C305.1	Ability to understand Java and OOP fundamentals
C305.2	Able to Develop Java programs with the concepts inheritance and interfaces
C305.3	Able to Build Java applications using exceptions and I/O streams
C305.4	Able to Develop Java applications with threads and generics classes
C305.5	Ability to Develop interactive Java programs using swings

Course Code: C306 Course Name: OMD551 Basics of Biomedical Instrumentation

C306.1	Able to Learn the different bio potential and its propagation.
C306.2	Able to get Familiarize the different electrode placement for various physiological recording
C306.3	Able to design bio amplifier for various physiological recording
C306.4	Able to understand various technique non electrical physiological measurements
C306.5	Able to Understand the different biochemical measurements

Course Code: C307 Course Name: EE8511 Control and Instrumentation Laboratory

C307.1	Ability to understand control theory and apply them to electrical engineering problems.
C307.2	Ability to analyze the various types of converters.
C307.3	Ability to design compensators
C307.4	Ability to understand the basic concepts of bridge networks.
C307.5	Ability to understand the basics of signal conditioning circuits and simulation packages.

Course Code: C308 Course Name: HS8581 Professional Communication

C308.1	Make effective presentations
C308.2	Participate confidently in Group Discussions.
C308.3	Attend job interviews and be successful in them.
C308.4	Develop adequate Soft Skills required for the workplace

Course Code: C309 Course Name: CS8383 Object Oriented Programming Laboratory

C309.1	Develop and implement Java programs for simple applications that make use of classes, packages and interfaces.
C309.2	Develop and implement Java programs with array list, exception handling and multi threading .

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C316.1	Ability to understand and apply computing platform and software for engineering problems.
C316.2	Ability to programming logics for code conversion.
C316.3	Ability to acquire knowledge on A/D and D/A.
C316.4	Ability to understand basics of serial communication.
C316.5	Ability to understand and impart knowledge in DC and AC motor interfacing and software simulators

Course Code: C317 Course Name: EE8611 Mini Project

C317.1	On Completion of the mini project work students will be in a position to take up their final year project work and find solution by formulating proper methodology.

Course Code: C401 Course Name:EE8701 High Voltage Engineering

C401.1	Ability to understand the over voltages in electrical power system
C401.2	Ability to understand the dielectric breakdown
C401.3	Ability to understand Generation of high voltages and high currents
C401.4	Ability to measure high voltages and high currents
C401.5	Ability to test power apparatus and insulation coordination

Course Code: C402 Course Name: EE8702 Power System Operation and Control

C402.1	Ability to understand the significance of power system operation and control.
C402.2	Ability to acquire knowledge on real power-frequency interaction.
C402.3	Ability to understand the reactive power-voltage interaction
C402.4	Ability to understand the economic operation of power systems
C402.5	Ability to design SCADA and its application for real time operation

Course Code: C403 Course Name: EE8703 Renewable Energy Systems

C403.1	Ability to explain and create awareness about the various renewable energy resources
C403.2	Ability to acquire knowledge about Wind energy
C403.3	Ability to acquire knowledge about solar PV and thermal systems
C403.4	Ability to understand basics about biomass energy.
C403.5	Ability to understand basics of tidal energy,wave energy,ocean thermal energy,fuel cells and hybrid energy systems

Course Code: C404 Course Name: OCS752 Introduction to C Programming

C404.1	Able to understand the structure of C program
C404.2	Able to develop applications using Arrays
C404.3	Able to develop applications using Strings
C404.4	Able to develop applications using Functions
C404.5	Able to develop applications using Structures

Course Code: C405 Course Name: MG8491 Operations Research

C405.1	Ability to understand the Linear models
C405.2	Ability to understand the Transportation and network models
C405.3	Ability to understand the Inventory models
C405.4	Ability to understand the Queueing models
C405.5	Ability to understand the Decision models

Course Code: C406 Course Name: GE8077 Total Quality Management

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C309.3	Design applications using file processing, generic programming and event handling.

Course Code: C310 Course Name: EE8601 Solid State Drives

C310.1	Ability to study about the steady state operation and transient dynamics of a motor load system
C310.2	Ability to analyze the operation of the converter/chopper fed dc drive.
C310.3	Ability to analyze the operation and performance of Induction motor drives
C310.4	Ability to analyze the operation and performance of Synchronous motor drives
C310.5	Ability to analyze and design the current and speed controllers for a closed loop solid state DC motor drive.

Course Code: C311 Course Name: EE8602 Protection and Switchgear

C311.1	Ability to find the causes of abnormal operating conditions of the apparatus and system.
C311.2	Ability to understand and analyze Electromagnetic Relays.
C311.3	Ability to study about the apparatus protection
C311.4	Ability to study about the static and numerical relays.
C311.5	Ability to acquire knowledge on functioning of circuit breakers

Course Code: C312 Course Name: EE8691 Embedded Systems

C312.1	Ability to understand and analyze Embedded systems
C312.2	Ability to study about the bus Communication in processors.
C312.3	Ability to operate various Embedded Development Strategies
C312.4	Ability to understand basics of Real time operating system.
C312.5	Ability to suggest an embedded system for a given application

Course Code: C313 Course Name: EE8002 Design of Electrical Apparatus

C313.1	Ability to design of field system for its application.
C313.2	Ability to design single and three phase transformer.
C313.3	Ability to design armature and field of DC machines.
C313.4	Ability to design stator and rotor of induction motor.
C313.5	Ability to design and analyze synchronous machines

Course Code: C314 Course Name: EE8005 Special Electrical Machines

C314.1	Ability to acquire the knowledge on construction,operation of stepper motor.
C314.2	Ability to construction,operation of switched reluctance motors and design of controllers
C314.3	Ability to acquire the knowledge on construction,operation of permanent magnet brushless D.C. motors and design of controllers
C314.4	Ability to acquire the knowledge on construction,operation of permanent magnet synchronous motors.and design of controllers
C314.5	Ability to acquire the knowledge on construction,operation of hysterisis motor,synchronous reluctance motor,linear induction motor,Repulsion motor and its applications

Course Code: C315 Course Name: EE8661 Power Electronics and Drives Laboratory

C315.1	Ability to practice and understand converter and inverter circuits and apply software for engineering problems.
C315.2	Ability to experiment about switching characteristics various switches.
C315.3	Ability to analyze about AC to DC converter circuits.
C315.4	Ability to analyze about DC to AC circuits.
C315.5	Ability to acquire knowledge on AC to AC converters and simulation software.

Course Code: C316 Course Name: EE8681 Microprocessors and Microcontrollers Laboratory

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C406.1	Ability to understand the basics of total quality management
C406.2	Ability to understand thePrinciples of total quality management
C406.3	Ability to understand the tools and techniques of total quality management
C406.4	Ability to understand the quality circles,cost of quality ,QFD and TPM
C406.5	Ability to understand the quality management system

Course Code: C407 Course Name: EE8711 Power System Simulation Laboratory

C407.1	Ability to understand power system planning and operational studies.
C407.2	Ability to acquire knowledge on Formation of Bus Admittance and Impedance Matrices and Solution of Networks.
C407.3	Ability to analyze the power flow using GS and NR method • Ability to find Symmetric and Unsymmetrical fault
C407.4	Ability to understand the economic dispatch.
C407.5	Ability to analyze the electromagnetic transients.

Course Code: C408 Course Name: EE8712 Renewable Energy Systems Laboratory

C408.1	Ability to understand and analyze Renewable energy systems.
C408.2	Ability to provide adequate inputs on a variety of issues in harnessing Renewable Energy.
C408.3	Ability to simulate the various Renewable energy sources.
C408.4	Ability to recognize current and possible future role of Renewable energy sources.
C408.5	Ability to understand basics of Intelligent Controllers

Course Code: C409 Course Name: EE8015 Electric Energy Generation, Utilization and Conservation

C409.1	Ability to design of illumination for residential, commercial, street lighting, factory lighting and flood lighting
C409.2	Ability to understand working of Refrigerator,Air conditioning and its types
C409.3	Ability to identify an appropriate method of heating for any particular industrial application.
C409.4	Ability to evaluate the performance of a traction unit.and understand the main aspects of Traction.
C409.5	Ability to evaluate domestic wiring connection and design a battery charging circuit for a specific household application.

Course Code: C410 Course Name: EE8016 Energy Management and Auditing

C410.1	Ability to understand the basics of Energy audit process.
C410.2	Ability to understand the basics of energy management by cogeneration
C410.3	Ability to acquire knowledge on Energy management in lighting systems
C410.4	Ability to understand the importance of Energy management on various electrical equipment and metering.
C410.5	Ability to acquire knowledge on HVAC.

Course Code: C411 Course Name: EE8811 Project Work

C411.1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology

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Course Outcomes (CO)

(R 2013)

M.E. POWER ELECTRONICS AND DRIVES

Course Code: C101 Course Name: MA7163 Applied Mathematics for Electrical Engineers

C101.1	Apply various methods in matrix theory to solve system of linear equations.
C101.2	Maximizing and minimizing the functional that occur in electrical engineering discipline.
C101.3	Computation of probability and moments, standard distributions of discrete and continuous random variables and functions of a random variable.
C101.4	Could develop a fundamental understanding of linear programming models, able to develop a linear programming model from problem description, apply the simplex method for solving linear programming problems.
C101.5	Fourier series analysis and its uses in representing the power signals.

Course Code: C102 Course Name: PX7101 Analysis of Electrical Machines

C102.1	Ability to understand the fundamentals of magnetic circuits, energy, force and torque of multi-excited systems.
C102.2	Ability to analyze the steady state and dynamic state operation of DC machine
C102.3	Ability to understand the different types of reference frame theories and transformation relationships.
C102.4	Ability to find the equivalent circuit parameters and modeling of three-phase induction machines
C102.5	Ability to find the equivalent circuit parameters and modeling of three-phase synchronous machines

Course Code: C103 Course Name: PX7102 Analysis of Power Converters

C103.1	Ability to design single phase AC - DC converter
C103.2	Able to acquire knowledge on inverter and effect of source impedance
C103.3	Ability to analyze and design DC -DC converters
C103.4	Ability to analyze and design AC voltage controllers
C103.5	Ability to analyze and design cyclo converters

Course Code: C104 Course Name: PX7103 Analysis and Design of Inverters

C104.1	Ability to design single phase inverters and understand the modes of operation of inverters
C104.2	Ability to design Three phase voltage source inverters and understand the modes of operation of inverters
C104.3	Ability to design Three phase current source inverters and understand the modes of operation of inverters
C104.4	Will acquire knowledge on multilevel inverters and modulation techniques
C104.5	Will acquire knowledge on resonant inverters and power conditioners

Course Code: C105 Course Name: PX7104 Advanced Power Semiconductor Devices

C105.1	Ability to understand the overview of power switching devices
C105.2	Ability to understand the characteristics of current controlled power semiconductor devices
C105.3	Ability to understand the characteristics of voltage controlled power semiconductor devices
C105.4	Ability to design of protection circuits
C105.5	Ability to design of thermal protection circuits for power switching devices

Course Code: C106 Course Name:CL7103 System Theory

C106.1	Ability to represent the time-invariant systems in state space form as well as analyze, whether the system is stabilizable, controllable, observable and detectable.
C106.2	Ability to solve linear and non linear equations
C106.3	Ability to classify singular points and construct phase trajectory using delta and isocline methods.

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C106.4	Ability to understand the stability analysis of systems using Lyapunov's theory
C106.5	Ability to design state feedback controller and state observers

Course Code: C107 Course Name: PX7201 Solid State DC Drives

C107.1	Ability to understand fundamentals of DC motors and mechanical systems
C107.2	Ability to analyze and design the AC - DC converter fed DC drive
C107.3	Ability to analyze and design the chopper fed DC drive
C107.4	Ability to analyze and design the speed controllers for a closed loop solid state DC motor drive.
C107.5	Ability to understand the implementation of control algorithms using microcontrollers and phase locked loop.

Course Code: C108 Course Name: PX7202 Solid State AC Drives

C108.1	Ability to understand various operating regions of the induction motor drives.
C108.2	Ability to study and analyze the operation of VSI & CSI fed induction motor control.
C108.3	Ability to understand the speed control of induction motor drive from the rotor side.
C108.4	Ability to understand the field oriented control of induction machine
C108.5	Ability to understand the control of synchronous motor drives.

Course Code: C109 Course Name: PX7203 Special Electrical Machines

C109.1	Ability to understand the characteristics and operation of permanent magnet brushless DC motors
C109.2	Ability to understand the characteristics and operation of permanent magnet synchrounous motors
C109.3	Ability to understand the characteristics and operation of switched reluctance motors
C109.4	Ability to understand the characteristics and operation of stepper motors
C109.5	Ability to understand the characteristics and operation of hysteresis motor,AC series motor,linear motor

Course Code: C110 Course Name: PX7204 Power Quality

C110.1	Ability to understand various power quality issues
C110.2	Ability to understand the concept of power and power factor in single phase and three phase systems supplying nonlinear loads.
C110.3	Ability to understand and design conventional load compensation techniques
C110.4	Ability to understand and design load compensation technique using Dstatcom
C110.5	Ability to understand the series compensation of power distribution system

Course Code: C111 Course Name: CL7204 Soft Computing Techniques

C111.1	Will be able to know the basic concepts of feed forward neural networks
C111.2	Will be able to know the basic ANN architectures and associative memory
C111.3	Will acquire knowledge about genetic algorithm
C111.4	Will be knowledgeable to use Fuzzy logic for modeling and control of non-linear systems.
C111.5	Will acquire knowledge about various application of Genetic algorithm and stallity analysis o fuzzy conrol systems

Course Code: C112 Course Name: PS7202 Flexible AC Transmission Systems

C112.1	Able to understand the need for FACTS controllers.
C112.2	Ability to design SVC compensator and understand operation of the compensator
C112.3	Ability to analyse TCSC and GCSC
C112.4	Ability to understand various voltage source converter based FACTS controllers
C112.5	Ability to analyze the interaction of different FACTS controller and perform control coordination

Course Code: C113 Course Name: PX7211 Power Electronics and Drives Lab

C113.1	Ability of the student to design and implement analog circuits for Power electronic control applications
C113.2	Ability to design and fabricate a power converter circuit at an reasonable power level.Exposure to PCB designing and fabrication
C113.3	Ability to simulate different types of machines, converters in a system.
C113.4	Analyze the performance of various electric drive systems.
C113.5	Ability to perform both hardware and software simulation.

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Course Code: C201 Course Name: PX7301 Power Electronics for Renewable Energy Systems

C201.1	Able to understand the characteristics of renewable energy sources and Analyze the impacts of renewable energy generation on environment.
C201.2	Ability to understand the principle of operation of electrical machines for renewable energy conversion
C201.3	Ability to design suitable power converters for wind and solar PV systems.
C201.4	Ality to understand the stand alone and grid connected renewable energy systems
C201.5	Able to understand the various Hybrid renewable energy systems

Course Code: C202 Course Name: PS7005 High Voltage Direct Current Transmission

C202.1	Able to understand the DC power transmission technology
C202.2	Able to understand the thyristor based HVDC converters and system control
C202.3	Able to understand the control and protection of multiterminal DC systems
C202.4	Able to perform steady state analysis of AC/DC systems
C202.5	Able to simulate various HVDC systems

Course Code: C203 Course Name: PS7004 Solar and Energy Storage Systems

C203.1	Will acquire knowledge on solar energy storage systems
C203.2	Ability to understand the standalone PV system
C203.3	Able to understand the grid connected PV systems and international PV programs
C203.4	Ability to understand the modeling of different energy storage systems and their performances
C203.5	Able to understand the various applications of solar energy

Course Code: C204 Course Name: PX7311 Project work (Phase I)

C204.1	Able to practice Project Management principles while developing a hardware.
C204.2	Able to take up any challenging practical problems
C204.3	Able to find solution by formulating proper methodology.

Course Code: C205 Course Name: PX7411 Project work (Phase II)

C205.1	Demonstrate a sound technical knowledge of their selected project topic
C205.2	Undertake problem identification, formulation and solution.
C205.3	Design engineering solutions to complex problems utilising a systems approach

Course Outcomes (CO)

(R 2017)

M.E. POWER ELECTRONICS AND DRIVES

Course Code: C101 Course Name: MA5155 Applied Mathematics for Electrical Engineers

C101.1	Apply various methods in matrix theory to solve system of linear equations.
C101.2	Maximizing and minimizing the functional that occur in electrical engineering discipline.
C101.3	Computation of probability and moments, standard distributions of discrete and continuous random variables and functions of a random variable.
C101.4	Could develop a fundamental understanding of linear programming models, able to develop a linear programming model from problem description, apply the simplex method for solving linear programming problems.
C101.5	Fourier series analysis and its uses in representing the power signals.

Course Code: C102 Course Name: PX5101 Power Semiconductor Devices

C102.1	Ability to understand the overview of power switching devices
C102.2	Ability to understand the characteristics of current controlled power semiconductor devices
C102.3	Ability to understand the characteristics of voltage controlled power semiconductor devices

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C102.4	Ability to design of protection circuits
C102.5	Ability to design of thermal protection circuits for power switching devices

Course Code: C103 Course Name: PX5151 Analysis of Electrical Machines

C103.1	Ability to understand the fundamentals of magnetic circuits, energy, force and torque of multi-excited systems.
C103.2	Ability to analyze the steady state and dynamic state operation of DC machine
C103.3	Ability to understand the different types of reference frame theories and transformation relationships.
C103.4	Ability to find the equivalent circuit parameters and modeling of three-phase induction machines
C103.5	Ability to find the equivalent circuit parameters and modeling of three-phase synchronous machines

Course Code: C104 Course Name: PX5152 Analysis and Design of Power Converters

C104.1	Ability to Analyze various single phase and three phase power converters
C104.2	Ability to understand the basic topologies of DC-DC switching regulators.
C104.3	Ability to design of power converter components.
C104.4	Ability to understand the knowledge about resonant converters.
C104.5	Design ac-ac converters for variable frequency applications.

Course Code: C105 Course Name: IN5152 System Theory

C105.1	Ability to represent the time-invariant systems in state space form as well as analyze, whether the system is stabilizable, controllable, observable and detectable.
C105.2	Ability to solve linear and non linear equations
C105.3	Ability to classify singular points and construct phase trajectory using delta and isocline methods.
C105.4	Ability to design state feedback controller and state observers
C105.5	Ability to understand the stability analysis of systems using Lyapunov's theory

Course Code: C106 Course Name: IN5091 Soft Computing Techniques

C106.1	Will be able to know the basic concepts of feed forward neural networks
C106.2	Will be able to know the basic ANN architectures and associative memory
C106.3	will acquire knowledge about genetic algorithm
C106.4	Will be knowledgeable to use Fuzzy logic for modeling and control of non-linear systems.
C106.5	Will be competent to use hybrid control schemes and P.S.O and support vector Regressive.

Course Code: C107 Course Name: PX5111Power Electronics Circuits Lab

C107.1	Comprehensive understanding on the switching behaviour of Power Electronic Switches
C107.2	Comprehensive understanding on mathematical modeling of power electronic system and ability to implement the same using simulation tools
C107.3	Ability of the student to use microcontroller and its associated IDE for power electronic applications
C107.4	Ability of the student to design and implement analog circuits for Power electronic control applications
C107.5	Ability to design and fabricate a power converter circuit at an reasonable power level.Exposure to PCB designing and fabrication

Course Code: C108 Course Name: PX5201 Analysis and Design of Inverters

C108.1	Ability to design single phase inverters and understand the modes of operation of inverters
C108.2	Ability to design Three phase voltage source inverters and understand the modes of operation of inverters
C108.3	Ability to design Three phase current source inverters and understand the modes of operation of inverters
C108.4	Will acquire knowledge on multilevel inverters and modulation techniques
C108.5	Will acquire knowledge on resonant inverters and power conditioners

Course Code: C109 Course Name: PX5202 Solid State Drives

C109.1	Will get expertise in rectifier control of DC drives
C109.2	Will get expertise in chopper control of DC drives
C109.3	Will acquire knowledge on the operation of VSI and CSI fed induction motor drives.
C109.4	Will get expertise in the field oriented control of induction motor drives.
C109.5	Will be able to formulate the control schemes for synchronous motor drives.

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Course Code: C110 Course Name: PX5251 Special Electrical Machines

C110.1	Ability to understand the characteristics and operation of permanent magnet brushless DC motors
C110.2	Ability to understand the characteristics and operation of permanent magnet synchrounous motors
C110.3	Ability to understand the characteristics and operation of switched reluctance motors
C110.4	Ability to understand the characteristics and operation of stepper motors
C110.5	Ability to understand the characteristics and operation of hysteresis motor,AC series motor,linear motor

Course Code: C111 Course Name: PX5252 Power Quality

C111.1	Ability to understand various power quality issues
C111.2	Ability to understand the concept of power and power factor in single phase and three phase systems supplying nonlinear loads.
C111.3	Ability to understand and design conventional load compensation techniques
C111.4	Ability to understand and design load compensation technique using Dstatcom
C111.5	Ability to understand the series compensation of power distribution system

Course Code: C112 Course Name: PX5003 Flexible AC Transmission Systems

C112.1	Able to understand the need for FACTS controllers.
C112.2	Ability to design SVC compensator and understand operation of the compensator
C112.3	Ability to analyse TCSC and GCSC
C112.4	Ability to understand various voltage source converter based FACTS controllers
C112.5	Ability to analyze the interaction of different FACTS controller and perform control coordination

Course Code: C113 Course Name: PS5071 Distributed Generation and Microgrid

C113.1	Will attain knowledge on the various schemes of conventional and nonconventional power generation.
C113.2	Will have knowledge on the topologies and energy sources of distributed generation.
C113.3	Will attain knowledge about the requirements for grid interconnection and its impact with NCE sources
C113.4	Will understand the fundamental concept of Microgrid.
C113.5	Will understand the control and operation of Microgrid.

Course Code: C114 Course Name: PX5211 Electrical Drives Laboratory

C114.1	Ability to simulate different types of machines, converters in a system.
C114.2	Analyze the performance of various electric drive systems.
C114.3	Ability to perform both hardware and software simulation.

Course Code: C115 Course Name: PX5212 Mini Project

C115.1	Acquire practical knowledge within the chosen area of technology for project development
C115.2	Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach
C115.3	Contribute as an individual or in a team in development of technical projects
C115.4	Develop effective communication skills for presentation of project related activities

Course Code: C201 Course Name: PX5005 High Voltage Direct Current Transmission

C201.1	Able to understand the DC power transmission technology
C201.2	Able to understand the thyristor based HVDC converters and system control
C201.3	Able to understand the control and protection of multiterminal DC systems
C201.4	Able to perform steady state analysis of AC/DC systems
C201.5	Able to simulate various HVDC systems

Course Code: C202 Course Name: PS5092 Solar and Energy Storage Systems

C202.1	Will acquire knowledge on solar energy storage systems
C202.2	Ability to understand the standalone PV system
C202.3	Able to understand the grid connected PV systems and international PV programs

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C202.4	Ability to understand the modeling of different energy storage systems and their performances
C202.5	Able to understand the various applications of solar energy

Course Code: C203 Course Name: PX5072 Power Electronics for Renewable Energy Systems

C203.1	Able to understand the characteristics of renewable energy sources and Analyze the impacts of renewable energy generation on environment.
C203.2	Ability to understand the principle of operation of electrical machines for renewable energy conversion
C203.3	Ability to design suitable power converters for solar PV systems.
C203.4	Ability to design suitable power converters for wind energy systems.
C203.5	Able to understand the various Hybrid renewable energy systems

Course Code: C204 Course Name:PX5311 Project Work Phase I

C204.1	Able to practice Project Management principles while developing a hardware.
C204.2	Able to take up any challenging practical problems
C204.3	Able to find solution by formulating proper methodology.

Course Code: C205 Course Name: PX5411 Project Work Phase II

C205.1	Demonstrate a sound technical knowledge of their selected project topic
C205.2	Undertake problem identification, formulation and solution.
C205.3	Design engineering solutions to complex problems utilising a systems approach

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Course Outcomes (CO)

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Branch: B.E, Electronics and communication engineering

Course Code: C102 Course Name: HS8151 Communicative English

C101.1	Read articles of a general kind in magazines and newspapers.
C101.2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
C101.3	Comprehend conversations and short talks delivered in English.
C101.4	Write short essays of a general kind.
C101.5	Write personal letters and emails in English.

Course Code: C102 Course Name: MA6151 Mathematics – I

C102.1	Use both the limit definition and rules of differentiation to differentiate functions
C102.2	Apply differentiation to solve maxima and minima problems.
C102.3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.
	Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.
	Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.
C102.4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
C102.5	Apply various techniques in solving differential equations.

Course Code: C103 Course Name: PH8151 Engineering Physics

C103.1	The students will gain knowledge on the basics of properties of matter and its applications
C103.2	The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics
C103.3	The students will have adequate knowledge on the concepts of thermal properties of the materials and their applications in expansion joints and heat exchangers.
C103.4	The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunnelling microscopes,
C103.5	The students will understand the basics of crystals their structures and different crystal growth techniques.

Course Code: C104 Course Name:CY8151 Engineering Chemistry

C104.1	To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
C104.2	To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significanc
C104.3	Preparation, properties and applications of engineering materials.
C104.4	Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.
C104.5	Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.

Course Code: C105 Course Name:GE8151 Problem Solving and Python Programming

C105.1	Develop algorithmic solutions to simple computational problems
C105.2	Read, write, execute by hand simple Python programs.
C105.3	Structure simple Python programs for solving problems.
C105.4	Decompose a Python program into functions.
C105.5	Represent compound data using Python lists, tuples, dictionaries. Read and write data from/to files in Python Programs.

Course Code: C106 Course Name: GE8152 Engineering Graphics

C106.1	Ability to familiarize with the fundamentals and standards of Engineering graphics
C106.2	Ability to perform freehand sketching of basic geometrical constructions and multiple views of objects
C106.3	Ability to Project orthographic projections of lines and plane surfaces
C106.4	Ability to draw projections of solids and development of surfaces
C106.5	Ability to visualize and to project isometric and perspective sections of simple solids

Course Code: C107 Course Name:GE8161 Problem Solving and Python Programming Lab

C107.1	Write, test, and debug simple Python programs.
C107.2	Implement Python programs with conditionals and loops.
C107.3	Develop Python programs step-wise by defining functions and calling them.
C107.4	Use Python lists, tuples, dictionaries for representing compound data.
C107.5	Read and write data from/to files in Python.

Course Code:C108 Course Name:BS8161 Physics & Chemistry Lab

C108.1	To provide the basic practical exposure to all the engineering and technological streams in the field of physics with properties of matter and liquids.
C108.2	To provide the basic practical exposure to all the engineering and technological streams in the field of optics.
C108.3	The students are able to know about the thermal physics .
C108.4	To gain the knowledge about crystalline materials.
C108.5	To develop the knowledge of fiber optics cables optics and its applications

Course Code:C109 Course Name:HS8251 Technical English

C109.1	Read technical texts
C109.2	Write area- specific texts effortlessly.
C109.3	Listen lectures in their area of specialization.
C109.4	Comprehend talks in their area of specialisation
C109.5	Speak appropriately and effectively in varied formal and informal contexts.

Course Code:C110 Course Name:MA 8251 Engineering Mathematics-II

C110.1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.

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C110.2	Gradient, divergence and curl of a vector point function and related identities.
C110.3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
C110.4	Analytic functions, conformal mapping and complex integration.
C110.5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficient

Course Code:C111 Course Name:PH8253PHYSICS FOR ELECTRONICS ENGINEERING

C111.1	Gain knowledge on classical and quantum electron theories, and energy band structures
C111.2	Acquire knowledge on basics of semiconductor physics and its applications in various devices,
C111.3	Get knowledge on magnetic and dielectric properties of materials,
C111.4	Have the necessary understanding on the functioning of optical materials for optoelectronics,
C111.5	Understand the basics of quantum structures and their applications in spintronics and carbon electronics.

Course Code:C112 Course Name:BE8254 BASIC ELECTRICAL AND INSTRUMENTATION ENGINEERING

C112.1	Understand the concept of three phase power circuits and measurement.
C112.2	Comprehend the concepts in electrical generators, motors and transformers
C112.3	Choose appropriate measuring instruments for given application

Course Code:C113 Course Name:EC8251 CIRCUIT ANALYSIS

C113.1	Develop the capacity to analyze electrical circuits, apply the circuit theorems in real time
C113.2	Design and understand and evaluate the AC and DC circuits.

Course Code:C114 Course Name:EC8252 ELECTRONIC DEVICES

C114.1	Explain the V-I characteristic of diode, UJT and SCR
C114.2	Describe the equivalence circuits of transistors
C114.3	Operatéthebasicelectronicdevices suchasPN junctiondiode, Bipolar and Field effectTransistors, Powercontrol devices,LED,LCDand other Opto-electronicdevices

Course Code: C115 Course Name: GE8261 Engineering Practices Laboratory

C115.1	Ability to Fabricate carpentry components and pipe connections including plumbing works
C115.2	Ability to Use welding equipments to join the structures
C115.3	Ability to Carry out the basic machining operations
C115.4	Ability to Make the models using sheet metal works
C115.5	Ability to Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings

Course Code:C202 Course Name:EC8261CIRCUITS AND DEVICES LABORATORY

C202.1	Analyze the characteristics of basic electronic devices
C202.2	Design RL and RC circuits
C202.3	Verify Thevenin& Norton theorem KVL & KCL, and Super Position Theorems

Course Code:C202 Course Name:MA8352 LINEAR ALGEBRA AND PARTIAL DIFFERENTIAL EQUATIONS

C202.1	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.
C202.2	Demonstrateaccurateandefficientuseofadvancedalgebraictechniques.
C202.3	Demonstrate their mastery by solving non - trivial problems related to the concepts and by proving simple theorems about the statements proven by the text.
C202.4	Able to solve various types of partial differential equations.
C202.5	Able to solve engineering problems using Fourier series.

Course Code: C203 Course Name:EC8393FUNDAMENTALS OF DATA STRUCTURES IN C

C203.1	Implement linear and non-linear data structure operations using C
C203.2	Suggest appropriate linear / non-linear data structure for any given data set.
C203.3	Apply hashing concepts for a given problem
C203.4	Modify or suggest new data structure for an application
C203.5	Appropriately choose the sorting algorithm for an application

Course Code:C204 Course Name:EC8351 ELECTRONIC CIRCUITS I

C204.1	Acquireknowledge ofWorkingprinciples,characteristicsandapplications ofBJTandFET
	Frequencyresponse characteristicsofBJTandFETamplifiers
C204.2	Analyzetheperformanceofsmallsignal BJTandFETamplifiers-singlestageand multi stage amplifiers
C204.3	Applytheknowledgegained in thedesign ofElectroniccircuits

Course Code: C206 Course Name: EC8352 SIGNALS AND SYSTEMS

C206.1	To be able to determine if a given system is linear/causal/stable
C206.2	Capable of determining the frequency components present in a deterministic signal
C206.3	Capable of characterizing LTI systems in the time domain and frequency domain
C206.4	To be able to compute the output of an LTI system in the time and frequency domains

Course Code:C207 Course Name:EC8392DIGITAL ELECTRONICS

C207.1	Usedigitalelectronics inthepresent contemporaryworld
C207.2	Design various combinational digital circuitsusing logicgates
C207.3	Dotheanalysisanddesignproceduresforsynchronousandasynchronoussequential circuit
C207.4	Use thesemiconductormemories andrelatedtechnology
C207.5	Use electroniccircuits involvedin thedesign oflogicgates

Course Code: C209 Course Name:EC8391CONTROL SYSTEMS ENGINEERING

C209.1	Identify thevarious control system componentsand their representations.
C209.2	Analyze thevarious timedomain parameters.
C209.3	Analysis thevariousfrequencyresponse plotsand its system.
C209.4	Applytheconceptsofvarious systemstabilitycriterions.

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C209.5	Design variousstransferfunctionsofdigital controlsystemsusingstatevariable models.

Course Code:C211 Course Name: EC8381FUNDAMENTALS OF DATA STRUCTURES IN C LABORATORY

C211.1	Writebasicandadvancedprograms in C
C211.2	Implementfunctionsandrecursivefunctions in C
C211.3	Implement datastructuresusingC
C211.4	Choose appropriate sorting algorithm for an application and implement it in a modularized way

Course Code: C212 Course Name: EC8361ANALOG AND DIGITAL CIRCUITS LABORATORY

C212.1	Design and Test rectifiers, filters and regulated power supplies.
C212.2	Design and Test BJT/JFET amplifiers.
C212.3	Differentiate cascode and cascade amplifiers.
C212.4	Analyze the limitation in bandwidth of single stage and multi stage amplifier
C212.5	Measure CMRR in differential amplifier
C212.6	Simulate and analyze amplifier circuits using PSpice.
C212.7	Design and Test the digital logic circuits.

Course Code: C213 Course Name:HS8381 INTERPERSONAL SKILLS/LISTENING&SPEAKING

C213.1	Listen and respond appropriately
C213.2	Participate in group discussions
C213.3	Make effective presentations
C213.4	Participate confidently and appropriately in conversations both formal and informal

Course Code: C214 Course Name: MA8451 PROBABILITY AND RANDOM PROCESSES

C214.1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
C214.2	Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.
C214.3	Apply the concept random processes in engineering disciplines
C214.4	Understand and apply the concept of correlation and spectral densities
C214.5	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 ana
	of random inputs to linear time invariant systems.

Course Code:C215 Course Name: EC8452ELECTRONIC CIRCUITS II -I

C215.1	Analyze different typesofamplifier, oscillator andmultivibratorcircuits
C215.2	Design BJT amplifierand oscillator circuits
C215.3	Analyze transistorizedamplifierandoscillator circuits
C215.4	Design andanalyze feedbackamplifiers
C215.5	Design LC and RC oscillators, tuned amplifiers, wave shaping circuits, multivibrators, power amplifier and DC convertors

Course Code:C216 Course Name: EC849 COMMUNICATION THEORY

C216.1	Design AM communication systems
C216.2	Design Angle modulated communication systems
C216.3	ApplytheconceptsofRandomProcesstothedesign ofCommunicationsystems
C216.4	Analyze themoise performance ofAMand FMsystems
C216.5	Gainknowledge insamplingandquantization

Course Code:C217 Course Name: EC8451 ELECTROMAGNETIC FIELDS

C217.1	Displayanunderstandingof fundamentalelectromagnetic lawsand concepts
C217.2	Write Maxwell's equations in integral, differential and phasor forms and explain their physical meaning
C217.3	Explain electromagnetic wave propagation in lossy and in lossless media
C217.4	Solve simple problems requiring estimation of electric and magnetic field quantities based on these concepts and laws

Course Code:C218 Course Name:EC8453LINEAR INTEGRATED CIRCUITS

C218.1	Design linear and non linear applications of OP – AMPS
C218.2	Design applications using analog multiplier and PLL
C218.3	Design ADC and DAC using OP – AMPS
C218.4	Generate waveforms using OP – AMP Circuits
C218.5	Analyze special function ICs

Course Code:C301 Course Name: GE8291 ENVIRONMENTAL SCIENCEAND ENGINEERING

C301.1	Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One wi
C301.2	Public awareness of environmental is at infant stage.
C301.3	Ignorance and incomplete knowledge has lead to misconceptions
C301.4	Development and improvement in std. of living has lead to serious environmental disasters
C301.5	Public awareness of environmental is at infant stage.

Course Code: C302 Course Name: EC8461 CIRCUITS DESIGN AND SIMULATION LABORATORY

C302.1	Analyzevarious typesof feedbackamplifiers
C302.2	Design oscillators, tunedamplifiers,wave-shapingcircuitsandmultivibrators
C302.3	Design andsimulatefeedback amplifiers, oscillators, tunedamplifiers, wave-shaping circuitsandmultivibratorsusingSPICETool.

Course Code:C303 Course Name:EC8462 LINEAR INTEGRATED CIRCUITS LABORATORY

C303.1	Design amplifiers, oscillators, D-A converters using operational amplifiers.
C303.2	Design filters using op-amp and performs an experiment on frequency response.
C303.3	Analyze the working of PLL and describe its application as a frequency multiplier.
C303.4	Design DC power supply using ICs.
C303.5	Analyze theperformance of filters, multivibrators, A/D converter and analog multiplier using SPICE.

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Course Code:C304 Course Name: EC8501DIGITAL COMMUNICATION

C304.1	Design PCMsystems
C304.2	Design andimplementbasebandtransmissionschemes
C304.3	Design andimplementband passsignalingschemes
C304.4	Analyze the spectral characteristics of band pass signaling schemes and their noise performance
C304.5	Design errorcontrolcodingschemes

Course Code:C306 Course Name: EC8553 DISCRETE-TIME SIGNAL PROCESSING

C306.1	Apply DFT for theanalysisofdigitalsignalsand systems
C306.2	DesignIIRand FIRfilters
C306.3	Characterize theeffectsoffiniteprecisionrepresentation ondigitalfilters
C306.4	Designmultiratefilters
C306.5	Applyadaptive filtersappropriately in communicationsystems

Course Code:C307 Course Name: EC8552 COMPUTER ARCHITECTURE AND ORGANIZATION

C307.1	Describe data representation, instruction formats and the operation of a digital computer
C307.2	Illustrate the fixed point and floating-point arithmetic for ALU operation
C307.3	Discuss about implementation schemes of control unit and pipeline performance
C307.4	Explain the concept of various memories, interfacing and organization of multiple processors
C307.5	Discuss parallel processing technique and unconventional architectures

Course Code:C308 Course Name: EC8551COMMUNICATION NETWORKS

C308.1	Identify thecomponentsrequiredto build different typesofnetworks
C308.2	Choosetherequiredfunctionalityateachlayer for givenapplication
C308.3	Identify solution for each functionality at each layer
C308.4	Trace the flow of information from one node to another node in the network
C308.5	Design a DSP system for various applications of DSP

Course Code: C309 Course Name: EC8562 DIGITAL SIGNAL PROCESSING LABORATORY

C309.1	Carryout basic signal processing operations
C309.2	Demonstrate their abilities towards MATLAB based implementation of various DSP
	Systems
C309.3	Analyze thearchitectureofaDSP Processor
C309.4	Design and Implement the FIR and IIR Filters in DSP Processor for performing filtering operation over real-time signals
C309.5	Design a DSP system for various applications of DSP

Course Code: C3010 Course Name: EC8561 COMMUNICATION SYSTEMS LABORATORY

C310.1	Simulate&validate the variousfunctionalmodules ofa communication system
C310.2	Demonstrate their knowledge in base band signaling schemes through implementationofdigitalmodulation schemes
C310.3	Apply various channel coding schemes &demonstrate their capabilities towards theimprovementof thenoiseperformance ofcommunicationsystem
	Simulateend-to-endcommunicationLink
C310.4	Simulateend-to-endcommunicationLink

Course Code:C311 Course Name: EC8563 COMMUNICATION NETWORKS LABORATORY

C311.1	Communicatebetween two desktopcomputers
C311.2	Implement thedifferent protocols
C311.3	Programusingsockets.
C311.4	Implement and comparethevariousroutingalgorithms
C311.5	Use thesimulationtool

Course Code: C312 Course Name: EC8691 MICROPROCESSORS AND MICROCONTROLLERS

C312.1	Understand and execute programs based on 8086 microprocessor.
C312.2	Design Memory Interfacing circuits.
C312.3	Design and interface I/O circuits.
C312.4	Design and implement 8051 microcontroller based systems.
C312.5	Understand and execute programs based on 8086 microprocessor.

Course Code: C313 Course Name:EC8095 VLSI DESIGN

C313.1	Realize the concepts of digital building blocks using MOS transistor.
C313.2	Design combinational MOS circuits and power strategies.
C313.3	Design and construct Sequential Circuits and Timing systems.
C313.4	Design arithmetic building blocks and memory subsystems.
C313.5	Apply and implement FPGA design flow and testing.
C313.6	Realize the concepts of digital building blocks using MOS transistor.

Course Code: C315 Course Name:EC8652 WIRELESS COMMUNICATION

C315.1	Characterize awirelesschannel and evolve thesystemdesignspecifications
C315.2	Design acellularsystembasedonresource availabilityand trafficdemands
C315.3	Characterize awirelesschannel and evolve thesystemdesignspecifications
C315.4	Design acellularsystembasedonresource availabilityand trafficdemands

Course Code: C316 Course Name: MG8591 PRINCIPLES OF MANAGEMENT

C316.1	Upon completionofthe course, studentswill beable to have clearunderstanding
C316.2	Managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management

Course Code: C317 Course Name: HS8581 Professional Communication

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C317.1	Make effective presentations
C317.2	Participate confidently in Group Discussions
C317.3	Attend job interviews and be successful in them
C317.4	Develop adequate Soft Skills required for the workplace

Course Code: C401 Course Name:EC8651TRANSMISSION LINESAND RF SYSTEMS

C401.1	Explain the characteristics of transmission lines and its losses
C401.2	Write about the standing wave ratio and input impedance in high frequency transmissionlines
C401.3	Analyze impedance matchingby stubsusingsmith charts
C401.4	Analyze thecharacteristicsof TE andTM waves
C401.5	Design a RFtransceiver system forwireless communication

Course Code:C402 Course Name:EC8681 MICROPROCESSORSAND MICROCONTROLLERS LABORATORY

C402.1	WriteALP Programmesfor fixedand FloatingPointandArithmeticoperations
C402.2	Interfacedifferent I/Oswith processor
C402.3	Generate waveformsusingMicroprocessors
C402.4	Execute Programsin8051
C402.5	Explain thedifferencebetween simulator and Emulator

Course Code: C403 Course Name: EC8661VLSIDESIGNLABORATORY

C403.1	WriteHDL codeforbasicas well as advanceddigital integratedcircuit
C403.2	Import thelogicmodulesintoFPGA Boards
C403.3	Synthesize Placeand Routethedigital IPs
C403.4	Design, Simulateand Extract thelayoutsofDigital &Analog IC BlocksusingEDA tools

Course Code: C407 Course Name: ME8791 Simulation and Analysis Lab

C407.1	Simulate simple problems in vibrations and simple mechanisms using simulation software.
C407.2	Perform analysis of stress, truss/beam and dynamic analysis of mechanical members.
C407.3	Perform two dimensional stress analysis in plate and asymmetric shells.
C407.4	Analyze the temperature distribution in one dimensional heat transfer problems (walls and fins).
C407.5	Analyze the temperature distribution in two dimensional heat transfer problems (plates and shell).

Course Code: C408 Course Name: EC8701 ANTENNAS AND MICROWAVE ENGINEERING

C408.1	Applythebasicprinciples and evaluate antennaparametersand linkpowerbudgets
C408.2	Design andassess theperformanceofvarious antennas
C408.3	Designamicrowave system given theapplicationspecifications

Course Code: C409 Course Name: EC8751OPTICAL COMMUNICATION

C409.1	Realize basic elements in optical fibers, different modes and configurations.
C409.2	Analyze the transmission characteristics associated with dispersion and polarization techniques.
C409.3	Design optical sources and detectors with their use in optical communication system.
C409.4	Construct fiber optic receiver systems, measurements and coupling techniques.
C409.5	Design optical communication systems and its networks.

Course Code: C410 Course Name:EC8791EMBEDDEDAND REALTIME SYSTEMS

C410.1	Describe thearchitectureand programmingofARMprocessor
C410.2	Outlinetheconceptsofembeddedsystems
C410.3	Explain thebasicconceptsof real time operatingsystemdesign
C410.4	Model real-timeapplications usingembedded-systemconcepts
C410.5	Describe thearchitectureand programmingofARMprocessor

Course Code: C411 Course Name:EC8702AD HOCAND WIRELESS SENSOR NETWORK

C411.1	Know the basics of Ad hoc networks and Wireless Sensor Networks
C411.2	Apply this knowledge to identify the suitable routing algorithm based on the network and user requirement
C411.3	Apply the knowledge to identify appropriate physical and MAC layer protocols
C411.4	Understand the transport layer and security issues possible in Ad hoc and sensor networks.
C411.5	Be familiar with the OS used in Wireless Sensor Networks and build basic modules

Course Code: C412 Course Name:EC8711EMBEDDEDLABORATORY

C412.1	Write programs in ARM for a specific Application
C412.2	Interfacememory,A/DandD/A convertorswith ARMsystem
C412.3	Analyze theperformanceofinterrupt
C412.4	Writeprogramforinterfacingkeyboard,display, motorandsensor.
C412.5	Formulateamini project usingembeddedsystem

Course Code: C413 Course Name:EC8761ADVANCED COMMUNICATION LABORATORY

C413.1	Analyze the performance of simple optical link by measurement of losses and Analyzing the mode characteristics of fiber
C413.2	Analyze the Eye Pattern, Pulse broadening of optical fiber and the impact on BER
C413.3	Estimate the Wireless Channel Characteristics and Analyze the performance of Wireless
	Communication System
C413.4	Understand the Intricacies in Microwave System design

Course Outcomes (CO)

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Branch: B.E, Electronics and communication engineering

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MA6351 Transforms And Partial Differential Equations (Odd)

C201.1	Able to understand the mathematical principles on transforms and partial differential equations
C201.2	Ability to apply partial differential equations in real time
C201.3	The ability to formulate and solve some of the physical problems of engineering.

EE 6352 Electrical Engineering and Instrumentation (Odd)

C202.1	Able to understand the three phase supply and power measurement.
C202.2	Able to understand the concepts in electrical generators, motors and transformers.
C202.3	Able to understand the basic measurement and instrumentation based devices.
C202.4	Able to understand the relevance of digital instruments in measurements.

EC 6301 Object Oriented Programming and Data Structures (Odd)

C203.1	Able to explain the concepts of Object oriented programming.
C203.2	Able to write simple applications using C++.
C203.3	Able to discuss the different methods of organizing large amount of data.

EC 6302 Digital Electronics (Odd)

C204.1	Able to analyze different methods used for simplification of Boolean expressions.
C204.2	Able to design and implement Combinational circuits.
C204.3	Able to design and implement synchronous and asynchronous sequential circuits.
C204.4	Able to write simple HDL codes for the circuits.

EC 6303 Signals And Systems (Odd)

C205.1	Able to analyze the properties of signals & systems.
C205.2	Able to apply Laplace transform, Fourier transform, Z transform and DFFT in signal analysis.
C205.3	Able to analyze continuous time LTI systems using Fourier and Laplace Transforms.
C205.4	Able to analyze discrete time LTI systems using Z transform and DTFT.

EC 6304 Electronic Circuits I (Odd)

C206.1	Able to design circuits with transistor biasing.
C206.2	Able to design simple amplifier circuits.
C206.3	Able to analyze the small signal equivalent circuits of transistors.
C206.4	Able to design and analyze large signal amplifiers.

EC 6311 Analog and Digital Circuits Laboratory (Odd)

C207.1	Able to differentiate cascade and cascade amplifier.
C207.2	Able to analyze the limitation in bandwidth of single stage and multi stage amplifier
C207.3	Able to simulate amplifiers using Spice
C207.4	Able to measure CMRR in differential amplifier

EC 6312 OOPS and Data Structures Laboratory (Odd)

C208.1	Able to design and implement C++ programs for manipulating stacks, queues, linked lists, trees, and graphs.
C208.2	Able to apply good programming design methods for program development.
C208.3	Able to apply the different data structures for implementing solutions to practical problems.

MA6451 Probability And Random Processes (Even)

C209.1	The students will have an exposure of various distribution functions and help in acquiring skills in handling situations involving more than one variable.
C209.2	The students will have an exposure to the basic concepts in probability and random processes for applications such as random signals, linear systems etc in communication engineering.
C209.3	Able to analyze the response of random inputs to linear time invariant systems.

EC 6401 Electronic Circuits II (Even)

C210.1	Able to design and analyze feedback amplifiers.
C210.2	Able to design LC and RC oscillators, tuned amplifiers, wave shaping circuits, multivibrators, blocking oscillators and time base generators.
C210.3	Able to analyze performance of tuned amplifiers.

EC 6402 Communication Theory (Even)

C211.1	Able to design AM communication systems.
C211.2	Able to design Angle modulated communication systems
C211.3	Able to apply the concepts of Random Process to the design of Communication systems.
C211.4	Able to analyze the noise performance of AM and FM systems.

EC 6403 Electromagnetic Fields (Even)

C212.1	Able to analyze field potentials due to static changes and static magnetic fields.
C212.2	Able to explain how materials affect electric and magnetic fields.
C212.3	Able to analyze the relation between the fields under time varying situations.
C212.4	Able to discuss the principles of propagation of uniform plane waves.

EC 6404 Linear Integrated Circuits (Even)

C213.1	Able to design linear and non linear applications of op – amps.
C213.2	Able to design applications using analog multiplier and PLL.
C213.3	Able to design ADC and DAC using op – amps.
C213.4	Able to generate waveforms using op – amp circuits.
C213.5	Able to analyze special function ICs.

EC 6405 Control Systems (Even)

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C214.1	Able to perform time domain and frequency domain analysis of control systems required for stability analysis.
C214.2	Able to design the compensation technique that can be used to stabilize
	control systems.
C214.3	The students will have an exposure to state variable analysis.

EC 6411 Circuits and Simulation Integrated Laboratory (Even)

C215.1	Able to analyse the characteristics of rectifiers
C215.2	Able to simulate amplifiers using Spice
C215.3	Able to design Bias Circuit for BJT
C215.4	Able to differentiate Class A and Class B Amplifiers

EC 6412 Linear Integrated Circuits Laboratory (Even)

C216.1	Able to design oscillators and amplifiers using operational amplifiers.
C216.2	Able to design filters using Opamp and perform experiment on frequency response.
C216.3	Able to analyse the working of PLL and use PLL as frequency multiplier.
C216.4	Able to design DC power supply using ICs.
C216.5	Able to analyse the performance of oscillators and multivibrators using SPICE

EE 6461 Electrical Engineering and Control System Laboratory (Even)

C217.1	Able to perform experiments to study the load characteristics of DC motors / generators.
C217.2	Able to design bridge network circuit to measure the values of passive component.
C217.3	Able to analyse the stability of linear system through simulation software.
C217.4	Able to obtain transfer function of DC generators.

EC 6501 Digital Communication (Odd)

C301.1	Able to design PCM systems.
C301.2	Able to design and implement base band transmission schemes.
C301.3	Able to design and implement band pass signaling schemes.
C301.4	Able to analyze the spectral characteristics of band pass signaling schemes and their noise performance.
C301.5	Able to design error control coding schemes .

EC 6502 Principles of Digital Signal Processing (Odd)

C302.1	Able to apply DFT for the analysis of digital signals & systems.
C302.2	Able to design IIR and FIR filters.
C302.3	Able to characterize finite Word length effect on filters.
C302.4	Able to design the Multirate Filters.
C302.5	Able to apply Adaptive Filters to equalization.

EC 6503 Transmission Lines And Waveguides (Odd)

C303.1	Able to discuss the propagation of signals through transmission lines.
C303.2	Able to analyze signal propagation at Radio frequencies.
C303.3	Able to explain radio propagation in guided systems.
C303.4	Able to utilize cavity resonators.

GE 6351 Environmental Science And Engineering (Odd)

C304.1	Obtain knowledge regarding public awareness of environment at infant stage.
C304.2	Insist that the public participation is an important aspect which serves the environmental Protection.
C304.3	Ability to understand that the development and improvement in standard of living has lead to serious environmental disasters.

EC 6504 Microprocessor And Microcontroller (Odd)

C305.1	Able to design and implement programs on 8086 microprocessor.
C305.2	Able to design I/O circuits.
C305.3	Able to design Memory Interfacing circuits.
C305.4	Able to design and implement 8051 microcontroller based systems.

EC 6511 Digital Signal Processing Laboratory (Odd)

C306.1	Able to carry out simulation of DSP systems.
C306.2	Able to demonstrate their abilities towards DSP processor based implementation of DSP systems.
C306.3	Able to analyze Finite word length effect on DSP systems.
C306.4	Able to demonstrate the applications of FFT to DSP.
C306.5	Able to implement adaptive filters for various applications of DSP.

EC 6512 Communication Systems Laboratory (Odd)

C307.1	Able to simulate end-to-end Communication Link
C307.2	Able to demonstrate their knowledge in base band signaling schemes through implementation of FSK, PSK and DPSK
C307.3	Able to apply various channel coding schemes & demonstrate their capabilities towards the improvement of the noise performance of communication system
C307.4	Able to simulate & validate the various functional modules of a communication system .

EC 6513 Microprocessor and Microcontroller Laboratory (Odd)

C308.1	Able to write ALP programs for fixed and Floating Point and Arithmetic
C308.2	Able to interface different I/Os with processor
C308.3	Able to generate waveforms using Microprocessors .
C308.4	Able to execute Programs in 8051
C308.5	Able to explain the difference between simulator and Emulator

MG 6851 Principles Of Management (Even)

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C309.1	Able to understand managerial functions like planning, organizing, staffing.
C309.2	Able to direct a group and control the group.
C309.3	The students are exposed to the basic knowledge on international aspect of management

CS6303 Computer Architecture (Even)

C310.1	Able to design arithmetic and logic unit.
C310.2	Able to design and analyze pipelined control units.
C310.3	Able to evaluate performance of memory systems.
C310.4	Able to understand parallel processing architectures.

CS6551 Computer Networks (Even)

C311.1	Able to identify the components required to build different types of networks.
C311.2	Able to choose the required functionality at each layer for given application.
C311.3	Able to identify solution for each functionality at each layer.
C311.4	Able to trace the flow of information from one node to another node in the network.

EC 6601 VLSI Design (Even)

C312.1	Able to explain the basic CMOS circuits and the CMOS process technology.
C312.2	Able to discuss the techniques of chip design using programmable devices.
C312.3	Able to model the digital system using Hardware Description Language.

EC 6602 Antennas And Wave Propagation (Even)

C313.1	Able to explain the various types of antennas and wave propagation.
C313.2	Able to explain about the radiation from a current element.
C313.3	Able to analyze the antenna arrays, aperture antennas and special antennas such as frequency independent and broad band.

EC 6001 Medical Electronics (Even)

C314.1	Able to discuss the application of electronics in diagnostic and therapeutic area.
C314.2	Able to measure biochemical and various physiological information.
C314.3	Able to describe the working of units which will help to restore normal functioning.

EC 6003 Robotics and Automation (Even)

C315.1	Able to explain the basic concepts of working of robot.
C315.2	Able to analyze the function of sensors in the robot.
C315.3	Able to write program to use a robot for a typical application.
C315.4	Able to use Robots in different applications.

EC 6611 Computer Networks Laboratory (Even)

C316.1	Able to communicate between two desktop computers .
C316.2	Able to implement the different protocols
C316.3	Able to program using sockets.
C316.4	Able to implement and compare the various routing algorithms
C316.5	Able to use simulation tool.

EC 6612 VLSI Design Laboratory (Even)

C317.1	Able to write HDL code for basic as well as advanced digital integrated circuits.
C317.2	Able to import the logic modules into FPGA Boards.
C317.3	Able to synthesize, Place and Route the digital IPs.
C317.4	Able to design, Simulate and Extract the layouts of Analog IC Blocks using EDA tools.

GE 6674 Communication and Soft skills Laboratory (Even)

C318.1	Able to take international examination such as IELTS and TOEFL
C318.2	Able to make presentations and Participate in Group Discussions.
C318.3	Able to successfully answer questions in interviews.

EC 6701 RF and Microwave Engineering (Odd)

C401.1	Able to explain the active & passive microwave devices & components used in Microwave communication systems.
C401.2	Able to analyze the multi- port RF networks and RF transistor amplifiers.
C401.3	Able to generate Microwave signals and design microwave amplifiers.
C401.4	Able to measure and analyze Microwave signal and parameters.

EC 6702 Optical Communication and Networks (Odd)

C402.1	Able to discuss the various optical fiber modes, configurations and various signal degradation factors associated with optical fiber.
C402.2	Able to explain the various optical sources and optical detectors and their use in the optical communication system.
C402.3	Able to analyze the digital transmission and its associated parameters on system performance.

EC 6703 Embedded and Real Time Systems (Odd)

C403.1	Able to describe the architecture and programming of ARM processor.
C403.2	Able to explain the concepts of embedded systems.
C403.3	Able to explain the basic concepts of real time Operating system design.
C403.4	Able to use the system design techniques to develop software for embedded systems.
C403.5	Able to differentiate between the general purpose operating system and the real time operating system.
C403.6	Able to design model real-time applications using embedded-system concepts.

EC 6004 Satellite Communication (Odd)

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C404.1	Able to analyze the satellite orbits.
C404.2	Able to analyze the earth segment and space segment.
C404.3	Able to design various satellite applications

EC 6011 Electromagnetic Interference and Compatibility (Odd)

C405.1	Find solution to EMI Sources, EMI problems in PCB level / Subsystem and system level design.
C405.2	Gains knowledge on the EMI coupling mechanism and its mitigation techniques.
C405.3	To measure emission immunity level from different systems to couple with the prescribed EMC standards

EC 6014 Cognitive Radio (Odd)

C406.1	Able to describe the basics of the software defined radios.
C406.2	Able to design the wireless networks based on the cognitive radios
C406.3	Able to explain the concepts behind the wireless networks and next generation networks

EC 6711 Embedded Laboratory (Odd)

C407.1	Able to write programs in ARM for a specific Application
C407.2	Able to interface memory and Write programs related to memory operations
C407.3	Able to interface A/D and D/A convertors with ARM system
C407.4	Able to analyse the performance of interrupt
C407.5	Able to write programmes for interfacing keyboard, display, motor and sensor.
C407.6	Able to formulate a mini project using embedded system

EC 6712 Optical and Microwave Laboratory (Odd)

C408.1	Able to analyze the performance of simple optical link.
C408.2	Able to test microwave and optical components.
C408.3	Able to analyse the mode characteristics of fiber
C408.4	Able to analyse the radiation of pattern of antenna.

EC 6801 Wireless Communication (Even)

C409.1	Able to characterize wireless channels.
C409.2	Able to design and implement various signaling schemes for fading channels.
C409.3	Able to compare multipath mitigation techniques and analyze their performance.
C409.4	Able to design and implement systems with transmit/receive diversity and MIMO systems and analyze their performance

EC 6802 Wireless Networks (Even)

C410.1	Conversant with the latest 3G/4G and WIMAX networks and its architecture.
C410.2	Able to design and implement wireless network environment for any application using latest wireless protocols and standards.
C410.3	Able to implement different type of applications for smart phones and mobile devices with latest network strategies.

GE 6075 Professional Ethics in Engineering (Even)

C411.1	Able to apply ethics in the society
C411.2	Helps to discuss the ethical issues related to engineering
C411.3	Realize the responsibility & rights in the society.

GE 6757 Total Quality Management (Even)

C412.1	To understand the quality management principles and process.
C412.2	Able to apply the tools and techniques of quality management
C412.3	Able to apply the tools and techniques to manufacturing & services processes.

EC 6811 Project Work (Even)

C413.1	Able to practice Project Management principles while developing a hardware.
C413.2	Able to take up any challenging practical problems
C413.3	Able to find solution by formulating proper methodology.

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Course Outcomes (CO)

(R 2017)

Branch: M.E,Communication Systems

Course Code: C101 Course Name: MA5154 Applied Mathematics for Communication Engineers

C101.1	To achieve an understanding of the basic concepts of algebraic equations and method of solving them.
C101.2	To familiarize the students with special functions and solve problems associated with engineering applications.
C101.3	Concepts on vector spaces, linear transformation, inner product spaces, eigen values and generalized eigenvectors.
C101.4	Apply various methods in linear algebra to solve system of linear equations
C101.5	Could develop a fundamental understanding of linear programming models, able to develop a linear programming n Problems

Course Code: C102 Course Name: CU5191 Advanced Radiation Systems

C102.1	Ability to understand antenna concepts
C102.2	Ability to design antenna for various applications
C102.3	Knowledge of modern antenna design

Course Code: C103 Course Name: CU5151 Advanced Digital Communication Techniques

C103.1	Develop the ability to understand the concepts of signal space analysis for coherent and non coherent receivers
C103.2	Conceptually appreciate different Equalization techniques
C103.3	Possess knowledge on different block codes and convolutional codes
C103.4	Comprehend the generation of OFDM signals and the techniques of multiuser detection.

Course Code: C104 Course Name:AP5152 Advanced Digital Signal Processing

C104.1	State Parseval"s theorem, WK theorem, principle of orthogonality, spectral factorization theorem, Widrow Hoff LM
C104.2	Explain various noise types, Yule-Walker algorithm, parametric and non-parametric methods, Wiener and Kalman filtering, LMS and RMS algorithms, Levinson Durbin algorithm, adaptive noise cancellation a
C104.3	Calculate mean, variance, auto-correlation and PSD for WSS stochastic processes, and derive prediction error criteri equations.
C104.4	Design AR, MA, ARMA models, Weiner filter, anti aliasing and anti imaging filters, and develop FIR adaptive filter and polyphase filter structures.
C104.5	Simulate spectral estimation algorithms and basic models on computing platform.

Course Code: C105 Course Name:CU5192 Optical Networks

C105.1	Design and Analyze Network Components
C105.2	Assess and Evaluate optical networks

Course Code: C106 Course Name: CU5092 Real Time Embedded Systems

C106.1	Explain different protocols
C106.2	Discuss state machine and design process models

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C106.3	Outline embedded software developmemt tools and RTOS

Course Code: C107 Course Name:CU5161 Communication Systems Laboratory

C107.1	Measure and analyze various transmission line parameters.
C107.2	Design Microstrip patch antennas.
C107.3	Implement the adaptive filtering algorithms
C107.4	To generate and detect digital communication signals of various modulation techniques using MATLAB.
C107.5	Evaluate cellular mobile communication technology and propagation model.

Course Code:C201 Course Name:CU5291 Advanced Wireless Communication Systems

C202.1	Analyze MIMO system
C202.2	Discuss millimeter wave communication
C202.3	Demonstrate software defined radio and cognitive radio

Course Code:C202 Course Name:CU5201 MIC and RF System Design

C202.1	Capability to design RF circuits
C202.2	To be able to analyze RF circuits

Course Code: C203 Course Name:CU5292 Electromagnetic Interference and Compatibility

C203.1	Identify Standards
C203.2	CompareEMI test methods
C203.3	Discuss EMImitigation techniques

Course Code:C204 Course Name:NC5251 Cc

C204.1	Compare MAC and network layer design for cognitive radio
C204.2	Discuss cognitive radio for Internet of Things and M2M technologies

Course Code: C206 Course Name: DS5291 Advanced Digital Image Processing

C206.1	Explain the fundamentals digital image processing.
C206.2	Describe image various segmentation and feature extraction techniques for image analysis.
C206.3	Discuss the concepts of image registration and fusion.
C206.4	Explain 3D image visualization.

Course Code:C207 Course Name:CU5094 Software Design Radio

C207.1	Appreciate the motivation and the necessity for cognitive radio communication strategies
C207.2	Appreciate new techniques and demonstrate their feasibility using mathematical validations and simulation
C207.3	Demonstrate the impact of the evolved solutions in future wireless network design

Course Code: C209 Course Name:CU5211 RF system design laboratory

C209.1	Utilize ARM and FPGA
C209.2	Demonstrate design of ALU in FPGA using VHDL and Verilog
C209.3	Assess flash controller programming data flash with erase, verify and fusing
C209.4	Explain design, simulation and analysis of signal integrity

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Course Code:C301 Course Name: CU5301 Millimeter Wave Communication

C301.1	Understand the basic concepts of millimeter wave devices and circuits
C301.2	Analyze the millimeter wave devices for various applications
C301.3	Design antenna for millimeter wave frequencies
C301.4	Assess knowledge of millimeter wave technology

Course Code:C302 Course Name: CP5292 IoT

C302.1	Able to understand the application areas of IoT
C302.2	Able to realize the revolution of internet in mobile devices, Cloud & Sensor netorks
C302.3	Able to understand building blocks of Internet of Things and characteristics.

Course Code:C303 Course Name: NE5071 Network Management

C303.1	Examine the need of security for the given network scenario
C303.2	Criticize the preventive measures to secure routing and switching
C303.3	Infer the design of firewall, VPN and IDS / IPS for the given network

Course Code:C304 Course Name: CU5311 Project Work I

C304.1	Able to practice Project Management principles while developing a hardware.
C304.2	Able to take up any challenging practical problems
C304.3	Able to find solution by formulating proper methodology.

Course Code:C401 Course Name: CU5411 Project Work II

C401.1	Demonstrate a sound technical knowledge of their selected project topic
C401.2	Undertake problem identification, formulation and solution.
C401.3	Design engineering solutions to complex problems utilising a systems approach

Course Outcomes (CO)

(R 2013)

Branch: M.E,Communication Systems

Course Code: C101 Course Name: MA7158 Applied Mathematics for Communication Engineers

C101.1	To achieve an understanding of the basic concepts of algebraic equations and method of solving them.
C101.2	To familiarize the students with special functions and solve problems associated with engineering applications.
C101.3	Concepts on vector spaces, linear transformation, inner product spaces, eigen values and generalized eigenvectors.
C101.4	Apply various methods in linear algebra to solve system of linear equations
C101.5	Could develop a fundamental understanding of linear programming models, able to develop a linear programming n Problems

Course Code: C102 Course Name: CU7101 Advanced Radiation Systems

C102.1	Ability to understand antenna concepts
C102.2	Ability to design antenna for various applications
C102.3	Knowledge of modern antenna design

Course Code: C103 Course Name: CU7102 Advanced Digital Communication Techniques

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C103.1	Develop the ability to understand the concepts of signal-space analysis for coherent and non coherent receivers
C103.2	Conceptually appreciate different Equalization techniques
C103.3	Possess knowledge on different block codes and convolutional codes
C103.4	Comprehend the generation of OFDM signals and the techniques of multiuser detection.

Course Code: C104 Course Name:AP7101 Advanced Digital Signal Processing

C104.1	State Parseval"s theorem, WK theorem, principle of orthogonality, spectral factorization theorem, Widrow Hoff LM
C104.2	Explain various noise types, Yule-Walker algorithm, parametric and non-parametric methods, Wiener and Kalman filtering, LMS and RMS algorithms, Levinson Durbin algorithm, adaptive noise cancellation a
C104.3	Calculate mean, variance, auto-correlation and PSD for WSS stochastic processes, and derive prediction error criter equations.
C104.4	Design AR, MA, ARMA models, Weiner filter, anti aliasing and anti imaging filters, and develop FIR adaptive filter and polyphase filter structures.
C104.5	Simulate spectral estimation algorithms and basic models on computing platform.

Course Code: C105 Course Name:CU7103 Optical Networks

C105.1	Design and Analyze Network Components
C105.2	Assess and Evaluate optical networks

Course Code: C106 Course Name: CU7001 Real Time Embedded Systems

C106.1	Explain different protocols
C106.2	Discuss state machine and design process models
C106.3	Outline embedded software developmemt tools and RTOS

Course Code: C107 Course Name:CU7111 Communication Systems Laboratory

C107.1	Measure and analyze various transmission line parameters.
C107.2	Design Microstrip patch antennas.
C107.3	Implement the adaptive filtering algorithms
C107.4	To generate and detect digital communication signals of various modulation techniques using MATLAB.
C107.5	Evaluate cellular mobile communication technology and propagation model.

Course Code:C201 Course Name:CU7201 Wireless Communication Networks

C202.1	Analyze MIMO system
C202.2	Discuss millimeter wave communication
C202.3	Demonstrate software defined radio and cognitive radio

Course Code:C202 Course Name:CU7202 MIC and RF System Design

C202.1	Capability to design RF circuits
C202.2	To be able to analyze RF circuits

Course Code: C203 Course Name:AP7301 Electromagnetic Interference and Compatibility

C203.1	Identify Standards

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C203.2	CompareEMI test methods
C203.3	Discuss EMImitigation techniques

Course Code:C204 Course Name:CU7005 Cc

C204.1	Compare MAC and network layer design for cognitive radio
C204.2	Discuss cognitive radio for Internet of Things and M2M technologies

Course Code: C206 Course Name: DS7201 Advanced Digital Image Processing

C206.1	Explain the fundamentals digital image processing.
C206.2	Describe image various segmentation and feature extraction techniques for image analysis.
C206.3	Discuss the concepts of image registration and fusion.
C206.4	Explain 3D image visualization.

Course Code:C207 Course Name:NC7101 High Performance Networks

C207.1	Discuss advanced network concepts
C207.2	Outline traffic modeling
C207.3	Evaluate network security

Course Code: C209 Course Name:CU7211 Innovative system design laboratory

C209.1	Utilize ARM and FPGA
C209.2	Demonstrate design of ALU in FPGA using VHDL and Verilog
C209.3	Assess flash controller programming data flash with erase, verify and fusing
C209.4	Explain design, simulation and analysis of signal integrity

Course Code:C301 Course Name: CU7301 Advanced satellite based systems

C301.1	Navigation, Tracking and safety systems
C301.2	Inertial navigation and differential GPS systems
C301.3	Remote sensing systems and techniques
C301.4	Broadcast systems

Course Code:C302 Course Name: NC7202 Wireless ADHOC and Sensor networks

C302.1	Identify different issues in wireless adhoc and sensor networks
C302.2	To analyze protocols developed for adhoc and sensor networks
C302.3	To identify nd address the security threats in ad hoc and sensor networks

Course Code:C303 Course Name: NC7201 Communication network security

C303.1	Classify the symmetric encryption techniques
C303.2	illustrate various public key cryptographic techniques
C303.3	Discuss authentication applications

Course Code:C304 Course Name: CU7311 Project Work I

C304.1	Able to practice Project Management principles while developing a hardware.
C304.2	Able to take up any challenging practical problems
C304.3	Able to find solution by formulating proper methodology.

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Course Code:C401 Course Name: CU7411 Project Work II

C401.1	Demonstrate a sound technical knowledge of their selected project topic
C401.2	Undertake problem identification, formulation and solution.
C401.3	Design engineering solutions to complex problems utilising a systems approach

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COURSE OUTCOMES

(R 2013)

Branch:B.E. Civil Engineering

Course Code: C101 Course Name:HS6151 Technical English – I

C101.1	Read different genres of texts adopting various reading strategies.
C101.2	Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
C101.3	Listen/view and comprehend different spoken discourses/excerpts in different accents.
C101.4	Speak clearly, confidently, comprehensibly.
C101.5	Communicate with one or many listeners using appropriate communicative strategies.

Course Code: C102 Course Name: MA6151 Mathematics – I

C102.1	Use both the limit definition and rules of differentiation to differentiate functions
C102.2	Apply differentiation to solve maxima and minima problems.
C102.3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.
C102.4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
C102.5	Apply various techniques in solving differential equations.

Course Code:C103 Course Name: PH6151 Engineering Physics – I

C103.1	Acoustics, Production and the applications of Ultrasonics in Engineering and Medical Fields.
C103.2	Interference, different types of lasers and its application in various fields.
C103.3	Fiber optics and optical fiber and its applications.
C103.4	Development of quantum mechanics and its necessary, wave equations and its applications, X - Ray.
C103.5	Crystallography and can able to calculate the crystal parameters

Course Code: C104 Course Name:CY6151 Engineering Chemistry I

C104.1	To make the students conversant with basics of polymer chemistry.
C104.2	To make the student acquire sound knowledge of second law of thermodynamics and second law based derivations of importance in engineering applications
C104.3	To acquaint the student with concepts of important photophysical and photochemical processes and spectroscopy.
C104.4	To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
C104.5	To acquaint the students with the basics of nano materials, their properties and applications.

Course Code: C105 Course Name:GE6151 Computer Programming

C105.1	Apply good programming design methods for program development.
C105.2	Write and execute C programs for simple applications
C105.3	Acquire programming knowledge on arrays and strings
C105.4	Develop programs using functions and pointers
C105.5	Knowledge on programs using structures and unions

Course Code: C106 Course Name:GE6152 Engineering graphics

C106.1	Perform free hand sketching of basic geometrical constructions and multiple views of objects.
C106.2	Do orthographic projection of lines and plane surfaces.
C106.3	Draw projections and solids and development of surfaces.
C106.4	Prepare isometric and perspective sections of simple solids.
C106.5	Demonstrate computer aided drafting.

Course Code: C107 Course Name:GE6161 Computer Practices laboratory

C107.1	Apply good programming design methods for program development.
C107.2	Design and implement C programs for simple applications.
C107.3	Develop recursive programs.
C107.4	Document creation,text manipulaation with scientific notation
C107.5	Table creation,Table formatting and conversion

Course Code: C108 Course Name:GE6162 Engineering Practices Laboratory

C108.1	Ability to fabricate carpentry components and pipe connections including plumbing works
C108.2	Ability to use welding equipments to join the structures.
C108.3	Ability to fabricate electrical and electronics circuits.
C108.4	Study of plumbing and carpentry components of residential and industrial buildings. Safety aspects.
C108.5	Preparation of welding , basic machining and sheet metal work

Course Code: C109 Course Name:GE6163 Physics and Chemistry Laboratory I

C109.1	To provide the basic practical exposure to all the engineering and technological streams in the field of physics. .
C109.2	The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.
C109.3	The students are able to know about the water containing impurities and some physical parameters.
C109.4	To gain the knowledge about light, sound, laser, fiber optics and magnetism.

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C109.5	To develop the knowledge of conductometric titration and viscometry

Course Code: C110 Course Name:HS6251 Technical English II

C110.1	Read different genres of texts, infer implied meanings and critically analyse and evaluate them for ideas as well as for method of presentation.
C110.2	Write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
C110.3	Listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.
C110.4	Speak convincingly, express their opinions clearly.
C110.5	Initiate a discussion, negotiate, argue using appropriate communicative strategies.

Course Code: C111 Course Name: MA6251 Mathematics II

C111.1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
C111.2	Gradient, divergence and curl of a vector point function and related identities.
C111.3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
C111.4	Analytic functions, conformal mapping and complex integration.
C111.5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

Course Code: C112 Course Name:PH6251ENGINEERING PHYSICS – II

C112.1	To make the students conversant with boiler feed water requirements, related problem and water treatment techniques.
C112.2	Semiconductors, carrier concentration of semiconductors, Hall effect and semiconductor devices.
C112.3	Types of magnetic materials, ferro magnetic materials, magnetic storage devices, Super conductors and their properties and applications.
C112.4	Dielectrics, properties and its applications, ferro electricity.
C112.5	Modern engineering materials, Nano materials and Carbon nano tubes.

Course Code: C113 Course Name CY6251 ENGINEERING CHEMISTRY - II

C113.1	To make the students conversant with boiler feed water requirements, related problem and water treatment techniques.
C113.2	Principles of electrochemical reactions, redox reactions in corrosion of materials and methods for corrosion prevention and protection of materials.
C113.3	Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.
C113.4	Preparation, properties and applications of engineering materials.
C113.5	Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.

Course Code: C114 Course Name:GE6252 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

C114.1	Analyze DC and AC circuits using basic laws.
C114.2	Understand the construction, working principle, EMF equation of DC machines and single phase transformer
C114.3	Understand the fundamentals of semiconductor and applications.
C114.4	Understand the construction, working principle of an digital electronics.
C114.5	Understand the construction, working principle of an amplitude and frequency modulations

Course Code: C115 Course Name:GE6253 ENGINEERING MECHANICS

C115.1	Understand the vectorial and scalar representation of forces and moments
C115.2	Analyse the problems in static equilibrium of particles and rigid bodies both in two dimensions and also in three dimensions.
C115.3	Evaluate various sectional properties like centroid, moment of inertia.
C115.4	Understand the laws of motion, the kinematics of motion and the interrelationship.
C115.5	Comprehend the effect of friction on equilibrium.

Course Code: C116 Course Name:GE6261 COMPUTER AIDED DRAFTING AND MODELING LABORATORY

C116.1	To create 2D and 3D models
C116.2	Drawing plan of residential building
C116.3	Drawing isometric projection of simple objects
C116.4	Drawing a simple steel truss

Course Code: C117 Course Name:GE6262 Physics and Chemistry laboratory II

C117.1	To provide the basic practical exposure to all the engineering and technological streams in the field of physics.
C117.2	To provide the basic practical exposure to all the engineering and technological streams in the field of chemistry.
C117.3	The students are able to know about the water containing impurities and some physical parameters.
C117.4	To gain the knowledge about properties of matter, semiconductors and solar cells
C117.5	To develop the knowledge of spectrophotometry.

Course Code: C201 Course Name:MA6351 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

C201.1	Understand how to solve the given standard partial differential equations.
C201.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
C201.3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
C201.4	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.
C201.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

Course Code: C202 Course Name:GE6351 ENVIRONMENTAL SCIENCE AND ENGINEERING

C202.1	Understand the fundamentals of environmental pollution.
C202.2	Public awareness of environmental is at infant stage.
C202.3	Ignorance and incomplete knowledge has lead to misconceptions.
C202.4	Development and improvement in std. of living has lead to serious environmental disasters.

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C202.5	Demonstrate knowledge of contemporary environmental issues.

Course Code: C203 Course Name: CE6301 ENGINEERING GEOLOGY

C203.1	Will be able to understand the importance of geological knowledge such as earth,earthquake, volcanism and the action of various geological agencies.
C203.2	Will get basic knowledge on properties of minerals.
C203.3	Gain knowledge about types of rocks, their distribution and uses
C203.4	Will understand the methods of study on geological structure.
C203.5	Will understand the application of geological investigation in projects such as dams,tunnels, bridges, roads, airport and harbor.

Course Code: C204 Course Name:CE6302 MECHANICS OF SOLIDS

C204.1	Thorough understanding of the fundamental concepts of stress and strain in mechanics of solids and structures.
C204.2	To determine shear forces, bending moments and axial forces.
C204.3	To determine the deflection of determinate beams
C204.4	To understand the effect of torsion on shafts and springs
C204.5	To analyse a complex two dimensional state of stress and plane trusses

Course Code: C205 Course Name:CE6303 MECHANICS OF FLUIDS

C205.1	Get a basic knowledge of fluids in static, kinematic and dynamic equilibrium
C205.2	Understand and solve the problems related to equation of motion.
C205.3	Gain knowledge about dimensional and model analysis.
C205.4	Learn types of flow and losses of flow in pipes.
C205.5	Understand and solve the boundary layer problems.

Course Code: C206 Course Name: CE6304 SURVEYING

C206.1	The use of various surveying instruments and mapping
C206.2	Measuring horizontal angle and vertical angle using different instruments
C206.3	Methods of levelling and setting levels with different instruments; base line measurements
C206.4	Concepts of astronomical surveyinjg and methods to determine the time, longitude, latitude and azimuth
C206.5	Concept and principle of modern surveying

Course Code: C207 Course Name:CE6311 SURVEY PRACTICAL I

C207.1	Students completing this course would have acquired practical knowledge on handling basic survey instruments including leveling and development of contour map of given area.
C207.2	Handle the conventional surveying equipments such as chain, tape, compass, plain table and theodolite in the field of civil engineering
C207.3	Undergo traverse using various instruments and use the theodolite effectively for various applications
C207.4	Plot LS,CS and contour using levelling instruments
C207.5	Do lay out preparation using theodolite

Course Code: C208 Course Name:CE6312 COMPUTER AIDED BUILDING DRAWING

C208.1	Have fundamental understanding of 2D and 3D views of buildings
C208.2	Understand the different views of the components of building
C208.3	Familiarize with standard symbols and sign conventions suitably
C208.4	Understand the structures with North light roof truss
C208.5	Create plan, section and elevation of different buildings

Course Code: C209 Course Name:MA6459 Numerical Methods

C209.1	Understand the basic concepts and techniques of solving algebraic and transcendental equations
C209.2	Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations.
C209.3	Apply the numerical techniques of differentiation and integration for engineering problems.
C209.4	Understand the basic concepts and techniques of solving algebraic and transcendental equations
C209.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

Course Code: C210 Course Name:CE6401 CONSTRUCTION MATERIALS

C210.1	Compare the properties of most common and advanced building materials
C210.2	Understand the typical and potential applications of lime, cement and aggregates
C210.3	Know the production of concrete and also the method of placing and making of concrete elements
C210.4	Understand the applications of timbers and other materials
C210.5	Understand the importance of modern material for construction

Course Code: C211 Course Name:CE6402 STRENGTH OF MATERIALS

C211.1	Determine the strain energy and compute the deflection of determinate beams, frames and trusses using energy principles.
C211.2	Analyze propped cantilever, fixed beams and continuous beams using theorem of three moment equation for external loadings and support settlements.
C211.3	Find the load carrying capacity of columns and stresses induced in columns and cylinders
C211.4	Determine principal stresses and planes for an element in three dimensional state of stress and study various theories of failure
C211.5	Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and find the stresses in curved beams.

Course Code: C212 Course Name:CE6403 APPLIED HYDRAULIC ENGINEERING

C212.1	Apply their knowledge of fluid mechanics in addressing problems in open channels
C212.2	To provide knowlege on designing a most economical section of various shapes in uniform flow

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C212.3	To understand the behaviour of various types of non uniform channel flows and their practical application
C212.4	Understand the principles, working and application of turbines.
C212.5	Understand the principles, working and application of pumps.

Course Code: C213 Course Name:CE6404 SURVEYING II

C213.1	Understand the advantages of electronic surveying
C213.2	Advantages of electronic surveying over conventional surveying methods
C213.3	Understand the working principle of GPS
C213.4	Understand the components, signal structure, and error sources of GPS
C213.5	Understand various GPS surveying methods and processing techniques used in GPS observation

Course Code: C214 Course Name:CE6405 SOIL MECHANICS

C214.1	Classify the soil and assess the engineering properties based on index properties.
C214.2	Assess the permeability characteristics of soil and understand the stress concept in soils.
C214.3	understand and identify the stress distribution in soils using different theories and to understand the behaviors of soil due to setlement.
C214.4	understand the concept of shear strength of soil using different methods.
C214.5	Analyze the concept of finite and infinite soil and to understand the stability behaviors of soils.

Course Code: C215 Course Name:CE6411 STRENGTH OF MATERIALS LABORATORY

C215.1	The students will have the required knowledge in the area of testing of materials and components of structural elements experimentally.
C215.2	Apply the concepts of mechanics for determining stresses and strains from the member forces.
C215.3	Do problems by knowing the effects of axial loads, bending, shear and torsion on structural components. And Feel physically the behavior of materials and structural elements including distribution of stresses, strains, deformations and failure modes.
C215.4	Determine the behavior of structural elements such as bars, beams and columns subjected to tension, compression, shear, bending and torsion by means of experiments.
C215.5	And Feel physically the behavior of materials and structural elements including distribution of stresses, strains, deformations and failure modes.

Course Code: C216 Course Name:CE6412 HYDRAULIC ENGINEERING LABORATORY

C216.1	The students will be able to measure flow in pipes and determine frictional losses.
C216.2	The students will be able to develop characteristics of pumps and turbines.
C216.3	Determine the flow in pipes and open channels.
C216.4	Analyze the major and minor losses in pipes. And Select an appropriate pump for a specific application.
C216.5	Understand the impact of jet on vanes and to compute their efficiency.Select a suitable type of turbine for the given situation.

Course Code: C217 Course Name:CE6413 SURVEY PRACTICAL II

C217.1	Students completing this course would have acquired practical knowledge on handling survey instruments like Theodolite, Tacheometery and Total station and haveadequate knowledge to carryout Triangulation and Astronomical surveying including general field marking for various engineering projects and curves setting.
C217.2	Determine the heights distances and gradient using trignometric methods
C217.3	Have adequate knowledge to carryout Triangulation and Astronomical surveying including general field marking for various engineering projects and curves setting.
C217.4	Calculate the height of inaccessible point by system of tacheometry calculate the azimuth of a line by observation of sun
C217.5	Apply field procedures in setting out of a curve and Use modern surveying instruments like total station and GPS

Course Code: C301 Course Name: CE6501 STRUCTURAL ANALYSIS I

C301.1	Analyse the internal forces in the member by virtual work method (Truss, frame)
C301.2	Analyze the moving load for determinate and indeterminate structures by using influence line diagram
C301.3	Knowledge on various types of arches , their radial shear and normal thrust
C301.4	To analyse truss, beam, frame by slope deflection method
C301.5	To analyse truss, beam, frame by moment distribution method

Course Code: C302Course Name: CE6502 FOUNDATION ENGINEERING

C302.1	Knowledge on the various steps and methods involved in site investigation and soil exploration.
C302.2	Able to analyze stress distribution for a given loading on bearing capacity and settlement for different types of soil under different loading conditions
C302.3	Ability to Analyze and calculate Knowledge on different types of foundation and pressure distribution on foundation.
C302.4	Gain knowledge on pile foundation methods and and to design pile foundation due to settlements.
C302.5	Ability to gain knowledge on theories of failures plane and to analyze and to design the earth pressure on retaining wall.

Course Code: C303Course Name: CE6503 ENVIRONMENTAL ENGINEERING I

C303.1	Acquire knowledge on Basic principles of water supply Engineering and to identify appropriate unit operations and processes &exposure to different
C303.2	Gain knowledge on intake structures and materials used for the water supply systems
C303.3	Knowledge on water treatment process and to design the treatment methods.
C303.4	Knowledge on advance water treatment and membrane systems
C303.5	The ability to analysis the methods of water distribution network

Course Code: C304 Course Name: CE6504 HIGHWAY ENGINEERING

C304.1	Overview with respect to highway Planning, Alignment and road development
C304.2	Knowledge on geometric Design of highway
C304.3	Able to design flexible and Rigid pavements
C304.4	Gain Knowledge on Highway Construction materials, Properties and testing methods
C304.5	Understand the concept of pavement management system, evaluation of distress and maintenance of Pavements

Course Code: C305 Course Name: CE6505 DESIGN OF REINFORCED CONCRETE ELEMENTS

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C305.1	Understand the general mechanical behavior of reinforced concrete , Be able to identify and apply the applicable industry design codes and methods relevant to the design of reinforced concrete member
C305.2	Be able to analyze and design reinforced concrete members in flexure
C305.3	Be able to analyze and design reinforced concrete members in shear and compression
C305.4	Be able to perform design of columns
C305.5	Be able to perform design of footings and stair cases

Course Code: C306 Course Name: CE6506 CONSTRUCTION TECHNIQUES, EQUIPMENT AND PRACTICE

C306.1	Acquire knowledge on fundamentals of concrete technology.
C306.2	Awareness on construction practice in the civil field.
C306.3	Impart the knowledge of sub structure construction.
C306.4	Impart the knowledge of super structure construction.
C306.5	Gain Knowledge on selection of Best suitable Equipments for Respective Construction

Course Code: C307 Course Name: GE6674COMMUNICATION AND SOFT SKILLS- LABORATORY BASED

C307.1	Take international examination such as IELTS and TOEFL
C307.2	Make presentations and Participate in Group Discussions.
C307.3	Successfully answer questions in interviews.
C307.4	Improve the active and passive vocabulary
C307.5	Familiarize students with different rhetorical functions of scientific English

Course Code: C308 Course Name: CE6511SOIL MECHANICS LABORATORY

C308.1	Students know the techniques to determine index properties and engineering properties such as shear strength, compressibility and permeability by conducting appropriate tests.
C308.2	Awareness of using California Bearing ratio
C308.3	Knowledge on grain size distribution
C308.4	Impart the knowledge of in situ density and compaction characteristics
C308.5	Gain knowledge on Engineering properties

Course Code: C309 Course Name: CE6512 SURVEY CAMP

C309.1	Handle the conventional surveying equipments such as chain, tape, compass, plain table and theodolite in the field of civil engineering.
C309.2	Undergo traverse using various instruments and to Plot LS,CS and contour using levelling instruments
C309.3	Do lay out preparation using theodolite
C309.4	calculate the azimuth of a line by observation of sun
C309.5	Use modern surveying instruments like total station and GPS

Course Code: C310 Course Name: CE6601 DESIGN OF REINFORCED CONCRETE & BRICK MASONRY STRUCTURES

C310.1	Design various types of retaining walls under various loading conditions.
C310.2	Design and detailing of different types of water tanks along with the staging and foundation.
C310.3	Attain sufficient knowledge of design for staircases, flat slabs and reinforced concrete walls and gain knowledge about the principles of design of mat foundation, box culvert and road bridges.
C310.4	Apply the yield line theory for design of square, rectangular, circular and triangular slabs.
C310.5	Design axially and eccentrically loaded brick walls based on the knowledge gained for various loading conditions.

Course Code: C311 Course Name: CE6602 STRUCTURAL ANALYSIS II

C311.1	Analyse statically indeterminate structures by imposing boundary conditions on flexibility matrix.
C311.2	Form the element stiffness matrices and assemble the structure stiffness matrix for solving indeterminate problems.
C311.3	Apply the concept of finite element method to structural analysis.
C311.4	Employ plastic analysis to calculate the collapse loads for beams and frames.
C311.5	Determine the member forces in suspension bridges and space truss

Course Code: C312 Course Name: CE6603 DESIGN OF STEEL STRUCTURES

C312.1	Gain knowledge on limit state design concepts and joints.
C312.2	Design of tension members.
C312.3	Design of compression members.
C312.4	Get trained with design of beams.
C312.5	Design components of steel trusses such as purlins and gantry girders.

Course Code: C313 Course Name: CE6604 RAILWAYS,AIRPORTS & HARBOUR ENGINEERING

C313.1	Understand the methods of route alignment and design elements in Railway Planning and Constructions.
C313.2	Understand the Construction techniques and Maintenance of Track laying and Railway stations.
C313.3	Gain an insight on the planning and site selection of Airport Planning and design.
C313.4	Analyze and design the elements for orientation of runways and passenger facility systems.
C313.5	Understand the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted.

Course Code: C314 Course Name: CE6605 ENVIRONMENTAL ENGINEERING II

C314.1	An ability to estimate sewage generation and design sewer system including sewage pumping stations

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C314.2	The required understanding on the characteristics and composition of sewage, selfpurification of streams
C314.3	An ability to perform basic design of the unit operations and processes that are used in sewage treatment
C314.4	Understand the standard methods for disposal of sewage.
C314.5	Gain knowledge on sludge treatment and disposal

Course Code: C315 Course Name: CE6002 CONCRETE TECHNOLOGY

C315.1	To impart knowledge to the students on the properties of materials
C315.2	Suitable tests on concrete quality Test
C315.3	To have a knowledge on Mix design for concrete
C315.4	To have a knowledge on Fresh concrete and harden conrete.
C315.5	To have a knowledge on special concrete

Course Code: C316 Course Name: CE6611 ENVIRONMENTAL ENGINEERING LABORATORY

C316.1	Able to characterize wastewater and conduct treatability studies.
C316.2	Acquire the sampling and preservation methods of water and wastewater.
C316.3	Test bleaching powder and find the disinfectant percentage in chlorinated water.
C316.4	Do the water and wastewater analysis.
C316.5	Detect the gases by using gas analyzers.

Course Code: C317 Course Name: CE6612 CONCRETE AND HIGHWAY ENGINEERING LABORATORY

C317.1	Student knows the techniques to characterize various pavement materials through relevant tests.
C317.2	Acquire knowledge on test of fresh concrete
C317.3	Awareness on testing of aggregates
C317.4	Gain knowledge on test of bitumen

Course Code: C318 Course Name: HS8581 PROFESSIONAL COMMUNICATION

C317.1	Make Effective Presentation
C317.2	participate Confidently in group discussions
C317.3	Attend job interview and be successful in them
C317.4	Develop acquired soft skills required for the work place

Course Code: C401 Course Name:CE6701STRUCTURAL DYNAMICS AND EARTHQUAKE ENGINEERING

C401.1	Identify, formulate and solve dynamic response of SDOF systems
C401.2	Identify, formulate and solve dynamic response of MDOF systems
C401.3	Understand the basic concepts and fundamentals of seismology.
C401.4	To impart knowledge on effect of earthquake loading to different type of structures like RCC, Steel and Prestressed Concrete structures
C401.5	Student will have the knowledge to analyse structures subjected to dynamic loading and to design the structures for seismic loading as per code provisions.

Course Code: C402 Course Name:CE6702 PRESTRESSED CONCRETE STRUCTURES

C402.1	Deliver the basic fundamentals of prestressing.
C402.2	Deliver the design principles of flexure and shear of prestressed concrete.
C402.3	Deflection criteria of composite construction.
C402.4	Analyze the stresses and strain of composite beams.
C402.5	Design of prestressed concrete tanks.

Course Code: C403 Course Name:CE6703 WATER RESOURCES AND IRRIGATION ENGINEERING

C403.1	The students will have knowledge and skills on Planning, design, operation and management of reservoir system.
C403.2	The students will have knowledge on water policies, consumptive and conjuctive use of water.
C403.3	Will understand the different components of Irrigation methods
C403.4	Students will gain the knowledge based on the canal regulators
C403.5	Students will understand the concept of participatory irrigation management.

Course Code: C404 Course Name:CE6704 ESTIMATION AND QUANTITY SURVEYING

C404.1	Estimate the cost and quantity required to construct a building thereby helping the owner in deciding the needed funds.
C404.2	Estimate the various items of engineering works such as buildings, canals, roads etc.,
C404.3	Familiar with the specifications and to arrive the rate analysis
C404.4	Value the properties considering depreciation and time value of money.
C404.5	Prepare report documents for various structures.

Course Code: C405 Course Name:CE6701 HOUSING PLANNING AND MANAGEMENT

C405.1	Will understand the basic terms related to housing programs and learn about the concepts of NHP and about the institutions of housing.
C405.2	Will learn about the basic concepts of housing programmes and about the improvement of slum housing also about the role of public,private,NGO's in slum improvement.
C405.3	Will learn about the building byelaws and rules related to housing and about the site analysis and problems related to layout designs.
C405.4	Have knowledge about the cost effective materials and the new construction techniques and learn about the building centres.
C405.5	Will learn about the housing finance, cost recovery, cash flow analysis and about the public private projects and problems related to pricing of housing units.

Course Code: C406 Course Name:EN6501 MUNICIPAL SOLID WASTE MANAGEMENT

C406.1	Will have an understanding of the nature and characteristics of municipal solid wastes and the regulatory requirements regarding municipal solid waste management
C406.2	Ability to gain knowledge on on-site storage and processing and methods of segregation.

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C406.3	Understand the methodology for collection of municipal solid waste and transfer station location, operation and maintenance.
C406.4	gain knowledge about the off-site processing and resources recovery from solid waste composting.
C406.5	Understand the methodology for disposal of solid waste and to design the sanitary landfills.

Course Code: C407 Course Name:CE6711 COMPUTER AIDED DESIGN AND DRAFTING LABORATORY

C407.1	At the end of the course the student acquires hands on experience in design andpreparation of structural drawings for concrete / steel structures normally encountered in
C407.2	Students will be able to implement ideas of computer aided design with advantages and demerits.
C407.3	Will have a knowledge on computer software package for analysis of the structures
C407.4	Will learn the Optimization techniques of the structure
C407.5	Design and draw the detailing involved in the plate girder.

Course Code: C408 Course Name:CE6712 DESIGN PROJECT

C408.1	On completion of the design project students will have a better experience in designing various design problems related to Civil Engineering.
C408.2	Gain Knowledge on software package drafting and design software
C408.3	Knowledge on design calculation based on design specification
C408.4	Opportunity to utilise the creative ability and inference capability
C408.5	Explore the communication skill by project presentation

Course Code: C409 Course Name:MG6851 PRINCIPLES OF MANAGEMENT

C409.1	Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading &
C409.2	Will have some basic knowledge on international aspect of planning in management
C409.3	Will have some basic knowledge on the organizing aspect in management.
C409.4	will able to understand the concept of leading and controlling
C409.5	Will able to understand the current trends and issues in management

Course Code: C410 Course Name:CE6016 PREFABRICATED STRUCTURES

C410.1	The student will have good knowledge about design principles, layout of factory and stages of loading in precast construction.
C410.2	Acquire knowledge about panel systems, slabs, connections used in precast construction and they will be in a position to design the elements.
C410.3	Acquire knowledge about types of floor systems, stairs and roofs used in precast construction
C410.4	Acquire knowledge about types of walls used in precast construction, sealants, design of joints.
C410.5	Acquire knowledge about components in industrial building

Course Code: C411 Course Name:CE6021 REPAIR AND REHABILITATION OF STRUCTURES

C411.1	The importance of maintenance and assessment method of distressed structures.
C411.2	The strength and durability properties ,their effects due to climate and temperature.
C411.3	Recent development in concrete
C411.4	The techniques for repair rand protection methods
C411.5	Repair, rehabilitation and retrofitting of structures and demolition methods.

Course Code: C412 Course Name:CE6811 PROJECT WORK

C412.1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.
C412.2	Relate the theoretical studies with experimental work or field work
C412.3	Gain Knowledge on real time problem related to project work
C412.4	Knowledge on design calculation based on design specification
C412.5	Explore the communication skill by project presentation

2017 Regulation Course outcome

Course Code: C101 Course Name:HS6151 COMMUNICATIVE ENGLISH

C101.1	Read articles of a general kind in magazines and newspapers.
C101.2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
C101.3	Comprehend conversations and short talks delivered in English
C101.4	Write short essays of a general kind and personal letters and emails in English.
C101.5	Speak clearly confidently ,comprehensibly

Course Code: C102 Course Name:MA8151 ENGINEERING MATHEMATICS I

C102.1	Use both the limit definition and rules of differentiation to differentiate functions.
C102.2	Apply differentiation to solve maxima and minima problems
C102.3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.
C102.4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
C102.5	Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.

Course Code: C103 Course Name:PH8151 ENGINEERING PHYSICS I

C103.1	the students will gain knowledge on the basics of properties of matter and its applications
C103.2	the students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,
C103.3	the students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,
C103.4	the students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes

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C103.5	the students will understand the basics of crystals, their structures and different crystal growth techniques.

Course Code: C104 Course Name:CY8151 ENGINEERING CHEMISTRY

C104.1	To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
C104.2	To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and sign
C104.3	Preparation, properties and applications of engineering materials
C104.4	Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.
C104.5	Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells

Course Code: C105 Course Name:GE8151 PROBLEM SOLVING AND PYTHON PROGRAMMING

C105.1	Develop algorithmic solutions to simple computational problem
C105.2	Read, write, execute by hand simple Python programs.
C105.3	Structure simple Python programs for solving problems.
C105.4	Decompose a Python program into functions.
C105.5	Represent compound data using Python lists, tuples, dictionaries.

Course Code: C106 Course Name:GE8152 ENGINEERING GRAPHICS

C106.1	familiarize with the fundamentals and standards of Engineering graphics
C106.2	perform freehand sketching of basic geometrical constructions and multiple views of objects
C106.3	project orthographic projections of lines and plane surfaces.
C106.4	draw projections and solids and development of surfaces
C106.5	visualize and to project isometric and perspective sections of simple solids.

Course Code: C107 Course Name:GE8161 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY

C107.1	Write, test, and debug simple Python programs.
C107.2	Implement Python programs with conditionals and loops
C107.3	Develop Python programs step-wise by defining functions and calling them.
C107.4	Use Python lists, tuples, dictionaries for representing compound data
C107.5	Read and write data from/to files in Python.

Course Code: C108 Course Name:BS8161 PHYSICS AND CHEMISTRY LABORATORY

C108.1	Apply principles of elasticity, optics and thermal properties for engineering applications
C108.2	The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.

Course Code: C109 Course Name:HS8251 TECHNICAL ENGLISH

C109.1	Read technical texts and write area- specific texts effortlessly.
C109.2	Listen and comprehend lectures and talks in their area of specialisation successfully
C109.3	Speak appropriately and effectively in varied formal and informal contexts.
C109.4	Write reports and winning job applications
C109.5	Initiate a discussion, negotiate, argue using appropriate communicative strategies.

Course Code: C110 Course Name:MA8251ENGINEERING MATHEMATICS- II

C110.1	Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices
C110.2	Gradient, divergence and curl of a vector point function and related identities
C110.3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
C110.4	Analytic functions, conformal mapping and complex integration
C110.5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coeff

Course Code: C111 Course Name:PH8201 PHYSICS FOR CIVIL ENGINEERING

C111.1	the students will have knowledge on the thermal performance of buildings,
C111.2	the students will acquire knowledge on the acoustic properties of buildings,
C111.3	the students will get knowledge on various lighting designs for buildings,
C111.4	the students will gain knowledge on the properties and performance of engineering materials, and
C111.5	the students will understand the hazards of buildings

Course Code: C112 Course Name:BE8251 BASIC ELECTRICAL & ELECRONICS ENGINEERING

C112.1	ability to identify the electrical components and explain the characteristics of electrical machines.
C112.2	ability to identify electronics components and understand the characteristics
C112.3	To explain the fundamentals of semiconductor and applications.
C112.4	To explain the principles of digital electronics
C112.5	To impart knowledge of communication.

Course Code: C113 Course Name:GE8291 ENVIRONMENTAL SCIENCE AND ENGINEERING

C113.1	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.
C113.2	Public awareness of environmental is at infant stage
C113.3	Ignorance and incomplete knowledge has lead to misconceptions
C113.4	Development and improvement in std. of living has lead to serious environmental disasters
C113.5	To study the integrated themes and biodiversity, natural resources, pollution control and waste management.

Course Code: C114 Course Name:GE8292 ENGINEERING MECHANICS

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C114.1	illustrate the vectorial and scalar representation of forces and moments
C114.2	analyse the rigid body in equilibrium
C114.3	evaluate the properties of surfaces and solids
C114.4	calculate dynamic forces exerted in rigid body
C114.5	determine the friction and the effects by the laws of friction

Course Code: C115 Course Name:GE8261 ENGINEERING PRACTICES LABORATORY

C115.1	To provide the basic practical exposure to building work,plumbing work,carpentry using power tools
C115.2	To provide the basic practical exposure to welding,basic Machining,sheet metal work,machine assembly practice,
C115.3	To provide the basic practical exposure to Electrical Engineering practice
C115.4	To provide the basic practical exposure to Electronics Engineering practice
C115.5	Carry out basic home electrical works and appliances

Course Code: C116 Course Name:CE8211 COMPUTER AIDED BUILDING DRAWING

C116.1	Have fundamental understanding of 2D and 3D views of buildings
C116.2	Understand the different views of the components of building
C116.3	Familiarize with standard symbols and sign conventions suitably
C116.4	Understand the structures with North light roof truss
C116.5	Create plan, section and elevation of different buildings

Course Code: C201 Course Name: MA8353 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

C201.1	Understand how to solve the given standard partial differential equations.
C201.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications
C201.3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
C201.4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the ph
C201.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

Course Code: C202 Course Name: CE8301 STRENGTH OF MATERIALS I

C202.1	Understand the concepts of stress and strain, principal stresses and principal planes.
C202.2	Determine Shear force and bending moment in beams and understand concept of theory of simple bending
C202.3	Calculate the deflection of beams by different methods and selection of method for determining slope or deflection
C202.4	Apply basic equation of torsion in design of circular shafts and helical springs
C202.5	Analyze the pin jointed plane and space trusses

Course Code: C203 Course Name: CE8302 FLUID MECHANICS

C203.1	Get a basic knowledge of fluids in static, kinematic and dynamic equilibrium.
C203.2	Understand and solve the problems related to equation of motion.
C203.3	Gain knowledge about dimensional and model analysis.
C203.4	Learn types of flow and losses of flow in pipes.
C203.5	Understand and solve the boundary layer problems.

Course Code: C204 Course Name: CE8351 SURVEYING

C204.1	The use of various surveying instruments and mapping
C204.2	Measuring Horizontal angle and vertical angle using different instruments
C204.3	Methods of Leveling and setting Levels with different instruments
C204.4	Concepts of astronomical surveying and methods to determine time, longitude, latitude and azimuth .] Concept and principle of modern surveying.
C204.5	Concept and principle of modern surveying.

Course Code: C205 Course Name: CE8391 CONSTRUCTION MATERIAL

C205.1	Compare the properties of most common and advanced building materials
C205.2	understand the typical and potential applications of lime, cement and aggregates
C205.3	know the production of concrete and also the method of placing and making of concrete elements.
C205.4	understand the applications of timbers and other materials
C205.5	Understand the importance of modern material for construction.

Course Code: C206 Course Name: CE8392 ENGINEERING GEOLOGYAL

C206.1	Will be able to understand the importance of geological knowledge such as earth, earthquake, volcanism and the action of various geological agencies.
C206.2	Will get basics knowledge on properties of minerals
C206.3	Gain knowledge about types of rocks, their distribution and uses
C206.4	Will understand the methods of study on geological structure
C206.5	Will understand the application of geological investigation in projects such as dams, tunnels, bridges, roads, airport and harbor

Course Code: C207 Course Name: CE8311 CONSTRUCTION MATERIAL LABORATOORY

C207.1	To facilitate the understanding of the behavior of construction materials.
C207.2	The students will have the required knowledge in the area of testing of construction materials and components of construction elements experimentally.

Course Code: C208 Course Name: CE8361 SURVEYING LABORATOORY

C208.1	At the end of the course the student will posses knowledge about Survey field techniques
C208.2	Students completing this course would have acquired practical knowledge on handling basic survey instruments including Theodolite, Tacheometry, Total Station and GPS and have adequate knowledge to carryout Triangulation and Astronomical surveying including general field marking for various engineering projects and Location of site etc.

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Course Code: C209 Course Name: CE8381 INTERPERSONAL SKILL/LISTENING AND SPEAKING

C209.1	Listen and respond appropriately.
C209.2	Participate in group discussions
C209.3	Make effective presentations
C209.4	Participate confidently and appropriately in conversations both formal and informal

Course Code: C210 Course Name: MA8491NUMERICAL METHODS

C210.1	Understand the basic concepts and techniques of solving algebraic and transcendental equations.
C210.2	Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations
C210.3	Apply the numerical techniques of differentiation and integration for engineering problems.
C210.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations
C210.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

Course Code: C211 Course Name: CE8401CONSTRUCTION TECHNIQUES AND PRACTICES

C211.1	know the different construction techniques and structural systems
C211.2	Understand various techniques and practices on masonry construction, flooring, and roofing.
C211.3	Plan the requirements for substructure construction
C211.4	Know the methods and techniques involved in the construction of various types of super structures
C211.5	Select, maintain and operate hand and power tools and equipment used in the building construction sites.

Course Code: C212 Course Name: CE8402 STRENGTH OF MATERIALS II

C212.1	Determine the strain energy and compute the deflection of determinate beams, frames and trusses using energy principles.
C212.2	Analyze propped cantilever, fixed beams and continuous beams using theorem of three moment equation for external loadings and support settlements.
C212.3	Find the load carrying capacity of columns and stresses induced in columns and cylinders
C212.4	Determine principal stresses and planes for an element in three dimensional state of stress and study various theories of failure
C212.5	Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and find the stresses in curved beams

Course Code: C213 Course Name: CE8403 APPLIED HYDRAULIC ENGINEERING

C213.1	Apply their knowledge of fluid mechanics in addressing problems in open channels.
C213.2	Able to identify a effective section for flow in different cross sections.
C213.3	To solve problems in uniform, gradually and rapidly varied flows in steady state conditions
C213.4	Understand the principles, working and application of turbines.
C213.5	Understand the principles, working and application of pumps

Course Code: C214 Course Name: CE8404 CONCRETE TECHNOLOGY

C214.1	The various requirements of cement, aggregates and water for making concrete
C214.2	The effect of admixtures on properties of concrete
C214.3	The concept and procedure of mix design as per IS method
C214.4	The properties of concrete at fresh and hardened state
C214.5	The importance and application of special concretes.

Course Code: C215 Course Name: CE8405 SOIL MECHANICS

C215.1	Classify the soil and assess the engineering properties, based on index properties.
C215.2	Understand the stress concepts in soils
C215.3	Understand and identify the settlement in soils.
C215.4	Determine the shear strength of soil
C215.5	Analyze both finite and infinite slopes.

Course Code: C216 Course Name: CE8481STRENGTH OF MATERIALS LABORATORY

C216.1	To expose the students to the testing of different materials under the action of various forces and determination of their characteristics experimentally
C216.2	The students will have the required knowledge in the area of testing of materials and components of structural elements experimentally.

Course Code: C217 Course Name: CE8461 HYDRAULIC ENGINEERING LABORATORY

C217.1	The students will be able to measure flow in pipes and determine frictional losses.
C217.2	The students will be able to develop characteristics of pumps and turbines.
C217.3	Determine the flow in pipes and open channels.
C217.4	Analyze the major and minor losses in pipes. And Select an appropriate pump for a specific application.
C217.5	Understand the impact of jet on vanes and to compute their efficiency.Select a suitable type of turbine for the given situation.

Course Code: C218 Course Name: HS8461 ADVANCED READING AND WRITING

C218.1	Write different types of essays.
C218.2	Write winning job applications.
C218.3	Read and evaluate texts critically
C218.4	Display critical thinking in various professional contexts.

Course Code: C301Course Name: CE8501 DESIGN OF REINFORCED CEMENT CONCRETE ELEMENTS

C301.1	Understand the various design methodologies for the design of RC elements.
C301.2	Know the analysis and design of flanged beams by limit state method and sign of beams for shear, bond and torsion.
C301.3	design the various types of slabs and staircase by limit state method
C301.4	Design columns for axial, uniaxial and biaxial eccentric loadings.

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C301.5	Design of footing by limit state method.

Course Code: C302Course Name: CE8502 STRUCTURAL ANALYSIS I

C302.1	Analyze continuous beams, pin-jointed indeterminate plane frames and rigid plane frames by strain energy method
C302.2	Analyse the continuous beams and rigid frames by slope defection method
C302.3	Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway
C302.4	Analyse the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method
C302.5	Understand the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames.

Course Code: C303Course Name: EN8491 WATER SUPPLY ENGINEERING

C303.1	an insight into the structure of drinking water supply systems, including water transport, treatment and distribution
C303.2	The knowledge in various unit operations and processes in water treatment
C303.3	an ability to design the various functional units in water treatment
C303.4	an understanding of water quality criteria and standards, and their relation to public health
C303.5	the ability to design and evaluate water supply project alternatives on basis of chosen criteria

Course Code: C304Course Name: CE8591 FOUNDATION ENGINEERING

C304.1	Understand the site investigation, methods and sampling.
C304.2	Get knowledge on bearing capacity and testing methods
C304.3	Design shallow footings
C304.4	Determine the load carrying capacity, settlement of pile foundation
C304.5	Determine the earth pressure on retaining walls and analysis for stability.

Course Code: C305Course Name: GI8014 GEOGRAPHIC INFORMATION SYSTEM

C305.1	Have basic idea about the fundamentals of GIS.
C305.2	Understand the types of data models.
C305.3	Get knowledge about data input and topology
C305.4	Gain knowledge on data quality and standards
C305.5	Understand data management functions and data output

Course Code: C306Course Name: OA6151 ENVIRONMENT &AGRICULTURE

C306.1	students will understand the factors of Environment and agriculture
C306.2	Students will understand the impacts of Environment
C306.3	Students will understand the climatic changes and causes
C306.4	Students will come to know about the diversity of agriculture and Environment
C306.5	Students will come to know about the emerging issues of agriculture and Environment

Course Code: C307Course Name: CE8511 SOIL MECHANICS LABORATORY

C307.1	Students know the techniques to determine index properties and engineering properties such as shear strength, compressibility and permeability by conducting appropriate tests.
C307.2	Awareness of using California Bearing ratio
C307.3	Knowledge on grain size distribution
C307.4	Impart the knowledge of in situ density and compaction characteristics
C307.5	Gain knowledge on Engineering properties

Course Code: C308Course Name: CE8512 WATER & WASTE WATER ANALYSIS LABORATORY

C308.1	Quantify the pollutant concentration in water and wastewater
C308.2	Suggest the type of treatment required and amount of dosage required for the treatment
C308.3	Examine the conditions for the growth of micro-organisms

Course Code: C309Course Name: CE8513 SURVEY CAMP

C309.1	Handle the conventional surveying equipments such as chain, tape, compass, plain table and theodolite in the field of civil engineering.
C309.2	Undergo traverse using various instruments and to Plot LS,CS and contour using levelling instruments
C309.3	Do lay out preparation using theodolite
C309.4	calculate the azimuth of a line by observation of sun
C309.5	Use modern surveying instruments like total station and GPS

Course Code: C310Course Name: CE8601 DESIGN OF STEEL STRUCTURAL ELEMENTS

C310.1	Understand the concepts of various design philosophies
C310.2	Design common bolted and welded connections for steel structures
C310.3	Design tension members and understand the effect of shear lag
C310.4	Understand the design concept of axially loaded columns and column base connections
C310.5	Understand specific problems related to the design of laterally restrained and unrestrained steel beams

Course Code: C310Course Name: CE8602 STRUCTURAL ANALYSIS II

C311.1	Draw influence lines for statically determinate structures and calculate critical stress resultants
C311.2	Understand Muller Breslau principle and draw the influence lines for statically indeterminate beams
C311.3	Analyse of three hinged, two hinged and fixed arches
C311.4	Analyse the suspension bridges with stiffening girders
C311.5	Understand the concept of Plastic analysis and the method of analyzing beams and rigid frames

Course Code: C312Course Name: CE8603 IRRIGATION ENGINEERING

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C312.1	Have knowledge and skills on crop water requirements.
C312.2	Understand the methods and management of irrigation.
C312.3	Gain knowledge on types of Impounding structures
C312.4	Understand methods of irrigation including canal irrigation
C312.5	Get knowledge on water management on optimization of water use

Course Code: C313Course Name: CE8604 HIGHWAY ENGINEERING

C313.1	Get knowledge on planning and aligning of highway.
C313.2	Design flexible and rigid pavements.
C313.3	Gain knowledge on Highway construction materials, properties, testing methods
C313.4	Gain knowledge on Highway construction materials, properties, testing methods
C313.5	Understand the concept of pavement management system, evaluation of distress and maintenance of pavements.

Course Code: C314Course Name: EN8592 WASTE WATER ENGINEERING

C314.1	An ability to estimate sewage generation and design sewer system including sewage pumping stations
C314.2	The required understanding on the characteristics and composition of sewage, selfpurification of streams
C314.3	An ability to perform basic design of the unit operations and processes that are used in sewage treatment
C314.4	Understand the standard methods for disposal of sewage.
C314.5	Gain knowledge on sludge treatment and disposal.

Course Code: C315Course Name:CE8005 AIR POLLUTION AND CONTROL ENGINEERING

C315.1	an understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management
C315.2	ability to identify, formulate and solve air and noise pollution problems
C315.3	ability to design stacks and particulate air pollution control devices to meet applicable standards
C315.4	Ability to select control equipments.
C315.5	Ability to ensure quality, control and preventive measures.

Course Code: C316Course Name:CE8611 HIGHWAY ENGINEERING LABORATORY

C316.1	Test on Aggregates
C316.2	Test on Bitumen
C316.3	Test on bitumen mixes
C316.4	Demensotration on field test of pavement
C316.5	Student knows the techniques to characterize various pavement materials through relevant tests

Course Code: C317Course Name:CE8612 RRIGATION AND ENVIRONMENTAL ENGINEERING DRAWING

C317.1	At the end of the semester, the student shall conceive, design and draw the irrigation and environmental engineering structures in detail showing the plan, elev Sections.
C317.2	The students after completing this course will be able to design and draw various units of Municipal water treatment plants and sewage treatment plants.

Course Code: C401Course Name:CE8701 ESTIMATION COSTING AND VALUATION ENGINEERING

C401.1	Estimate the quantities for buildings
C401.2	Rate Analysis for all Building works, canals, and Roads and Cost Estimate.
C401.3	Understand types of specifications, principles for report preparation, tender notices types
C401.4	Gain knowledge on types of contracts
C401.5	Evaluate valuation for building and land.

Course Code: C402COURSEName:CE8702 RAILWAYS, AIRPORTS, DOCKS AND HARBOUR ENGINEERING

C402.1	Understand the methods of route alignment and design elements in Railway Planning and Constructions.
C402.2	Understand the Construction techniques and Maintenance of Track laying and Railway stations.
C402.3	Gain an insight on the planning and site selection of Airport Planning and design.
C402.4	Analyze and design the elements for orientation of runways and passenger facility systems.
C402.5	Understand the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted

Course Code: C403Course Name:CE8703 STRUCTURAL DESIGN AND DRAWING

C403.1	Design and draw reinforced concrete Cantilever and Counterfort Retaining Walls
C403.2	Design and draw flat slab as per code provisions
C403.3	Design and draw reinforced concrete and steel bridges
C403.4	Design and draw reinforced concrete and steel water tanks
C403.5	Design and detail the various steel trusses and cantry girders

Course Code: C404Course Name:EN8591 MUNICIPAL SOLID WASTE MANAGEMENT

C404.1	understanding of the nature and characteristics of municipal solid wastes and the regulatory requirements regarding municipal solid waste management.
C404.2	
C404.3	ability to plan and design systems for storage, collection, transport, processing anddisposal of municipal solid waste.
C404.4	knowledge on the issues on solid waste management from an integrated and holistic perspective, as well as in the local and international context.
C404.5	Design and operation of sanitary landfill.

Course Code: C405Course Name:OML751 TESTING OF MATERIALS

C405.1	Understand the importance of material testing
C405.2	understand the mechanical testing of hardness tensile and impact
C405.3	understand the applications of non destructive testing

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C405.4	understand the material characterization testing
C405.5	understandd the importance other testing

Course Code: C406Course Name:CE8711CREATIVE AND INNOVATIVE PROJECT

C406.1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.
C406.2	Relate the theoretical studies with experimental work or field work
C406.3	Gain Knowledge on real time problem related to project work
C406.4	Knowledge on design calculation based on design specification
C406.5	Explore the communication skill by project presentation

Course Code: C407Course Name:CE8712 INDUSTRIAL TRAINING

C407.1	The intricacies of implementation textbook knowledge into practice
C407.2	The concepts of developments and implementation of new techniques

Course Code: C408Course Name:GE8076 Professional Ethics in Engineering

C408.1	To inculcate the sense of social responsibility
C408.2	To develop a firm ethical base
C408.3	To make students realize the significance of ethics in professional environment
C408.4	Ethical social and environmental awareness
C408.5	Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibili in the society.

Course Code: C409Course Name:CE8020 Maintenance, Repair and Rehabilitation of Structures

C409.1	the importance of maintenance and assessment method of distressed structures.
C409.2	the strength and durability properties ,their effects due to climate and temperature.
C409.3	recent development in concrete
C409.4	the techniques for repair rand protection methods
C409.5	repair, rehabilitation and retrofitting of structures and demolition methods.

Course Code: C410Course Name:CE8811 PROJECT WORK

C410.1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.
C410.2	Relate the theoretical studies with experimental work or field work
C410.3	Gain Knowledge on real time problem related to project work
C410.4	Knowledge on design calculation based on design specification
C410.5	Explore the communication skill by project presentation

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COURSE OUTCOMES

(R 2017)

Branch:ME
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Course Code C101- Course Name -Advanced Mathematical Methods

C101.1	Application of Laplace and Fourier transforms to initial value, initial–boundary value and boundary value problems in Partial Differential Equations
C101.2	Maximizing and minimizing the functional that occur in various branches of Engineering Disciplines
C101.3	Construct conformal mappings between various domains and use of conformal mapping in studying problems in physics and engineering particularly to fluid flow and heat flow problems.
C101.4	Understand tensor algebra and its applications in applied sciences and engineering and develops ability to solve mathematical problems involving tensors.
C101.5	Competently use tensor analysis as a tool in the field of applied sciences and related fields.

Course Code C102- Course Name : Advanced Concrete Structures

C102.1	To make the students be familiar with the limit state design of RCC beams and columns
C102.2	To design special structures such as Deep beams, Corbels, Deep beams, and Grid floors
C102.3	To make the students confident to design the flat slab as per Indian standard, yield line theory and strip method.
C102.4	To design the beams based on limit analysis and detail the beams, columns and joints for ductility.
C102.5	On completion of this course the students will have the confidence to design various concrete structures and structural elements by limit state design and detail the same for ductility as per codal requirements.

Course Code C103 - Course Name Dynamics of Structures

C103.1	To expose the students the principles and methods of dynamic analysis of structures and to prepare them for designing the structures for wind, earthquake and other dynamic loads.
C103.2	After completion of the course the students will have the knowledge of vibration analysis of systems/structures with different degrees of freedom and they know the method of damping the systems.
C103.3	Dynamic response of continuous system
C103.4	solve problems using the direct method of integration of dynamic response
C103.5	Mode superposition technique and response spectrum method of dynamics analysis of system

Course Code C104 - Course Name: Theory of Elasticity and Plasticity

C104.1	To understand the concept of 3D stress, strain analysis and its applications.
C104.2	On completion of this course the students will be familiar to the concept of elastic analysis of plane stress and plane strain problems, beams on elastic foundation and torsion on non- circular section
C104.3	They will also have sufficient knowledge in various theories of failure and plasticity
C104.4	Expose the students to torsion of circular and non circular section
C104.5	Methods of analysis of beam in elastic foundation

Course Code C105 -Course Name: Maintenance and Rehabilitation of Structures

C105.1	To study the damages, repair and rehabilitation of structures
C105.2	Various types of cracks in concrete structure
C105.3	Study on moisture penetration remedial treatment and measures
C105.4	Knowledge on various distress in steel and concrete structures
C105.5	Different methods of strengthening of existing member

Course Code C106 -Course Name: Prefabricated Structures

C106.1	To Study the design principles, analysis and design of elements
C106.2	At the end of this course student will have good knowledge about the prefabricated elements and the technologies used in fabrication and erection
C106.3	They will be in a position to design floors, stairs, roofs, walls and industrial buildings, and various joints for the connections.
C106.4	study on Types of wall panels and shear walls existing in building

Course Code C107 -Course Name: Advanced Steel Structures

C107.1	To study the behaviour of members and connections, analysis and design of industrial buildings and roofs, chimneys.

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C107.2	Study the design of with cold formed steel and plastic analysis of structures.
C107.3	At the end of this course students will be in a position to design bolted and welded connections in industrial structures.
C107.4	They also know the plastic analysis and design of light gauge steel structures.
C107.5	Aseismic design of steel building

Course Code C108 - Course Name:Stability of Structures

C108.1	To study the concept of buckling and analysis of structural elements.
C108.2	On completion of this course student will know the phenomenon of buckling and they are in a position to calculate the buckling load on column, beam – column, frames and plates using classical and approximate methods.
C108.3	To learn the principles of measurements of static and dynamic response of structures and carryout the analysis of results.
C108.4	Study on lateral and torsional buckling of open sections

Course Code C109 -Course Name:Experimental Techniques

C110.1	To learn the principles of measurements of static and dynamic response of structures and carryout the analysis of results.
C110.2	At the end of this course students will know about measurement of strain, vibrations and wind blow
C110.3	They will be able to analyze the structure by non-destructive testing methods
C110.4	Direct and indirect method of model analysis of structures
C110.5	Exposure to choice on experimental stress analysis methods

Course CodeC110 -Course Name:Finite Element Analysis of Structures

C111.1	To study the basics of the Finite Element Technique, a numerical tool for the solution of different classes of problems.
C111.2	On completion of this course, the students will know the concept of finite element analysis and enable to analyze framed structure, Plate and Shells and modify using recent softwares.
C111.3	Acquire knowledge on Finite element Analysis of plate
C111.4	Acquire knowledge on Finite element Analysis of shell
C111.5	Acquire knowledge on Finite element Analysis of framed structures

Course Code C111 - Course Name:Industrial Structures

C112.1	To study the requirements, planning and design of industrial structures.
C112.2	On completion of this course student will be able to plan industrial structures for functional requirements.
C112.3	They will be able to design various structures such as Bunkers, Silos, Cooling Towers, Chimneys, and Transmission Towers with required foundations.
C112.4	Exposure to design of turbo generator foundation
C112.5	Study on various components of industrial building

Course Code C113 -Course Name: Prestressed Concrete

C113.1	Principle of prestressing, analysis and design of prestressed concrete structures
C113.2	On completion of this course students will have sufficient knowledge on various methods of prestressing and the concepts of partial pre-stressing.
C113.3	They will be in a position to design beams, pipes, water tanks, posts and similar structures.
C113.4	Prestressed Cylindrical tank design

Course Code C114 - Course Name:Advanced Structural Engineering Laboratory

C114.1	On completion of this laboratory course students will be able to cast and test RC beams for strength and deformation behaviour
C114.2	They will be able to test dynamic testing on steel beams, static cyclic load testing of RC frames and non-destruction testing on concrete.
C114.3	Fabrication, casting and testing of reinforced concrete column subjected to concentric and eccentric loading.
C114.4	Testing of simply supported steel beam for strength and deflection behaviour.
C114.5	Dynamic Response of cantilever steel beam

Course Code C115 Course Name: Practical Training I (2 weeks)

C115.1	To train the students in the field work so as to have a first hand knowledge of practical problems related to Structural Engineering in carrying out engineering tasks.
C115.2	To develop skills in facing and solving the field problems.
C115.3	They are trained in tackling a practical field/industry orientated problem related to Structural Engineering.

Course Code C201- Course Name:Earthquake Analysis and Design of Structures

C201.1	To study the effect of earthquakes, analysis and design of earthquake resistant Structures.
C201.2	At the end of this course the students will be able to understand the causes and effect of earthquake.
C201.3	They will be able to design masonry and RC structures to the earthquake forces as per the recommendations of IS codes of practice.
C201.4	Gain knowledge on vibration control Techniques
C201.5	Design earthquake resistant design of RC building using IS13920 1993

Course Code C202 -Course Name:Design of Sub Structures

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C202.1	To gain familiarity with different types of foundation
C202.2	To expose the students to the design of shallow foundations and deep foundations.
C202.3	To understand the concepts of designing well, machine and special foundations.
C202.4	They will be in a position to determine the load carrying capacity of each type of foundation.
C202.5	They will gain thorough knowledge about the design of reinforced concrete shallow foundations, pile foundations, well foundations, and machine foundations.

Course Code C203 -Course Name: Design of Steel Concrete Composite Structures

C203.1	To develop an understanding of the behaviour and design concrete composite elements and structures.
C203.2	At the end of this course students will be in a position to design composite beams, columns, trusses and box-girder bridges including the related connections.
C203.3	They will get exposure on case studies related to steel-concrete constructions of buildings.
C203.4	Dynamic behaviour of steel concrete composite construction

Course Code C204 -Course Name:Practical Training II (2 weeks)

C204.1	To train the students in the field work so as to have a firsthand knowledge of practical problems related to Structural Engineering in carrying out engineering tasks.
C204.2	To develop skills in facing and solving the field problems
C204.3	They are trained in tackling a practical field/industry orientated problem related to Structural Engineering.

Course Code C205 -Course Name:Seminar

C205.1	To work on a specific technical topic in Structural Engineering and acquire the skills of written and oral presentation.
C205.2	To acquire writing abilities for seminars and conferences.
C205.3	The students will be trained to face an audience and to tackle any problem during group discussion in the interviews.

Course Code C206 -Course Name: Project Work (Phase I)

C206.1	To identify a specific problem for the current need of the society and collecting information related to the same through detailed review of literature
C206.2	To develop the methodology to solve the identified problem.
C206.3	To train the students in preparing project reports and to face reviews and viva-voce examination.
C206.4	At the end of the course the students will have a clear idea of his/her area of work and they are in a position to carry out the remaining phase II work in a systematic way.

Course Code C207 - Course Name:Practical Training III (2 weeks)

C207.1	To train the students in the field work so as to have a firsthand knowledge of practical problems related to Structural Engineering in carrying out engineering tasks.
C207.2	To develop skills in facing and solving the field problems.
C207.3	They are trained in tackling a practical field/industry orientated problem related to Structural Engineering.
C207.4	To solve the identified problem based on the formulated methodology.

Course Code C208- Course Name:Project work (Phase II)

C208.1	To solve the identified problem based on the formulated methodology.
C208.2	To develop skills to analyze and discuss the test results, and make conclusions.
C208.3	On completion of the project work students will be in a position to take up any challenging practical problem and find better solutions.

COURSE OUTCOMES

(R 2013)

Branch:ME
Structural
Engineering

Course Code C101- Course Name -Advanced Mathematical Methods

C101.1	Application of Laplace and Fourier transforms to initial value, initial–boundary value and boundary value problems in Partial Differential Equations
C101.2	Maximizing and minimizing the functional that occur in various branches of Engineering Disciplines
C101.3	Construct conformal mappings between various domains and use of conformal mapping in studying problems in physics and engineering particularly to fluid flow and heat flow problems.
C101.4	Understand tensor algebra and its applications in applied sciences and engineering and develops ability to solve mathematical problems involving tensors.
C101.5	Competently use tensor analysis as a tool in the field of applied sciences and related fields.

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Course Code C102- Course Name : Concrete Structures

C102.1	To make the students be familiar with the limit state design of RCC beams and columns
C102.2	To design special structures such as Deep beams, Corbels, Deep beams, and Grid floors
C102.3	To make the students confident to design the flat slab as per Indian standard, yield line theory and strip method.
C102.4	To design the beams based on limit analysis and detail the beams, columns and joints for ductility.
C102.5	On completion of this course the students will have the confidence to design various concrete structures and structural elements by limit state design and detail the same for ductility as per codal requirements.

Course Code C103 - Course Name Structural Dynamics

C103.1	To expose the students the principles and methods of dynamic analysis of structures and to prepare them for designing the structures for wind, earthquake and other dynamic loads.
C103.2	After completion of the course the students will have the knowledge of vibration analysis of systems/structures with different degrees of freedom and they know the method of damping the systems.
C103.3	Dynamic response of continuous system
C103.4	solve problems using the direct method of integration of dynamic response
C103.5	Mode superposition technique and response spectrum method of dynamics analysis of system

Course Code C104 - Course Name: Theory of Elasticity and Plasticity

C104.1	To understand the concept of 3D stress, strain analysis and its applications.
C104.2	On completion of this course the students will be familiar to the concept of elastic analysis of plane stress and plane strain problems, beams on elastic foundation and torsion on non- circular section
C104.3	They will also have sufficient knowledge in various theories of failure and plasticity
C104.4	Expose the students to torsion of circular and non circular section
C104.5	Methods of analysis of beam in elastic foundation

Course Code C105 -Course Name: Maintenance and Rehabilitation of Structures

C105.1	To study the damages, repair and rehabilitation of structures
C105.2	Various types of cracks in concrete structure
C105.3	Study on moisture penetration remedial treatment and measures
C105.4	Knowledge on various distress in steel and concrete structures
C105.5	Different methods of strengthening of existing member

Course Code C106 -Course Name: Advanced Concrete Technology

C106.1	To study the properties of concrete Making
C106.2	Test on concrete
C106.3	Knowledge on Mix design of concrete
C106.4	Various types of concrete

Course CodeC107Course Name:Finite Element Analysis of Structures

C107.1	To study the basics of the Finite Element Technique, a numerical tool for the solution of different classes of problems.
C107.2	On completion of this course, the students will know the concept of finite element analysis and enable to analyze framed structure, Plate and Shells and modify using recent softwares.
C107.3	Acquire knowledge on Finite element Analysis of plate
C107.4	Acquire knowledge on Finite element Analysis of shell
C107.5	Acquire knowledge on Finite element Analysis of framed structures

Course Code C108 - Course Name:Experimental Techniques and Instrumentation

C108.1	To learn the principles of measurements of static and dynamic response of structures and carryout the analysis of results.
C108.2	At the end of this course students will know about measurement of strain, vibrations and wind blow
C108.3	They will be able to analyze the structure by non-destructive testing methods
C108.4	Direct and indirect method of model analysis of structures
C108.5	Exposure to choice on experimental stress analysis methods

Course Code C109 -Course Name: Steel Structures

C109.1	To study the behaviour of members and connections, analysis and design of industrial buildings and roofs, chimneys.
C109.2	Study the design of with cold formed steel and plastic analysis of structures.
C109.3	At the end of this course students will be in a position to design bolted and welded connections in industrial structures.
C109.4	They also know the plastic analysis and design of light gauge steel structures.
C109.5	Aseismic design of steel building

Course Code C110- Course Name:Earthquake Analysis and Design of Structures

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C110.1	To study the effect of earthquakes, analysis and design of earthquake resistant Structures.
C110.2	At the end of this course the students will be able to understand the causes and effect of earthquake.
C110.3	They will be able to design masonry and RC structures to the earthquake forces as per the recommendations of IS codes of practice.
C110.4	Gain knowledge on vibration control Techniques
C110.5	Design earthquake resistant design of RC building using IS13920 1993

Course Code C111 - Course Name:Design of Bridges

C111.1	Design of short Span RC Bridges
C111.2	Design of long span RC Bridges
C111.3	Design of prestressed concrete bridges
C111.4	Design of steel bridges
C111.5	Design of bearings and Substructures

Course Code C112 -Course Name: Prestressed Concrete

C112.1	Principle of prestressing, analysis and design of prestressed concrete structures
C112.2	On completion of this course students will have sufficient knowledge on various methods of prestressing and the concepts of partial pre-stressing.
C112.3	They will be in a position to design beams, pipes, water tanks, posts and similar structures.
C112.4	Prestressed Cylindrical tank design

Course Code C113 - Course Name:Advanced Structural Engineering Laboratory

C113.1	On completion of this laboratory course students will be able to cast and test RC beams for strength and deformation behaviour
C113.2	They will be able to test dynamic testing on steel beams, static cyclic load testing of RC frames and non-destruction testing on concrete.
C113.3	Fabrication, casting and testing of reinforced concrete column subjected to concentric and eccentric loading.
C113.4	Testing of simply supported steel beam for strength and deflection behaviour.
C113.5	Dynamic Response of cantilever steel beam

Course Code C201- Course Name:Design of Steel Concrete Composite structures

C201.1	To develop an understanding of the behaviour and design concrete composite elements and structures.
C201.2	At the end of this course students will be in a position to design composite beams, columns, trusses and box-girder bridges including the related connections.
C201.3	They will get exposure on case studies related to steel-concrete constructions of buildings.
C201.4	Dynamic behaviour of steel concrete composite construction

Course Code C202 -Course Name:Industrial Structures

C202.1	To study the requirements, planning and design of industrial structures.
C202.2	On completion of this course student will be able to plan industrial structures for functional requirements.
C202.3	They will be able to design various structures such as Bunkers, Silos, Cooling Towers, Chimneys, and Transmission Towers with required foundations.
C202.4	Exposure to design of turbo generator foundation
C202.5	Study on various components of industrial building

Course Code C203 -Course Name: Prefabricated structures

C203.1	To Study the design principles, analysis and design of elements
C203.2	At the end of this course student will have good knowledge about the prefabricated elements and the technologies used in fabrication and erection
C203.3	They will be in a position to design floors, stairs, roofs, walls and industrial buildings, and various joints for the connections.
C203.4	study on Types of wall panels and shear walls existing in building

Course Code C204 -Course Name:Practical Training (4 weeks)

C204.1	To train the students in the field work so as to have a firsthand knowledge of practical problems related to Structural Engineering in carrying out engineering tasks.
C204.2	To develop skills in facing and solving the field problems
C204.3	They are trained in tackling a practical field/industry orientated problem related to Structural Engineering.

Course Code C205 -Course Name:Seminar

C205.1	To work on a specific technical topic in Structural Engineering and acquire the skills of written and oral presentation.
C205.2	To acquire writing abilities for seminars and conferences.
C205.3	The students will be trained to face an audience and to tackle any problem during group discussion in the interviews.

Course Code C206 -Course Name: Project Work (Phase I)

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C206.1	To identify a specific problem for the current need of the society and collecting information related to the same through detailed review of literature
C206.2	To develop the methodology to solve the identified problem.
C206.3	To train the students in preparing project reports and to face reviews and viva-voce examination.
C206.4	At the end of the course the students will have a clear idea of his/her area of work and they are in a position to carry out the remaining phase II work in a systematic way.

Course Code C207- Course Name:Project work (Phase II)

C207.1	To solve the identified problem based on the formulated methodology.
C207.2	To develop skills to analyze and discuss the test results, and make conclusions.
C207.3	On completion of the project work students will be in a position to take up any challenging practical problem and find better solutions.

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Course Outcomes (CO)

(R 2013)

Branch: B.E, Mechanical Engineering

Course Code: C101 Course Name:HS6151 Technical English – I

C101.1	Read different genres of texts adopting various reading strategies.
C101.2	Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
C101.3	Listen/view and comprehend different spoken discourses/excerpts in different accents.
C101.4	Speak clearly, confidently, comprehensibly.
C101.5	Communicate with one or many listeners using appropriate communicative strategies.

Course Code: C102 Course Name: MA6151 Mathematics – I

C102.1	Use both the limit definition and rules of differentiation to differentiate functions
C102.2	Apply differentiation to solve maxima and minima problems.
C102.3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.
C102.4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
C102.5	Apply various techniques in solving differential equations.

Course Code:C103 Course Name: PH6151 Engineering Physics – I

C103.1	Acoustics, Production and the applications of Ultrasonics in Engineering and Medical Fields.
C103.2	Interference, different types of lasers and its application in various fields.
C103.3	Fiber optics and optical fiber and its applications.
C103.4	Development of quantum mechanics and its necessary, wave equations and its applications, X - Ray.
C103.5	Crystallography and can able to calculate the crystal parameters

Course Code: C104 Course Name:CY 6151 Engineering Chemistry – I

C104.1	To make the students conversant with basics of polymer chemistry.
C104.2	To make the student acquire sound knowledge of second law of thermodynamics and second law based derivations of importance in engineering applications.
C104.3	To acquaint the student with concepts of important photophysical and photochemical processes and spectroscopy.
C104.4	To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
C104.5	To acquaint the students with the basics of nano materials, their properties and applications.

Course Code: C105 Course Name:GE6151 Computer Programming

C105.1	Explain the components of computer and logical operations.
C105.2	Convert the number system and their representation.
C105.3	Discuss hardware and software devices
C105.4	Summarize network fundamentals.
C105.5	Plan the logic using flowchart and develop algorithm to write a C Program.

Course Code: C106 Course Name: GE6152 Engineering Graphics

C106.1	Ability to familiarize with the fundamentals and standards of Engineering graphics
C106.2	Ability to perform freehand sketching of basic geometrical constructions and multiple views of objects
C106.3	Ability to Project orthographic projections of lines and plane surfaces
C106.4	Ability to draw projections of solids and development of surfaces
C106.5	Ability to visualize and to project isometric and perspective sections of simple solids

Course Code: C107 Course Name:GE6161 Computer Practices Laboratory

C107.1	Prepare data using MS-word & Excel to visualize graphs, charts in MS-Excel.
C107.2	Outline the logic using flowchart for a given problem and to program using Switch case & Control structures
C107.3	Develop logic using decision making & looping statements
C107.4	Apply passing parameters using Arrays & Functions
C107.5	Construct structure and Union for a given database and to bring out the importance of Unions over structure

Course Code:C108 Course Name: GE6162 Engineering Practices Laboratory

C108.1	Ability to Fabricate carpentry components and pipe connections including plumbing works
C108.2	Ability to Use welding equipments to join the structures
C108.3	Ability to Carry out the basic machining operations
C108.4	Ability to Make the models using sheet metal works
C108.5	Ability to Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings

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Course Code:C109 Course Name:GE6163 Physics and Chemistry Laboratory - I

C109.1	To provide the basic practical exposure to all the engineering and technological streams in the field of physics.
C109.2	To provide the basic practical exposure to all the engineering and technological streams in the field of chemistry.
C109.3	The students are able to know about the water containing impurities and some physical parameters.
C109.4	To gain the knowledge about light, sound, laser, fiber optics and magnetism.
C109.5	To develop the knowledge of conductometric titration and viscometry

Course Code:C110 Course Name:HS6251 Technical English – II

C110.1	Read different genres of texts, infer implied meanings and critically analyse and evaluate them for ideas as well as for method of presentation.
C110.2	Write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
C110.3	Listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.
C110.4	Speak convincingly, express their opinions clearly.
C110.5	Initiate a discussion, negotiate, argue using appropriate communicative strategies.

Course Code:C111 Course Name:MA6251 Mathematics – II

C111.1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
C111.2	Gradient, divergence and curl of a vector point function and related identities.
C111.3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
C111.4	Analytic functions, conformal mapping and complex integration.
C111.5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

Course Code:C112 Course Name:PH6251 Engineering Physics – II

C112.1	Electric conduction, electrical conductivity, carrier concentration of metals.
C112.2	Semiconductors, carrier concentration of semiconductors, Hall effect and semiconductor devices.
C112.3	Types of magnetic materials, ferro magnetic materials, magnetic storage devices, Super conductors and their properties and applications.
C112.4	Dielectrics, properties and its applications, ferro electricity.
C112.5	Modern engineering materials, Nano materials and Carbon nano tubes.

Course Code:C113 Course Name:CY6251 Engineering Chemistry – II

C113.1	To make the students conversant with boiler feed water requirements, related problem and water treatment techniques.
C113.2	Principles of electrochemical reactions, redox reactions in corrosion of materials and methods for corrosion prevention and protection of materials.
C113.3	Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.
C113.4	Preparation, properties and applications of engineering materials.
C113.5	Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.

Course Code:C114 Course Name:GE6252 Basic Electrical and Electronics Engineering

C114.1	Ability to understand basic theorems used in Electrical circuits and the different components
C114.2	Ability to explain about the function and characteristics of electrical machines.
C114.3	Ability to explain about the fundamentals of semiconductor and applications.
C114.4	Ability to explain about the principles of digital electronics.
C114.5	Ability to explain about the knowledge of communication.

Course Code: C115 Course Name: GE6253 Engineering Mechanics

C115.1	Ability to illustrate the vectorial and scalar representation of forces and moments
C115.2	Ability to analyse the rigid body in equilibrium
C115.3	Ability to evaluate the properties of surfaces and solids
C115.4	Ability to calculate dynamic forces exerted in rigid body
C115.5	Ability to determine the friction and the effects by the laws of friction

Course Code: C116 Course Name:GE6261Computer Aided Drafting and Modeling Laboratory

C116.1	Sketch simple figures with title block using AutoCAD software commands.
C116.2	Sketch curves like parabola, spiral and involute of square & circle and draw the orthographic projection of simple solids.
C116.3	Prepare orthographic projection of simple machine parts and draw a plan of residential building.
C116.4	Sketch simple steel truss and sectional views of simple solids.
C116.5	Prepare 2D multi view drawing from 3D model.

Course Code:C117 Course Name:GE6262 Physics and Chemistry Laboratory -II

C117.1	To provide the basic practical exposure to all the engineering and technological streams in the field of physics.
C117.2	To provide the basic practical exposure to all the engineering and technological streams in the field of chemistry.
C117.3	The students are able to know about the water containing impurities and some physical parameters.
C117.4	To gain the knowledge about properties of matter, semiconductors and solar cells
C117.5	To develop the knowledge of spectrophotometry.

Course Code:C201 Course Name:MA6351 Transforms and Partial Differential Equations

C201.1	Understand how to solve the given standard partial differential equations.
C201.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
C201.3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.

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C201.4	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.
C201.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

Course Code: C202 Course Name:CE6306 Strength of Materials

C202.1	Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes
C202.2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment
C202.3	Apply basic equation of simple torsion in designing of shafts and helical spring
C202.4	Calculate the slope and deflection in beams using different methods.
C202.5	Analyze and design thin and thick shells for the applied internal and external pressures

Course Code:C203 Course Name: ME6301 Engineering Thermodynamics

C203.1	Apply the first law of thermodynamics for simple open and closed systems under steadyand unsteady conditions
C203.2	Apply second law of thermodynamics to open and closed systems and calculate entropyand availability
C203.3	Apply Rankine cycle to steam power plant and compare few cycle improvement methods
C203.4	Derive simple thermodynamic relations of ideal and real gases
C203.5	Calculate the properties of gas mixtures and moist air and its use in psychometric Processes

Course Code:C204 Course Name:CE6451 Fluid Mechanics and Machinery

C204.1	Apply mathematical knowledge to predict the properties and characteristics of a fluid.
C204.2	Can analyse and calculate major and minor losses associated with pipe flow in piping networks
C204.3	Can mathematically predict the nature of physical quantities
C204.4	Can critically analyse the performance of pumps
C204.5	Can critically analyse the performance of turbines

Course Code:C205 Course Name:ME6302Manufacturing Technology – I

C205.1	Explain different metal casting processes, associated defects, merits and demerits
C205.2	Compare different metal joining processes
C205.3	Summarize various hot working and cold working methods of metals
C205.4	Explain various sheet metal making processes
C205.5	Distinguish various methods of manufacturing plastic components

Course Code:C206 Course Name: EE6351Electrical Drives and Controls

C206.1	Students can able to explain different types of electrical machines.
C206.2	Students can able to explain the performance of various machines.
C206.3	Students can able to explain the different methods of starting dc motors and induction motors.
C206.4	Students can able to understand and explain the conventional and solid state dc drives.
C206.5	Students can able to understand and explain the conventional and solid state ac drives.

Course Code:C207 Course Name: ME6311 Manufacturing Technology

Laboratory - I

C207.1	Use different machine tools to manufacturing gears
C207.2	Ability to use different machine tools to manufacturing gears
C207.3	Ability to use different machine tools for finishing operations
C207.4	Ability to manufacture tools using cutter grinder
C207.5	Develop CNC part programming

Course Code:C208 Course Name: CE6461 Fluid Mechanics and Machinery Laboratory

C208.1	Calculate the coefficient of discharge for Orifice meter and Venturimeter.
C208.2	Calibrate the Rotameter and Estimate the friction factor for flow through pipes.
C208.3	Predict performance characteristics of centrifugal pump and submergible pump.
C208.4	Predict performance characteristics of reciprocating pump and gear pump.
C208.5	Predict performance characteristics of turbines.

Course Code:C209 Course Name: EE6365 Electrical Engineering Laboratory

C209.1	Ability to perform Load and speed characteristics of dc machines.
C209.2	Ability to perform Load and speed characteristics of induction motor.
C209.3	Ability to perform Load and performance characteristics of transformers.
C209.4	Ability to perform Load and performance characteristics of alternators.
C209.5	Ability to understand various ac and dc motor starters.

Course Code:C210 Course Name: MA6452 Statistics and Numerical Methods

C210.1	Identify small, large samples and apply testing of hypothesis.
C210.2	Apply ANOVA test to design of experiments.
C210.3	Determine the solution of algebraic and transcendal system of linear equations.
C210.4	To interpolate the values of unknown functions using Newton's Formula
C210.5	Estimate the numerical values of the derivatives and integrals of unknown function difference equations

Course Code:C211 Course Name: ME6401 Kinematics of Machinery

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C211.1	Ability to discuss the basics of mechanism
C211.2	Ability to calculate velocity and acceleration in simple mechanisms
C211.3	Ability to develop CAM profiles
C211.4	Ability to Solve problems on gears and gear trains
C211.5	Ability to examine friction in machine elements

Course Code:C212 Course Name:ME6402 Manufacturing Technology–II

C212.1	Ability to explain the mechanism of material removal processes
C212.2	Ability to describe the constructional and operational features of centre lathe and other specialpurpose lathes
C212.3	Describe the constructional and operational features of shaper, planner, milling, drilling,sawing and broaching machines
C212.4	Explain the types of grinding and other super finishing processes apart from gear manufacturing processes
C212.5	Ability to summarize numerical control of machine tools and write a part program

Course Code:C213 Course Name: ME6403 Engineering Materials and Metallurgy

C213.1	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification
C213.2	Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes
C213.3	Clarify the effect of alloying elements on ferrous and non-ferrous metals
C213.4	Summarize the properties and applications of non metallic materials.
C213.5	Explain the testing of mechanical properties

Course Code:C214 Course Name: GE6351 Environmental Science and Engineering

C214.1	Describe the structure and functions of different eco system.
C214.2	Identify the various causes, effects and control measures of different types of pollution.
C214.3	Summarize the over exploitation and their effects of natural resources.
C214.4	Appraise the environmental issues and possible solution.
C214.5	Explain the causes of population growth and explosion.

Course Code:C215 Course Name: ME6404Thermal Engineering

C215.1	Calculate the mean effective pressure and air standard efficiency of different gas power cycles.
C215.2	Calculate the performance test on IC engines.
C215.3	Sketch the velocity diagrams of single and multi-stage turbines.
C215.4	Explain the classification and working principle of various types of air compressors.
C215.5	Calculate properties of moist air and COP of vapor refrigeration systems by using refrigeration table andchart.

Course Code:C216 Course Name: ME6411 Manufacturing Technology Laboratory–II

C216.1	Demonstrate contour milling and generate a spur gear from a cylindrical work piece.
C216.2	Perform helical gear cutting operation and generate gear using hobbing machine.
C216.3	Generate gear using gear shaping machine and demonstrate plain surface grinding operation.
C216.4	Perform cylindrical grinding operation and practice Tool angle grinding with tool and Cutter Grinder.
C216.5	Measure cutting forces in Milling / Turning Process and develop CNC part programming.

Course Code:C217 Course Name:ME6412Thermal Engineering Laboratory - I

C217.1	Sketch the valve timing diagram and port timing diagram for single cylinder four stroke diesel engine and two stroke petrol engine.
C217.2	Calculate the mechanical efficiency of four stroke SI engine by Morse test.
C217.3	Evaluate the performance of four stroke single cylinder CI engine & Predict actual diagram.
C217.4	Evaluate the performance of steam generator and steam turbines.
C217.5	Measure the flash and fire point of various fuel/lubricants.

Course Code:C218 Course Name: CE6315 Strength of Materials Laboratory

C218.1	Evaluate the values of yield stress, breaking stress and ultimate stress of the given specimen under tension test.
C218.2	Conduct the torsion test to determine the modulus of rigidity of given specimen.
C218.3	Justify the Rockwell hardness test over with Brinell hardness and measure the hardness of the given specimen.
C218.4	Examine the stiffness of the open coil and closed coil spring and grade them.
C218.5	Analyze the microstructure and characteristics of specimen.

Course Code:C301 Course Name: ME6501 Computer Aided Design

C301.1	Describe theproductcycledesignprocess,sequentialandconcurrent Engineering.
C301.2	Explain the various types of curves, patches and surfaces and the constructive solid geometry with Boundary representation techniques.
C301.3	Apply the principle of visual realism for line, surface and solid removal algorithms and Explore the techniques involved in shading and coloring.
C301.4	Assemble the machine parts in different interfacing of positions and orientation and Calculate the mass property in the assembly modeling.
C301.5	Appraise the uses of standard for GKS and open GL library.

Course Code:C302 Course Name: ME6502 Heat and Mass Transfer

C302.1	Apply heat conduction equations to different surface configurations under steady state and transient conditions and solve problems
C302.2	Apply free and forced convective heat transfer correlations to internal and external flows through/over various surface configurations and solve problems
C302.3	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
C302.4	Explain basic laws for Radiation and apply these principles to radiative heat transfer between different types of surfaces to solve problems
C302.5	Apply diffusive and convective mass transfer equations and correlations to solve problems for different applications

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Course Code:C303 Course Name: Design of Machine Elements

C303.1	Explain the influence of steady and variable stresses in machine component design.
C303.2	Apply the concepts of design to shafts, keys and couplings
C303.3	Apply the concepts of design to temporary and permanent joints
C303.4	Apply the concepts of design to energy absorbing members, connecting rod and crank shaft.
C303.5	Apply the concepts of design to bearings

Course Code:C304 Course Name: ME6504 Metrology and Measurements

C304.1	Describe the concepts of measurements to apply in various metrological instruments
C304.2	Outline the principles of linear and angular measurement tools used for industrial applications
C304.3	Explain the procedure for conducting computer aided inspection
C304.4	Demonstrate the techniques of form measurement used for industrial components
C304.5	Discuss various measuring techniques of mechanical properties in industrial applications

Course Code:C305 Course Name: ME6505 Dynamics of Machines

C305.1	Calculate static and dynamic forces of mechanisms
C305.2	Calculate the balancing masses and their locations of reciprocating and rotating masses
C305.3	Compute the frequency of free vibration
C305.4	Compute the frequency of forced vibration and damping coefficient.
C305.5	Calculate the speed and lift of the governor and estimate the gyroscopic effect on automobiles, ships and airplanes

Course Code:C306 Course Name: GE6075Professional Ethics in Engineering

C306.1	Distinguish between Moral and Ethics.
C306.2	Summarize the moral theories and ethical inquiries.
C306.3	Evaluate the result of the engineering projects by applying ethical theories.
C306.4	Discuss about professional rights, employ rights and intellectual property rights, safety and risk involved in engineering projects.
C306.5	Judge the role of engineer in environmental issues, computer applications, weapons development, multinational corporations and Corporate Social Responsibility.

Course Code:C307 Course Name: ME6511 Dynamics Laboratory

C307.1	Review the various types of gears, gear trains, kinematic mechanisms, and universal joints.
C307.2	Estimate the mass moment of inertia of axisymmetric objects using Turn table apparatus, bi-filar suspension, compound pendulum and natural frequency for single and double rotor systems, equivalent spring mass system and transverse
C307.3	Inspect the critical speed of shaft under the given load conditions and the gyroscopic effect and couple on motorized gyroscope.
C307.4	Sketch the characteristic curves of Watt, Porter, Proell and Hartnell governors and motion curves for the given cam follower setup.
C307.5	Examine the balancing of rotating masses in dynamic balancing machine.

Course Code:C308 Course Name: ME6512 Thermal Engineering Laboratory-II

C308.1	Conduct a test to find thermal conductivity of various engineering materials.
C308.2	Measure heat transfer rate in free and forced convection environment.
C308.3	Measure emissivity of grey surface.
C308.4	Measure the effectiveness of parallel and counter flow heat exchanger.
C308.5	Measure COP of refrigeration and air conditioning system and performance of air compressor and fluidized bed cooling tower.

Course Code:C309 Course Name: ME6513 Metrology and Measurements Laboratory

C309.1	Check the dimensions and the dimensional deviations of given parts.
C309.2	Inspect the dimensions, angularity and parallelism of a given component.
C309.3	Construct the torque characteristic curves to various loads at various distances.
C309.4	Evaluate the straightness of surfaces and determine size of irregularities on a machined surface.
C309.5	Measure the vertical distances or height of objects, taper angle of slope for a given component, various parameters of threads and gear wheel.

Course Code:C310 Course Name: ME6601 Design of Transmission systems

C310.1	Design belt drives (flat belt, V-belt), chain drives, rope drives, belt drive pulleys & chain sprockets.
C310.2	Design spur and straight helical gears based on strength and wear consideration.
C310.3	Design straight bevel gear, worm gear pair and cross helical gear.
C310.4	Design various gear boxes (sliding mesh, constant mesh, multispeed) through geometric progression, standard step ratio, ray diagram, kinematics layout.
C310.5	Design various cams, clutches, internal and external shoe brakes using basic knowledge acquired from earlier studies.

Course Code:C311 Course Name: MG6851Principles of Management

C311.1	Explain the purpose of management & managerial roles in local and global organization.
C311.2	Prescribe the decision making model under different conditions.
C311.3	Explain the process of staff selection and career development.
C311.4	Demonstrate creativity and innovation, and explain the motivational theories.
C311.5	Explain the process of different types of control, and planning operations in management.

Course Code:C312 Course Name:ME6602Automobile Engineering

C312.1	Explain the various types of chassis, frame and functions of IC engine parts.
C312.2	Describe the engine auxiliary system used in SI and CI engine.
C312.3	Distinguish between the manual transmission systems with automatic transmission systems.

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C312.4	Demonstrate how the steering, brakes and the suspension system operate.
C312.5	Justify the importance of alternative fuels.

Course Code:C313 Course Name: ME6603 Finite Element Analysis

C313.1	Explain the steps involved in FEA and also the types of weight residual methods.
C313.2	Formulate FE equation for structural, heat transfer and vibration problems.
C313.3	Predict finite element equations for two dimensional thermal and torsion problems.
C313.4	Predict finite element equations for axisymmetric bodies, plate and shell.
C313.5	Apply matrix solution techniques to dynamic problems.

Course Code:C314 Course Name: ME6604 Gas Dynamics and Jet Propulsion

C314.1	Discuss the basic difference between incompressible flow and compressible flow and the effect of Mach number on compressible flow.
C314.2	Compare Fanno flow and Rayleigh flow and calculate the flow properties in Fanno flow and Rayleigh flow.
C314.3	Compute the PrandtlMeyer equation for shock waves.
C314.4	Compare the working of various jet engines and calculate thrust & efficiency in jet propulsion using gas dynamics principles.
C314.5	Classify rocket engines and calculate efficiency in rocket propulsion.

Course Code:C315 Course Name: ME6004 Unconventional Machining Processes

C315.1	Justify the needs of unconventional machining processes.
C315.2	Explain the working principles of Mechanical Energy Based Processes and various process parameters influence on their performance.
C315.3	Differentiate between Electric discharge machining and Wire cut Electric discharge machining.
C315.4	Compare the chemical machining process with electro-chemical machining process.
C315.5	Explain the working principles of thermal energy based processes.

Course Code:C316 Course Name: ME6611 C.A.D. / C.A.M. Laboratory

C316.1	Create 2D and 3D models using modeling software.
C316.2	Understand the CNC control in modern manufacturing system.
C316.3	Prepare CNC part programming and perform manufacturing.
C316.4	Create the CL Data and Post process generation using CAM packages.
C316.5	Apply CAPP in Machining and Turning Centre.

Course Code:C317 Course Name: ME6612 Design and Fabrication Project

C317.1	Develop conceptual and engineering design of any mechanical components and also to fabricate them using different manufacturing tools.

Course Code :C318 Course Name: GE6563 Communication Skills – Laboratory Based

C318.1	Apply appropriate communication skills across settings, purposes, and audiences.
C318.2	Demonstrate knowledge of communication theory and application.
C318.3	Practice critical thinking to develop innovative and well-founded perspectives related to the students' emphases.
C318.4	Build and maintain healthy and effective relationships. Use technology to communicate effectively in various settings and contexts.
C318.5	Demonstrate appropriate and professional ethical behavior.

Course Code:C401 Course Name: ME6701 Power Plant Engineering

C401.1	Explain the layout, construction and working of the components inside a thermal power plant
C401.2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants
C401.3	Explain the layout, construction and working of the components inside nuclear power plants
C401.4	Explain the layout, construction and working of the components inside Renewable energy power plants
C401.5	Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy produc

Course Code:C402 Course Name: ME6702 Mechatronics

C402.1	State the specifications of sensors and choose the suitable sensors for real time applications.
C402.2	Combine the real time control systems with peripheral devices through programmable interface techniques.
C402.3	Test the input output terminals of PLC based control system by interfacing technique.
C402.4	Construct the ladder logic circuits for simple automation system.
C402.5	Design Mechatronics system with the help of microprocessor, PLC and other electrical and electronic Circuits.

Course Code:C403 Course Name:ME6703Computer Integrated Manufacturing Systems

C403.1	Describe the elements of CIM system & an automated system, Production system and mathematical models of production performance & manufacturing control.
C403.2	Discuss the use of computers in process planning, different aspects of planning system and control systems.
C403.3	Solve the simple problems in part coding system in Group Technology and quantitative analysis in cellular manufacturing.
C403.4	Discuss the flexible manufacturing system components, planning & control and Automated Guided Vehicle System.
C403.5	Discuss the Robot anatomy, related attributes, and classification of robots, robot control systems and robot part programming.

Course Code:C404 Course Name: GE6757 Total Quality Management

C404.1	Students will be able to gain basic knowledge in total quality management relevant to both manufacturing and service industry including IT sector
C404.2	Students will be able to implement the basic principles of TQM in manufacturing and service based organization.
C404.3	The student would be able to apply the traditional tools and techniques of quality management to
C404.4	The student would be able to apply the new tools and techniques of quality management to manufacturing and services processes.
C404.5	Students will gain knowledge on Quality systems and International standards

Course Code:C405 Course Name: ME6005Process Planning and Cost Estimation

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C405.1	Explain the methods of process planning and the various steps involved in process selection.
C405.2	Examine the various steps involved in process planning activities.
C405.3	Explain the procedure of cost estimation.
C405.4	Estimate the production cost of a given component produced in foundry shop, forging shop & welding shop.
C405.5	Calculate the machining time for different operations performed in lathe, milling, shaping, planning, drilling, boring & grinding.

Course Code:C406 Course Name: ME6012 Maintenance Engineering

C406.1	Ability to understand the principles and objectives of Maintenance Engineering.
C406.2	Ability to describe the various categories of maintenance.
C406.3	Ability to discuss various condition monitoring techniques.
C406.4	Ability to explain the repair methods of beds and slide ways.
C406.5	Ability to explain the repair methods of material handling equipment's.

Course Code:C407 Course Name: ME6711Simulation and Analysis Laboratory

C407.1	Simulate simple problems in vibrations and simple mechanisms using simulation software.
C407.2	Perform analysis of stress, truss/beam and dynamic analysis of mechanical members.
C407.3	Perform two dimensional stress analysis in plate and asymmetric shells.
C407.4	Analyze the temperature distribution in one dimensional heat transfer problems (walls and fins).
C407.5	Analyze the temperature distribution in two dimensional heat transfer problems (plates and shell).

Course Code:C408 Course Name:ME6712Mechatronics Laboratory

C408.1	Ability to create the program for arithmetic functions and the program for sorting, code conversion functions.
C408.2	Ability to formulate the program codes to interface with traffic light controller and stepper motor.
C408.3	Ability to compare the set speed with actual speed of DC motor by interfacing suitable speed sensors.
C408.4	Ability to integrate all the hydraulic, pneumatic and electro pneumatic circuits by using simulation software.
C408.5	Ability to create the program for arithmetic functions and the program for sorting, code conversion functions.

Course Code:C409 Course Name: ME6713 Comprehension

C409.1	Understand and comprehend any given problem related to mechanical engineering field.

Course Code:C410 Course Name: MG6863 Engineering Economics

C410.1	Learn basics of Engineering Economics and optimum costing.
C410.2	Understand Value Engineering and Time Value of Money.
C410.3	Differentiate Cash Dominated and Revenue Dominated Cash flow.
C410.4	Apply suitable cash flow methods for different Situations.
C410.5	Apply Depreciation methods for Individual/Industrial/Public Alternatives.

Course Code:C411 Course Name: IE6605 Production Planning and Control

C411.1	Describe the functions of production control, various production system, different aspects of product development and break even analysis.
C411.2	Describe the concept of Method study, Motion study and work measurement techniques.
C411.3	Perform the analysis of problems in lack of product planning, quantity determination in batch production and analysis of process capabilities in a multi product system.
C411.4	Discuss about production scheduling, production control systems, progress reporting & expediting and techniques for aligning completion times & due dates.
C411.5	Calculate the economic order quantity & economic lot size in inventory control.

Course Code:C412 Course Name: ME6016 Advanced I.C. Engines

C412.1	Explain fuel injection systems in SI engine, types of combustion chamber and combustion process.
C412.2	Explain different types of fuel injection system and combustion chambers of CI engine.
C412.3	Explain the mechanism of pollution formation and the evolution of emission norms.
C412.4	Describe the properties of various alternative fuels, engine modification required and emission characteristic of alternative fuels.
C412.5	Discuss various ignition methods used in I.C engine and electronic engine management system.

Course Code:C413 Course Name:ME6811Project work

C413.1	Develop the ability to solve a specific problem right from its identification and literature review till finding the successful solution of the same

Course Outcomes (CO)

(R 2017)

: B.E, Mechanical Engineering

Course Name: HS8151 Communicative English

C101.1	Read articles of a general kind in magazines and newspapers.
C101.2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
C101.3	Comprehend conversations and short talks delivered in English.
C101.4	Write short essays of a general kind.
C101.5	Write personal letters and emails in English.

ourse Name: MA8151 Engineering Mathematics-I

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C102.1	Use both the limit definition and rules of differentiation to differentiate functions
C102.2	Apply differentiation to solve maxima and minima problems.
C102.3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus. Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts. Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.
C102.4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
C102.5	Apply various techniques in solving differeptial equations.

3 Course Name: PH8151 Engineering Physics

C103.1	The students will gain knowledge on the basics of properties of matter and its applications
C103.2	The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics
C103.3	The students will have adequate knowledge on the concepts of thermal properties of the materials and their applications in expansion joints and heat exchangers.
C103.4	The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunnelling microscopes,
C103.5	The students will understand the basics of crystals their structures and different crystal growth techniques.

Course Code: C104 Course Name: CY8151 Engineering Chemistry

C104.1	To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
C104.2	To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
C104.3	Preparation, properties and applications of engineering materials.
C104.4	Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.
C104.5	Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.

ourse Name: GE8151 Problem Solving and Python

Programming

C105.1	Develop algorithmic solutions to simple computational problems
C105.2	Read, write, execute by hand simple Python programs.
C105.3	Structure simple Python programs for solving problems.
C105.4	Decompose a Python program into functions.
C105.5	Represent compound data using Python lists, tuples, dictionaries. Read and write data from/to files in Python Programs.

Course Name: GE8152 Engineering Graphics

C106.1	Ability to familiarize with the fundamentals and standards of Engineering graphics
C106.2	Ability to perform freehand sketching of basic geometrical constructions and multiple views of objects
C106.3	Ability to Project orthographic projections of lines and plane surfaces
C106.4	Ability to draw projections of solids and development of surfaces
C106.5	Ability to visualize and to project isometric and perspective sections of simple solids

ourse Name: GE8161 Problem Solving and Python

Programming Lab

C107.1	Write, test, and debug simple Python programs.
C107.2	Implement Python programs with conditionals and loops.
C107.3	Develop Python programs step-wise by defining functions and calling them.
C107.4	Use Python lists, tuples, dictionaries for representing compound data.
C107.5	Read and write data from/to files in Python.

Course Name: BS8161 Physics & Chemistry Lab

C108.1	To provide the basic practical exposure to all the engineering and technological streams in the field of physics with properties of matter and liquids.
C108.2	To provide the basic practical exposure to all the engineering and technological streams in the field of optics.
C108.3	The students are able to know about the thermal physics.
C108.4	To gain the knowledge about crystalline materials.
C108.5	To develop the knowledge of fiber optics cables optics and its applications

109 Course Name: HS8251 Technical English

C109.1	Read technical texts
C109.2	Write area- specific texts effortlessly.
C109.3	Listen lectures in their area of specialization.
C109.4	Comprehend talks in their area of specialisation
C109.5	Speak appropriately and effectively in varied formal and informal contexts.

ourse Name: MA 8251 Engineering Mathematics-II

C110.1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
C110.2	Gradient, divergence and curl of a vector point function and related identities.
C110.3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
C110.4	Analytic functions, conformal mapping and complex integration.
C110.5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

111 Course Name: PH8251 Material Science

C111.1	The students will have knowledge on the various phase diagrams and their applications

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C111.2	The students will acquire knowledge on Fe-Fe2C phase diagram various microstructures and alloys
C111.3	The students will get knowledge on mechanical properties of materials and their measurements
C111.4	The students will gain knowledge on magnetic dielectric, and superconducting materials and properties of materials
C111.5	The students will understand the basics of ceramics , composites and nano materials

ırse Name: BE8253 Basic Electrical, Electronics and

Instrumentation Engineering

C112.1	Understand the basic eelctric circuits and various theroms
C112.2	Understand the concepts of AC circuits
C112.3	Understanding the working principles of electrical machines
C112.4	Understand the concepts of various electronic devices
C112.5	Choose appropriate instruments for electrical measurement for a specific application

e Name: GE8291 Environment science and engineering

C113.1	Public awareness of environment at infant stage.
C113.2	Pollution controlling aids
C113.3	Development and improvement in standard of living has lead to serious environmental disasters.
C113.4	Ignorance and incomplete knowledge has lead to misconceptions. Knowledge about water conservation methods.
C113.5	World's Population related problems and AIDS

Course Name: GE8292 Engineering Mechanics

C114.1	Ability to illustrate the vectorial and scalar representation of forces and moments
C114.2	Ability to analyse the rigid body in equilibrium
C114.3	Ability to evaluate the properties of surfaces and solids
C114.4	Ability to calculate dynamic forces exerted in rigid body
C114.5	Ability to determine the friction and the effects by the laws of friction

5 Course Name: GE8261 Engineering Practices

Laboratory

C115.1	Ability to Fabricate carpentry components and pipe connections including plumbing works
C115.2	Ability to Use welding equipments to join the structures
C115.3	Ability to Carry out the basic machining operations
C115.4	Ability to Make the models using sheet metal works
C115.5	Ability to Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings

ne: MA8353 Transforms and Partial Differential Equations

C201.1	Understand how to solve the given standard partial differential equations.
C201.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
C201.3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
C201.4	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.
C201.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

urse Name: ME8391 Engineering Thermodynamics

C202.1	Apply the first law of thermodynamics for simple open and closed systems under steady and unsteady conditions
C202.2	Apply second law of thermodynamics to open and closed systems and calculate entropy and availability
C202.3	Apply Rankine cycle to steam power plant and compare few cycle improvement methods
C202.4	Derive simple thermodynamic relations of ideal and real gases
C202.5	Calculate the properties of gas mixtures and moist air and its use in psychometric Processes

3 Course Name: CE8394 Fluid Mechanics and

Machinery

C203.1	Apply mathematical knowledge to predict the properties and characteristics of a fluid.	
C203.2	Can analyse and calculate major and minor losses associated with pipe flow in piping networks	
C203.3	Can mathematically predict the nature of physical quantities	
C203.4	Can critically analyse the performance of pumps	
C203.5	Can critically analyse the performance of turbines	

urse Name: ME8351 Manufacturing Technology –I

C204.1	Explain different metal casting processes, associated defects, merits and demerits
C204.2	Compare different metal joining processes
C204.3	Summarize various hot working and cold working methods of metals
C204.4	Explain various sheet metal making processes
C204.5	Distinguish various methods of manufacturing plastic components

ourse Name: ME8361 Manufacturing Technology

Lab - I

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C206.1	Use different machine tools to manufacturing gears
C206.2	Ability to use different machine tools to manufacturing gears
C206.3	Ability to use different machine tools for finishing operations
C206.4	Ability to manufacture tools using cutter grinder
C206.5	Develop CNC part programming

se Name: ME8381 Computer Aided Machine drawing

Lab

C207.1	Follow the drawing standards, Fits and Tolerances
C207.2	Re-create part drawings, sectional views and assembly drawings as per standards

ame: HS8381 Interpersonal Skills / Listening & Speaking

C209.1	Ability to Listen and respond appropriately
C209.2	Ability to participate in group discussions
C209.3	Ability to make effective presentations
C209.4	Ability to give information and converse with accuracy
C209.5	Participate confidently in conversations both formal and informal

Course Name: ME8492 Kinematics of Machinery

C211.1	Ability to discuss the basics of mechanism
C211.2	Ability to calculate velocity and acceleration in simple mechanisms
C211.3	Ability to develop CAM profiles
C211.4	Ability to Solve problems on gears and gear trains
C211.5	Ability to examine friction in machine elements

arse Name: ME8451 Manufacturing Technology– II

C212.1	Ability to explain the mechanism of material removal processes
C212.2	Ability to describe the constructional and operational features of centre lathe and other special purpose lathes
C212.3	Describe the constructional and operational features of shaper, planner, milling, drilling, sawing and broaching machines
C212.4	Explain the types of grinding and other super finishing processes apart from gear manufacturing processes
C212.5	Ability to summarize numerical control of machine tools and write a part program

Course Name: ME8491 Engineering Metallurgy

C213.1	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification
C213.2	Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes
C213.3	Clarify the effect of alloying elements on ferrous and non-ferrous metals
C213.4	Summarize the properties and applications of non-metallic materials.
C213.5	Explain the testing of mechanical properties

ne: CE8395 Strength of Materials For Mechanical Engineers

C214.1	Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes
C214.2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment
C214.3	Apply basic equation of simple torsion in designing of shafts and helical spring
C214.4	Calculate the slope and deflection in beams using different methods.
C214.5	Analyze and design thin and thick shells for the applied internal and external pressures

Course Name: ME8493 Thermal Engineering-I

C215.1	Calculate the mean effective pressure and air standard efficiency of different gas power cycles.
C215.2	Calculate the performance test on IC engines.
C215.3	Sketch the velocity diagrams of single and multi-stage turbines.
C215.4	Explain the classification and working principle of various types of air compressors.
C215.5	Calculate properties of moist air and COP of vapor refrigeration systems by using refrigeration table and chart.

ourse Name: ME8462 Manufacturing Technology

Lab-II

C216.1	Demonstrate contour milling and generate a spur gear from a cylindrical work piece.
C216.2	Perform helical gear cutting operation and generate gear using hobbing machine.
C216.3	Generate gear using gear shaping machine and demonstrate plain surface grinding operation.
C216.4	Perform cylindrical grinding operation and practice Tool angle grinding with tool and Cutter Grinder.
C216.5	Measure cutting forces in Milling / Turning Process and develop CNC part programming.

Strength of Materials and Fluid Mechanics and Machinery Laboratory

C217.1	Ability to perform Tension, Torsion, Hardness, Compression, and Deformation test on Solid materials

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irse Name: HS8461 Advanced Reading and Writing

C218.1	Ability to read and evaluate texts critically
C218.2	Ability to write different types of essays
C218.3	Ability to write reports and winning job applications
C218.4	Ability to organize ideas, projects and to write e-mails.
C218.5	Ability to display critical thinking in various professional contexts.

Course Name: ME8595 Thermal Engineering-II

C301.1	Solve problems in Steam Nozzle
C301.2	Explain the functioning and features of different types of Boilers and auxiliaries and calculate performance parameters
C301.3	Explain the flow in steam turbines, draw velocity diagrams for steam turbines and solve problems
C301.4	Summarize the concept of Cogeneration, Working features of Heat pumps and Heat exchangers
C301.5	Solve problems using refrigerant table / charts and psychrometric charts

'ourse Name: ME8593 Design of Machine Elements

C302.1	Explain the influence of steady and variable stresses in machine component design.
C302.2	Apply the concepts of design to shafts, keys and couplings
C302.3	Apply the concepts of design to temporary and permanent joints
C302.4	Apply the concepts of design to energy absorbing members, connecting rod and crank shaft.
C302.5	Apply the concepts of design to bearings

urse Name: ME8501 Metrology and Measurements

C303.1	Describe the concepts of measurements to apply in various metrological instruments
C303.2	Outline the principles of linear and angular measurement tools used for industrial applications
C303.3	Explain the procedure for conducting computer aided inspection
C303.4	Demonstrate the techniques of form measurement used for industrial components
C303.5	Discuss various measuring techniques of mechanical properties in industrial applications

Course Name: ME8594 Dynamics of Machines

C304.1	Calculate static and dynamic forces of mechanisms
C304.2	Calculate the balancing masses and their locations of reciprocating and rotating masses
C304.3	Compute the frequency of free vibration
C304.4	Compute the frequency of forced vibration and damping coefficient.
C304.5	Calculate the speed and lift of the governor and estimate the gyroscopic effect on automobiles, ships and airplanes

urse Name: ME8511 Kinematics & Dynamics Lab

C306.1	Explain gear parameters, kinematics of mechanisms, gyroscopic effect and working of lab equipment's
C306.2	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

Course Name: ME8512 Thermal Engineering Lab

C307.1	Conduct a test to find thermal conductivity of various engineering materials.
C307.2	Measure heat transfer rate in free and forced convection environment.
C307.3	Measure emissivity of grey surface.
C307.4	Measure the effectiveness of parallel and counter flow heat exchanger.
C307.5	Measure COP of refrigeration and air conditioning system and performance of air compressor and fluidized bed cooling tower.

308 Course Name: ME8513 Metrology and

Measurements Lab

C308.1	Check the dimensions and the dimensional deviations of given parts.
C308.2	Inspect the dimensions, angularity and parallelism of a given component.
C308.3	Construct the torque characteristic curves to various loads at various distances.
C308.4	Evaluate the straightness of surfaces and determine size of irregularities on a machined surface.
C308.5	Measure the vertical distances or height of objects, taper angle of slope for a given component, various parameters of threads and gear wheel.

irse Name: ME8651 Design of Transmission systems

C309.1	Design belt drives (flat belt, V-belt), chain drives, rope drives, belt drive pulleys & chain sprockets.
C309.2	Design spur and straight helical gears based on strength and wear consideration.
C309.3	Design straight bevel gear, worm gear pair and cross helical gear.
C309.4	Design various gear boxes (sliding mesh, constant mesh, multispeed) through geometric progression, standard step ratio, ray diagram, kinematics layout.
C309.5	Design various cams, clutches, internal and external shoe brakes using basic knowledge acquired from earlier studies.

ame: ME8691 Computer Aided Design and Manufacturing

C310.1	Explain the 2D and 3D transformations, clipping algorithm, Manufacturing models and Metrics
C310.2	Explain the fundamentals of parametric curves, surfaces and Solids
C310.3	Summarize the different types of Standard systems used in CAD
C310.4	Apply NC & CNC programming concepts to develop part programme for Lathe & Milling Machines
C310.5	Summarize the different types of techniques used in Cellular Manufacturing and FMS

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Course Name: ME8693 Heat and Mass Transfer

C311.1	Apply heat conduction equations to different surface configurations under steady state and transient conditions and solve problems
C311.2	Apply free and forced convective heat transfer correlations to internal and external flows through/over various surface configurations and solve problems
C311.3	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
C311.4	Explain basic laws for Radiation and apply these principles to radiative heat transfer between different types of surfaces to solve problems
C311.5	Apply diffusive and convective mass transfer equations and correlations to solve problems for different applications

Course Name: ME8692 Finite Element Analysis

C312.1	Explain the steps involved in FEA and also the types of weight residual methods.
C312.2	Formulate FE equation for structural, heat transfer and vibration problems.
C312.3	Predict finite element equations for two dimensional thermal and torsion problems.
C312.4	Predict finite element equations for axisymmetric bodies, plate and shell.
C312.5	Apply matrix solution techniques to dynamic problems.

ourse Name: ME8694 Hydraulics and Pneumatics

C313.1	Explain the Fluid power and operation of different types of pumps
C313.2	Summarize the features and functions of Hydraulic motors, actuators and Flow control valves

ɔurse Name: ME8681 C.A.D. / C.A.M. Laboratory

C315.1	Create 2D and 3D models using modeling software.
C315.2	Understand the CNC control in modern manufacturing system.
C315.3	Prepare CNC part programming and perform manufacturing.
C315.4	Create the CL Data and Post process generation using CAM packages.
C315.5	Apply CAPP in Machining and Turning Centre.

ırse Name: ME8682 Design and Fabrication Project

C316.1	Develop conceptual and engineering design of any mechanical components and also to fabricate them using different manufacturing tools.

ɔurse Name: HS8581 Professional Communication

C317.1	Make effective presentations
C317.2	Participate confidently in Group Discussions
C317.3	Attend job interviews and be successful in them
C317.4	Develop adequate Soft Skills required for the workplace

Course Name: ME8792 Power Plant Engineering

C401.1	Explain the layout, construction and working of the components inside a thermal power plant
C401.2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants
C401.3	Explain the layout, construction and working of the components inside nuclear power plants
C401.4	Explain the layout, construction and working of the components inside Renewable energy power plants
C401.5	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

Name: ME8793 Process Planning and Cost Estimation

C402.1	Explain the methods of process planning and the various steps involved in process selection.
C402.2	Examine the various steps involved in process planning activities.
C402.3	Explain the procedure of cost estimation.
C402.4	Estimate the production cost of a given component produced in foundry shop, forging shop & welding shop.
C402.5	Calculate the machining time for different operations performed in lathe, milling, shaping, planning, drilling, boring & grinding.

C403 Course Name: ME8791 Mechatronics

C403.1	State the specifications of sensors and choose the suitable sensors for real time applications.
C403.2	Combine the real time control systems with peripheral devices through programmable interface techniques.
C403.3	Test the input output terminals of PLC based control system by interfacing technique.
C403.4	Construct the ladder logic circuits for simple automation system.
C403.5	Design Mechatronics system with the help of microprocessor, PLC and other electrical and electronic Circuits.

ırse Name: ME8791 Simulation and Analysis Lab

C407.1	Simulate simple problems in vibrations and simple mechanisms using simulation software.
C407.2	Perform analysis of stress, truss/beam and dynamic analysis of mechanical members.
C407.3	Perform two dimensional stress analysis in plate and asymmetric shells.
C407.4	Analyze the temperature distribution in one dimensional heat transfer problems (walls and fins).
C407.5	Analyze the temperature distribution in two dimensional heat transfer problems (plates and shell).

Course Name: ME8781 Mechatronics Laboratory

C408.1	Ability to create the program for arithmetic functions and the program for sorting, code conversion functions.
C408.2	Ability to formulate the program codes to interface with traffic light controller and stepper motor.
C408.3	Ability to compare the set speed with actual speed of DC motor by interfacing suitable speed sensors.
C408.4	Ability to integrate all the hydraulic, pneumatic and electro pneumatic circuits by using simulation software.

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C408.5	Ability to create the program for arithmetic functions and the program for sorting, code conversion functions.

09 Course Name: ME8712 Technical Seminar

C409.1	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

Course Name: MG8591 Principle of Management

C410.1	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

C412 Course Name: ME8811 Project work

C412.1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology

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COURSE OUTCOMES
(R 2013)

Branch:B.E.Biomedical Engineering

Course Code: C101 Course Name:HS6151 Technical English – I

C101.1	Speak clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies.
C101.2	Write cohesively and coherently and flawlessly avoiding grammatical errors
C101.3	Using a wide vocabulary range, organizing their ideas logically on a topic.
C101.4	Read different genres of texts adopting various reading strategies.
C101.5	Listen/view and comprehend different spoken discourses/excerpts in different accents.

Course Code: C102 Course Name:MA6151 Mathematics – I

C102.1	Develop the use of matrix algebra techniques this is needed by engineers for practical applications
C102.2	Make the student knowledgeable in the area of infinite series and their convergence so that he/ she will be familiar with limitations of using infinite series approximations for solutions arising in mathematical modeling
C102.3	Familiarize the student with functions of several variables. This is needed in many branches of engineering
C102.4	Introduce the concepts of improper integrals, Gamma, Beta and Error functions which are needed in engineering applications
C102.5	Acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage

Course Code: C103 Course Name:PH6151 Engineering Physics – I

C103.1	Apply knowledge on the basis of physics related to properties of matter
C103.2	Apply knowledge on the basis of physics related to optics
C103.3	Apply knowledge related to acoustics
C103.4	Apply these fundamental principles to solve practical problems
C103.5	The materials are used for engineering applications

Course Code: C104 Course Name:CY6151 Engineering Chemistry – I

C104.1	Make the students conversant with basics of polymer chemistry
C104.2	To make the student acquire sound knowledge of second law of thermodynamics and second law based derivations of importance in engineering applications in all disciplines
C104.3	Acquaint the student with concepts of important photophysical and photochemical processes and spectroscopy
C104.4	Develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys
C104.5	Acquaint the students with the basics of nano materials, their properties and applications

Course Code: C105 Course Name:GE6151 Computer Programming

C105.1	Learn the organization of a digital computer
C105.2	Be exposed to the number systems
C105.3	Learn to think logically and write pseudo code or draw flow charts for problems
C105.4	Be exposed to the syntax of C
C105.5	Be familiar with programming in C, Learn to use arrays, strings, functions, pointers, structures and unions in C

Course Code: C106 Course Name: GE6152 Engineering Graphics

C106.1	perform free hand sketching of basic geometrical constructions and multiple views of objects
C106.2	do orthographic projection of lines and plane surfaces
C106.3	draw projections and solids and development of surfaces
C106.4	prepare isometric and perspective sections of simple solids
C106.5	demonstrate computer aided drafting

Course Code: C107 Course Name: GE6161 Computer Practices Laboratory

C107.1	Introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics and properties of matter
C107.2	Get the practical skills in the field of thermal physics
C107.3	Acquire the industrial knowledge in the field of properties of matter
C107.4	Acquire practical skills in the determination of water quality parameters through volumetric and instrumental analysis.
C107.5	acquaint the students with the determination of molecular weight of a polymer by viscometry

Course Code: C108 Course Name: GE6162 Engineering Practices Laboratory

C108.1	To provide exposure to the students with hands on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering
C108.2	Study of plumbing and carpentry components of residential and industrial buildings. Safety aspe
C108.3	Ability to fabricate carpentry components and pipe connections including plumbing works
C108.4	Ability to use welding equipments to join the structures
C108.5	Ability to fabricate electrical and electronics circuit

Course Code: C109 Course Name: GE6163 Physics and Chemistry Laboratory - I

C109.1	To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics and properties of matter
C109.2	To get the practical skills in the field of thermal physics
C109.3	To acquire the industrial knowledge in the field of properties of matter
C109.4	To make the student to acquire practical skills in the determination of water quality parameters through volumetric and instrumental analysis.
C109.5	To acquaint the students with the determination of molecular weight of a polymer by viscometry

Course Code: C110 Course Name: HS6251 Technical English – II

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C110.1	acquire listening and speaking skills in both formal and informal contexts
C110.2	develop reading skills by familiarizing them with different types of reading strategies
C110.3	Equip writing skills needed for academic as well as workplace contexts
C110.4	acquire language skills at their own pace by using e-materials and language lab components
C110.5	listen/view and comprehend different spoken discourses/excerpts in different accents

Course Code: C111 Course Name: MA6251 Mathematics – II

C111.1	Acquire sound knowledge of techniques in solving ordinary equations that model engineering problems
C111.2	Apply the concepts of vector calculus needed for problems in all engineering disciplines
C111.3	Develop an understanding of the standard techniques of complex variable theory so as to enable the student to apply them with confidence
C111.4	Application areas such conduction, elasticity, fluid dynamics and flow the of electric current
C111.5	Create a new domain which it is easier to handle the problem that is being investigated

Course Code: C112 Course Name: PH6251 Engineering Physics – II

C112.1	The students will have the knowledge on physics of materials and that knowledge will be used by them in different engineering and technology applications
C112.2	Get knowledge on the functioning of conducting and semiconducting materials and their applications
C112.3	Understand the functioning of magnetic and superconducting materials
C112.4	Get knowledge about various dielectric materials
C112.5	Have the necessary understanding on various advanced materials

Course Code: C113 Course Name: CY6251 Engineering Chemistry – II

C113.1	Make the students conversant with boiler feed water requirements, related problems and water treatment techniques
C113.2	Principles of electrochemical reactions, redox reactions in corrosion of materials and methods for corrosion prevention and protection of materials
C113.3	Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells
C113.4	Preparation, properties and applications of engineering materials
C113.5	Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels

Course Code: C114 Course Name: EC6202 Electronic Devices and Circuits

C114.1	Explain the structure of the basic electronic device
C114.2	Design applications using the basic electronic devices
C114.3	Understand the amplifiers and multistage amplifiers
C114.4	Understand the characteristics of transistors and p n junction
C114.5	Understand the p n junction

Course Code: C115 Course Name: EE6201 Circuit Theory

C115.1	Introduce electric circuits and its analysis
C115.2	Impart knowledge on solving circuits using network theorems
C115.3	Introduce the phenomenon of resonance in coupled circuits
C115.4	Educate on obtaining the transient response of circuits
C115.5	Apply Phasor diagrams for the analysis of three phase circuits

Course Code: C116 Course Name: GE6262 Physics and Chemistry Laboratory - II

C116.1	
C116.2	The students will have the ability to test materials by using their knowledge of applied physics principles in optics and properties of matter
C116.3	To make the student acquire practical skills in the wet chemical and instrumental methods for quantitative estimation of hardness
C116.4	Alkalinity, metal ion content, corrosion in metals and cement analysis
C116.5	The students will be conversant with hands-on knowledge in the quantitative chemical analysis of water quality related parameters, corrosion measurement and cement analysis

Course Code: C118 Course Name: EC6211 Circuits and Devices Laboratory

C118.1	To provide practical experience with simulation of electrical circuits and verifying circuit theorems
C118.2	Experimental verification of Kirchhoff's voltage and current laws
C118.3	Design and Simulation of series and parallel resonance circuit
C118.4	Experimental determination of power in three phase circuits by two-watt meter method, Calibration of single phase energy meter
C118.5	Ability to understand and apply circuit theorems and concepts in engineering applications

Course Code: C201 Course Name:MA6351 Transforms and Partial Differential Equations

C201.1	Application of Fourier series analysisin engineering apart from its use in solving boundary value problems.
C201.2	Illustrate Fourier transform techniques used in wide variety of situations.
C201.3	Explain the effective mathematical tools for the solutions of partial differential equations that model several physical processes.
C201.4	Develop Z transform techniques for discrete time systems.
C201.5	Relate the one and two dimensional equation for different condition

Course Code: C202 Course Name:BM6301 Bio Chemistry

C202.1	Explain the fundamentals of biochemistry
C202.2	Relate the metabolic activity of carbohydrates and its cyclic actions
C202.3	Outline the study about the classification, architecture and significance of lipids
C202.4	Interpret the importance of the nucleuic acids and its importances
C202.5	Categorize about the Enzymes actions in the human body

Course Code: C203 Course Name:EC6303 Signals and Systems

C203.1	To understand the basic properties of signal & systems
C203.2	To know the methods of characterization of continuous LTI systems in time domain
C203.3	To analyze continuous time signals and system in the Fourier and Laplace domain
C203.4	To know the methods of characterization of discrete LTI systems in time domain
C203.5	To analyze discrete time signals and system in the Fourier and Z transform domain

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Course Code: C204 Course Name:BM6302 Sensors and Measurements

C204.1	Illustrate the methods of measurements and its purpose
C204.2	Make use of modern tools to eliminate errors asssociated with measurements
C204.3	Recall appropriate light sensors for measurement of physical phenomenon
C204.4	Evaluate the principle of signal conditoners and signal analysers
C204.5	Describe about the sorting and searching

Course Code: C205 Course Name:EC6301 Object Oriented Programming and Data Structures

C205.1	Explain the concepts of Object oriented programming.
C205.2	Write simple applications using C++.
C205.3	Discuss the different methods of organizing large amount of data.
C205.4	Study about the linear data structures
C205.5	Describe about the sorting and searching

Course Code: C206 Course Name:BM6303 Anatomy and Human Physiology

C206.1	Describe basic structural and functional elements of human body.
C206.2	Explain organs and structures involving in system formation and functions
C206.3	Identify all systems in the human body
C206.4	Develope clearly knowledge about the renal acylons and its functions
C206.5	Infer about the nervus system of humans

Course Code: C207 Course Name:BM6311 Bio Chemistry and Human Physiology Laboratory

C207.1	Interpret the changes in biomolecules.
C207.2	Analyze the importance of macromolecules.
C207.3	Infer the importance of assay in biological testing.
C207.4	Enumeration the of importance of electrophorsis technique in biological study
C207.5	Apply the fundamental test on blood

Course Code: C208 Course NameBM6312 OOPS and Data Structures Laboratory

C208.1	Design and implement C++ programs for manipulating stacks, queues, linked lists, trees, and graphs.
C208.2	Apply good programming design methods for program development.
C208.3	Apply the different data structures for implementing solutions to practical problems.
C208.4	Solve problem involving graphs, trees and heaps
C208.5	Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data

Course Code: C209 Course Name : MA6451 Probability and Random Processes

C209.1	Analyse various distribution functions and help in acquiring skills in handling situations involving more than one variable
C209.2	Analyze the response of random inputs to linear time invariant systems
C209.3	Explain the function of random variables based on single & multiples random variables
C209.4	Evaluate and apply moments & characteristic functions and understand the concept of inequalities and probabilistic limits
C209.5	Summarize the concept of random processes and determine covariance and spectral density of stationary random processes

Course Code: C210 Course Name: BM6401 Medical physics

C210.1	Assess effects of sound and light in human body
C210.2	Analyze effects of radiation in matter and how isotopes are produced
C210.3	Importance of ionization radiation in medical field
C210.4	Demonstrate the sound intraction with body
C210.5	Interpret the radioactivity and its medical application

Course Code: C211 Course Name:BM6402 Basics of Electrical Engineering

C211.1	Illustrate Magnetic circuits, principle and application of transformers
C211.2	Sumarize principle and application of transformers
C211.3	Explain of operation of DC Machines
C211.4	Explain principle of operation of AC Machines
C211.5	Intrepert the operation of fractional-kW motors and their applications.

Course Code: C212 Course Name: BM6403 Analog and Digital ICs

C212.1	Understand the basic of the digital system
C212.2	Do application of digital ics
C212.3	Design various functional Circuit using this ICS
C212.4	Discuss the importance of Filters and waveform generator
C212.5	Explain the application of analog ics in the designing circuit

Course Code: C213 Course Name: BM6404 Pathology and Microbiology

C213.1	Student can perform practical experiments on tissue processing, cryoprocessing, staining,Processes etc.
C213.2	Identification of disease condition by processing tissue
C213.3	Importance of straining technique
C213.4	Understanding the functioning of equipments used in microbial study
C213.5	Study of biological fluids and its importance

Course Code: C214 Course Name: CS6304 Analog and Digital Communication

C214.1	Apply analog communication techniques
C214.2	Apply digital communication techniques
C214.3	Use data and pulse communication techniques

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C214.4	Describe the source and Error control coding of information
C214.5	Utilise multi-user radio communication

Course Code: C215 Course Name:BM6411 Circuits and ICs Laboratory

C215.1	Design digital logic and circuits
C215.2	Learn the function of different ics
C215.3	Understand the applications of operation amplifier
C215.4	Learn the working of multivibrators
C215.5	Design circuits for generating waveforms using ICs.

Course Code: C216 Course Name:BM6412 Pathology and Microbiology Laboratory

C216.1	Infer the practical experiments on tissue processing, cryoprocessing, staining,Processes etc.
C216.2	Make use of disease condition by processing tissue
C216.3	Demonstrate the importance of straining technique
C216.4	Analyze the functioning of equipments used in microbial study
C216.5	Interpret the study of biological fluids and its importance

Course Code: C301 Course Name: BM6501 Bio Control Systems

C301.1	Describe about the mrchanical translational and rotational system also to know abou the bloc digram reduction rula and signal flow graph
C301.2	Analyze the time domaain of the given system using different mathematical techniques
C301.3	Analyze the frequency domains of the given system using different mathematical techniques
C301.4	Understand to make a freuency response plot
C301.5	Learn about the modelling of physiological system

Course Code: C302 Course Name: BM6502 Diagnostic and Therapeutic Equipment - I

C302.1	Illustrate different medical devices applied in measurement of parameters related to cardiology
C302.2	Discuss the use different medical devices applied in measurement of parameters related to neurology
C302.3	Measure signals generated by muscles
C302.4	Explain about cardiac assist devices, its continuous monitoring and transmission
C302.5	Explain about extra corporeal devices and its special diagnostic techniques

Course Code: C303 Course Name: BM6503 Bio Materials and Artificial Organs

C303.1	Analyze different types of Biomaterials and its classification.
C303.2	Compare the different types of metal alloys, ceramics and the characteristics of different metal alloys, ceramics
C303.3	Classify the types of polymeric materials and their importance in hard and soft tissue replacement
C303.4	Develop a materials that could be used as a tissue replacement implant.
C303.5	Design a materials that could be used for developing artificial organs

Course Code: C304 Course Name: BM6504 Biomedical Instrumentation

C304.1	Differentiate different bio potentials and its propagations.
C304.2	Illustrate different electrode placement for various physiological recordings
C304.3	Design bio amplifier for various physiological recordings
C304.4	Explain various technique for non-electrical physiogical measurements
C304.5	Demonstrate different biochemical measurement techniques.

Course Code: C 305 Course Name:EC6504 Microprocessor and Microcontroller

C305.1	Design and implement programs on 8086 microprocessor.
C305.2	Design I/O circuits.
C305.3	Design Memory interfacing circuits.
C305.4	Study the architecture of 8051 microcontroller
C305.5	Design and implement 8051 microcontroller based systems.

Course Code: C 306 Course Name: MD6501 Hospital Management

C306.1	To understand the basic structure of hospital management
C306.2	Summarize the principles of Human Resource management in hospital
C306.3	Analys about marketing principles and consusmers behaviours
C306.4	to know hospital information systems & supportive services
C306.5	Examine the quality and safety aspects in hospital

Course Code: C 307 Course Name:BM6511 Microprocessor and Microcontroller Laboratory

C307.1	Write ALP Programmes for fixed and Floating Point and Arithmetic
C307.2	Interface different I/Os with processor
C307.3	Generate waveforms using Microprocessors
C307.4	Execute Programs in 8051
C307.5	Explain the difference between simulator and Emulator

Course Code: C 308 Course Name: BM6512 Bio Medical Instrumentation Laboratory

C308.1	Design the amplifier for Bio signal measurements
C308.2	Recording and analysis of bio signals
C308.3	Inspect common biomedical signals and distinguish characteristic features
C308.4	Measure various non-electrical parameters using suitable sensors/transducers
C308.5	Identify, explain and study the patient safety issues related to biomedical instrumentation.

Course Code: C 309 Course Name:GE6674
Communication and Soft Skills - Laboratory Based

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C309.1	Develop listening skills for academic and professional purposes.
C309.2	Gain familiarity with learning approaches connected to successful writing
C309.3	Take International examination such as IELTS and TOEFL
C309.4	Make presentations and Participate in Group Discussions.
C309.5	Successfully answer questions in interviews.

Course Code: C 310 Course Name: BM6601 Radiological Equipment

C310.1	Explain the different radio diagnostic and therapeutic techniques
C310.2	Describe the development of computer tomography
C310.3	Learn about the structure and functional capabilities of MRI scan
C310.4	To study and understand the basic convcepts of radio isotopes
C310.5	To understand the safety precations of handling a radiological equipments

Course Code: C 311 Course Name: BM6602 Biomechanics

C311.1	Illustrate the mechanics of physiological systems.
C311.2	Analyze the biomechanical systems
C311.3	Evaluate orthopaedic applications.
C311.4	Demonstrate an understanding of kinetic concepts including inertia, force, torque, and impulse.
C311.5	Inspect the major factors involved in the angular kinematics of human movement.

Course Code: C 312 Course Name: BM6603 Diagnostic and Therapeutic Equipment - II

C312.1	Explain about measurements of parameters related to respiratory system
C312.2	Illustrate the measurement techniques of sensory responses
C312.3	Analyze different types and uses of diathermy units
C312.4	Discuss ultrasound imaging techniques and its usefulness in diagnosis
C312.5	Outline the importance of patient safety against electrical hazard

Course Code: C 313 Course Name: EC6502 Principles of Digital Signal Processing

C313.1	Apply DFT for analysis of digital signal and systems.
C313.2	Design IIR and FIR filters.
C313.3	Analyze the effects of finite word length on filters
C313.4	Design multirate filters.
C313.5	Explain the concept of adaptive filters for equalization

Course Code: C 314 Course Name: GE6351 Environmental Science and Engineering

C314.1	To introduce the nature and facts about environment, inter-relationship between organisms and biodiversity.
C314.2	To create a awareness about causes of various environmental pollutions and its control measures.
C314.3	To realise the importance of natural resources and to give warning about over-untilization of resources.
C314.4	To find and implement scientific, technological, economic and political solutions to environmental problems
C314.5	To educate on impacts of population growth and explosion.

Course Code: C 315 Course Name: BM6002 Biometric Systems

C315.1	Summarize the technologies of biometrics systems
C315.2	Illustrate the principles of design of finger print biometric system
C315.3	Analys the design of face and hand geometry biometric system
C315.4	To understand the evaluation multimodel biometrics based systems
C315.5	Intreprets the Biometric Authentication Systems

Course Code: C 316 Course Name: BM6611 Digital Signal Processing Laboratory

C316.1	Build simulation of DSP systems
C316.2	Demonstrate their abilities towards DSP processor based implementation of DSP systems
C316.3	Analyze Finite word length effect on DSP systems
C316.4	Demonstrate the applications of FFT to DSP
C316.5	Make use of adaptive filters for various applications of DSP

Course Code: C 317 Course Name: BM6612 Diagnostic and Therapeutic Equipment Laboratory

C317.1	practice on recording of Biopotentials
C317.2	practice on analyzing Biopotentials and Biomedical Signals
C317.3	practice on recording of Lung Volumes and Audiometry
C317.4	Check the transmission of Biological signal using telemetry concepts
C317.5	check the safety of any medical equipments and to have the knowledge about therapeutic equipments.

Course Code: C 401 Course Name: BM6701 Pattern Recognition and Neural Networks

C401.1	Explain the fundamentals of supervised learning
C401.2	Explain the fundamentals of unsupervised learning
C401.3	outline the fundamentals of simple neural net
C401.4	Design and apply different pattern recognition techniques in neural network using associative memory
C401.5	Design and apply different pattern recognition techniques in neural network using competitive networks

Course Code: C 402 Course Name: BM6702 Medical Informatics

C402.1	Discuss about health informatics and different ICT applications in medicine.
C402.2	Explain the function of Hospital Information Systems
C402.3	Analyze medical standards
C402.4	Discuss on bioinformatics and different application of it.

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C402.5	Illustrate the application of medical informatics in recent trends.

Course Code: C 403 Course Name: BM6703 Medical Optics

C403.1	Demonstrate the knowledge of the fundamentals of optical properties of tissues
C403.2	Illustrate surgical applications of laser.
C403.3	Interret photonics and its therapeutic applications.
C403.4	Analyze biological systems and recommend possible photonic techniques/instruments that can be used to probe these systems
C403.5	Understand and recognize the limitations of current optical imaging technologies and propose new approaches to overcome/improve upon them

Course Code: C 404 Course Name: IT6005 Digital Image Processing

C404.1	Learn digital image fundamentals and colour models.
C404.2	Be exposed to simple image processing techniques in spatial and frequency domain.
C404.3	Be familiar with image restoration and segmentation techniques.
C404.4	Be familiar with image compression and Wavelets techniques.
C404.5	Learn to represent image in form of features.

Course Code: C 405 Course Name: MD6010 Telehealth Technology

C405.1	To Learn the key principles for telemedicine and health
C405.2	To Understand the telemedical technology.
C405.3	Summarize the telemedical standards and its operations
C405.4	Apply the mobile telemedicine and it operations in healthcare
C405.5	Contrast the application of telemedicine in various area of healtcare sector

Course Code: C 406 Course Name: CS6551 Computer Networks

C406.1	Explain the components requirement of networks and link layer service
C406.2	Classify the Media Access Control Protocols and different Internetworking
C406.3	Demonstrate various types of routing techniques
C406.4	Outline the mechanisms involved in transport layer
C406.5	Experiment with different application layer protocols

Course Code: C 407 Course Name: BM6711 Hospital Training

C407.1	understand the basic structure of hospital management
C407.2	understand the principles of Human Resource management in hospital
C407.3	Perform segmentation operations in the images
C407.4	Perform Morphological and edge detection techniques on the images
C407.5	Apply image processing technique to solve real health care problems.

Course Code: C 408 Course Name: BM6712 Digital Image Processing Laboratory

C408.1	Perform enhancing operations on the image using spatial filters and frequency domain filters.
C408.2	Use transforms and analyze the characteristics of the image.
C408.3	Perform segmentation operations in the images
C408.4	to know hospital information systems & supportive services
C408.5	to know the quality and safety aspects in hospital

Course Code: C 409 Course Name:BM6801 Rehabilitation Engineering

C409.1	Gain adequate knowledge about the needs of rehabilitations and its future development
C409.2	Interpret in depth knowledge about Engineering Concepts in Sensory & Motor rehabilitation.
C409.3	Apply the different types of Therapeutic Exercise Technique to benefit the society
C409.4	Design and apply different types Hearing aids, visual aids and their application in biomedical field and hence the benefit of the society.
C409.5	Gain in-depth knowledge about different types of models of Hand and arm replacement.

Course Code: C 410 Course Name: BM6010 Assist Devices

C410.1	Study various mechanical techniques that will help failing heart.
C410.2	Explain the function of Hospital Information Systems
C410.3	Understand the tests to assess the hearing loss and development of electronic devices to compensate for the loss.
C410.4	Know the various orthodic devices and prosthetic devices to overcome orthopaedic problems.
C410.5	Understand electrical stimulation techniques used in clinical applications.

Course Code: C 411 Course Name: GE6083 Disaster Management

C411.1	Differentiate the types of disasters, causes and their impact on environment and society.
C411.2	Assess vulnerability and various methods of risk reduction measures as well as mitigation.
C411.3	Understand the inter-relationship between disasters and development.
C411.4	Evaluate the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management.
C411.5	To apply the knowledge in understandingg various prone zones in India.

Course Code: C 412 Course Name: BM6012 Wearable Systems

C412.1	Infer about sensors and its application in wearable systems
C412.2	Demonstrate about applications of wearable systems
C412.3	Analyze the application of signal processing in wearable system.
C412.4	Extend the importance of energy harvesting in wearable system
C412.5	Inspect the importance of technology in wireless system in medical field

Course Code: C 413 Course Name: BM6811 Project Work

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C413.1	On Completion of the project work students will be in a position to take up any challenging
C413.2	Relate the theoretical studies with experimental work.
C413.3	Gain Knowledge on real time problem related to project work
C413.4	Knowledge on design calculation based on design specification
C413.5	Explore the communication skill by project presentation

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COURSE OUTCOMES

(R 2017)

Course code C101 Course Name: HS 8151Communicative English

C101.1	Read articles of a general kind in magazines and newspapers.
C101.2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
C101.3	Introduce themselves and their friends and express opinions in English.
C101.4	Comprehend conversations and short talks delivered in English
C101.5	Write short essays of a general kind and personal letters and emails in English.

Course codeC102 Course Name : MA 8151 Engineering Mathematics

C102.1	Use both the limit definition and rules of differentiation to differentiate functions.
C102.2	Apply differentiation to solve maxima and minima problems.
C102.3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.
C102.4	Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.
C102.5	Apply various techniques in solving differential equations.

Course code C103 Course name: PH8151 Engineering Physics

C103.1	Gain knowledge on the basics of properties of matter and its applications.
C103.2	Acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics
C103.3	Apply the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers.
C103.4	Get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes
C103.5	Understand the basics of crystals, their structures and different crystal growth techniques

Course codeC104 Course Name: CY8151 Engineering Chemistry

C104.1	To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
C104.2	To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate th
C104.3	Preparation, properties and applications of engineering materials.
C104.4	Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.
C104.5	Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.

Course codeC105 Course Name:GE 8151Problem Solving and Python Programming

C105.1	To know the basics of algorithmic problem solving
C105.2	To read and write simple Python programs.
C105.3	To develop Python programs with conditionals, loops, functions and call them
C105.4	To use Python data structures — lists, tuples, dictionaries
C105.5	To do Input/output with files in Python.

Course codeC106 Course Name:GE8152Engineering Graphics

C106.1	To develop in students, graphic skills for communication of concepts, ideas and design of engineering products.
C106.2	To develop in students, graphi
C106.3	To develop in students , for design of engineering products.
C106.4	To develop in students in engineering drawing.
C106.5	T o expose them to existing national standards related to technical drawings.

Course codeC107 Course Name:GE 8161 Problem Solving and Python Programming Laboratory

C107.1	To write, test, and debug simple Python programs.
C107.2	To implement Python programs with conditionals and loops.
C107.3	Use functions for structuring Python programs.
C107.4	Represent compound data using Python lists, tuples, dictionaries.
C107.5	Read and write data from/to files in Python.

Course codeC108 Course Name:BS8161 Physics and Chemistry Laboratory

C108.1	To introduce different experiments to test basic understanding of physics concepts applied in optics

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C108.2	To introduce different experiments to test basic understanding of physics concepts applied in thermal physics
C108.3	To introduce different experiments to test basic understanding of physics concepts applied in properties of matter and liquids.
C108.4	To make the student to acquire practical skills in the determination of water quality parameters through volumetric and instrumental analysis
C108.5	To acquaint the students with the determination of molecular weight of a polymer by viscometery.

Course codeC109 Course Name:HS8251 Technical English

C109.1	Read technical texts
C109.2	Write area- specific texts effortlessly.
C109.3	Listen lectures in their area of specialization.
C109.4	Comprehend talks in their area of specialisation
C109.5	Speak appropriately and effectively in varied formal and informal contexts

Course code C110 Course Name:MA8251 Engineering Mathematics - II

C110.1	Eigen values and eigenvectors, Diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
C110.2	Gradient, divergence and curl of a vector point function and related identities.
C110.3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification
C110.4	Apply functions, conformal mapping and complex integration.
C110.5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations w

Course code C111 Course Name:PH 8253 Physics for Electronics Engineering

C111.1	Gain knowledge on classical and quantum electron theories, and energy band structuues.
C111.2	Acquire knowledge on basics of semiconductor physics and its applications in various devices.
C111.3	Get knowledge on magnetic and dielectric properties of materials.
C111.4	understanding on the functioning of optical materials for optoelectronics.
C111.5	understand the basics of quantum structures and their applications in spintronics and carbonelectronics.

Course code C112 Course Name:BM8251 Engineering Mechanics for Biomedical Engineers

C112.1	Use scalar and vector analytical techniques for analysing forces in statically determinate structures
C112.2	Apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple, practical problems
C112.3	Apply fundamental principles of mechanics.
C112.4	Learn basics of fluid mechanics and relate it to bio-fluids.
C112.5	Understand the action of friction and motion.

Course code C113 Course Name:BM8201 Fundamentals of Bio Chemistry

C113.1	List the fundamental of biochemistry, acid, base and pH relation in blood and biomolecules.
C113.2	Relate the importance and classification of Carbohydrates and its metabolics activities in absortion of energy in body and its disorder.
C113.3	Examine the importance and classification of Lipids and its metabolics activities in absortion of energy in body and its disorder.
C113.4	Estimate the Basic units of DNA and RNA and its function in human body with its disorders and protein and its metabolic activity.
C113.5	Infer the explanation for enzyme, enzymatic reaction and its type with its functions in metabolism as catalyst.

Course code C114 Course Name:EC 8251 Circuit Analysis

C114.1	Develop the capacity to analyze electrical circuits, apply the circuit theorems in real time
C114.2	Design and understand and evaluate the AC and DC circuits.
C114.3	To study the transient and steady state response of the circuits subjected to step and sinusoidal excitations.
C114.4	Develop different methods of circuit analysis using Network theorems, duality and topology.
C114.5	To study the two port networks and properties

Course code C115 Course Name:GE 8261 Engineering Practices Laboratory

C115.1	Fabricate carpentry components and pipe connections including plumbing works and Use welding equipments to join the structures.
C115.2	Carry out the basic machining operations
C115.3	Make the models using sheet metal works,Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary andfittings
C115.4	Carry out basic home electrical works and appliances
C115.5	Measure the electrical quantities,Elaborate on the components, gates, soldering practices.

Course code C116 Course Name: BM 8211 Bio Chemistry Laboratory

C116.1	Understand the Biochemistry laboratory functional components

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C116.2	Understand the basics principle of preparation of buffers
C116.3	Have a sound knowledge of qualitative test of different biomolecules
C116.4	Understand the basics knowledge of Biochemical parameter and their interpretation in Blood sample
C116.5	Have a sound knowledge of separation technology of proteins and aminoacids

Course code C201 Course Name:MA 8352 Linear Algebra and Partial Differential Equations

C201.1	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.
C201.2	Demonstrate accurate and efficient use of advanced algebraic techniques.
C201.3	Demonstrate their mastery by solving non - trivial problems related to the concepts and by proving simple theorems about the statements pr
C201.4	Able to solve various types of partial differential equations
C201.5	Able to solve engineering problems using Fourier series

Course code C202 Course Name: EC8352 Signals and system

C202.1	To understand the basic properties of signal & systems
C202.2	To know the methods of characterization of continuous LTI systems in time domain
C202.3	To analyze continuous time signals and system in the Fourier and Laplace domain
C202.4	To know the methods of characterization of discrete LTI systems in time domain
C202.5	To analyze discrete time signals and system in the Fourier and Z transform domain

Course code C203 Course Name:BM8351 Anatomy and Human Physiology

C203.1	Students would be able to explain basic structure and functions of cell
C203.2	Students would be learnt about anatomy and physiology of various systems of human body
C203.3	Students would be able to explain interconnect of various systems
C203.4	Develope clearly knowlodge about the endocrinology and nervous system of human
C203.5	Outline about the digestiva and renal systems of human

Course code C204 Course Name:BM8301 Sensors and Measurements

C204.1	Inspect various electrical parameters with accuracy, precision, resolution
C204.2	Label appropriate passive or active transducers for measurement of physical phenomenon.
C204.3	Evaluate and select appropriate light sensors for measurement of physical phenomenon.
C204.4	Apply AC and DC bridges for relevant parameter measurement
C204.5	Illustrate Multimeter, CRO and different types of recorders for appropriate measurement.

Course code C205 Course Name:EC 8353 Electron Devices and Circuits

C205.1	Explain the structure and working operation of basic electronic devices.
C205.2	Able to identify and differentiate both active and passive elements
C205.3	Analyze the characteristics of different electronic devices such as diodes and transistors
C205.4	Choose and adapt the required components to construct an amplifier circuit.
C205.5	Employ the acquired knowledge in design and analysis of oscillators

Course code C206 Course Name:BM8302 Pathology and Microbiology

C206.1	Student can perform practical experiments on tissue processing, cryoprocessing, staining,Processes etc.
C206.2	Identification of disease condition by processing tissue
C206.3	Importance of straining technique
C206.4	Understanding the functioning of equipments used in microbial study
C206.5	Study of biological fluids and its importance

Course code C207 Course Name:BM8311 Pathology and Microbiology Laboratory

C207.1	Analyze structural and functional aspects of living organisms.
C207.2	Explain the function of microscope
C207.3	Discuss the importance of public health.
C207.4	Describe methods involved in treating the pathological diseases.
C207.5	Importance of immunology and technology use in treatment

Course code C208 Course Name:BM8312 Devices and Circuits Laboratory

C208.1	Analyze the characteristics of diodes (PN and Zener Diodes) and its applications (Clipper, Clamper & FWR)
C208.2	Analyze the characteristics of Transistors (BJT & FET)
C208.3	Analyze the characteristics of Thyristors (SCR)
C208.4	Design RL and RC circuits.

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C208.5	Verify Thevinin & Norton theorem KVL & KCL, Super Position Theorems, Maximum Power Transfer Theorem & Reciprocity theorem

Course code C209 Course Name: BM 8313 Human Physiology Laboratory

C209.1	Identification and enumeration of blood cells
C209.2	Enumeration of haematological parameters
C209.3	Analysis of special sensory organs test
C209.4	Experiment identification of blood groups and collection of blood
C209.5	Make use of Microscopic study of blood cells

Course code C210 Course Name: MA 8391 Probability and Statistics

C210.1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real
C210.2	Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.
C210.3	Apply the concept of testing of hypothesis for small and large samples in real life problems.
C210.4	Apply the basic concepts of classifications of design of experiments in the field of agriculture and statistical quality control.
C210.5	Have the notion of sampling distributions and statistical techniques used in engineering and management problems.

Course code C211 Course Name: BM 8401 Medical Physics

C211.1	Explain about non-ionizing radiation, interaction with tissue and its effects.
C211.2	Define and compare intensities of sensory stimuli.
C211.3	Summarizes how ionizing radiation interacts with the human body, how to quantify it and its levels seen in the environment and healthcare.
C211.4	Explain the fundamentals of radioactivity and radioactive isotopes.
C211.5	Illustrates the methods of detecting and recording the ionizing radiation and its interaction with matter.

Course code C212 Course Name:EE8452 Basics of Electrical Engineering

C212.1	Design simple electrical circuits and understand through nodal, mesh analysis about constructing series and parallel configuration of circuits v
C212.2	Get knowledge on electrical machines and on its efficient operating principle.
C212.3	Understand metering principles, safety measures while working with electrical circuits.
C212.4	Analyse existing power distribution and hence apply technology in electrical applications
C212.5	Intrepert the operation of fractional-kW motors and their applications.

Course code C213 Course Name: EC8453 Linear Integrated Circuits

C213.1	Design linear and non linear applications of OP – AMPS
C213.2	Design applications using analog multiplier and PLL
C213.3	Design ADC and DAC using OP – AMPS
C213.4	Generate waveforms using OP – AMP Circuits
C213.5	Analyze special function ics

Course code C214 Course Name:EC8393 Fundamentals of Data Structures in C

C214.1	Implement linear and non-linear data structure operations using C
C214.2	Suggest appropriate linear / non-linear data structure for any given data set.
C214.3	Apply hashing concepts for a given problem
C214.4	Modify or suggest new data structure for an application
C214.5	Appropriately choose the sorting algorithm for an application

Course code C215 Course Name: EC8392 Digital Electronics

C215.1	To present the Digital fundamentals, Boolean algebra and its applications in digital systems
C215.2	To familiarize with the design of various combinational digital circuits using logic gates
C215.3	To introduce the analysis and design procedures for synchronous and asynchronous sequential circuits
C215.4	To explain the various semiconductor memories and related technology
C215.5	To introduce the electronic circuits involved in the making of logic gates

Course code C216 Course Name: EC8393 Fundamentals of Data Structures in C Laboratory

C216.1	Write basic and advanced programs in C
C216.2	Implement functions and recursive functions in C
C216.3	Implement data structures using C
C216.4	Choose appropriate sorting algorithm for an application and implement it in a modularized way
C216.5	Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data and graphs, trees and heaps

Course code C217 Course Name: BM8411 Integrated Circuits Laboratory

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C217.1	Design oscillators and amplifiers using operational amplifiers
C217.2	Design filter using op amps and performs experiment on frequency respopnse
C217.3	Analyze the working of PLL and use PLL as frequency multiplier
C217.4	Design DC power supply using ics
C217.5	Acquire knowledge in using spice

Course codeC301 Course Name:EC8394 Analog and Digital Communication

C301.1	Apply analog communication techniques.
C301.2	Apply digital communication techniques.
C301.3	Use data and pulse communication techniques.
C301.4	Describe the source and Error control coding of information.
C301.5	Utilize multi-user radio communication.

Course code C302 Course Name:BM 8501 Bio Control systems

C302.1	Understand the need for mathematical modeling of various systems, representation of systems in block diagrams and signal flow graphs and
C302.2	Analyze the time response of various systems and discuss the concept of system stability
C302.3	Analyze the frequency response characteristics of various systems using different charts
C302.4	Understand the concept of modeling basic physiological systems
C302.5	Comprehend the application aspects of time and frequency response analysis in physiological control systems.

Course code C303 Course Name:BM8502 Biomedical Instrumentation

C303.1	Differentiate different bio potentials and its propagations.
C303.2	Illustrate different electrode placement for various physiological recordings
C303.3	Design bio amplifier for various physiological recordings
C303.4	Explain various technique for non-electrical physiological measurements
C303.5	Demonstrate different biochemical measurement techniques.

Course code C304 Course Name: EC8553 Discrete -Time Signal Processing

C304.1	Apply DFT for analysis of digital signal and systems.
C304.2	Design IIR and FIR filters.
C304.3	Analyze the effects of finite word length on filters
C304.4	Design multirate filters.
C304.5	Explain the concepts of digital signal processor and its applications.

Course codeC305 Couse Name: BM8072 Biomaterials

C305.1	Analyze different types of Biomaterials and its classification and apply the concept of nanotechnology towards biomaterials use.
C305.2	Identify significant gap required to overcome challenges and further development in metallic and ceramic materials
C305.3	Identify significant gap required to overcome challenges and further development in polymeric materials
C305.4	Create combinations of materials that could be used as a tissue replacement implant.
C305.5	Understand the testing standards applied for biomaterials.

Course codeC306 Couse name: OBT 4531 Fundamentals of Nutrition

C306.1	Overview of nutrition, nutrients and dietary plan,energy calculation.
C306.2	Understanding the functions of digestion and absorption of nutrients.
C306.3	Understanding the principle,characteristics of carbohydrate and its absorption in blood.
C306.4	Understanding the principle,characteristics of proteins and fats and its absorption in blood.
C306.5	understanding the metabolism of nutrition and its analysis.

Course codeC307 Course Name:EC 8562 Digital Signal Processing Laboratory

C307.1	Carryout basic signal processing operations
C307.2	Demonstrate their abilities towards MATLAB based implementation of various DSP systems
C307.3	Analyze the architecture of a DSP Processor
C307.4	Design and implement the FIR and IIR Filters in DSP Processor for performing filtering operation over real-time signals
C307.5	Design a DSP system for various applications of DSP

Course codeC308 Course Name:BM8511 Biomedical Instrumentation Laboratory

C308.1	Design preamplifiers and amplifiers for various bio signal recordings.
C308.2	Measure various non-electrical parameters using suitable sensors/transducers

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C308.3	Application of mux and demux in biosignal processing
C308.4	Design and analyze the characteristics of isolation amplifier
C308.5	Design PCB layout for any bio amplifier.

Course codeC309 Course Name:HS8381 Interpersonal Skills/Listening & Speaking

C309.1	Listen and respond appropriately.
C309.2	Participate in group discussions
C309.3	Make effective presentations
C309.4	Participate confidently and appropriately in conversations both formal and informal
C309.5	work environment based communication skill development.

Course codeC310 Course Name:EC8691 Microprocessors and Microcontrollers

C310.1	Design and implement programs on 8086 microprocessor.
C310.2	Design I/O circuits.
C310.3	Design Memory interfacing circuits.
C310.4	Study the architecture of 8051 microcontroller.
C310.5	Design and implement 8051 microcontroller based systems.

Course codeC311 Course Name:BM8601 Diagnostic and Therapeutic Equipment - I

C311.1	Describe the functioning and recording setup of all cardiac equipments
C311.2	Describe the functioning and recording setup of all Neurologic equipments
C311.3	Explain the recording of EMG parameters
C311.4	Explain the recording of respiratory parameters
C311.5	Describe the measurement techniques of sensory responses

Course codeC312 Course Name:BM8651 Biomechanics

C312.1	Explain about the principles of mechanics
C312.2	Define and discuss the mechanics of physiological systems.
C312.3	Summarizes the mechanics of joints.
C312.4	Explain the mathematical models used in the analysis of biomechanical systems
C312.5	Illustrates the methods of detecting and recording the Ionizing radiation and its interaction with matter

Course codeC313 Course Name:GE8291 Environmental Science and Engineering

C313.1	To introduce the nature and facts about environment, inter-relationship between organisms and biodiversity.
C313.2	To create a awareness about causes of various environmental pollutions and its control measures.
C313.3	To realise the importance of natural resources and to give warning about over-untilization of resources.
C313.4	To find and implement scientific, technological, economic and political solutions to environmental problems.
C313.5	To educate on impacts of population growth and explosion.

Course codeC314 Course Name:MD 8091Hospital Management

C314.1	Explain the principles of Hospital administration
C314.2	Identify the importance of Human resource management
C314.3	List various marketing research techniques
C314.4	Identify information management systems and its uses
C314.5	Understand safety procedures followed in hospitals

Course codeC315 Course Name:MD8071Tele Health Technology

C315.1	To learn the fundamentals of Tele health.
C315.2	Apply multimedia technologies in telemedicine.
C315.3	Understand and Apply the Ethical and legal aspects of telemedicine.
C315.4	Understanding the design and architecture of PACS .
C315.5	Apply telehealth in healthcare

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Course codeC316 Course Name:EC 8681 Microprocessors and Microcontrollers Lab

C316.1	Write ALP Programmes for fixed and Floating Point and Arithmetic.
C316.2	Interface different I/Os with processor.
C316.3	Generate waveforms using Microprocessors.
C316.4	Execute Programs in 8051.
C316.5	Explain the difference between simulator and Emulator.

Course codeC317 Course Name:BM8611Diagnostic and Therapeutic Equipment Laboratory

C317.1	Measure different bioelectrical signals using various methods
C317.2	Assess different non-electrical parameters using various methodologies
C317.3	Illustrate various diagnostic and therapeutic techniques
C317.4	Examine the electrical safety measurements
C317.5	Analyze the different bio signals using suitable tools.

Course codeC318 Course Name:BM8612 Mini Project

C318.1	Formulate a real world problem, identify the requirement and develop the design solutions.
C318.2	Express the technical ideas, strategies and methodologies.
C318.3	Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.
C318.4	Test and validate through conformance of the developed prototype and analysis the cost effectiveness.
C318.5	Prepare report and present the oral demonstrations

Course codeC401 Course Name:BM8701 Diagnostic and Therapeutic Equipment - II

C4011	Discuss the various equipment used in ICU and applications of telemetry.
C401.2	Explain the types of diathermy and its applications.
C401.3	Express the basics of ultrasound and its application in medicine
C401.4	Discuss the various extracorporeal and special diagnostic devices used in hospitals
C401.5	Outline the importance of patient safety against electrical hazard

Course codeC402 Course Name:EC8093 Digital Image Processing

C402.1	Know and understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transform
C402.2	Operate on images using the techniques of smoothing, sharpening and enhancement.
C402.3	Understand the restoration concepts and filtering techniques.
C402.4	Learn the basics of segmentation and features extraction.
C402.5	Learn the basics of compression and recognition methods

Course codeC403 Course Name:BM8702 Radiological Equipments

C403.1	Describe the working principle of X ray machine and its application.
C403.2	Illustrate the principle computed tomography.
C403.3	Interpret the technique used for visualizing various sections of the body using magnetic resonance imaging
C403.4	Demonstrate the applications of radio nuclide imaging.
C403.5	Outline the methods of radiation safety.

Course codeC404 Course Name:BM8703 Rehabilitation Engineering

C404.1	Gain adequate knowledge about the needs of rehabilitations and its future development
C404.2	Have an in depth idea about Engineering Concepts in Sensory & Motor rehabilitation.
C404.3	Apply the different types of Therapeutic Exercise Technique to benefit the society
C404.4	Design and apply different types Hearing aids, visual aids and their application in biomedical field and hence the benefit of the society.
C404.5	Gain in-depth knowledge about different types of models of Hand and arm replacement.

Course codeC405 Course Name:GE8071Disaster Management

C405.1	Differentiate the types of disasters, causes and their impact on environment and society.
C405.2	Assess vulnerability and various methods of risk reduction measures as well as mitigation.
C405.3	Understand the inter-relationship between disasters and development.

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C405.4	Evaluate the hazard and vulnerability profile of India, Scenarious in the Indian context, Disaster damage assessment and management.
C405.5	Apply the knowledge in understandindg various prone zones in India.

Course codeC406 Course Name:Introduction of Cell Biology

C406.1	Understanding the fundamentals of structural importances of cell.
C406.2	Outline the study about the cell organelles and its functional importances.
C406.3	Interpret the cell division model and understand the developmental state of cell growth.
C406.4	Underatand the basic units, architectural hierarchy and organisational functions of macromolecules.
C406.5	Categorize about the Enzymes actions in the human body.

Course codeC407 Course Name:EC8762 Digital Image Processing Laboratory

C407.1	Perform enhancing operations on the image using spatial filters and frequency domain filters.
C407.2	Use transforms and analyse the characteristics of the image.
C407.3	Perform segmentation operations in the images.
C407.4	Estimate theefficiency of the compression technique on the images.
C407.5	Apply image processing technique to solve real health care problems.

Course codeC408 Course Name:MD8751 Hospital Training

C408.1	Advocate a patient-centred approach in healthcare
C408.2	Communicate with other health professionals in a respectful and responsible manner
C408.3	Recognize the importance of inter-professional collaboration in healthcare.
C408.4	Propose a patient-centred inter-professional health improvement plan based upon the patient's perceived needs
C408.5	Use the knowledge of one's own role and those of other professions to address the healthcare needs of populations and patients served.

Course codeC409 Course Name:BM8077 Hospital Waste Management

C409.1	Analyse various hazards, accidents and its control
C409.2	Design waste disposal procedures for different biowastes
C409.3	Categorise different biowastes based on its properties
C409.4	Design different safety facility in hospitals
C409.5	Propose various regulations and safety norms

Course codeC410 Course Name:GE8073 Fundamentals of Nano Science

C410.1	understanding the fundamentals of the physics,chemistry and biology involved in nano science and the balcs classifications of nano materials
C410.2	Gaining the knowledge related to the prepration methods of nanomaterials.
C410.3	Interpret the basic molecular difference of nano materials and its properties.
C410.4	Demonstrate the different characteristic testing metholodies for nanao material analysis.
C410.5	Application of nanomaterials in different fields and its advantages

Course codeC411 Course Name:BM8811 Project Work

C411.1	On Completion of the project work students will be in a position to take up any challenging problem.
C411.2	Relate the theoretical studies with experimental work.
C411.3	Gain Knowledge on real time problem related to project work.
C411.4	Knowledge on design calculation based on design specification.
C411.5	Explore the communication skill by project presentation.

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Course Outcomes (CO)

(R 2017)

Branch: B.E, Mechanical & Automation Engineering

Course Code: C101 Course Name: HS8151 Communicative English

C101.1	Read articles of a general kind in magazines and newspapers.
C101.2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
C101.3	Comprehend conversations and short talks delivered in English.
C101.4	Write short essays of a general kind.
C101.5	Write personal letters and emails in English.

Course Code: C102 Course Name: MA8151 Engineering Mathematics-I

C102.1	Use both the limit definition and rules of differentiation to differentiate functions
C102.2	Apply differentiation to solve maxima and minima problems.
C102.3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus. Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts. Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.
C102.4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
C102.5	Apply various techniques in solving differential equations.

Course Code: C103 Course Name: PH8151 Engineering Physics

C103.1	The students will gain knowledge on the basics of properties of matter and its applications
C103.2	The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics
C103.3	The students will have adequate knowledge on the concepts of thermal properties of the materials and their applications in expansion joints and heat exchangers.
C103.4	The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunnelling microscopes,
C103.5	The students will understand the basics of crystals their structures and different crystal growth techniques.

Course Code: C104 Course Name: CY8151 Engineering Chemistry

C104.1	To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
C104.2	To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
C104.3	Preparation, properties and applications of engineering materials.
C104.4	Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.
C104.5	Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.

Course Code: C105 Course Name: GE8151 Problem Solving and Python Programming

C105.1	Develop algorithmic solutions to simple computational problems
C105.2	Read, write, execute by hand simple Python programs.
C105.3	Structure simple Python programs for solving problems.
C105.4	Decompose a Python program into functions.
C105.5	Represent compound data using Python lists, tuples, dictionaries. Read and write data from/to files in Python Programs.

Course Code: C106 Course Name: GE8152 Engineering Graphics

C106.1	Ability to familiarize with the fundamentals and standards of Engineering graphics
C106.2	Ability to perform freehand sketching of basic geometrical constructions and multiple views of objects
C106.3	Ability to Project orthographic projections of lines and plane surfaces
C106.4	Ability to draw projections of solids and development of surfaces
C106.5	Ability to visualize and to project isometric and perspective sections of simple solids

Course Code: C107 Course Name: GE8161 Problem Solving and Python Programming Lab

C107.1	Write, test, and debug simple Python programs.
C107.2	Implement Python programs with conditionals and loops.
C107.3	Develop Python programs step-wise by defining functions and calling them.
C107.4	Use Python lists, tuples, dictionaries for representing compound data.
C107.5	Read and write data from/to files in Python.

Course Code: C108 Course Name: BS8161 Physics & Chemistry Lab

C108.1	To provide the basic practical exposure to all the engineering and technological streams in the field of physics with properties of matter and liquids.
C108.2	To provide the basic practical exposure to all the engineering and technological streams in the field of optics.
C108.3	The students are able to know about the thermal physics .
C108.4	To gain the knowledge about crystalline materials.

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C108.5	To develop the knowledge of fiber optics cables optics and its applications

Course Code: C109 Course Name: HS8251 Technical English

C109.1	Read technical texts
C109.2	Write area- specific texts effortlessly.
C109.3	Listen lectures in their area of specialization.
C109.4	Comprehend talks in their area of specialisation
C109.5	Speak appropriately and effectively in varied formal and informal contexts.

Course Code: C110 Course Name: MA 8251 Engineering Mathematics-II

C110.1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
C110.2	Gradient, divergence and curl of a vector point function and related identities.
C110.3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
C110.4	Analytic functions, conformal mapping and complex integration.
C110.5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

Course Code: C111 Course Name: PH8251 Material Science

C111.1	The students will have knowledge on the various phase diagrams and their applications
C111.2	The students will acquire knowledge on Fe-Fe2C phase diagram various microstructures and alloys
C111.3	The students will get knowledge on mechanical properties of materials and their measurements
C111.4	The students will gain knowledge on magnetic dielectric, and superconducting materials and properties of materials
C111.5	The students will understand the basics of ceramics , composites and nano materials

Course Code: C112 Course Name: BE8253 Basic Electrical, Electronics and Instrumentation Engineering

C112.1	To Understand electric circuits
C112.2	To gain knowledge in Electric circuit laws, single and three phase circuits and wiring
C112.3	To study the working principles of electrical machines
C112.4	Understand the concepts of various electronic devices and circuits
C112.5	To Choose appropriate instruments for electrical measurement for a specific application

rse Code: C113 Course Name: GE8291 Environment science and engineering

C113.1	Public awareness of environment at infant stage.
C113.2	Pollution controlling aids
C113.3	Development and improvement in standard of living has lead to serious environmental disasters.
C113.4	Ignorance and incomplete knowledge has lead to misconceptions. Knowledge about water conservation methods.
C113.5	World's Population related problems and AIDS

Course Code: C114 Course Name: GE8292 Engineering Mechanics

C114.1	Ability to illustrate the vectorial and scalar representation of forces and moments
C114.2	Ability to analyse the rigid body in equilibrium
C114.3	Ability to evaluate the properties of surfaces and solids
C114.4	Ability to calculate dynamic forces exerted in rigid body
C114.5	Ability to determine the friction and the effects by the laws of friction

Course Code: C115 Course Name: GE8261 Engineering Practices Laboratory

C115.1	Ability to Fabricate carpentry components and pipe connections including plumbing works
C115.2	Ability to Use welding equipments to join the structures
C115.3	Ability to Carry out the basic machining operations
C115.4	Ability to Make the models using sheet metal works
C115.5	Ability to illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings

ode: C201 Course Name: MA8353 Transforms and Partial Differential Equations

C201.1	Understand how to solve the given standard partial differential equations.
C201.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
C201.3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
C201.4	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.
C201.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

Course Code: C202 Course Name: ME8391 Engineering Thermodynamics

C202.1	Apply the first law of thermodynamics for simple open and closed systems under steady and unsteady conditions
C202.2	Apply second law of thermodynamics to open and closed systems and calculate entropy and availability
C202.3	Apply Rankine cycle to steam power plant and compare few cycle improvement methods
C202.4	Derive simple thermodynamic relations of ideal and real gases
C202.5	Calculate the properties of gas mixtures and moist air and its use in psychometric Processes

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Course Code: C203 Course Name: CE8394 Fluid Mechanics and Machinery

C203.1	Apply mathematical knowledge to predict the properties and characteristics of a fluid.
C203.2	Can analyse and calculate major and minor losses associated with pipe flow in piping networks
C203.3	Can mathematically predict the nature of physical quantities
C203.4	Can critically analyse the performance of pumps
C203.5	Can critically analyse the performance of turbines

Course Code: C204 Course Name: ME8351 Manufacturing Technology –I

C204.1	Explain different metal casting processes, associated defects, merits and demerits
C204.2	Compare different metal joining processes
C204.3	Summarize various hot working and cold working methods of metals
C204.4	Explain various sheet metal making processes
C204.5	Distinguish various methods of manufacturing plastic components

Code: C205 Course Name: EE8353 ELECTRICAL DRIVES AND CONTROLS

C205.1	To understand the basic concepts of different types of electrical machines and their performance.
C205.2	To study the drive motor characterisitics
C205.3	To study the different methods of starting D.C motors and induction motors.
C205.4	To study the conventional and solid-state D.C. drives
C205.5	To study the conventional and solid-state A.C. drives

06 Course Name: EC8382 ELECTRONICS AND MICROPROCESSORS LABORATORY

C206.1	Ability to perform speed characteristics of Zener diode and PN Junction diode
C206.2	Ability to perform characteristics of Half Adder and Full Adder
C206.3	Ability to perform Shift Registers and Counters
C206.4	Ability to perform Operational Amplifier (Adder, Subtractor, Differentiator, Integrator, Inverting and Non – Inverting
C206.5	Ability to understand various microprocessor and Stepper Motor Interfacing.

: C208 Course Name: HS8381INTERPERSONAL SKILLS/LISTENING&SPEAKING

C208.1	Use different machine tools to manufacturing gears
C208.2	Ability to use different machine tools to manufacturing gears
C208.3	Ability to use different machine tools for finishing operations
C208.4	Ability to manufacture tools using cutter grinder
C208.5	Develop CNC part programming

Course Code: C209 Course Name: MG8491 Operation Research

C209.1	Identify various linear models
C209.2	Apply transportation and network model in solving engineering problems.
C209.3	To understand the inventory model in manufacturing industry.
C209.4	To analyse various queueing model in engineering.
C209.5	To apply various decision model for use in business function and management decision.

ırse Code:C210 Course Name: AN8401 Manufacturing System Management

C210.1	To gain Knowledge gained in replacement policies of man power and equipments.
C210.2	To gain Knowledge in product cost and costing analysis.
C211.3	Ability to design, develop and implement are integrated system involving man, machine, materials and energy
C212.4	Ability to apply work standards method in manufacturing.
C213.5	Ability to identify different types of maintenance strategies.

ode: C211 Course Name: CE8395 Strength of Materials For Mechanical Engineers

C211.1	Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes
C211.2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment
C211.3	Apply basic equation of simple torsion in designing of shafts and helical spring
C211.4	Calculate the slope and deflection in beams using different methods.
C211.5	Analyze and design thin and thick shells for the applied internal and external pressures

Course Code: C212 Course Name PR8451 Mechanics of Machines

C212.1	Be able to design linkage, cam mechanim for a given input/output motion.
C212.2	To classify different type of gears and gear trains
C212.3	To Study of effects of friction in different machine members
C212.4	To Explain the undesirable effects of unbalances & he principles in mechanisms used for speed control
C212.5	To Solve problem on effect of Dynamics of undesirable vibrations.

Course Code: C213 Course Name: ME8491 Engineering Metallurgy

C213.1	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification

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C213.2	Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes
C213.3	Clarify the effect of alloying elements on ferrous and non-ferrous metals
C213.4	Summarize the properties and applications of non-metallic materials.
C213.5	Explain the testing of mechanical properties

Course Code: C214 Course Name: ME8451 Manufacturing Technology– II

C214.1	Ability to explain the mechanism of material removal processes
C214.2	Ability to describe the constructional and operational features of centre lathe and other special purpose lathes
C214.3	Describe the constructional and operational features of shaper, planner, milling, drilling, sawing and broaching machines
C214.4	Explain the types of grinding and other super finishing processes apart from gear manufacturing processes
C214.5	Ability to summarize numerical control of machine tools and write a part program

e: CE8381 STRENGTH OF MATERIALS AND FLUID MECHANICS & MACHINERY LABORATORY

C214.1	Tension test on a mild steel rod & Double shear test on Mild steel and Aluminium rods
C214.2	Torsion test on mild steel rod 4. Impact test on metal specimen
C214.3	Hardness test on metals - Brinnell and Rockwell Hardness Number 6. Deflection test on beams
C214.4	Ability to study Tempering- Improvement Mechanical properties Comparison
C214.5	Ability to do Microscopic Examination of (i) Hardened samples and (ii) ttempered samples.

Course Code: C216 Course Name: ME8461 Manufacturing Technology Lab

C216.1	Demonstrate contour milling and generate a spur gear from a cylindrical work piece.
C216.2	Perform helical gear cutting operation and generate gear using hobbing machine.
C216.3	Generate gear using gear shaping machine and demonstrate plain surface grinding operation.
C216.4	Perform cylindrical grinding operation and practice Tool angle grinding with tool and Cutter Grinder.
C216.5	Measure cutting forces in Milling / Turning Process and develop CNC part programming.

Course Code: C218 Course Name: HS8461 Advanced Reading and Writing

C218.1	Ability to read and evaluate texts critically
C218.2	Ability to write different types of essays
C218.3	Ability to write reports and winning job applications
C218.4	Ability to organize ideas, projects and to write e-mails.
C218.5	Ability to display critical thinking in various professional contexts.

e Code:C214 Course Name: CS8492 DATABASE MANAGEMENT SYSTEMS

C214.1	Classify the modern and futuristic database applications based on size and complexity
C214.2	Map ER model to Relational model to perform database design effectively
C214.3	Write queries using normalization criteria and optimize queries
C214.4	Compare and contrast various indexing strategies in different database systems
C214.5	Appraise how advanced databases differ from traditional databases.

Course Code: C302 Course Name: ME8593 Design of Machine Elements

C302.1	Explain the influence of steady and variable stresses in machine component design.
C302.2	Apply the concepts of design to shafts, keys and couplings
C302.3	Apply the concepts of design to temporary and permanent joints
C302.4	Apply the concepts of design to energy absorbing members, connecting rod and crank shaft.
C302.5	Apply the concepts of design to bearings

rse Code:C303 Course Name: ME8591 Applied Hydraulics and Pneumatics

C303.1	To Study FLUID POWER PRINCIPLES AND HYDRAULIC PUMPS
C303.2	ToUnderstand operating principles and constructional features of hydraulic systems.
C303.3	To Understand operating principles and constructional features of pneumatic systems.
C303.4	To gain Knowledge with selection of hydraulic / pneumatic components
C303.5	To understand& designing and layout of Hydraulic Power package and trouble shooting.

Course Code: C301 Course Name: AN8501 LAN AND NETWORKING

C301.1	Ability to Look up Internet Addresses.
C301.2	To Write a program to trace the port of a particular host.
C301.3	To Write a program to implement the daytime protocol.
C301.4	To Demonstration of TCP/IP protocol. And UDP Protocol.
C301.5	To Implement a chat server using TCP/IP protocol & Transfer of files from PC to PC using Windows / Unix socket processing

rse Code:C307 Course Name: AN8511 Dynamics and Metrology Laboratory

C307.1	Review the various types of gears, gear trains, kinematic mechanisms, and universal joints.
C307.2	Sketch the characteristic curves of Watt, Porter, Proell and Hartnell governors and motion curves for the given cam follower setup.
C307.3	Inspect the critical speed of shaft under the given load conditions and the gyroscopic effect and couple on motorized gyroscope.
C307.4	To make the students understand the fundamental principles of measuring techniques by practicing exercises on various measuring instruments.
C307.5	To understand how certain measuring devices are used for dynamic testing.

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: Code:C316 Course Name: CS8481 Database Management Systems Laboratory

C316.1	Ability to Design and Implement a database schema for a given problem-domain
C316.2	Ability toPopulate and query a database
C316.3	Ability to Create and maintain tables using PL/SQL.
C316.4	Able to Have hands on experience on DDL Commands
C316.5	Ability to Prepare reports.

ourse Code:C216 Course Name: AN8511 LAN and Networking Laboratory

C216.1	Ability to Look up Internet Addresses.
C216.2	To Write a program to trace the port of a particular host.
C216.3	To Write a program to implement the daytime protocol.
C216.4	To Demonstration of TCP/IP protocol. And UDP Protocol.
C216.5	To Implement a chat server using TCP/IP protocol & Transfer of files from PC to PC using Windows / Unix socket processing

Course Code:C311 Course Name: MG8591 Principles of Management

C311.1	Explain the purpose of management & managerial roles in local and global organization.
C311.2	Prescribe the decision making model under different conditions.
C311.3	Explain the process of staff selection and career development.
C311.4	Demonstrate creativity and innovation, and explain the motivational theories.
C311.5	Explain the process of different types of control, and planning operations in management.

Course Code: C215 Course Name: AN8601 Thermal Engineering

C215.1	Calculate the mean effective pressure and air standard efficiency of different gas power cycles.
C215.2	Calculate the performance test on IC engines.
C215.3	Sketch the velocity diagrams of single and multi-stage turbines.
C215.4	Explain the classification and working principle of various types of air compressors.
C215.5	Calculate properties of moist air and COP of vapor refrigeration systems by using refrigeration table and chart.

ourse Code: C309 Course Name: ME8651 Design of Transmission systems

C309.1	Design belt drives (flat belt, V-belt), chain drives, rope drives, belt drive pulleys & chain sprockets.
C309.2	Design spur and straight helical gears based on strength and wear consideration.
C309.3	Design straight bevel gear, worm gear pair and cross helical gear.
C309.4	Design various gear boxes (sliding mesh, constant mesh, multispeed) through geometric progression, standard step ratio, ray diagram, kinematics layout.
C309.5	Design various cams, clutches, internal and external shoe brakes using basic knowledge acquired from earlier studies.

Course Code: C311 Course Name: ME8693 Heat and Mass Transfer

C311.1	Apply heat conduction equations to different surface configurations under steady state and transient conditions and solve problems
C311.2	Apply free and forced convective heat transfer correlations to internal and external flows through/over various surface configurations and solve problems
C311.3	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
C311.4	Explain basic laws for Radiation and apply these principles to radiative heat transfer between different types of surfaces to solve problems
C311.5	Apply diffusive and convective mass transfer equations and correlations to solve problems for different applications

Course Code: C312 Course Name: ME8692 Finite Element Analysis

C312.1	Explain the steps involved in FEA and also the types of weight residual methods.
C312.2	Formulate FE equation for structural, heat transfer and vibration problems.
C312.3	Predict finite element equations for two dimensional thermal and torsion problems.
C312.4	Predict finite element equations for axisymmetric bodies, plate and shell.
C312.5	Apply matrix solution techniques to dynamic problems.

Course Code:C313 Course Name: IE8591 Manufacturing Automation

C313.1	Able to classify types of automation,strategies, business functions with mathematical models.
C313.2	Able to identify control technologies in conjuction with PLCs for automation.
C313.3	Able to design transfer lines using line balancing method
C313.4	Able to develop part program,APT program for CNC Machines and Robotics
C313.5	Able to select AGVs, storage systems,data capture technologies

Course Code:C313 Course Name: AN8001 Metal Cutting and Tool Design

C313.1	Knowledge in the mechanics of various cutting processes and selection of cutting parameters.
C313.2	Ability to measure temperature distribution in metal cutting.
C313.3	Ability to identify machinability criteria and form of tool-wear in metal cutting
C313.4	Ability to design single / multipoint cutting tools.
C313.5	Confidence in designing and recommending jigs and fixtures

Course Code:C315 Course Name: AN8681 Automation Laboratory

C315.1	Ability to write CNC programming using G-code nd M-code
C315.2	Ability to write programming for robot control

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C315.3	Ability to use PLC for actutation
C315.4	Ability to draw Ladder Logic diagram for PLC
C315.5	Ability to simulate the actuation of automation devices using Software

Course Code: C316 Course Name: ME8682 Design and Fabrication Project

C316.1	Develop conceptual and engineering design of any mechanical components and also to fabricate them using different manufacturing tools.

Course Code: C317 Course Name: HS8581 Professional Communication

C317.1	Make effective presentations
C317.2	Participate confidently in Group Discussions
C317.3	Attend job interviews and be successful in them
C317.4	Develop adequate Soft Skills required for the workplace

Course Code: C403 Course Name: ME8791 Mechatronics

C403.1	State the specifications of sensors and choose the suitable sensors for real time applications.
C403.2	Combine the real time control systems with peripheral devices through programmable interface techniques.
C403.3	Test the input output terminals of PLC based control system by interfacing technique.
C403.4	Construct the ladder logic circuits for simple automation system.
C403.5	Design Mechatronics system with the help of microprocessor, PLC and other electrical and electronic Circuits.

Course Code:C403 Course Name:ME8094 Computer Integrated Manufacturing Systems

C403.1	Describe the elements of CIM system & an automated system, Production system and mathematical models of production performance & manufacturing control.
C403.2	Discuss the use of computers in process planning, different aspects of planning system and control systems.
C403.3	Solve the simple problems in part coding system in Group Technology and quantitative analysis in cellular manufacturing.
C403.4	Discuss the flexible manufacturing system components, planning & control and Automated Guided Vehicle System.
C403.5	Discuss the Robot anatomy, related attributes, and classification of robots, robot control systems and robot part programming.

rse Code:C403 Course Name:AN8701 MEASUREMENTS AND CONTROLS

C403.1	To explain different terminologies of Mechanical Measurements.
C403.2	To understand the principle and use of sensors for measurement of different parameters.
C403.3	To identify and choose appropriate parameters of measurement.
C403.4	To understand the concept of feedback control systems and their applications.
C403.5	To conversant with Usage of Automobile control of mechanisms in measurements of mechanical parameters.

Course Code: C402 Course Name: ME8793 Process Planning and Cost Estimation

C402.1	Explain the methods of process planning and the various steps involved in process selection.
C402.2	Examine the various steps involved in process planning activities.
C402.3	Explain the procedure of cost estimation.
C402.4	Estimate the production cost of a given component produced in foundry shop, forging shop & welding shop.
C402.5	Calculate the machining time for different operations performed in lathe, milling, shaping, planning, drilling, boring & grinding.

Course Code: C407 Course Name: MF8761 Computer Aided Simulation and Analysis Laboratory

C407.1	Simulate simple problems in vibrations and simple mechanisms using simulation software.
C407.2	Perform analysis of stress, truss/beam and dynamic analysis of mechanical members.
C407.3	Perform two dimensional stress analysis in plate and asymmetric shells.
C407.4	Analyze the temperature distribution in one dimensional heat transfer problems (walls and fins).
C407.5	Analyze the temperature distribution in two dimensional heat transfer problems (plates and shell).

Course Code: C408 Course Name: ME8781 Mechatronics Laboratory

C408.1	Ability to create the program for arithmetic functions and the program for sorting, code conversion functions.
C408.2	Ability to formulate the program codes to interface with traffic light controller and stepper motor.
C408.3	Ability to compare the set speed with actual speed of DC motor by interfacing suitable speed sensors.
C408.4	Ability to integrate all the hydraulic, pneumatic and electro pneumatic circuits by using simulation software.
C408.5	Ability to create the program for arithmetic functions and the program for sorting, code conversion functions.

Course Code: C408 Course Name: ME8099 Robotics

C408.1	Explain the concepts of industrial robots, classification, specifications and coordinate systems. Also summarize the need and application of robots in different sectors.
C408.2	Illustrate the different types of robot drive systems as well as robot end effectors.
C408.3	Apply the different sensors and image processing techniques in robotics to improve the ability of robots.
C408.4	Develop robotic programs for different tasks and familiarize with the kinematics of robot.
C408.5	Examine the implementation of robots in various industrial sectors and interpolate the economic analysis of robots.

Course Code: C412 Course Name: AN 8811 Project work

C412.1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology

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Branch: B.E, Mechanical & Automation Engineering

Course Code: C101 Course Name:HS6151 Technical English – I

C101.1	Read different genres of texts adopting various reading strategies.
C101.2	Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
C101.3	Listen/view and comprehend different spoken discourses/excerpts in different accents.
C101.4	Speak clearly, confidently, comprehensibly.
C101.5	Communicate with one or many listeners using appropriate communicative strategies.

Course Code: C102 Course Name: MA6151 Mathematics – I

C102.1	Use both the limit definition and rules of differentiation to differentiate functions
C102.2	Apply differentiation to solve maxima and minima problems.
C102.3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.
C102.4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
C102.5	Apply various techniques in solving differential equations.

Course Code:C103 Course Name: PH6151 Engineering Physics – I

C103.1	Acoustics, Production and the applications of Ultrasonics in Engineering and Medical Fields.
C103.2	Interference, different types of lasers and its application in various fields.
C103.3	Fiber optics and optical fiber and its applications.
C103.4	Development of quantum mechanics and its necessary, wave equations and its applications, X - Ray.
C103.5	Crystallography and can able to calculate the crystal parameters

Course Code: C104 Course Name:CY 6151 Engineering Chemistry – I

C104.1	To make the students conversant with basics of polymer chemistry.
C104.2	To make the student acquire sound knowledge of second law of thermodynamics and second law based derivations of importance in engineering applications.
C104.3	To acquaint the student with concepts of important photophysical and photochemical processes and spectroscopy.
C104.4	To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
C104.5	To acquaint the students with the basics of nano materials, their properties and applications.

Course Code: C105 Course Name:GE6151 Computer Programming

C105.1	Explain the components of computer and logical operations.
C105.2	Convert the number system and their representation.
C105.3	Discuss hardware and software devices
C105.4	Summarize network fundamentals.
C105.5	Plan the logic using flowchart and develop algorithm to write a C Program.

Course Code: C106 Course Name: GE6152 Engineering Graphics

C106.1	Ability to familiarize with the fundamentals and standards of Engineering graphics
C106.2	Ability to perform freehand sketching of basic geometrical constructions and multiple views of objects
C106.3	Ability to Project orthographic projections of lines and plane surfaces
C106.4	Ability to draw projections of solids and development of surfaces
C106.5	Ability to visualize and to project isometric and perspective sections of simple solids

Course Code: C107 Course Name:GE6161 Computer Practices Laboratory

C107.1	Prepare data using MS-word & Excel to visualize graphs, charts in MS-Excel.
C107.2	Outline the logic using flowchart for a given problem and to program using Switch case & Control structures
C107.3	Develop logic using decision making & looping statements
C107.4	Apply passing parameters using Arrays & Functions
C107.5	Construct structure and Union for a given database and to bring out the importance of Unions over structure

Course Code:C108 Course Name: GE6162 Engineering Practices Laboratory

C108.1	Ability to Fabricate carpentry components and pipe connections including plumbing works

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C108.2	Ability to Use welding equipments to join the structures
C108.3	Ability to Carry out the basic machining operations
C108.4	Ability to Make the models using sheet metal works
C108.5	Ability to Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings

ourse Code:C109 Course Name:GE6163 Physics and Chemistry Laboratory - I

C109.1	To provide the basic practical exposure to all the engineering and technological streams in the field of physics.
C109.2	To provide the basic practical exposure to all the engineering and technological streams in the field of chemistry.
C109.3	The students are able to know about the water containing impurities and some physical parameters.
C109.4	To gain the knowledge about light, sound, laser, fiber optics and magnetism.
C109.5	To develop the knowledge of conductometric titration and viscometry

Course Code:C201 Course Name:HS6251 Technical English – II

C201.1	Read different genres of texts, infer implied meanings and critically analyse and evaluate them for ideas as well as for method of presentation.
C202.2	Write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
C203.3	Listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.
C204.4	Speak convincingly, express their opinions clearly.
C205.5	Initiate a discussion, negotiate, argue using appropriate communicative strategies.

Course Code:C202 Course Name:MA6251 Mathematics – II

C202.1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matr
C2022	Gradient, divergence and curl of a vector point function and related identities.
C203.3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
C204.4	Analytic functions, conformal mapping and complex integration.
C205.5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

Course Code:C203 Course Name:PH6251 Engineering Physics – II

C112.1	Electric conduction, electrical conductivity, carrier concentration of metals.
C112.2	Semiconductors, carrier concentration of semiconductors, Hall effect and semiconductor devices.
C112.3	Types of magnetic materials, ferro magnetic materials, magnetic storage devices, Super conductors and their properties an
C112.4	Dielectrics, properties and its applications, ferro electricity.
C112.5	Modern engineering materials, Nano materials and Carbon nano tubes.

Course Code:C204 Course Name:CY6251 Engineering Chemistry – II

C113.1	To make the students conversant with boiler feed water requirements, related problem and water treatment techniques.
C113.2	Principles of electrochemical reactions, redox reactions in corrosion of materials and methods for corrosion prevention and protection of materials.
C113.3	Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.
C113.4	Preparation, properties and applications of engineering materials.
C113.5	Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.

se Code:C205 Course Name:GE6252 Basic Electrical and Electronics Engineering

C114.1	Ability to understand basic theorems used in Electrical circuits and the different components
C114.2	Ability to explain about the function and characteristics of electrical machines.
C114.3	Ability to explain about the fundamentals of semiconductor and applications.
C114.4	Ability to explain about the principles of digital electronics.
C114.5	Ability to explain about the knowledge of communication.

Course Code: C206 Course Name: GE6253 Engineering Mechanics

C115.1	Ability to illustrate the vectorial and scalar representation of forces and moments
C115.2	Ability to analyse the rigid body in equilibrium
C115.3	Ability to evaluate the properties of surfaces and solids
C115.4	Ability to calculate dynamic forces exerted in rigid body
C115.5	Ability to determine the friction and the effects by the laws of friction

ode: C207 Course Name:GE6261Computer Aided Drafting and Modeling Laboratory

C116.1	Sketch simple figures with title block using AutoCAD software commands.
C116.2	Sketch curves like parabola, spiral and involute of square & circle and draw the orthographic projection of simple solids.
C116.3	Prepare orthographic projection of simple machine parts and draw a plan of residential building.
C116.4	Sketch simple steel truss and sectional views of simple solids.
C116.5	Prepare 2D multi view drawing from 3D model.

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ourse Code:C208 Course Name:GE6262 Physics and Chemistry Laboratory -II

C117.1	To provide the basic practical exposure to all the engineering and technological streams in the field of physics. .
C117.2	To provide the basic practical exposure to all the engineering and technological streams in the field of chemistry.
C117.3	The students are able to know about the water containing impurities and some physical parameters.
C117.4	To gain the knowledge about properties of matter, semiconductors and solar cells
C117.5	To develop the knowledge of spectrophotometry.

e Code:C301 Course Name:MA6351 Transforms and Partial Differential Equations

C301.1	Understand how to solve the given standard partial differential equations.
C301.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
C301.3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
C301.4	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.
C301.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for d

Course Code:C203 Course Name: ME6301 Engineering Thermodynamics

C203.1	Apply the first law of thermodynamics for simple open and closed systems under steadyand unsteady conditions
C203.2	Apply second law of thermodynamics to open and closed systems and calculate entropyand availability
C203.3	Apply Rankine cycle to steam power plant and compare few cycle improvement methods
C203.4	Derive simple thermodynamic relations of ideal and real gases
C203.5	Calculate the properties of gas mixtures and moist air and its use in psychometric Processes

Course Code:C204 Course Name:CE6451 Fluid Mechanics and Machinery

C204.1	Apply mathematical knowledge to predict the properties and characteristics of a fluid.
C204.2	Can analyse and calculate major and minor losses associated with pipe flow in piping networks
C204.3	Can mathematically predict the nature of physical quantities
C204.4	Can critically analyse the performance of pumps
C204.5	Can critically analyse the performance of turbines

Course Code:C205 Course Name:ME6302Manufacturing Technology – I

C205.1	Explain different metal casting processes, associated defects, merits and demerits
C205.2	Compare different metal joining processes
C205.3	Summarize various hot working and cold working methods of metals
C205.4	Explain various sheet metal making processes
C205.5	Distinguish various methods of manufacturing plastic components

Course Code:C206 Course Name: EE6351Electrical Drives and Controls

C206.1	Students can able to explain different types of electrical machines.
C206.2	Students can able to explain the performance of various machines.
C206.3	Students can able to explain the different methods of starting dc motors and induction motors.
C206.4	Students can able to understand and explain the conventional and solid state dc drives.
C206.5	Students can able to understand and explain the conventional and solid state ac drives.

Course Code:C207 Course Name: ME6311 Manufacturing Technology Laboratory - I

C207.1	Use different machine tools to manufacturing gears
C207.2	Ability to use different machine tools to manufacturing gears
C207.3	Ability to use different machine tools for finishing operations
C207.4	Ability to manufacture tools using cutter grinder
C207.5	Develop CNC part programming

se Code:C208 Course Name: CE6461 Fluid Mechanics and Machinery Laboratory

C208.1	Calculate the coefficient of discharge for Orifice meter and Venturimeter.
C208.2	Calibrate the Rotameter and Estimate the friction factor for flow through pipes.
C208.3	Predict performance characteristics of centrifugal pump and submergible pump.
C208.4	Predict performance characteristics of reciprocating pump and gear pump.
C208.5	Predict performance characteristics of turbines.

Course Code:C209 Course Name: EE6365 Electrical Engineering Laboratory

C209.1	Ability to perform Load and speed characteristics of dc machines.
C209.2	Ability to perform Load and speed characteristics of Induction motor.
C209.3	Ability to perform Load and performance characteristics of transformers.
C209.4	Ability to perform Load and performance characteristics of alternators.

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C209.5	Ability to understand various ac and dc motor starters.

se Code:C209 Course Name: EC6466 Electronics and Microprocessors Laboratory

C209.1	Ability to perform speed characteristics of Zener diode and PN Junction diode
C209.2	Ability to perform characteristics of Half Adder and Full Adder
C209.3	Ability to perform Shift Registers and Counters
C209.4	Ability to perform Operational Amplifier (Adder, Subtractor, Differentiator, Integrator, Inverting and Non – Inverting
C209.5	Ability to understand various microprocessor and Stepper Motor Interfacing.

Course Code:C210 Course Name: ME6015 Operations Research

C210.1	Identify various linear models
C210.2	Apply transportation and network model in solving engineering problems.
C210.3	To understand the inventory model in manufacturing industry.
C210.4	To analyse various queueing model in engineering.
C210.5	To apply various decision model for use in business function and management decision.

Course Code:C210 Course Name: AN6401 LAN and Networking

C210.1	Explain the characteristics and function of the OSI model
C210.2	Explain the configuration for TCP/IP configuration
C210.3	Explain the fundamentals of networking process
C210.4	Explain the data transfer through networks.
C210.5	To analyse data communication Technology

Course Code: C202 Course Name:CE6306 Strength of Materials

C202.1	Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes
C202.2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment
C202.3	Apply basic equation of simple torsion in designing of shafts and helical spring
C202.4	Calculate the slope and deflection in beams using different methods.
C202.5	Analyze and design thin and thick shells for the applied internal and external pressures

urse Code:C211 Course Name: AN6402 Kinematics and Dynamics of Machinery

C211.1	Ability to discuss the basics of mechanism
C211.2	Ability to Solve problems on gears and gear trains
C211.3	Ability to examine friction in machine elements
C211.4	Ability to study force analysis in various machine members
C211.5	Ability to understand balancing and vibration in mechanical systems.

Course Code:C212 Course Name:ME6402 Manufacturing Technology–II

C212.1	Ability to explain the mechanism of material removal processes
C212.2	Ability to describe the constructional and operational features of centre lathe and other specialpurpose lathes
C212.3	Describe the constructional and operational features of shaper, planner, milling, drilling,sawing and broaching machines
C212.4	Explain the types of grinding and other super finishing processes apart from gear manufacturing processes
C212.5	Ability to summarize numerical control of machine tools and write a part program

urse Code:C213 Course Name: ME6403 Engineering Materials and Metallurgy

C213.1	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification
C213.2	Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes
C213.3	Clarify the effect of alloying elements on ferrous and non-ferrous metals
C213.4	Summarize the properties and applications of non metallic materials.
C213.5	Explain the testing of mechanical properties

Course Code:C218 Course Name: CE6315 Strength of Materials Laboratory

C218.1	Evaluate the values of yield stress, breaking stress and ultimate stress of the given specimen under tension test.
C218.2	Conduct the torsion test to determine the modulus of rigidity of given specimen.
C218.3	Justify the Rockwell hardness test over with Brinell hardness and measure the hardness of the given specimen.
C218.4	Examine the stiffness of the open coil and closed coil spring and grade them.
C218.5	Analyze the microstructure and characteristics of specimen.

urse Code:C216 Course Name: ME6465 Manufacturing Technology Laboratory

C216.1	Demonstrate contour milling and generate a spur gear from a cylindrical work piece.
C216.2	Perform helical gear cutting operation and generate gear using hobbing machine.

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C216.3	Generate gear using gear shaping machine and demonstrate plain surface grinding operation.
C216.4	Perform cylindrical grinding operation and practice Tool angle grinding with tool and Cutter Grinder.
C216.5	Measure cutting forces in Milling / Turning Process and develop CNC part programming.

Course Code:C216 Course Name: AN6411 LAN and Networking Laboratory

C216.1	Ability to Look up Internet Addresses.
C216.2	To Write a program to trace the port of a particular host.
C216.3	To Write a program to implement the daytime protocol.
C216.4	To Demonstration of TCP/IP protocol. And UDP Protocol.
C216.5	To Implement a chat server using TCP/IP protocol & Transfer of files from PC to PC using Windows / Unix socket process

urse Code:C214 Course Name: GE6351 Environmental Science and Engineering

C214.1	Describe the structure and functions of different eco system.
C214.2	Identify the various causes, effects and control measures of different types of pollution.
C214.3	Summarize the over exploitation and their effects of natural resources.
C214.4	Appraise the environmental issues and possible solution.
C214.5	Explain the causes of population growth and explosion.

rse Code:C214 Course Name: CS6312 DATABASE MANAGEMENT SYSTEMS

C214.1	Ability to Design Databases for applications.
C214.2	Ability to Use the Relational model, ER diagrams.
C214.3	Ability toApply concurrency control and recovery mechanisms for practical problems.
C214.4	Ability to Design the Query Processor and Transaction Processor.
C214.5	To be able to Apply security concepts to databases.

Course Code:C303 Course Name:ME6503 Design of Machine Elements

C303.1	Explain the influence of steady and variable stresses in machine component design.
C303.2	Apply the concepts of design to shafts, keys and couplings
C303.3	Apply the concepts of design to temporary and permanent joints
C303.4	Apply the concepts of design to energy absorbing members, connecting rod and crank shaft.
C303.5	Apply the concepts of design to bearings

ourse Code:C303 Course Name: AN6501 Manufacturing System Management

C303.1	To gain Knowledge gained in replacement policies of man power and equipments.
C303.2	To gain Knowledge in product cost and costing analysis.
C303.3	Ability to design, develop and implement are integrated system involving man, machine, materials and energy
C303.4	Ability to apply work standards method in manufacturing.
C303.5	Ability to identify different types of maintenance strategies.

Course Code:C215 Course Name: AN6502 Measurements and Controls

C215.1	To Understand terminologies of Mechanical Measurements.
C215.2	To Gain knowledge of parameters of Mechanical Measurements.
C215.3	Ability to be conversant ith theUsage of Automobile control of mechanisms in measurements of mechanical parameters.
C215.4	To understand the concept of feedback control systems and their applications.
C215.5	To apply control systems in mechanical measurement systems.

ourse Code:C215 Course Name: MT6602 Applied Hydraulics and Pneumatics

C215.1	To Study FLUID POWER PRINCIPLES AND HYDRAULIC PUMPS
C215.2	ToUnderstand operating principles and constructional features of hydraulic systems.
C215.3	To Understand operating principles and constructional features of pneumatic systems.
C215.4	To gain Knowledge with selection of hydraulic / pneumatic components
C215.5	To understand& designing and layout of Hydraulic Power package and trouble shooting.

ourse Code:C307 Course Name: AN6511 Dynamics and Metrology Laboratory

C307.1	Review the various types of gears, gear trains, kinematic mechanisms, and universal joints.
C307.2	Sketch the characteristic curves of Watt, Porter, Proell and Hartnell governors and motion curves for the given cam follow
C307.3	Inspect the critical speed of shaft under the given load conditions and the gyroscopic effect and couple on motorized gyrosc
C307.4	To make the students understand the fundamental principles of measuring techniques by practicing exercises on various m
C307.5	To understand how certain measuring devices are used for dynamic testing.

Course Code:C316 Course Name: ME6611 C.A.D/ C.A.M Laboratory

C316.1	Create 2D and 3D models using modeling software.
C316.2	Understand the CNC control in modern manufacturing system.

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C316.3	Prepare CNC part programming and perform manufacturing.
C316.4	Create the CL Data and Post process generation using CAM packages.
C316.5	Apply CAPP in Machining and Turning Centre.

se Code:C316 Course Name: CS6312 Database Management Systems Laboratory

C316.1	Ability to Design and implement a database schema for a given problem-domain
C316.2	Ability toPopulate and query a database
C316.3	Ability to Create and maintain tables using PL/SQL.
C316.4	Able to Have hands on experience on DDL Commands
C316.5	Ability to Prepare reports.

Course Code:C311 Course Name: MG6851Principles of Management

C311.1	Explain the purpose of management & managerial roles in local and global organization.
C311.2	Prescribe the decision making model under different conditions.
C311.3	Explain the process of staff selection and career development.
C311.4	Demonstrate creativity and innovation, and explain the motivational theories.
C311.5	Explain the process of different types of control, and planning operations in management.

Course Code:C302 Course Name: ME6502 Heat and Mass Transfer

C302.1	Apply heat conduction equations to different surface configurations under steady state and transient conditions and solve p
C302.2	Apply free and forced convective heat transfer correlations to internal and external flows through/over various surface configurations and solve problems
C302.3	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
C302.4	Explain basic laws for Radiation and apply these principles to radiative heat transfer between different types of surfaces to solve problems
C302.5	Apply diffusive and convective mass transfer equations and correlations to solve problems for different applications

Course Code:C310 Course Name: ME6601 Design of Transmission systems

C310.1	Design belt drives (flat belt, V-belt), chain drives, rope drives, belt drive pulleys & chain sprockets.
C310.2	Design spur and straight helical gears based on strength and wear consideration.
C310.3	Design straight bevel gear, worm gear pair and cross helical gear.
C310.4	Design various gear boxes (sliding mesh, constant mesh, multispeed) through geometric progression, standard step ratio, ray diagram, kinematics layout.
C310.5	Design various cams, clutches, internal and external shoe brakes using basic knowledge acquired from earlier studies.

Course Code:C313 Course Name: ME6603 Finite Element Analysis

C313.1	Explain the steps involved in FEA and also the types of weight residual methods.
C313.2	Formulate FE equation for structural, heat transfer and vibration problems.
C313.3	Predict finite element equations for two dimensional thermal and torsion problems.
C313.4	Predict finite element equations for axisymmetric bodies, plate and shell.
C313.5	Apply matrix solution techniques to dynamic problems.

Course Code:C313 Course Name: IE6504 Manufacturing Automation

C313.1	Able to classify types of automation,strategies, business functions with mathematical models.
C313.2	Able to identify control technologies in conjuction with PLCs for automation.
C313.3	Able to develop part program,APT program for CNC Machines and Robotics
C313.4	Able to select AGVs, storage systems,data capture technologies.
C313.5	Able to apply the use of computers in design, manufacture,graphics and basic geometrical constructions.

ourse Code:C315 Course Name: ME6004 Unconventional Machining Processes

C315.1	Justify the needs of unconventional machining processes.
C315.2	Explain the working principles of Mechanical Energy Based Processes and various process parameters influence on their p
C315.3	Differentiate between Electric discharge machining and Wire cut Electric discharge machining.
C315.4	Compare the chemical machining process with electro-chemical machining process.
C315.5	Explain the working principles of thermal energy based processes.

Course Code:C315 Course Name: AN6611 Automation Laboratory

C315.1	Ability to write CNC programming using G-code nd M-code
C315.2	Ability to write programming for robot control
C315.3	Ability to use PLC for actutation
C315.4	Ability to draw Ladder Logic diagram for PLC
C315.5	Ability to simulate the actuation of automation devices using Software

Course Code:C317 Course Name: AN6612 Design and Fabrication Project

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C317.1	Develop conceptual and engineering design of any mechanical components.
C318.1	Ability to fabricate any components using different manufacturing tools.

se Code :C318 Course Name: GE6674 Communication Skills – Laboratory Based

C318.1	Apply appropriate communication skills across settings, purposes, and audiences.
C318.2	Demonstrate knowledge of communication theory and application.
C318.3	Practice critical thinking to develop innovative and well-founded perspectives related to the students' emphases.
C318.4	Build and maintain healthy and effective relationships. Use technology to communicate effectively in various settings and contexts.
C318.5	Demonstrate appropriate and professional ethical behavior.

Course Code:C404 Course Name: GE6757 Total Quality Management

C4040.1	Students will be able to gain basic knowledge in total quality management relevant to both manufacturing and service industry including IT sector
C404.2	Students will be able to implement the basic principles of TQM in manufacturing and service based organization.
C404.3	The student would be able to apply the traditional tools and techniques of quality management to
C404.4	The student would be able to apply the new tools and techniques of quality management to manufacturing and services pro
C404.5	Students will gain knowledge on Quality systems and International standards

Course Code:C301 Course Name: AN 6701 Metal Cutting and Tool Design

C301.1	To gain Knowledge in the mechanics of various cutting processes and selection of cutting parameters.
C301.2	To study about heat generation in metal cutting and temperature distribution.
C301.3	To select appropriate material for cutting tool design.
C301.4	Ability to design single / multipoint cutting tools.
C301.5	Confidence in designing and recommending jigs and fixtures

Course Code:C402 Course Name: ME6702 Mechatronics

C402.1	State the specifications of sensors and choose the suitable sensors for real time applications.
C402.2	Combine the real time control systems with peripheral devices through programmable interface techniques.
C402.3	Test the input output terminals of PLC based control system by interfacing technique.
C402.4	Construct the ladder logic circuits for simple automation system.
C402.5	Design Mechatronics system with the help of microprocessor, PLC and other electrical and electronic Circuits.

se Code:C403 Course Name:ME6703Computer Integrated Manufacturing Systems

C403.1	Describe the elements of CIM system & an automated system, Production system and mathematical models of production performance & manufacturing control.
C403.2	Discuss the use of computers in process planning, different aspects of planning system and control systems.
C403.3	Solve the simple problems in part coding system in Group Technology and quantitative analysis in cellular manufacturing.
C403.4	Discuss the flexible manufacturing system components, planning & control and Automated Guided Vehicle System.
C403.5	Discuss the Robot anatomy, related attributes, and classification of robots, robot control systems and robot part programm

urse Code:C403 Course Name:AN6001 Modern Concepts of Engineering Design

C403.1	Ability to explain the Sequential steps of modern design process.
C403.2	Ability to recognize the significance of creativity in deign.
C403.3	Knowledge in Human Factor, Environmental factors in Mechanical Design.
C403.4	To be able to apply modern material and processes in design.
C403.5	To implement latest and new trends in Engineering design.

ourse Code:C405 Course Name: ME6005Process Planning and Cost Estimation

C405.1	Explain the methods of process planning and the various steps involved in process selection.
C405.2	Examine the various steps involved in process planning activities.
C405.3	Explain the procedure of cost estimation.
C405.4	Estimate the production cost of a given component produced in foundry shop, forging shop & welding shop.
C405.5	Calculate the machining time for different operations performed in lathe, milling, shaping, planning, drilling, boring & gri

de:C407 Course Name: ME6711 Computer Aided Simulation and Analysis Laboratory

C407.1	Simulate simple problems in vibrations and simple mechanisms using simulation software.
C407.2	Perform analysis of stress, truss/beam and dynamic analysis of mechanical members.
C407.3	Perform two dimensional stress analysis in plate and asymmetric shells.
C407.4	Analyze the temperature distribution in one dimensional heat transfer problems (walls and fins).
C407.5	Analyze the temperature distribution in two dimensional heat transfer problems (plates and shell).

Course Code:C408 Course Name:ME6712Mechatronics Laboratory

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C408.1	Ability to create the program for arithmetic functions and the program for sorting, code conversion functions.
C408.2	Ability to formulate the program codes to interface with traffic light controller and stepper motor.
C408.3	Ability to compare the set speed with actual speed of DC motor by interfacing suitable speed sensors.
C408.4	Ability to integrate all the hydraulic, pneumatic and electro pneumatic circuits by using simulation software.
C408.5	Ability to create the program for arithmetic functions and the program for sorting, code conversion functions.

Course Code:C409 Course Name: AN6711 Comprehension

C409.1	Understand and comprehend any given problem related to mechanical engineering field.

Course Code:C411 Course Name: ME6010 Robotics

C411.1	To understand the functions of the basic components of a Robot.
C411.2	To study the use of various types of End of Effectors and Sensors
C411.3	To impart knowledge in Robot Kinematics and Programming
C411.4	To gain knowledge about machine vision system and automated surveillance
C411.5	To learn Robot safety issues and economics.

Course Code:C411 Course Name: IE6605 Production Planning and Control

C411.1	Describe the functions of production control, various production system, different aspects of product development and break even analysis.
C411.2	Describe the concept of Method study, Motion study and work measurement techniques.
C411.3	Perform the analysis of problems in lack of product planning, quantity determination in batch production and analysis of process capabilities in a multi product system.
C411.4	Discuss about production scheduling, production control systems, progress reporting & expediting and techniques for aligning completion times & due dates.
C411.5	Calculate the economic order quantity & economic lot size in inventory control.

Course Code:C406 Course Name: ME6012 Maintenance Engineering

C406.1	Ability to understand the principles and objectives of Maintenance Engineering.
C406.2	Ability to describe the various categories of maintenance.
C406.3	Ability to discuss various condition monitoring techniques.
C406.4	Ability to explain the repair methods of beds and slide ways.
C406.5	Ability to explain the repair methods of material handling equipment's.

Course Code:C413 Course Name: AN6811Project work

C413.1	Develop the ability to solve a specific problem right from its identification and literature review till finding the successful solution of the same

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Course Outcomes (CO)

(R 2013)

Branch: B.E, Mechatronics Engineering

Course Code: C101 Course Name:HS6151 Technical English – I

C101.1	Speak clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies.
C101.2	Write cohesively and coherently and flawlessly avoiding grammatical errors
C101.3	Using a wide vocabulary range, organizing their ideas logically on a topic.
C101.4	Read different genres of texts adopting various reading strategies.
C101.5	Listen/view and comprehend different spoken discourses/excerpts in different accents.

Course Code: C102 Course Name: MA6151 Mathematics – I

C102.1	Develop the use of matrix algebra techniques this is needed by engineers for practical applications
C102.2	Make the student knowledgeable in the area of infinite series and their convergence so that he/ she will be familiar with limitations of using infinite series approximations for solutions arising in mathematical modeling
C102.3	Familiarize the student with functions of several variables. This is needed in many branches of engineering
C102.4	Introduce the concepts of improper integrals, Gamma, Beta and Error functions which are needed in engineering applications
C102.5	Acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage

Course Code:C103 Course Name: PH6151 Engineering Physics – I

C103.1	Apply knowledge on the basis of physics related to properties of matter
C103.2	Apply knowledge on the basis of physics related to optics
C103.3	Apply knowledge related to acoustics
C103.4	Apply these fundamental principles to solve practical problems
C103.5	The materials are used for engineering applications

Course Code: C104 Course Name:CY 6151 Engineering Chemistry – I

C104.1	Make the students conversant with basics of polymer chemistry
C104.2	To make the student acquire sound knowledge of second law of thermodynamics and second law based derivations of importance in engineering applications in all disciplines
C104.3	Acquaint the student with concepts of important photophysical and photochemical processes and spectroscopy
C104.4	Develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys
C104.5	Acquaint the students with the basics of nano materials, their properties and applications

Course Code: C105 Course Name:GE6151 Computer Programming

C105.1	Learn the organization of a digital computer
C105.2	Be exposed to the number systems
C105.3	Learn to think logically and write pseudo code or draw flow charts for problems
C105.4	Be exposed to the syntax of C
C105.5	Be familiar with programming in C, Learn to use arrays, strings, functions, pointers, structures and unions in C

Course Code: C106 Course Name: GE6152 Engineering Graphics

C106.1	perform free hand sketching of basic geometrical constructions and multiple views of objects
C106.2	do orthographic projection of lines and plane surfaces
C106.3	draw projections and solids and development of surfaces
C106.4	prepare isometric and perspective sections of simple solids
C106.5	demonstrate computer aided drafting

Course Code: C107 Course Name:GE6161 Computer Practices Laboratory

C107.1	Introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics and properties of matter

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C107.2	Get the practical skills in the field of thermal physics
C107.3	Acquire the industrial knowledge in the field of properties of matter
C107.4	Acquire practical skills in the determination of water quality parameters through volumetric and instrumental analysis.
C107.5	acquaint the students with the determination of molecular weight of a polymer by viscometry

Course Code:C108 Course Name: GE6162 Engineering Practices Laboratory

C108.1	To provide exposure to the students with hands on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering
C108.2	Study of plumbing and carpentry components of residential and industrial buildings. Safety aspe
C108.3	Ability to fabricate carpentry components and pipe connections including plumbing works
C108.4	Ability to use welding equipments to join the structures
C108.5	Ability to fabricate electrical and electronics circuit

Course Code:C109 Course Name:GE6163 Physics and Chemistry Laboratory - I

C109.1	To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics and properties of matter
C109.2	To get the practical skills in the field of thermal physics
C109.3	To acquire the industrial knowledge in the field of properties of matter
C109.4	To make the student to acquire practical skills in the determination of water quality parameters through volumetric and instrumental analysis.
C109.5	To acquaint the students with the determination of molecular weight of a polymer by viscometry

C110.1	Read different genres of texts, infer implied meanings and critically analyse and evaluate them for ideas as well as for method of presentation.
C110.2	Write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
C110.3	Listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.
C110.4	Speak convincingly, express their opinions clearly.
C110.5	Initiate a discussion, negotiate, argue using appropriate communicative strategies.

Course Code:C111 Course Name:MA6251 Mathematics – II

C111.1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
C111.2	Gradient, divergence and curl of a vector point function and related identities.
C111.3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
C111.4	Analytic functions, conformal mapping and complex integration.
C111.5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

Course Code:C112 Course Name:PH6251 Engineering Physics – II

C112.1	Electric conduction, electrical conductivity, carrier concentration of metals.
C112.2	Semiconductors, carrier concentration of semiconductors, Hall effect and semiconductor devices.
C112.3	Types of magnetic materials, ferro magnetic materials, magnetic storage devices, Super conductors and their properties and applications.
C112.4	Dielectrics, properties and its applications, ferro electricity.
C112.5	Modern engineering materials, Nano materials and Carbon nano tubes.

Course Code:C113 Course Name:CY6251 Engineering Chemistry – II

C113.1	To make the students conversant with boiler feed water requirements, related problem and water treatment techniques.
C113.2	Principles of electrochemical reactions, redox reactions in corrosion of materials and methods for corrosion prevention and protection of materials.
C113.3	Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.
C113.4	Preparation, properties and applications of engineering materials.
C113.5	Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.

Course Code:C114 Course Name:GE6252 Basic Electrical and Electronics Engineering

C114.1	Ability to understand basic theorems used in Electrical circuits and the different components
C114.2	Ability to explain about the function and characteristics of electrical machines.
C114.3	Ability to explain about the fundamentals of semiconductor and applications.
C114.4	Ability to explain about the principles of digital electronics.
C114.5	Ability to explain about the knowledge of communication.

Course Code: C115 Course Name: GE6253 Engineering Mechanics

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C115.1	Ability to illustrate the vectorial and scalar representation of forces and moments
C115.2	Ability to analyse the rigid body in equilibrium
C115.3	Ability to evaluate the properties of surfaces and solids
C115.4	Ability to calculate dynamic forces exerted in rigid body
C115.5	Ability to determine the friction and the effects by the laws of friction

Course Code: C116 Course Name:GE6261Computer Aided Drafting and Modeling Laboratory

C116.1	Sketch simple figures with title block using AutoCAD software commands.
C116.2	Sketch curves like parabola, spiral and involute of square & circle and draw the orthographic projection of simple solids.
C116.3	Prepare orthographic projection of simple machine parts and draw a plan of residential building.
C116.4	Sketch simple steel truss and sectional views of simple solids.
C116.5	Prepare 2D multi view drawing from 3D model.

Course Code:C117 Course Name:GE6262 Physics and Chemistry Laboratory -II

C117.1	To provide the basic practical exposure to all the engineering and technological streams in the field of physics.
C117.2	To provide the basic practical exposure to all the engineering and technological streams in the field of chemistry.
C117.3	The students are able to know about the water containing impurities and some physical parameters.
C117.4	To gain the knowledge about properties of matter, semiconductors and solar cells
C117.5	To develop the knowledge of spectrophotometry.

Course Code:C201 Course Name:MA6351 Transforms and Partial Differential Equations

C201.1	Understand how to solve the given standard partial differential equations.
C201.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
C201.3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
C201.4	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.
C201.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

Course Code: C202 Course Name:CE6306 Strength of Materials

C202.1	Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes
C202.2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment
C202.3	Apply basic equation of simple torsion in designing of shafts and helical spring
C202.4	Calculate the slope and deflection in beams using different methods.
C202.5	Analyze and design thin and thick shells for the applied internal and external pressures

Course Code: C203 Course Name:CE6451 Fluid Mechanics and Machinery

C203.1	To understand the basics concepts of fluid properties and their applications.
C203.2	To gain the fundamental knowledge on fluid flow through pipes of various section and its losses and boundary layer concept.
C203.3	To formulate equations for model and prototype for various applications and analysing it dimensionally.
C203.4	To understand the working principle of various pumps and its performance evaluation and comparison.
C203.5	To understand the working principle of various turbine and its performance evaluation and comparison.

Course Code: C204 Course Name:EC6302 Digital Electronics

C204.1	Use digital electronics in the present contemporary world and Analyze different methods used for simplification of Boolean expressions.
C204.2	Design and implement Combinational circuits using logic gates
C204.3	Use the semiconductor memories and related technology to design logic gates
C204.4	Design and implement synchronous and asynchronous sequential circuits.
C204.5	Write simple HDL codes for the circuits.

Course Code: C205 Course Name:EE6358 Electrical Drives and Machines

C205.1	Explain the structure of the basic electronic device
C205.2	Design applications using the basic electronic devices
C205.3	Understand the amplifiers and multistage amplifiers
C205.4	Understand the characteristics of transistors and p n junction
C205.5	Understand the p n junction

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Course Code: C206 Course Name:ME6401 Kinematics of Machinery

C206.1	To apply fundamentals of mechanism for the design of new mechanisms
C206.2	To analyze the velocity and acceleration at any point in a link of mechanisms for optimum design
C206.3	To understand the kinematics and design of cam and follower mechanism.
C206.4	To gain the knowledge on kinematics of gears and its applications in gear trains.
C206.5	To apply the effect of friction in belt drives, rope drives, brakes, clutches, screw jacks and bearings.

Course Code: C207 Course Name:CE6461 Fluid Mechanics and Machinery Laboratory

C207.1	Calibrate flow measuring devices used in pipes.
C207.2	Determine the minor losses in pipes.
C207.3	Verification of fluid properties and Energy Principles.
C207.4	Study the performance of different types of hydraulic turbines.
C207.5	Study the performance of different types of pumps.

Course Code: C208 Course Name:EE6365 Electrical Engineering Laboratory

C208.1	To provide practical experience with simulation of electrical circuits and verifying circuit theorems
C208.2	Experimental verification of Kirchhoff's voltage and current laws
C208.3	Design and Simulation of series and parallel resonance circuit
C208.4	Experimental determination of power in three phase circuits by two-watt meter method, Calibration of single phase energy meter
C208.5	Ability to understand and apply circuit theorems and concepts in engineering applications

Course Code: C209 Course Name:MT6311Computer Aidded Machine Drawning Laboratory

C209.1	This study helps the students to handle the most basic software in design era to create drawings which plays the vital role in all aspects using various commands.
C209.2	Ability to draw the title block to access the drawing sheet quickly and also navigate through the description of the drawing easily for future reference. Ability to draw the ellipse of various foci and involute curve as per the applications.
C209.3	Ability to draw an object to decipher the front, top view and side view of the object diagrammatically by projecting it orthogonally.
C209.4	Ability to draw the plan of residential building and simple steel structures with the different types of joints as per the design calculations.
C209.5	Ability to draw the sectional and isometric view of various objects in different dimension.

Course Code: C210 Course Name:MA6452 Statistics and Numerical Methods

C211.1	Students will gain the knowledge on Large Samples and Samples. These concepts are very useful in biological, economical and social experiments and all kinds of generalizations based on information about a smaller sample and larger samples. Apply the appropriate test in the problems related with sampling.
C211.2	ANOVA statistical significance result is independent of constant bias and scaling errors as well as the units used in expressing observations. In the era of mechanical calculation it was common to subtract a constant from all observations (when equivalent to dropping leading digits) to simplify data entry.
C211.3	Students will learn on nonlinear (algebraic or transcendental) equations and linear equations. Students learn to solve the Eigen value problem of a matrix numerically when analytical methods tend to fail to give solution and apply all these in their field like Vibrating systems, fluid dynamics.
C211.4	Students will learn to construct approximate polynomials that can be used in data representation using interpolation techniques to find the intermediate values. In particular, interpolation methods are extensively applied in the models of the different phenomena where experimental data must be used in computer studies where expressions of those data are required. The learners are introduced to numerical differentiation and integration techniques. The techniques are useful when the function in the analytical form is complicated
C211.5	Get an insight on ordinary differential equations which will be useful in solving engineering problems. Students learn about the different methods for solving first order and second order differential equations. It will be useful in attempting any engineering problems. ODE is applied in specific mathematical fields like geometry, analytical mechanics, celestial mechanics and weather modelling

Course Code: C211 Course Name:ME6505 Dynamics of Machines

C212.1	Calculate static and dynamic forces of mechanisms.
C212.2	Calculate the balancing masses and their locations of reciprocating and rotating masses.
C212.3	Compute the frequency of free vibration.
C212.4	Compute the frequency of forced vibration and damping coefficient.
C212.5	Calculate the speed and lift of the governor and estimate the gyroscopic effect on automobiles, ships and airplanes.

Course Code: C212 Course Name:EC6405 Control System Engineering

C213.1	Understand the basic concepts of control systems, pole, zero and can analyze system stability on that basis.
C213.2	Develop electrical models/ mechanical models to design a physical system for a specific operation
C213.3	Understand and implement mathematical tools (such as SFG) to analyze a complete system

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C213.4	Understand and implement mathematical tools (such as SFG) to analyze a complete system
C213.5	Analyze system's absolute, relative, local stability using different frequency domain methods.

Course Code: C213 Course Name:ME6402 Manufacturing Technology

C214.1	To understand the basic concepts of metal cutting, different types of machine tools, tool materials, single point cutting tool geometry and cutting fluids used in manufacturing.
C214.2	To understand the working principle of types of turning machine and its operations along with power and machining time estimation.
C214.3	To understand working principles and applications of shaping, drilling, boring, milling and gear generating machines.
C214.4	To enrich the knowledge of abrasive process, types of grinding and broaching machines.
C214.5	Ability to understand the evolution, types, features and gaining the CNC programming knowledge, and micro machining.

Course Code: C214 Course Name:ME6504 Metrology and Measurements

C215.1	To understand the basics of metrology its relationship with the working Environment and its effects on measurements.
C215.2	To understand the various devices used and principle behind linear and angular measurement.
C215.3	To understand the usuage of laser interferometers and Coordinate measuring machine.
C215.4	To understand the various devices used and principle behind form measurements.
C215.5	To Understand the the various devices used and principle behind measurement of power , Flow and Temperature.

Course Code: C216 Course Name:MT6401Microprocessor and Application

C216.1	Understand the architecture of 8085, 8086 and 8051
C216.2	Impart the knowledge about the instruction set.
C216.3	Understand the basic idea about the data transfer schemes and its applications.
C216.4	Develop skill in simple program writing for 8051, 8086 & 8085 and applications
C216.5	To know the Architecture and programming of 8086 Microprocessor

Course Code: C217 Course Name:MT6411 Microprocessor Laboratory

C217.1	Design and implement programs on 8085 microprocessor.
C217.2	Design and implement programs on 8086 microprocessor
C217.3	Design interfacing circuits with 8085
C217.4	Design interfacing circuits with 8086
C217.5	Design and implement 8051 microcontroller based systems

Course Code: C218 Course Name:ME6465 Manufacturing Technology Laboratory

C218.1	Ability to use different machine tools to create complicated channels and Develop CNC part programming
C218.2	Ability to use different machine tools to manufacturing gears.
C218.3	Ability to use different machine tools for finishing operations
C218.4	Ability to measure various cutting forces on a cutting tool
C218.5	Ability to manufacture tools using cutter grinder

Course Code: C219 Course Name:ME6511 Dynamics Laboratory

C219.1	Ability to demonstrate the principles of kinematics of machinery.
C219.2	Ability to demonstrate the principles of dynamics of machinery.
C219.3	Ability to use the measuring devices for dynamic testing.
C219.4	Ability to study the parameters of kinematics of machinery.
C219.5	Ability to study the parameters of dynamics of machinery.

Course Code: C301 Course Name:ME6503 Design of Machine Elements

C301.1	To understand and analyze stresses and strains in machine elements.
C301.2	To analyze and design the components for power transmission.
C301.3	To analyze the various stress developed in temporary and permanent joints.
C301.4	To design the energy storing elements, like springs & flywheel.
C301.5	To design and implement the various types of standard bearings.

Course Code: C302 Course Name:EE 6503 Power Electronics

C302.1	Understand the principle of electrical drives & be able to understand the dynamics of electrical drive systems.

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C302.2	Select a drive for a particular application based on power rating & to select a drive based on mechanical characteristics for a particular drive application
C302.3	Operate and maintain solid state drives for speed control of DC machines
C302.4	Operate and maintain solid state drive for speed control of various special electrical machines.
C302.5	Understand various starting and braking methods on electrical drives including their effects on power supply, motor and load.

Course Code: C303 Course Name:MT6501 Sensors and Signal Processing

C303.1	To understand the basics of sensors.
C303.2	To obtain knowledge about mechanical measurements.
C303.3	To obtain knowledge about eletrical measurements.
C303.4	To understand the basics of smart sensors.
C303.5	To understand the basics of signal processing and data acquisition.

Course Code: C304 Course Name:GE6351 Environmental Science and Engineering

C304.1	To obtain knowledge about environment, ecosystems and biodiversity.
C304.2	To take control measures of environmental pollution.
C304.3	To gain knowledge about natural resources and energy sources.
C304.4	To find and implement scientific, technological, economic and political solutions to environmental problems.
C304.5	To understand the impact of environment on human population.

Course Code: C305 Course Name:MF6505 CNC Machine Technology

C305.1	Able to understand the principles and classification of CNC machine tools.
C305.2	Able to understand the constructional features of CNC machine tools.
C305.3	Able to understand the various drives and controls in CNC machines.
C305.4	Able to write CNC program for the work.
C305.5	Able to understand the various tooling and work holding devices in CNC machines.

Course Code: C306 Course Name:MT6502 Thermodynamics Principles and Applications

C306.1	The students will able to understand the concept of thermodynamics properties and First law thermodynamics apply to Flow process & Non-Flow process
C306.2	The students will able to acquire the concept of Second law thermodynamics and apply to Heat Engine, Refrigerator & Heat Pump
C306.3	The students can implement the knowledge of thermodynamics laws into the field of IC Engine & its Characteristics analysis
C306.4	The students can implement the knowledge into the field of air conditioning and refrigeration equipments & its Performance analysis
C306.5	The students will able to study the various modes of Heat transfer

Course Code: C307 Course Name:MT6711 Power Electronics LAB

C307.1	Ability to use SCR, MOSFET, TRIAC in electronic circuit
C307.2	Ability to perform characteristic study on the electronics components
C307.3	Ability to perform performance study on half controlled & fully controller converters
C307.4	Ability to perform performance study of three phase AC regulator
C307.5	Ability to perform performance study on speed control of DC shunt motor using three phase fully controlled converter.

Course Code: C308 Course Name:MT6512 Sensors and Signal Processing Lab

C308.1	Ability to use the sensors for measuring temperature using thermocouple, thermistor and RTD.
C308.2	Ability to use the sensors for measuring displacement using POT, LVDT & Capacitive transducer.
C038.3	To perform Servomotor position control using photo electric pickup
C308.4	Study on the application of data acquisition system for industrial purposes.
C308.5	Ability to use the sensors for the measurement of different signals and use of signal processing techniques to convert them to useful signal

Course Code: C309 Course Name:MT6513 CNC Lab

C309.1	Ability to write manual part programming using G code and M code for CNC Lathe.
C309.2	Ability to write manual part programming using G code and M code for CNC Mill.
C309.3	Ability to simulate the manual part programming using software.
C309.4	Ability to operate CNC controlled lathe machine.
C309.5	Ability to operate CNC controlled milling machine

Course Code: C310 Course Name:MG6851 PRINCIPLES OF MANAGEMENT

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C311.1	Understand the definition of management, evolution of management, types of business organization and role of managers in a business entity.
C311.2	Know and understand the planning strategy, setting an objective oriented planning, tools and techniques applied for planning and decision
C311.3	Understand the organization structure, roles, delegation of authority. Understand the human resource planning, recruitment process, training and development.
C311.4	Understand the importance of directing workforce, motivation to employees, job enrichment, essentials of communication between entities of business.
C311.5	Understand and generate budget controls, productivity improvement and control framework for achieving the above objectives.

Course Code: C311 Course Name:MT 6601 Micro Controller and PLC

C312.1	Able to learn the theory and structure of 8051 microcontroller
C312.2	Able to write an ALP for 8051 microcontroller.
C312.3	Able to apply the knowledge of microcontroller and design a real time applications
C312.4	Able to understand the structure and programming of PLC
C312.5	Able to design and implement a system using PLC

Course Code: C312 Course Name:MT6602 Applied Hydraulics and Pneumatics

C313.1	Able to learn about fluid power principles.
C313.2	Able to learn about hydraulic actuators and valves.
C313.3	Able to design hydraulic systems using different hydraulic components.
C313.4	Able to design pneumatics systems using different pneumatics components.
C313.5	Able to operate and maintain various pneumatic and hydraulic systems in industrial environments

Course Code: C313 Course Name:MT6603 Design of Mechatronics System

C314.1	Understand the basics of mechatronics systems.
C314.2	Able to learn about real timr interfacing methods.
C314.3	Able to learn about micro mechatronics sytem.
C314.4	Able to learn about system modelling.
C314.5	Able to design systems in mechatronics approach using modern software packages.

Course Code: C314 Course Name:MT6604 Object Oriented Programe C++

C315.1	Express software design with UML diagrams
C315.2	Design software applications using OO concepts.
C315.3	Identify various scenarios based on software requirements
C315.4	Transform UML based software design into pattern based design using design patterns
C315.5	Understand the various testing methodologies for OO software

Course Code: C315 Course Name:IE6011 Product Design and Development

C316.1	Able to design some products for the given set of applications
C316.2	Able to learn about concept generation and selection.
C316.3	Able to learn about product architeture.
C316.4	Able to learn about industrial design.
C316.5	Able to make a prototype of a problem and hence product design and development can be achieved

Course Code: C316 Course Name:MT6611 Micro Controller and PLC Laboratory

C317.1	Ability to use microcontroller to perform various arithmetic and logic
C317.2	Ability to use microcontroller to control different types of motor.
C317.3	Ability to use PLC to control hydraulic and pneumatic circuits
C317.4	Ability to use PLC to design real time applications.
C317.5	Ability to use PLC to control equipment with timing and relays

Course Code: C317 Course Name:MT6612 Object Oriented Programe C++ Laboratory

C318.1	Gain the basic knowledge on Object Oriented concepts.
C318.2	Ability to develop applications using Object Oriented Programming Concepts.
C318.3	Ability to implement features of object oriented programming to solve real world problems
C318.4	Ability to develop applications using run time polymorphism
C318.5	Ability to develop applications using file handling

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Course Code: C318 Course Name:MT6613 Applied Hydraulics and Pneumatics Laboratory

C319.1	Ability to design and test hydraulic circuits.
C319.2	Ability to design and test pneumatics circuits.
C319.3	Use of MATLAB/LABVIEW software for simulation of hydraulic circuits.
C319.4	Use of MATLAB/LABVIEW software for simulation of pneumatic circuits
C319.5	Use of MATLAB/LABVIEW software for simulation of eletrical circuits.

Course Code: C401 Course Name:MT6701 Medical Mechatronics

C401.1	Able to learn the basics of medical mechatronics.
C401.2	To study the principle of transducers for bio medical instrumentation.
C401.3	Able to learn the basics of signal conditioning and display.
C401.4	Able to learn the basics of medical support by mechatronics.
C401.5	Able to design , use and maintain various medical equipments

Course Code: C402 Course Name:MT6702 Modelling and Simulation

C402.1	Able to learn the basics of system and system environment.
C402.2	Able to learn the basics of random number generation.
C402.3	Able to learn the basics of randon- variate neneration.
C402.4	Able to learn about analysis of data.
C402.5	Able to learn the basics of system identification.

Course Code: C403 Course Name:MT6703 Robotics Mission & Vission System

C403.1	To understand the functions of the basic components of a Robot.
C403.2	To study the use of various types of End of Effectors
C403.3	To understand the working of sensors and machine vision system
C403.4	To impart knowledge in Robot Kinematics and Programming
C403.5	To learn Robot safety issues and economics.

Course Code: C404 Course Name:ME6602 AUTOMOBILE ENGINEERING

C404.1	Understand the various vehicle structure and Components of IC engine.
C404.2	Gain Knowledge in various auxiliary systems used in an automobile.
C404.3	Understand the principle and application of Transmission systems in an automobile.
C404.4	Demonstrate the use of steering, braking and suspension systems in an automobile
C404.5	Apply the advantages of various alternative energy sources.

Course Code: C405 Course Name:MT6002 Diagnostics Techniques

C405.1	The students will be able to analyze the defects and rectify the faults.
C405.2	The students to understand the he different maintenance categories like Preventive maintenance, condition based maintenance strategy and repair of machine elements.
C405.3	The students to understand the principles, functions and systems adapted in industry for the successful management of maintenance activities.
C405.4	The students can able to acquire knowledge of various maintenance softwares and strategies used in industry.
C405.5	The students will be able to learn the simple instruments used for condition monitoring in industry.

Course Code: C406 Course Name:EE 6007 Micro Electro Mechanical System

C406.1	Ability to understand the knowledge of semiconductors and solid mechanics to fabricate MEMS devices.
C406.2	To understand the rudiments of Micro fabrication techniques.
C406.3	Able to learn about the various sensors and actuator.
C406.4	Able to learn about the different materials used for MEMS .
C406.5	Ability to understand the applications of MEMS to disciplines beyond Electrical and Mechanical engineering.

Course Code: C407 Course Name:ME6611 CAD/CAM LABORATORY

C407.1	Ability to Develop 2D Part Models using Modeling Software.
C407.2	Ability to Develop 3D Part Models using Modeling Software.
C407.3	Ability to Assemble 3D Models using Modeling Software.
C407.4	Ability to Understand the CNC Control in Modern Manufacturing System.

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C407.5	Ability to Prepare CNC Part Programming and Perform Manufacturing.

Course Code: C408 Course Name:MT6712 Robotics Laboratory

C408.1	Able to learn different types of robotics and demonstrate them to identify differnt parts and components.
C408.2	Use of Adam's software and MAT Lab software to model the different types of robots
C408.3	Use of Adam's software and MAT Lab software to calculate work volume for different robots.
C408.4	Able to learn the components of robots with drive system and end effectors.
C408.5	Able to write different robot programmings.

Course Code: C409 Course Name:ME6612 Design and Fabrication Project

C409.1	Identify a topic in advanced areas of Mechanical Engineering
C409.2	Identify methods and materials to carry out experiments/develop code
C409.3	Review literature to identify gaps and define objectives & scope of the work
C409.4	Reorganize the procedures with a concern for society, environment and ethics
C409.5	Generate and implement innovative ideas for social benefit

Course Code: C410 Course Name:GE6075 Professional Ethics in Engineering

C410.1	To understand the importance of human values and practicing yoga's for stressManagement.
C410.2	To learn different theories of ethics and can apply ethical principles in society
C410.3	To experiment the ethical issues and codes related to engineering
C410.4	To realize the safety, responsibilities and several rights in the society
C410.5	To understand the impact of several global issues and human Social Responsibilities to eliminate the impacts.

Course Code: C411 Course Name:MT6811 Project work

C411.1	Identify a topic in advanced areas of Mechanical Engineering Identify methods and materials to carry out experiments/develop code
C411.2	Review literature to identify gaps and define objectives & scope of the work Reorganize the procedures with a concern for society, environment and ethics
C411.3	Generate and implement innovative ideas for social benefit Analyze and discuss the results to draw valid conclusions
C411.4	Develop a prototypes/models, experimental set-up and software systems necessary to meet the objectives Prepare a report as per recommended format and defend the work
C411.5	Explore the possibility of publishing papers in peer reviewed journals/conference proceedings

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se Name: HS8151 Communicative English

C101.1	Read articles of a general kind in magazines and newspapers.
C101.2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
C101.3	Comprehend conversations and short talks delivered in English.
C101.4	Write short essays of a general kind.
C101.5	Write personal letters and emails in English.

Name: MA8151 Engineering Mathematics-I

C102.1	Use both the limit definition and rules of differentiation to differentiate functions
C102.2	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus
C102.3	Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.
C102.4	Apply differentiation to solve maxima and minima problems.
C102.5	Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.
C102.6	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
C102.7	Apply various techniques in solving differential equations.

ırse Name: PH8151 Engineering Physics

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C103.1	The students will gain knowledge on the basics of properties of matter and its applications
C103.2	The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics
C103.3	The students will have adequate knowledge on the concepts of thermal properties of the materials and their applications in expansion joints and heat exchangers.
C103.4	The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunnelling microscopes,
C103.5	The students will understand the basics of crystals their structures and different crystal growth techniques.

se Name: CY8151 Engineering Chemistry

C104.1	To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
C104.2	To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
C104.3	Preparation, properties and applications of engineering materials.
C104.4	Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.
C104.5	Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.

GE8151 Problem Solving and Python Programming

C105.1	Develop algorithmic solutions to simple computational problems
C105.2	Read, write, execute by hand simple Python programs.
C105.3	Structure simple Python programs for solving problems.
C105.4	Decompose a Python program into functions.
C105.5	Represent compound data using Python lists, tuples, dictionaries. Read and write data from/to files in Python Programs.

rse Name: GE8152 Engineering Graphics

C106.1	Ability to familiarize with the fundamentals and standards of Engineering graphics
C106.2	Ability to perform freehand sketching of basic geometrical constructions and multiple views of objects
C106.3	Ability to Project orthographic projections of lines and plane surfaces
C106.4	Ability to draw projections of solids and development of surfaces
C106.5	Ability to visualize and to project isometric and perspective sections of simple solids

E8161 Problem Solving and Python Programming Lab

C107.1	Write, test, and debug simple Python programs.
C107.2	Implement Python programs with conditionals and loops.
C107.3	Develop Python programs step-wise by defining functions and calling them.
C107.4	Use Python lists, tuples, dictionaries for representing compound data.
C107.5	Read and write data from/to files in Python.

e Name: BS8161 Physics & Chemistry Lab

C108.1	To provide the basic practical exposure to all the engineering and technological streams in the field of physics with properties of matter and liquids.
C108.2	To provide the basic practical exposure to all the engineering and technological streams in the field of optics.
C108.3	The students are able to know about the thermal physics .
C108.4	To gain the knowledge about crystalline materials.
C108.5	To develop the knowledge of fiber optics cables optics and its applications

urse Name: HS8251 Technical English

C109.1	Read technical texts
C109.2	Write area- specific texts effortlessly.
C109.3	Listen lectures in their area of specialization.
C109.4	Comprehend talks in their area of specialisation
C109.5	Speak appropriately and effectively in varied formal and informal contexts.

Name: MA 8251 Engineering Mathematics-II

C110.1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
C110.2	Gradient, divergence and curl of a vector point function and related identities.

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C110.3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
C110.4	Analytic functions, conformal mapping and complex integration.
C110.5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

ourse Name: PH8251 Material Science

C111.1	The students will have knowledge on the various phase diagrams and their applications
C111.2	The students will acquire knowledge on Fe-Fe2C phase diagram various microstructures and alloys
C111.3	The students will get knowledge on mechanical properties of materials and their measurements
C111.4	The students will gain knowledge on magnetic dielectric, and superconducting materials and properties of materials
C111.5	The students will understand the basics of ceramics , composites and nano materials

asic Electrical, Electronics and Instrumentation Engineering

C112.1	Understand the basic eelctric circuits and various theroms
C112.2	Understand the concepts of AC circuits
C112.3	Understanding the working principles of electrical machines
C112.4	Understand the concepts of various electronic devices
C112.5	Choose appropriate instruments for electrical measurement for a specific application

e: GE8291 Environment science and engineering

C113.1	Public awareness of environment at infant stage.
C113.2	Pollution controlling aids
C113.3	Development and improvement in standard of living has lead to serious environmental disasters.
C113.4	Ignorance and incomplete knowledge has lead to misconceptions. Knowledge about water conservation methods.
C113.5	World's Population related problems and AIDS

se Name: GE8292 Engineering Mechanics

C114.1	Ability to illustrate the vectorial and scalar representation of forces and moments
C114.2	Ability to analyse the rigid body in equilibrium
C114.3	Ability to evaluate the properties of surfaces and solids
C114.4	Ability to calculate dynamic forces exerted in rigid body
C114.5	Ability to determine the friction and the effects by the laws of friction

me: GE8261 Engineering Practices Laboratory

C115.1	Ability to Fabricate carpentry components and pipe connections including plumbing works
C115.2	Ability to Use welding equipments to join the structures
C115.3	Ability to Carry out the basic machining operations
C115.4	Ability to Make the models using sheet metal works
C115.5	Ability to Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings

Course Code: C201 Course Name: MA8353 Transforms and Partial Differential Equations

C201.1	Understand how to solve the given standard partial differential equations.
C201.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
C201.3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
C201.4	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.
C201.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

Course Code: C202 Course Name: CE 8395 Strength of Materials for Mechanical Engineer

C202.1	To understand the basics of Stress-Strain relationships and the deformation of solids
C202.2	To gain the fundamental knowledge on Transverse loading of beams and the stress distribution.
C202.3	To understand the torsional stresses developed in the shafts and the deflection in springs.
C202.4	To understand the methods of finding deflection of the beams

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C202.5	To understand the stresses and deformation developed in the thin and thick cylinders

Course Code: C203 Course Name: CE 8394 Fluid Mechanics and Machinery

C203.1	To understand the basics concepts of fluid properties and their applications.
C203.2	To gain the fundamental knowledge on fluid flow through pipes of various section and its losses and boundary layer concept.
C203.3	To formulate equations for model and prototype for various applications and analysing it dimensionally.
C203.4	To understand the working principle of various pumps and its performance evaluation and comparison.
C203.5	To understand the working principle of various turbine and its performance evaluation and comparison.

Course Code: C204 Course Name: EC 8392 Digital Electronics

C204.1	Use digital electronics in the present contemporary world
C204.2	Design various combinational digital circuits using logic gates
C204.3	Do the analysis and design procedures for synchronous and asynchronous sequential circuits
C204.4	Use the semiconductor memories and related technology
C204.5	Use electronic circuits involved in the design of logic gates

Course Code: C205 Course Name: MT 8301 Electrical Machines and Drives

C205.1	Get the basic knowledge about the Electric circuits and transformers.
C205.2	Understand the various types of electrical motors.
C205.3	Know about speed control and starting methods DC and induction motors
C205.4	Understand about various types of electrical drives
C205.5	Get exposure with solid state drives

Course Code: C206 Course Name: MT 8302 Analog Devices and Circuits

206.1	Apply the various switching devices in electronic circuits.
206.2	Work with various applications of amplifiers
206.3	Design various circuits using ICs.
206.4	Test and measure different parameters available in electronic circuits.
206.5	Explain the principles of various display devices.

Course Code: C207 Course Name: CE 8381Strength of Materials and Fluid Mechanics and Machinery Laboratory

207.1	Ability to perform Tension, Torsion, Hardness, Compression, and Deformation test on Solid materials.
207.2	Utilize appropriate materials in design considering engineering properities, sustainablity
207.3	Perform Tension, Torsion, Hardness, Compression, and Deformation test on Solid materials.
207.4	Use the measurement equipments for flow measurement.
207.5	Perform test on different fluid machinery.

Course Code: C208 Course Name: MT 8311 Electrical Machines and Drives Laboratory

208.1	Test and assess the performances of the DC motors and single phase AC motor for varying load.
208.2	Control the speed of AC and DC motor.
208.3	Analyze and present the findings of experimental observations in both written and oral format.
208.4	Understand about various types of electrical drives
208.5	Get exposure with solid state drives

Course Code: C209 Course Name: HS 8381 Interpersonal Skills / Listening speaking

209.1	Ability to Listen and respond appropriately
209.2	Ability to participate in group discussions
209.3	Ability to make effective presentations
209.4	Ability to give information and converse with accuracy
209.5	Participate confidently in conversations both formal and informal

Course Code: C210 Course Name: ME 8392 Manufacturing Technology

210.1	To understand the basic concepts of metal cutting, different types of machine tools, tool materials, single point cutting tool geometry and cutting fluids used in manufacturing.
210.2	To understand the working principle of types of turning machine and its operations along with power and machining time estimation.
210.3	To understand working principles and applications of shaping, drilling, boring, milling and gear generating machines.

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210.4	To enrich the knowledge of abrasive process, types of grinding and broaching machines.
210.5	Ability to understand the evolution, types, features and gaining the CNC programming knowledge, and micro machining.

Course Code: C211 Course Name: MT 8491Microprocessors and Microcontrollers

211.1	Distinguish the feature of the 8085 microprocessor, Hardware Architecture and PIN diagram.
211.2	Demonstrate programming proficiency using the various addressing modes and data transfer instructions of 8085 microprocessor
211.3	Acquaint the knowledge on architecture and programming of Microcontroller 8051.
211.4	Illustrate the interrupts handling and demonstrate peripherals applications in different IC and Know about A/D and D/A converters.
211.5	Apply the programming concepts to interface the hardware units with microprocessor and Microcontroller

Course Code: C212 Course Name: MT 8492 Kinematics of Machinery

212.1	To apply fundamentals of mechanism for the design of new mechanisms
212.2	To analyze the velocity and acceleration at any point in a link of mechanisms for optimum design
212.3	To understand the kinematics and design of cam and follower mechanism.
212.4	To gain the knowledge on kinematics of gears and its applications in gear trains.
212.5	To apply the effect of friction in belt drives, rope drives, brakes, clutches, screw jacks and bearings.

Course Code: C213 Course Name: MT 8401 Thermodynamics and Heat Transfer

213.1	Understand the basic concepts associated first law of thermodynamics
213.2	Understand basic concepts associated with second law of thermodynamics
213.3	Describing the working of I.C engines and to determine its performance parameters
213.4	Basic principles of refrigeration, air conditioning and psychometric chart
213.5	Distinguishing the various modes of heat transfer and its applications

Course Code: C214 Course Name: MT 8411 Microprocessors and Microcontrollers Laboratory

214.1	Solve the arithmatic operations using microprocessor and various on chip and off chip interfacing
214.2	Design the digital and analog hardware interface for microprocessor based systems
214.3	Solve the arithmatic operations using microcontroller and various on chip and off chip interfacing
214.4	Design the digital and analog hardware interface for microcontroller based systems
214.5	Able to design and implement simple mechatronics system

Course Code: C215 Course Name: ME 8461 Manufacturing Technology Laboratory

215.1	Ability to use different machine tools to create complicated channels and Develop CNC part programming
215.2	Ability to use different machine tools to manufacturing gears.
215.3	Ability to use different machine tools for finishing operations
215.4	Ability to measure various cutting forces on a cutting tool
215.5	Ability to manufacture tools using cutter grinder

Course Code: C216 Course Name: ME 8391 Computer Aided Machine Drawing

216.1	Follow the drawing standards, Fits and Tolerances
216.2	Re-create part drawings, sectional views and assembly drawings as per standards
216.3	Recognise the part drawing and 3D model
216.4	Ability to understand the sectional views
216.5	Illustrate various machines components through drawings

Course Code: C217 Course Name:HS 8461 Advanced Reading and Writing

217.1	Ability to read and evaluate texts critically
217.2	Ability to write different types of essays
217.3	Ability to write reports and winning job applications
217.4	Ability to organize ideas, projects and to write e-mails.
217.5	Ability to display critical thinking in various professional contexts.

Course Code: C301 Course Name:EE 8552 Power Electronics

301.1	Ability to understand the working of power semi conductor devicess
301.2	Ability to analyse AC-DC converters
301.3	Ability to analyse DC-DC converters

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301.4	Ability to analyse DC-AC converters
301.5	Ability to analyse AC-AC converters

Course Code: C302 Course Name:MT 8591 Sensors and Instrumentation

302.1	Familiar with various calibration techniques and signal types for sensors.
302.2	Apply the various sensors in the Automotive and Mechatronics applications
302.3	Describe the working principle and characteristics of force, magnetic and heading sensors.
302.4	Understand the basic principles of various pressure and temperature, smart sensors.
302.5	Ability to implement the DAQ systems with different sensors for real time applications.

Course Code: C303 Course Name:ME 8594 Dynamics of Machines

303.1	Calculate static and dynamic forces of mechanisms.
303.2	Calculate the balancing masses and their locations of reciprocating and rotating masses.
303.3	Compute the frequency of free vibration.
303.4	Compute the frequency of forced vibration and damping coefficient.
303.5	Calculate the speed and lift of the governor and estimate the gyroscopic effect on automobiles, ships and airplanes.

Course Code: C304 Course Name:EC 8391 Control Systems Engineering

304.1	Identify the various control system components and their representations.
304.2	Analyze the various time domain parameters.
304.3	Analysis the various frequency response plots and its system.
304.4	Apply the concepts of various system stability criterions.
304.5	Design various transfer functions of digital control system using state variable models.

Course Code: C305 Course Name:OMF 111 Product Design and Development

305.1	Able to design some products for the given set of applications
305.2	Able to learn about concept generation and selection.
305.3	Able to learn about product architeture.
305.4	Able to learn about industrial design.
305.5	Able to make a prototype of a problem and hence product design and development can be achieved

Course Code: C306 Course Name:MT 8511 Power Electronics Laboratory

306.1	Ability to use SCR, MOSFET, TRIAC in electronics
306.2	Ability to use UJT,RRC,firing circuits
306.3	Ability to perform characteristics study of AC-DC
306.4	Ability to perform characteristics study of choppers
306.5	Ability to perform characteristics study of inverters and AC-AC converters

Course Code: C307 Course Name:MT 8512 Sensors and Instrumentation Laboratory

307.1	Generate appropriate design procedure, suitable for signal conversion to interface with computer.
307.2	Design appropriate circuits by using conventional formulas used in signal conditioning and conversion.
307.3	Implement their design in bread board and test it.
307.4	Generate appropriate design procedure to obtain a required measurement data for temperature, force, humidity, displacement and sound.
307.5	Log the data in computer using LABVIEW/ MATLAB/PSILAB.

Course Code: C308 Course Name:ME 8481 Dynamics Laboratory

308.1	Ability to demonstrate the principles of kinematics of machinery.
308.2	Ability to demonstrate the principles of dynamics of machinery.
308.3	Ability to use the measuring devices for dynamic testing.
308.4	Ability to study the parameters of kinematics of machinery.
308.5	Ability to study the parameters of dynamics of machinery.

Course Code: C309 Course Name:HS 8581 Professional Communication

309.1	Ability to Listen and respond appropriately
309.2	Ability to participate in group discussions
309.3	Ability to make effective presentations

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309.4	Ability to give information and converse with accuracy
309.5	Participate confidently in conversations both formal and informal

Course Code: C310 Course Name:ME 8591 Applied Hydraulics and Pneumatics

310.1	Understanding operating principles and constructional features of hydraulic and pneumatic systems.
310.2	Knowledge with selection of hydraulic / pneumatic components
310.3	Understanding the design of hydraulic circuit and its applications
310.4	Understanding the design of pneumatic circuit and its applications
310.5	Understanding of designing and layout of Hydraulic Power package and trouble shooting.

Course Code: C311 Course Name:MT 8601 Design of Mechatronics System

311.1	Understand the basics and key elements of Mechatronics design process
311.2	Familiar with basic system modelling
311.3	Understand the concepts of engineering system and dynamic response of the system
311.4	Realize the concepts of real time interfacing and data acquisition
311.5	Understanding the concepts of design of Mechatronics system through case studies

Course Code: C312 Course Name:ME 8593 Design of Machine Elements

312.1	To understand and analyze stresses and strains in machine elements.
312.2	To analyze and design the components for power transmission.
312.3	To analyze the various stress developed in temporary and permanent joints.
312.4	To design the energy storing elements, like springs & flywheel.
312.5	To design and implement the various types of standard bearings.

Course Code: C313 Course Name:MT 8602 Industrial Automation

313.1	Choose appropriate PLC and explain the architecture, installation procedures and trouble shooting.
313.2	Develop PLC programs using various functions of PLCs for a given application.
313.3	Explain the application development procedures in SCADA and manage data, alarm and storage.
313.4	Distinguish DCS, SCADA and PLC and explain the architecture of DCS
313.5	Describe the controller elements and program methods.

Course Code: C314 Course Name:MG 8591 Principles of Management

314.1	Understand the definition of management, evolution of management, types of business organization and role of managers in a business entity.
314.2	Know and understand the planning strategy, setting an objective oriented planning, tools and techniques applied for planning and decision
314.3	Understand the organization structure, roles, delegation of authority. Understand the human resource planning, recruitment process, training and development.
314.4	Understand the importance of directing workforce, motivation to employees, job enrichment, essentials of communication between entities of business.
314.5	Understand and generate budget controls, productivity improvement and control framework for achieving the above objectives.

Course Code: C315 Course Name:ME6602 Automobile Engineering

315.1	Understand the various vehicle structure and Components of IC engine.
315.2	Gain Knowledge in various auxiliary systems used in an automobile.
315.3	Understand the principle and application of Transmission systems in an automobile.
315.4	Demonstrate the use of steering, braking and suspension systems in an automobile
315.5	Apply the advantages of various alternative energy sources.

Course Code: C316 Course Name:MT 8611 Applied Hydraulics and Pneumatics laboratory

316.1	Select the actuators and valves for the design of fluid power circuits.
316.2	Design and simulate the fluid power circuits using software tool.
316.3	Test the simulated using Automation Studio
316.4	Design and simulate fluid circuits controlled by PLC
316.5	Understanding the image processing technique using LAB VIEW Software

Course Code: C317 Course Name:MT 8612 Industrial Automation Laboratory

317.1	Carryout wiring connections and troubleshoot in different PLC

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317.2	Develop simple applications using LD, ST and FBD mode of programming.
317.3	Use timers and counter functions of PLC to construct simple applications.
317.4	Integrate and control process station with PLC.
317.5	Develop SCADA application using open source software and Perform speed control on AC motor using VFD and PLC.

Course Code: C318 Course Name:ME 8682 Design and Fabrication Project

318.1	Identify a topic in advanced areas of Mechanical Engineering
318.2	Identify methods and materials to carry out experiments/develop code
318.3	Review literature to identify gaps and define objectives & scope of the work
318.4	Reorganize the procedures with a concern for society, environment and ethics
318.5	Generate and implement innovative ideas for social benefit

Course Code: C401 Course Name:ME 8691 Computer Aided Design and Manufacturing

401.1	Explain the 2D and 3D transformations, clipping algorithm, Manufacturing models and Metrics
401.2	Explain the fundamentals of parametric curves, surfaces and Solids
401.3	Summarize the different types of Standard systems used in CAD
401.4	Apply NC & CNC programming concepts to develop part Programme for Lathe & Milling Machines
401.5	Summarize the different types of techniques used in Cellular Manufacturing and FMS

Course Code: C402 Course Name:MT 8701 Robotics and Machine Vision System

402.1	To understand the functions of the basic components of a Robot.
402.2	To study the use of various types of End of Effectors
402.3	To understand the working of sensors and machine vision system
402.4	To impart knowledge in Robot Kinematics and Programming
402.5	To learn Robot safety issues and economics.

Course Code: C403 Course Name:MT 8791 Embedded System Design

403.1	Explain the need of embedded systems and their development procedures.
403.2	Summaries the concepts involved in Real time operating systems.
403.3	Use various tools for developing embedded applications.
403.4	Explain the construction, addressing modes and instructions sets of PIC micro controller.
403.5	Conduct experiments with I/O systems used in embedded systems.

Course Code: C404 Course Name:MT 8002 Advanced Manufacturing Technology

404.1	understand the basics and working of various sheet metal & forming processes.
404.2	Knowledge on various non traditional machining processes with applications.
404.3	understand the various type of surface finishing and surface hardening process.
404.4	understand the concept of EDM & ECM with application.
404.5	understand the work and tool holding devices used for various machine tools.

Course Code: C405 Course Name:GE8071 DISASTER MANAGEMENT

405.1	Differentiate the types of disasters, causes and their impact on environment and society
405.2	Assess vulnerability and various methods of risk reduction measures as well as mitigation.
405.3	Draw the hazard and vulnerability profile of India, Scenarious in the Indian context, Disaster damage assessment and management.
405.4	Able to gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
405.5	Able to develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity .

Course Code: C406 Course Name:OAT 751 Production of Automotive Components

406.1	Understand the concept of engine components Manufacturing processes.
406.2	Knowledge on selection of suitable manufacturing processes for automotive components.
406.3	Understand the basics of chassis components.
406.4	Understand the concept of various body components used in automobiles.
406.5	Knowledge on various engineering materials used in automobile component manufacturing.

Course Code: C407 Course Name:MT 8711 Computer Aided and Manufacturing Laboratory

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407.1	Model and assemble a given three dimensional engineering components
407.2	Perform various analyses on simple structures for the application of different loads.
407.3	Generate CNC programs for a given components to work with CNC machines

Course Code: C408 Course Name:MT 8781 Robotics Laboratory

408.1	Able to write Robot programming and simulation for pick and place , Colour identification .
408.2	Able to write Robot programming and simulation for Shape identification
408.3	Able to write Robot programming and simulation for machining (cutting, welding) and writing practice .
408.4	Able to write Robot programming and simulation for any industrial process (Packaging, Assembly)
408.5	Able to write Robot programming and simulation for multi process.

Course Code: C409 Course Name:MT 8801 Automotive Electronics

409.1	Know the importance of emission standards in automobiles.
409.2	Understand the electronic fuel injection/ignition components and their function.
409.3	Choose and use sensors and equipment for measuring mechanical quantities, temperature and appropriate actuators
409.4	Diagnose electronic engine control systems problems with appropriate diagnostic tools.
409.5	Analyses the chassis and vehicle safety system.

Course Code: C410 Course Name:MG 8091Enterperunership Development

410.1	Able to understand the basics about entrepreneurship
410.2	Able to understand the objectives of motivation.
410.3	Able to understand the basics of business.
410.4	Able to understand the basics about financing and accounts.
410.5	Able to gain knowledge and skills needed to run a business successfully.

Course Code: C411 Course Name:MG 8892 Marketing management

411.1	Understand the concept of marketing processes.
411.2	Understand the buying behaviour of customers.
411.3	Understand the concept of product pricing.
411.4	Understand the market planning and BCG, GEC grids.
411.5	Understand the concept of advertising, sales and distribution.

Course Code: C412 Course Name:ME 8811 Project Work

412.1	Identify a topic in advanced areas of Mechanical Engineering Identify methods and materials to carry out experiments/develop code
412.2	Review literature to identify gaps and define objectives & scope of the work Reorganize the procedures with a concern for society, environment and ethics
412.3	Generate and implement innovative ideas for social benefit Analyze and discuss the results to draw valid conclusions
412.4	Develop a prototypes/models, experimental set-up and software systems necessary to meet the objectives Prepare a report as per recommended format and defend the work
412.5	Explore the possibility of publishing papers in peer reviewed Journals/conference proceedings

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Course Outcomes (CO)

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Branch: B.Tech, Chemical Engineering

Course Code: C101 Course Name:HS6151Technical English – I

C101.1	Read different genres of texts adopting various reading strategies.
C101.2	Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
C101.3	Listen/view and comprehend different spoken discourses/excerpts in different accents.
C101.4	Speak clearly, confidently, comprehensibly.
C101.5	Communicate with one or many listeners using appropriate communicative strategies.

Course Code: C102 Course Name: MA6151 Mathematics – I

C102.1	Use both the limit definition and rules of differentiation to differentiate functions
C102.2	Apply differentiation to solve maxima and minima problems.
C102.3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.
C102.4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
C102.5	Apply various techniques in solving differential equations.

Course Code:C103 Course Name: PH6151 Engineering Physics – I

C103.1	Acoustics, Production and the applications of Ultrasonics in Engineering and Medical Fields.
C103.2	Interference, different types of lasers and its application in various fields.
C103.3	Fiber optics and optical fiber and its applications.
C103.4	Development of quantum mechanics and its necessary, wave equations and its applications, X - Ray.
C103.5	Crystallography and can able to calculate the crystal parameters

Course Code: C104 Course Name:CY 6151 Engineering Chemistry – I

C104.1	To make the students conversant with basics of polymer chemistry.
C104.2	To make the student acquire sound knowledge of second law of thermodynamics and second law based derivations of importance in engineering applications.
C104.3	To acquaint the student with concepts of important photophysical and photochemical processes and spectroscopy.
C104.4	To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
C104.5	To acquaint the students with the basics of nano materials, their properties and applications.

Course Code: C105 Course Name:GE6151Computer Programming

C105.1	Explain the components of computer and logical operations.
C105.2	Convert the number system and their representation.
C105.3	Discuss hardware and software devices
C105.4	Summarize network fundamentals.
C105.5	Plan the logic using flowchart and develop algorithm to write a C Program.

Course Code: C106 Course Name: GE6152 Engineering Graphics

C106.1	Ability to familiarize with the fundamentals and standards of Engineering graphics
C106.2	Ability to perform freehand sketching of basic geometrical constructions and multiple views of objects
C106.3	Ability to Project orthographic projections of lines and plane surfaces
C106.4	Ability to draw projections of solids and development of surfaces
C106.5	Ability to visualize and to project isometric and perspective sections of simple solids

Course Code: C107 Course Name:GE6161Computer Practices Laboratory

C107.1	Prepare data using MS-word & Excel to visualize graphs, charts in MS-Excel.

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C107.2	Outline the logic using flowchart for a given problem and to program using Switch case& Control structures
C107.3	Develop logic using decision making & looping statements
C107.4	Apply passing parameters using Arrays & Functions
C107.5	Construct structure and Union for a given database and to bring out the importance of Unions over structure

Course Code:C108 Course Name: GE6162 Engineering Practices Laboratory

C108.1	Ability to Fabricate carpentry components and pipe connections including plumbing works
C108.2	Ability to Use welding equipments to join the structures
C108.3	Ability to Carry out the basic machining operations
C108.4	Ability to Make the models using sheet metal works
C108.5	Ability to Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings

Course Code:C109 Course Name:GE6163 Physics and Chemistry Laboratory - I

C109.1	To provide the basic practical exposure to all the engineering and technological streams in the field of physics. .
C109.2	To provide the basic practical exposure to all the engineering and technological streams in the field of chemistry.
C109.3	The students are able to know about the water containing impurities and some physical parameters.
C109.4	To gain the knowledge about light, sound, laser, fiber optics and magnetism.
C109.5	To develop the knowledge of conductometric titration and viscometry

Course Code:C110 Course Name:HS6251 Technical English – II

C110.1	Read different genres of texts, infer implied meanings and critically analyse and evaluate them for ideas as well as for method of presentation.
C110.2	Write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
C110.3	Listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.
C110.4	Speak convincingly, express their opinions clearly.
C110.5	Initiate a discussion, negotiate, argue using appropriate communicative strategies.

Course Code:C111 Course Name:MA6251 Mathematics – II

C111.1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
C111.2	Gradient, divergence and curl of a vector point function and related identities.
C111.3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
C111.4	Analytic functions, conformal mapping and complex integration.
C111.5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

Course Code:C112 Course Name:PH6251 Engineering Physics – II

C112.1	Electric conduction, electrical conductivity, carrier concentration of metals.
C112.2	Semiconductors, carrier concentration of semiconductors, Hall effect and semiconductor devices.
C112.3	Types of magnetic materials, ferro magnetic materials, magnetic storage devices, Super conductors and their properties and applications.
C112.4	Dielectrics, properties and its applications, ferro electricity.
C112.5	Modern engineering materials, Nano materials and Carbon nano tubes.

Course Code:C113 Course Name:CY6251 Engineering Chemistry – II

C113.1	To make the students conversant with boiler feed water requirements, related problem and water treatment techniques.
C113.2	Principles of electrochemical reactions, redox reactions in corrosion of materials and methods for corrosion prevention and protection of materials.
C113.3	Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.
C113.4	Preparation, properties and applications of engineering materials.
C113.5	Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.

Course Code:C114 Course Name:GE6252 Basic Electrical and Electronics Engineering

C114.1	Ability to understand basic theorems used in Electrical circuits and the different components
C114.2	Ability to explain about the function and characteristics of electrical machines.
C114.3	Ability to explain about the fundamentals of semiconductor and applications.
C114.4	Ability to explain about the principles of digital electronics.
C114.5	Ability to explain about the knowledge of communication.

Course Code: C115 Course Name: GE6253 Engineering Mechanics

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C115.1	Ability to illustrate the vectorial and scalar representation of forces and moments
C115.2	Ability to analyse the rigid body in equilibrium
C115.3	Ability to evaluate the properties of surfaces and solids
C115.4	Ability to calculate dynamic forces exerted in rigid body
C115.5	Ability to determine the friction and the effects by the laws of friction

Course Code:C116 Course Name:GE6262 Physics and Chemistry Laboratory -II

C116.1	To provide the basic practical exposure to all the engineering and technological streams in the field of physics.
C116.2	To provide the basic practical exposure to all the engineering and technological streams in the field of chemistry.
C116.3	The students are able to know about the water containing impurities and some physical parameters.
C116.4	To gain the knowledge about properties of matter, semiconductors and solar cells
C116.5	To develop the knowledge of spectrophotometry.

Course Code: C117 Course Name:GE6263 Computer Programming Laboratory

C117.1	Sketch simple figures with title block using AutoCAD software commands.
C117.2	Sketch curves like parabola, spiral and involute of square & circle and draw the orthographic projection of simple solids.
C117.3	Prepare orthographic projection of simple machine parts and draw a plan of residential building.
C117.4	Sketch simple steel truss and sectional views of simple solids.
C117.5	Prepare 2D multi view drawing from 3D model.

Course Code: C118 Course Name:GE6264 Basic Electrical and Electronics Laboratory

C118.1	To understand the operation and characteristics of Motors
C118.2	To understand the operation and characteristics of generator
C118.3	To understand the operation and characteristics of Tranducers

Course code :C201 Course Name: MA6351 Transforms and Partial Differential Equations

C201.1	Understand how to solve the given standard partial differential equations.
C201.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
C201.3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
C201.4	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.
C201.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

Course code : C202 Course Name: EE6351 Electrical Drives and Controls

C202.1	Understand the basics of electric circuits laws and steady state solution of DC circuits
C202.2	Understand the basics of AC circuits and types of wiring
C202.3	Understand the working principles and construction of electrical machines
C202.4	Understand the concepts of various electronic devices and its application
C202.5	Choose appropriate instruments for electrical measurement for a specific application

Course code :C203 Course Name: CH6301 Organic Chemistry

C203.1	At the end of the course students will have knowledge on various reaction mechanisms.
C203.2	About the types of carbohydrates and their structural elucidation.
C203.3	About the different polynuclear aromatics, heterocycles and their properties.
C203.4	Different types of amino acids, protein synthesis and structure.
C203.5	Various dyes and drugs and their synthesis methods.

Course code : C204 Course Name: CH6302 Mechanics of Solids

C204.1	the students would be able to design the support column
C204.2	the students would be able to design the beams
C204.3	the students would be able to design the pipelines, storage tanks
C204.4	the students would be able to design the reaction columns and tanks
C204.5	Able to do process equipment design and drawing.

Course code :C205 Course Name: CH6303 Physical Chemistry

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C205.1	To study the Principles of electrochemical reactions, redox reactions in cell constant.
C205.2	To study the Principles of corrosion of materials and methods of prevention for Corrosion
C205.3	To study the fundamental concepts in colloids
C205.4	To study the develop an understanding of the basic concepts of phase rule and its applications to single and two component systems
C205.5	To study the limitations of Nernst Distribution law and colligative properties.

Course code :C206 Course Name: CH6304 Fluid Mechanics

C206.1	Understand the fundamental properties of fluids
C206.2	Understand the characteristics under static and dynamic conditions
C206.3	Develop empirical correlation using dimensionless analysis
C206.4	Analyze flow of fluid through pipe and over the of solid
C206.5	Understand and select flow meter(s), characteristics of pumps used in Chemical Process

Course code : C207 Course Name: CH6311 Organic Chemistry Laboratory

C207.1	able to identify what distinguishes a strong and weak nucleophile and recall the rules of reactions. The student analyzes a list of compounds and
C207.2	Able to analyze a list of compounds
C207.3	Able to determine their reactivity.

Course code :C208 Course Name: CH6312 Physical Chemistry Laboratory

C208.1	Able to determine the properties of solvents and mixtures.
C208.2	Able to determine the characteristics of solvents and mixtures.

Course code :C209 Course Name: CH6468 Probability and Statistics

C209.1	Understand the basic concepts of One way and Two way classification
C209.2	Understand how to solve the problem based on the One way and Two way classification
C209.3	Understand the fundamental knowledge of the concepts of 2 POWER 2 experiment
C209.4	Understand how to solve the given X-chart and R-chart
C209.5	The basic knowledge of control chart and problem based on np-chart, p-chart and c-chart.

Course code :C210 Course Name: CH6401 Chemical Process Industries I

C210.1	Able to gain knowledge on various aspects of production engineering
C210.2	Understand the practical methods of production in a chemical factory.
C210.3	Able to integrate various courses such as chemistry, unit operations, mechanical operation, stoichiometry etc.,

Course code : C211 Course Name: CH6402 Chemical Engineering Thermodynamics I

C211.1	Understand Zeroth Law and terminologies associated with Engineering Thermodynamics
C211.2	Apply First law, Second law, Third law for Thermodynamic process
C211.3	Able to Mathematically relate PVT behavior of fluids
C211.4	Relate Thermodynamic properties Mathematically
C211.5	Calculate heat and work quantities for industrial processes and power cycles

Course code : C212 Course Name: CH6403 Chemical Process Calculations

C212.1	Students would have the knowledge of fundamentals units and stoichiometric equations.
C212.2	Student will understand the fundamentals of Humidity, Drying and the equipments used.
C212.3	Students will solve problems on basic laws for Radiation, apply these principles to radiative heat transfer between different types of surfaces.
C212.4	Students will understand the fundamentals of ideal gas behavior and phase equilibria
C212.5	Write energy and material balance for different chemical process.

Course code :C213 Course Name: CH6404 Mechanical Operations

C213.1	Students will understand the particle characterization and size analysis techniques.
C213.2	Students will understand the particle size reduction and particle enlargement latest techniques.
C213.3	Students will understand the latest particle separation methods
C213.4	Students will understand the filtration and latest filtration techniques available
C213.5	Students will understand the mixing and particle handling methods

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Course code :C214 Course Name: GE6351 Environmental Science and Engineering

C214.1	Describe the structure and functions of different eco system.
C214.2	Identify the various causes, effects and control measures of different types of pollution.
C214.3	Summarize the over exploitation and their effects of natural resources.
C214.4	Appraise the environmental issues and possible solution.
C214.5	Explain the causes of population growth and explosion.

Course code : C215 Course Name: CH6411 TECHNICAL ANALYSIS LABORATORY

C215.1	Able to understand basic principles involved in estimation and characterization of industrially important materials.
C215.2	understanding on the estimation and analysis of chemical compounds.
C215.3	Analysis of fuels

Course code :C216 Course Name: CH6412 FLUID MECHANICS LABORATORY

C216.1	To learn experimentally to calibrate flow meters
C216.2	Able to find pressure loss for fluid flows
C216.3	Able to determine pump characteristics.

Course code : C301 Course Name: CH6459 NUMERICAL METHODS

C301.1	Understand the basic concepts and techniques of solving algebraic and transcendental equations.
C301.2	Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations
C301.3	Apply the numerical techniques of differentiation and integration for engineering problems
C301.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
C301.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications

Course code :C302 Course Name: CH6501 INSTRUMENTAL METHODS OF ANALYSIS

C302.1	To make the students understand the concepts of EMR, various energy levels, and electronic transitions.
C302.2	To make the students gain knowledge in the Qualitative analysis of UV /Visible spectroscopy instrumentation and different rules.
C302.3	To make the students well equipped in Quantitative applications of UV/Visible spectroscopy.
C302.4	To make the students to excel in IR spectroscopy and its application in various fields.
C302.5	To make the students apply their ideas and become resourceful in different separation methods using Chromatography.

Course code : C303 Course Name: CH6502 CHEMICAL PROCESS INDUSTRIES II

C303.1	Able to gain knowledge on various aspects of production engineering
C303.2	Understand the practical methods of production in a chemical factory.
C303.3	Able to integrate various courses such as chemistry, unit operations, mechanical operation, stoichiometry etc.,
C303.4	Able to classify the chemical process industry into industrial categories of base, intermediate end-products
C303.5	Able to specify chemicals manufacturers

Course code : Course Name: CH6503 CHEMICAL ENGINEERING THERMODYNAMICS II

C304.1	Understand the concepts of partial molar properties of solutions and Gibbs Duhem Equation
C304.2	Explain the basic concepts in phase equilibria, chemical potential, fugacity, azeotropes and Vapour-Liquid Equilibrium
C304.3	Understand the various concepts in activity coefficient-composition models and thermodynamic consistency of phase equilibria
C304.4	Understand the concepts in evaluating equilibrium constant and thermodynamic analysis in reaction
C304.5	Understand the various concepts in refrigeration, liquefaction process and performance of vapour refrigeration cycles

Course code :C305 Course Name: CH6504 HEAT TRANSFER

C305.1	To understand the concepts of heat transfer in conduction, fins, critical radius of thickness and lumped heat analysis.
C305.2	To understand the concepts of convection in flow through flat plates and pipes
C305.3	To understand the various concepts of boiling and condensation
C305.4	To understand the concept behind evaporator and radiation heat transfer
C305.5	To know about heat exchangers and its types

Course code :C306 Course Name: CH6505 MASS TRANSFER I

C306.1	To understand the basic concept of diffusion and diffusivity prediction and measurement.
C306.2	To understand the concept of mass transfer coefficient for various phase types and stage wisedifferential contractors.

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C306.3	To understand the principals of humidification with design and theories of cooling towers.
C306.4	To understand the principals of drying with material balance and determination of length of dryers.
C306.5	To understand the concepts of crystallization with mass and energy balance and design of crystallizers.

Course code :C307 Course Name: GE6563 COMMUNICATION SKILLS

C307.1	Able to provide opportunities to learners to practice their communicative skills to make them become proficient users of English.
C307.2	Enable learners to fine-tune their linguistic skills (LSRW) with the help of technology to communicate globally.
C307.3	Able too enhance the performance of learners at placement interviews and group discussions and other recruitment procedures.

Course code : C308 Course Name: CH6511 PROCESS EQUIPMENT DESIGN– I

C308.1	Able to develop skill to design process equipments used widely in the chemical industry.
C308.2	Able to install process equipments used widely in a chemical industry.

Course code : C309 Course Name: CH6512 MECHANICAL OPERATIONS LABORATORY

C309.1	Able to develop a sound working knowledge on different types of crushing equipments
C309.2	Able to study the characteristics of different mechanical operation separators.
C309.3	Gain knowledge on various separation techniques like filtration, sedimentation, screening, elutriation, and centrifugation

Course code :C310 Course Name: CH6601 ENERGY ENGINEERING

C310.1	Able to understand the interaction between different parts of the energy system
C310.2	Ability to apply the fundamentals of energy conversion
C310.3	Able to understand the applications of energy conversion

Course code :C311 Course Name: CH6602 CHEMICAL REACTION ENGINEERING – I

C311.1	Interpret kinetic data and mechanism.
C311.2	Design a reactor for a chemical reaction
C311.3	Understand the choice of reactors
C311.4	Identify appropriate reactor for a chemical reaction under different operating conditions
C311.5	Analysis the optimum reaction condition for a chemical reaction.

Course code : C312 Course Name: CH6603 MASS TRANSFER II

C312.1	Students will be able to design an absorber and a Stripper
C312.2	Students will be able to design a distillation column.
C312.3	Students will be able to design extractors.
C312.4	Students will be able to design leaching equipments.
C312.5	Students will be able to design adsorbers.

Course code : C313 Course Name: CH6604 MATERIALS SCIENCE AND TECHNOLOGY

C313.1	emphasis on the fundamental scientific and engineering principles of material structure
C313.2	Able to know about processing, properties of materials
C313.3	Able to analyze the performance of all classes of materials used in engineering systems.

Course code : C314 Course Name: CH6605 PROCESS INSTRUMENTATION, DYNAMICS AND CONTROL

C314.1	Understand the concepts of Instrumentation
C314.2	Open and closed loop systems and its responses.
C314.3	Understand the concept of control loop components.
C314.4	Understand the Stability of control systems.
C314.5	Able to understand the concept of Advanced control System

Course code :C316 Course Name: CH6611 HEAT TRANSFER LABORATORY

C316.1	To develop a sound working knowledge on different types of heat transfer equipments.
C316.2	Able to calculate heat transfer by conduction
C316.3	Able to understand different types of convection using classical models

Course code : C317 Course Name: CH6612 PROCESS EQUIPMENT DESIGN II

C317.1	Gain knowledge on the shape and drawing of the process equipments

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C317.2	To gain knowledge and to develop key concepts and techniques to design the process equipment in a process plant.

Course code : C318 Course Name: CH6613 MASS TRANSFER LABORATORY

C318.1	to develop sound working knowledge on different types of mass transfer equipments.
C318.2	able to determine important data for the design and operation of the process equipments like distillation, extraction, diffusivity and drying principles which are having wide applications in various industries

Course code : C401 Course Name: CH6701 CHEMICAL REACTION ENGINEERING – II

C401.1	Understand the concepts of partial molar properties of solutions and Gibbs Duhem Equation
C401.2	Explain the basic concepts in phase equilibria, chemical potential, fugacity, azeotropes and Vapour-Liquid Equilibrium
C401.3	Understand the various concepts in activity coefficient-composition models andthermodynamic consistency of phase equilibria
C401.4	Understand the concepts in evaluating equilibrium constant and thermodynamic analysis in reaction
C401.5	Understand the various concepts in refrigeration, liquefaction process and performance of vapour refrigeration cycles

Course code : C402 Course Name: CH6702 TRANSPORT PHENOMENA

C402.1	Understand the fundamental connections between the conservation laws in heat, mass and momentum Interpret the importance of analogies between transport operation
C402.2	Identify the method of shell balance approach to transfer problems
C402.3	Apply equations of change to solve heat , mass and momentum transfer problems
C402.4	Apply the time smoothed equations of change for turbulent flow in pipes
C402.5	Interpret the importance of analogies between transport operation

Course code : C403 Course Name: CH6703 CHEMICAL PROCESS PLANT SAFETY

C403.1	Students would have learnt the basic concepts relating to safety programs
C403.2	Students would have learnt the basic concepts relating to chemical hazards, risk, and ethics.
C403.3	Students will be able to identify the different accidents and their causes.
C403.4	Students develop knowledge of quantitatively analyze release and dispersion rates of liquids and vapors.
C403.5	Students would have an awareness of the various legal aspects of safety

Course code : C404 Course Name: CH6704 PROCESS ECONOMICS

C404.1	knowledge on principles of management, organization and quality
C404.2	knowledge on cost and asset accounting, time value of money
C404.3	knowledge on profitability, alternative investments, minimum attractive rate of return
C404.4	knowledge on balance sheet, sensitivity and risk analysis
C404.5	knowledge on economic balance of Chemical Process Industries

Course code : C405 Course Name: CH6705 BIOCHEMICAL ENGINEERING

C405.1	To understand the basic biochemical engineering principles and applications relevant to bioprocesses and biotechnology operations.
C405.2	To understand the concept of biochemistry and microbiology and kinetics of enzyme action
C405.3	To understand the principals underlying and the derivation of the design equations for enzyme reactions and fermentation reactor operation and design.
C405.4	To understand the basic issues in biotechnology industry product/process development.
C405.5	To understand the concepts available to purify the product from bioreactor/fermentor in laboratory and pilot plant.

Course code : C406 Course Name: CH6009 Fertilizer Technology

C406.1	Understand the concepts of manufacture of nitrogenous fertilizers
C406.2	Understand the concepts of manufacture of Phosphatic fertilizers
C406.3	Understand the concepts of manufacture of Potassic fertilizers
C406.4	Interpret the complex and NPK fertilizer
C406.5	Understand the concept of manufacturing techniques and design of equipments in fertilizer industries.

Course code :C407 Course Name: CH6711 CHEMICAL REACTION ENGINEERING LABORATORY

C407.1	To gain knowledge on different types of reactors.
C407.2	To gain knowledge on design of reactors.

Course code :C408 Course Name: CH6712 SEMINAR AND COMPREHENSION

C408.1	To assess the overall level of proficiency of the students
C408.2	To understand the scholastic attainment of the student in the various subjects studied during the degree course

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Course code : C409 Course Name: CH6713 PROCESS CONTROL LABORATORY

C409.1	To understand the methods of controlling the processes including measurements using process simulation techniques.
C409.2	To development and use of right type of control dynamics for process control under different operative conditions.

Course code : C410 Course Name: CH6013 Petroleum Technology

C410.1	Students will understand the basic operations in petroleum refining, refinery products.
C410.2	Students will understand the concepts of catalytic cracking.
C410.3	Students will understand the blending and forming process involved.
C410.4	Students will understand the concepts of lubricating used in oil and gas production.
C410.5	Students will understand the cost evaluation techniques.

Course code : C411 Course Name: CH6018 Process Plant Utilities

C411.1	Students will understand the importance of health, safety and the environment in process industries.
C411.2	Students will understand the utility of steam and its usefulness.
C411.3	Students will understand the refrigeration processes used in industry.
C411.4	Students will understand the concepts of compressed air and its application in industries.
C411.5	Students will understand that efficient operation involving fuel is imperative for economic and safe operation is essential for the survival of industries.

Course code : C412 Course Name: CH6811 Project Work

C412.1	Able to practice Project Management principles while developing chemical formulations.
C412.2	Able to take up any challenging practical problems
C412.3	Able to find solution by formulating proper methodology.

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Course Outcomes (CO)

(R 2017)

Branch: B.Tech, Chemical Engineering

Course Code: C101 Course Name:HS87151 Communicative English

C101.1	Read different genres of texts adopting various reading strategies.
C101.2	Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
C101.3	Listen/view and comprehend different spoken discourses/excerpts in different accents.
C101.4	Speak clearly, confidently, comprehensibly.
C101.5	Communicate with one or many listeners using appropriate communicative strategies.

Course Code: C102 Course Name: MA8151 Engineering Mathematics – I

C102.1	Use both the limit definition and rules of differentiation to differentiate functions
C102.2	Apply differentiation to solve maxima and minima problems.
C102.3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.
C102.4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
C102.5	Apply various techniques in solving differential equations.

Course Code:C103 Course Name: PH8151 Engineering Physics

C103.1	Acoustics, Production and the applications of Ultrasonics in Engineering and Medical Fields.
C103.2	Interference, different types of lasers and its application in various fields.
C103.3	Fiber optics and optical fiber and its applications.
C103.4	Development of quantum mechanics and its necessary, wave equations and its applications, X - Ray.
C103.5	Crystallography and can able to calculate the crystal parameters

Course Code: C104 Course Name:CY 8151 Engineering Chemistry

C104.1	To make the students conversant with basics of polymer chemistry.
C104.2	To make the student acquire sound knowledge of second law of thermodynamics and second law based derivations of importance in engineering applications.
C104.3	To acquaint the student with concepts of important photophysical and photochemical processes and spectroscopy.
C104.4	To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
C104.5	To acquaint the students with the basics of nano materials, their properties and applications.

Course Code: C105 Course Name: GE8151 Problem solving and Python Programming

C105.1	Explain the components of computer and logical operations.
C105.2	Convert the number system and their representation.
C105.3	Discuss hardware and software devices
C105.4	Summarize network fundamentals.
C105.5	Plan the logic using flowchart and develop algorithm to write a C Program.

Course Code: C106 Course Name: GE8152 Engineering Graphics

C106.1	Ability to familiarize with the fundamentals and standards of Engineering graphics
C106.2	Ability to perform freehand sketching of basic geometrical constructions and multiple views of objects
C106.3	Ability to Project orthographic projections of lines and plane surfaces

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C106.4	Ability to draw projections of solids and development of surfaces
C106.5	Ability to visualize and to project isometric and perspective sections of simple solids

Course Code: C107 Course Name:GE8161 Problem solving and Python Programming laboratory

C107.1	Prepare data using MS-word & Excel to visualize graphs, charts in MS-Excel.
C107.2	Outline the logic using flowchart for a given problem and to program using Switch case& Control structures
C107.3	Develop logic using decision making & looping statements
C107.4	Apply passing parameters using Arrays & Functions
C107.5	Construct structure and Union for a given database and to bring out the importance of Unions over structure

Course Code:C108 Course Name:BS68163 Physics and Chemistry Laboratory

C108.1	To provide the basic practical exposure to all the engineering and technological streams in the field of physics. .
C108.2	To provide the basic practical exposure to all the engineering and technological streams in the field of chemistry.
C108.3	The students are able to know about the water containing impurities and some physical parameters.
C108.4	To gain the knowledge about light, sound, laser, fiber optics and magnetism.
C108.5	To develop the knowledge of conductometric titration and viscometry

Course Code:C109 Course Name:HS8251 Technical English

C109.1	Read different genres of texts, infer implied meanings and critically analyse and evaluate them for ideas as well as for method of presentation.
C109.2	Write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
C109.3	Listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.
C109.4	Speak convincingly, express their opinions clearly.
C109.5	Initiate a discussion, negotiate, argue using appropriate communicative strategies.

Course Code:C110 Course Name:MA8251 Engineering Mathematics – II

C110.1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
C110.2	Gradient, divergence and curl of a vector point function and related identities.
C110.3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
C110.4	Analytic functions, conformal mapping and complex integration.
C110.5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

Course Code:C111 Course Name:PH8254 Physics of Materials

C112.1	Electric conduction, electrical conductivity, carrier concentration of metals.
C112.2	Semiconductors, carrier concentration of semiconductors, Hall effect and semiconductor devices.
C112.3	Types of magnetic materials, ferro magnetic materials, magnetic storage devices, Super conductors and their properties and applications.
C112.4	Dielectrics, properties and its applications, ferro electricity.
C112.5	Modern engineering materials, Nano materials and Carbon nano tubes.

Course Code:C112 Course Name:CY8292 Chemistry for Technologists

C112.1	To make the students conversant with boiler feed water requirements, related problem and water treatment techniques.
C112.2	Principles of electrochemical reactions, redox reactions in corrosion of materials and methods for corrosion prevention and protection of materials.
C112.3	Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.
C112.4	Preparation, properties and applications of engineering materials.
C112.5	Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.

Course Code: C113 Course Name: BE8256 Basic Mechanical Engineering

C113.1	Ability to illustrate the vectorial and scalar representation of forces and moments
C113.2	Ability to analyse the rigid body in equilibrium
C113.3	Ability to evaluate the properties of surfaces and solids

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C113.4	Ability to calculate dynamic forces exerted in rigid body
C113.5	Ability to determine the friction and the effects by the laws of friction

Course Code: C114 Course Name: CH8201 Principles of chemical engineering

Course Code:C115 Course Name: GE8261 Engineering Practices Laboratory

C115.1	Ability to Fabricate carpentry components and pipe connections including plumbing works
C115.2	Ability to Use welding equipments to join the structures
C115.3	Ability to Carry out the basic machining operations
C115.4	Ability to Make the models using sheet metal works
C115.5	Ability to Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings

Course Code:C116 Course Name: CH8281 Chemical Analysis Laboratory

C116.1	Able to understand basic principles involved in estimation and characterization of industrially important materials.
C116.2	understanding on the estimation and analysis of chemical compounds.
C116.3	Analysis of fuels

Course code :C201 Course Name: MA8391 Probability and Statistics

C201.1	Understand the basic concepts of One way and Two way classification
C201.2	Understand how to solve the problem based on the One way and Two way classification
C201.3	Understand the fundamental knowledge of the concepts of 2 POWER 2 experiment
C201.4	Understand how to solve the given X-chart and R-chart
C201.5	The basic knowledge of control chart and problem based on np-chart, p-chart and c-chart.

Course code : C202 Course Name: CH8351 Process Calculations

C202.1	Students would have the knowledge of fundamentals units and stoichiometric equations.
C202.2	Student will understand the fundamentals of Humidity, Drying and the equipments used.
C202.3	Students will solve problems on basic laws for Radiation, apply these principles to radiative heat transfer between different types of surfaces.
C202.4	Students will understand the fundamentals of ideal gas behavior and phase equilibria
C202.5	Write energy and material balance for different chemical process.

Course code :C203 Course Name: CH8301 Fluid Mechanics for Chemical engineering

C203.1	Understand the fundamental properties of fluids
C203.2	Understand the characteristics under static and dynamic conditions
C203.3	Develop empirical correlation using dimensionless analysis
C203.4	Analyze flow of fluid through pipe and over the of solid
C203.5	Understand and select flow meter(s), characteristics of pumps used in Chemical Process

Course code : C204 Course Name: CH8302 of Solid Mechanics for Technologists

C204.1	the students would be able to design the support column
C204.2	the students would be able to design the beams
C204.3	the students would be able to design the pipelines, storage tanks
C204.4	the students would be able to design the reaction columns and tanks
C204.5	Able to do process equipment design and drawing.

Course Code: C205 Course Name:EE8352 Principles of Electrical and Electronics engineering

C205.1	To understand the operation and characteristics of Motors
C205.2	To understand the operation and characteristics of generator
C205.3	To understand the operation and characteristics of Tranducers

Course code :C206 Course Name: CY8291 Organic Chemistry

C206.1	At the end of the course students will have knowledge on various reaction mechanisms.

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C206.2	About the types of carbohydrates and their structural elucidation.
C206.3	About the different polynuclear aromatics, heterocycles and their properties.
C206.4	Different types of amino acids, protein synthesis and structure.
C206.5	Various dyes and drugs and their synthesis methods.

Course Code: C207 Course Name:EE8361 Electrical Engineering Laboratory

C207.1	To understand the operation and characteristics of Motors
C207.2	To understand the operation and characteristics of generator
C207.3	To understand the operation and characteristics of Tranducers

Course Code:C208 Course Name: ME8362 Mechanical Engineering Laboratory

C208.1	Ability to Fabricate carpentry components and pipe connections including plumbing works
C208.2	Ability to Use welding equipments to join the structures
C208.3	Ability to Carry out the basic machining operations
C208.4	Ability to Make the models using sheet metal works
C208.5	Ability to Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings

Course code : C209 Course Name: MA8491 NUMERICAL METHODS

C209.1	Understand the basic concepts and techniques of solving algebraic and transcendental equations.
C209.2	Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations
C209.3	Apply the numerical techniques of differentiation and integration for engineering problems
C209.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
C209.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications

Course code :C210 Course Name: GE8291 Environmental Science and Engineering

C210.1	Describe the structure and functions of different eco system.
C210.2	Identify the various causes, effects and control measures of different types of pollution.
C210.3	Summarize the over exploitation and their effects of natural resources.
C210.4	Appraise the environmental issues and possible solution.
C210.5	Explain the causes of population growth and explosion.

Course code :C211 Course Name: CH8491 INSTRUMENTAL METHODS OF ANALYSIS

C211.1	To make the students understand the concepts of EMR, various energy levels, and electronic transitions.
C211.2	To make the students gain knowledge in the Qualitative analysis of UV /Visible spectroscopy instrumentation and different rules.
C211.3	To make the students well equipped in Quantitative applications of UV/Visible spectroscopy.
C211.4	To make the students to excel in IR spectroscopy and its application in various fields.
C211.5	To make the students apply their ideas and become resourceful in different separation methods using Chromatography.

Course code : C212 Course Name: CH8401 Chemical Engineering Thermodynamics I

C212.1	Understand Zeroth Law and terminologies associated with Engineering Thermodynamics
C212.2	Apply First law, Second law, Third law for Thermodynamic process
C212.3	Able to Mathematically relate PVT behavior of fluids
C212.4	Relate Thermodynamic properties Mathematically
C212.5	Calculate heat and work quantities for industrial processes and power cycles

Course code :C213 Course Name: CH8402 Physical Chemistry

C213.1	To study the Principles of electrochemical reactions, redox reactions in cell constant.
C213.2	To study the Principles of corrosion of materials and methods of prevention for Corrosion
C213.3	To study the fundamental concepts in colloids

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C213.4	To study the develop an understanding of the basic concepts of phase rule and its applications to single and two component systems
C213.5	To study the limitations of Nernst Distribution law and colligative properties.

Course code :C214 Course Name: CH8451 Mechanical Operations

C214.1	Students will understand the particle characterization and size analysis techniques.
C214.2	Students will understand the particle size reduction and particle enlargement latest techniques.
C214.3	Students will understand the latest particle separation methods
C214.4	Students will understand the filtration and latest filtration techniques available
C214.5	Students will understand the mixing and particle handling methods

Course code :C215 Course Name: CH8461 FLUID MECHANICS LABORATORY

C215.1	To learn experimentally to calibrate flow meters
C215.2	Able to find pressure loss for fluid flows
C215.3	Able to determine pump characteristics.

Course code : C216 Course Name: CY8281 Organic Chemistry Laboratory

C216.1	able to identify what distinguishes a strong and weak nucleophile and recall the rules of reactions. The student analyzes a list of compounds and
C216.2	Able to analyze a list of compounds
C216.3	Able to determine their reactivity.

Course code :C301 Course Name: CH8501 Chemical Process Industries

C301.1	Able to gain knowledge on various aspects of production engineering
C301.2	Understand the practical methods of production in a chemical factory.
C301.3	Able to integrate various courses such as chemistry, unit operations, mechanical operation, stoichiometry etc.,

Course code :C302 Course Name: CH8591 HEAT TRANSFER

C302.1	To understand the concepts of heat transfer in conduction, fins, critical radius of thickness and lumped heat analysis.
C302.2	To understand the concepts of convection in flow through flat plates and pipes
C302.3	To understand the various concepts of boiling and condensation
C302.4	To understand the concept behind evaporator and radiation heat transfer
C302.5	To know about heat exchangers and its types

Course code :C303 Course Name: CH8551 MASS TRANSFER I

C303.1	To understand the basic concept of diffusion and diffusivity prediction and measurement.
C303.2	To understand the concept of mass transfer coefficient for various phase types and stage wisedifferential contractors.
C303.3	To understand the principals of humidification with design and theories of cooling towers.
C303.4	To understand the principals of drying with material balance and determination of length of dryers.
C303.5	To understand the concepts of crystallization with mass and energy balance and design of crystallizers.

Course code :C304 Course Name: CH8502 CHEMICAL REACTION ENGINEERING – I

C304.1	Interpret kinetic data and mechanism.
C304.2	Design a reactor for a chemical reaction
C304.3	Understand the choice of reactors
C304.4	Identify appropriate reactor for a chemical reaction under different operating conditions
C304.5	Analysis the optimum reaction condition for a chemical reaction.

Course code : C305 Course Name: CH8075 Petroleum Refining and Petrochemicals (PE-I)

C305.1	Understand the classification, composition and testing methods of crude petroleum / product.
C305.2	To develop innovative refining process and develop quality control and assurance techniques.
C305.3	Apply the knowledge of treatment processes to develop the manufacture of petroleum products.
C305.4	Overview of petrochemical technologies and discuss upon the general topology of the petrochemical process technologies.

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C305.5	Petrochemicals refers to all those compounds that can be derived from the petroleum refinery products

Course code : C306 Course Name: ORO551 RENEWABLE ENERGY SOURCES (open Elective I)

C306.1	Knowledge in capturing and applying other forms of energy sources like wind, biogas
C306.2	Knowledge in wind energy and biomass with its economic aspects.
C306.3	Knowledge in applying solar energy in a useful way.
C306.4	Ability to classify the solar energy collectors and methodologies of storing solar energy.
C306.5	Understanding the physics of solar radiation. geothermal energies

Course code : C307 Course Name: CH8581 MECHANICAL OPERATIONS LABORATORY

C307.1	Able to develop a sound working knowledge on different types of crushing equipments
C307.2	Able to study the characteristics of different mechanical operation separators.
C307.3	Gain knowledge on various separation techniques like filtration, sedimentation, screening, elutriation, and centrifugation

Course code :C308 Course Name: CH8561 HEAT TRANSFER LABORATORY

C308.1	To develop a sound working knowledge on different types of heat transfer equipments.
C308.2	Able to calculate heat transfer by conduction
C308.3	Able to understand different types of convection using classical models

Course code : C309 Course Name: CH8601 CHEMICAL REACTION ENGINEERING – II

C309.1	Understand the concepts of partial molar properties of solutions and Gibbs Duhem Equation
C309.2	Explain the basic concepts in phase equilibria, chemical potential, fugacity, azeotropes and Vapour-Liquid Equilibrium
C309.3	Understand the various concepts in activity coefficient-composition models andthermodynamic consistency of phase equilibria
C309.4	Understand the concepts in evaluating equilibrium constant and thermodynamic analysis in reaction
C309.5	Understand the various concepts in refrigeration, liquefaction process and performance of vapour refrigeration cycles

Course code : C310 Course Name: CH8651 MASS TRANSFER II

C310.1	Students will be able to design an absorber and a Stripper
C310.2	Students will be able to design a distillation column.
C310.3	Students will be able to design extractors.
C310.4	Students will be able to design leaching equipments.
C310.5	Students will be able to design adsorbers.

Course code : C311 Course Name: CH8602 CHEMICAL REACTION ENGINEERING – II

C311.1	Understand the concepts of partial molar properties of solutions and Gibbs Duhem Equation
C311.2	Explain the basic concepts in phase equilibria, chemical potential, fugacity, azeotropes and Vapour-Liquid Equilibrium
C311.3	Understand the various concepts in activity coefficient-composition models andthermodynamic consistency of phase equilibria
C311.4	Understand the concepts in evaluating equilibrium constant and thermodynamic analysis in reaction
C311.5	Understand the various concepts in refrigeration, liquefaction process and performance of vapour refrigeration cycles

Course code : C312 Course Name: CH8652 PROCESS ENGINEERING ECONOMICS

C312.1	knowledge on time value of money, cost and asset accounting
C312.2	knowledge on profitability, alternative investments, income statement, balance sheet
C312.3	knowledge on economic balance of Chemical Process Industries
C312.4	knowledge on principles of management, organization and quality
C312.5	knowledge on inventory control and types of production planning and control

Course code : C313 Course Name: CH8652 PROCESS INSTRUMENTATION, DYNAMICS AND CONTROL

C313.1	Understand the concepts of Instrumentation
C313.2	Open and closed loop systems and its responses.
C313.3	Understand the concept of control loop components.

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C313.4	Understand the Stability of control systems.
C313.5	Able to understand the concept of Advanced control System

Course code : C314 Course Name: CH8004 WASTE WATER TREATMENT (PE II)

C314.1	Students will understand the concepts and overview of waste water treatment.
C314.2	Students will understand the selection of process for the nature of waste water.
C314.3	Students will understand the chemical process methods and available latest techniques.
C314.4	Students will understand the biological treatment methods.
C314.5	Students will understand the advanced waste water treatment methods available right now.

Course code : C315 Course Name: CH8611 COMPUTATIONAL PROGRAMMING LABORATORY FOR CHEMICAL ENGINEERS

C315.1	To give the students an understanding the fundamentals concepts in mathematics.
C315.2	To gain knowledge in problems solving and computer programming.

Course code :C316 Course Name: CH8612 CHEMICAL REACTION ENGINEERING LABORATORY

C316.1	To gain knowledge on different types of reactors.
C316.2	To gain knowledge on design of reactors.

Course code : C401 Course Name: CH8791 TRANSPORT PHENOMENA

C401.1	Understand the fundamental connections between the conservation laws in heat, mass and momentum Interpret the importance of analogies between transport operation
C401.2	Identify the method of shell balance approach to transfer problems
C401.3	
C401.4	Apply the time smoothed equations of change for turbulent flow in pipes
C401.5	Interpret the importance of analogies between transport operation

Course code : C402 Course Name: CH8701 PROCESS EQUIPMENT DESIGN

C402.1	Able to develop skill to design process equipments used widely in the chemical industry.
C402.2	Able to install process equipments used widely in a chemical industry.

Course code : C403 Course Name: CH8093 Modern Seperation Techniques (PROFESSIONAL ELECTIVE - III)

C403.1	Create the understanding of separation processes for selecting optimal process for new and innovative applications.
C403.2	Ability to exhibit the skill to develop membrane processes.
C403.3	Ability to exhibit the skill to develop adsorption process and inorganic separation process.
C403.4	Apply the latest concepts like super critical fluid extraction, pervaporation, lyophilisation etc., in Chemical process industries.
C403.5	Understand Innovative techniques of controlling and managing oil spills.

Course code : C404 Course Name: CH8078 Process Plant Utilities (PROFESSIONAL ELECTIVE 4)

C404.1	Students can learn about Plant utilities, Water, Water softening and Reverse osmosis
C404.2	Students can learn about Steam and steam generation
C404.3	Students can learn about Refrigeration and Refrigerant.
C404.4	Students can learn about Compressed air, compressor
C404.5	Students can learn about Fuel and waste disposal

Course code : C405 Course Name: OME754 INDUSTRIAL SAFETY (OPEN ELECTIVE – II)

C405.1	To gain knowledge on safety engineering fundamentals and safety management practices.
C405.2	Able to identify and prevent chemical, environmental mechanical, fire hazard through analysis
C405.3	Able to apply proper safety techniques on safety engineering and management.

Course code : C406 Course Name: CH8711 PROCESS CONTROL LABORATORY

C406.1	To understand the methods of controlling the processes including measurements using process simulation techniques.
C406.2	To development and use of right type of control dynamics for process control under different operative conditions.

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Course code : C407 Course Name: CH8781 MASS TRANSFER LABORATORY

C407.1	to develop sound working knowledge on different types of mass transfer equipments.
C407.2	able to determine important data for the design and operation of the process equipments like distillation, extraction, diffusivity and drying principles which are having wide applications in various industries

Course code : C408 Course Name: CH8712 INTERNSHIP

C408.1	Students undergo training in R&D institutions / Academics / Industries for a minimum period of 15 days. At the end of internship students must submit a report for internal evaluation.

Course code : C409 Course Name: CH8073 Industrial Process Plant Safety (PROFESSIONAL ELECTIVE 5)

C409.1	Able to learn about implementation of safety procedures, risk analysis and assessment, hazard identification
C409.2	Able to Demonstrate the awareness of plant safety in selection and layout of chemical plants and the usage of safety codes.
C409.1	Exhibit the skill in classifying chemical, fire, explosion hazards and to understand the occupational diseases
C409.2	Analyze the bio medical and engineering response to health hazards and to implement the effective process control and instrumentation.

Course code : C410 Course Name: CH8010 Petroleum Technology (PROFESSIONAL ELECTIVE 6)

C410.1	Students will understand the basic operations in petroleum refining, refinery products.
C410.2	Students will understand the concepts of catalytic cracking.
C410.3	Students will understand the blending and forming process involved.
C410.4	Students will understand the concepts of lubricating used in oil and gas production.
C410.5	Students will understand the cost evaluation techniques

Course code : C411 Course Name: CH8811 Project Work

C411.1	Able to practice Project Management principles while developing chemical formulations.
C411.2	Able to take up any challenging practical problems
C411.3	Able to find solution by formulating proper methodology.

Course code :C412 Course Name: CH8812 SEMINAR

C412.1	To assess the overall level of proficiency of the students
C412.2	To understand the scholastic attainment of the student in the various subjects studied during the degree course

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Course Outcomes (CO) (R 2013)

DEPARTMENT OF INFORMATION TECHNOLOGY

Course Code: C101 Course Name:HS6151 Technical English – I	
C101.1	Read different genres of texts adopting various reading strategies.
C101.2	Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
C101.3	Listen/view and comprehend different spoken discourses/excerpts in different accents.
C101.4	Speak clearly, confidently, comprehensibly.
C101.5	Communicate with one or many listeners using appropriate communicative strategies
Course Code: C102 Course Name: MA6151 Mathematics – I	
C102.1	Use both the limit definition and rules of differentiation to differentiate functions
C102.2	Apply differentiation to solve maxima and minima problems.
C102.3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts. Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.
C102.4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
C102.5	Apply various techniques in solving differential equations.
Course Code:C103 Course Name: PH6151 Engineering Physics – I	
C103.1	Acoustics, Production and the applications of Ultrasonics in Engineering and Medical Fields
C103.2	Interference, different types of lasers and its application in various fields.
C103.3	Fiber optics and optical fiber and its applications.
C103.4	Development of quantum mechanics and its necessary, wave equations and its applications, X - Ray
C103.5	Crystallography and can able to calculate the crystal parameters
Course Code: C104 Course Name:CY 6151 Engineering Chemistry – I	
C104.1	To make the students conversant with basics of polymer chemistry.
C104.2	To make the student acquire sound knowledge of second law of thermodynamics and second law based derivations of importance in engineering applications in all disciplines.
C104.3	To acquaint the student with concepts of important photophysical and photochemical processes and spectroscopy.
C104.4	To develop an understanding of the basic concepts of phase rule and its applications to single and two component system and appreciate the purpose and significance of alloys.
C104.5	To acquaint the students with the basics of nano materials, their properties and applications.
Course Code: C105 Course Name:GE6151 Computer Programming	
C105.1	Develop simple applications in C using basic constructs
C105.2	Design and implement applications using arrays and strings
C105.3	Develop and implement applications in C using functions and pointers
C105.4	Develop applications in C using structures
C105.5	Design applications using sequential and random access file processing
Course Code: C106 Course Name: GE6152 Engineering Graphics	
C106.1	Perform free hand sketching of basic geometrical constructions and multiple views of objects.
C106.2	Do orthographic projection of lines and plane surfaces.
C106.3	Draw projections and solids and development of surfaces.
C106.4	Prepare isometric and perspective sections of simple solids.
C106.5	Demonstrate computer aided drafting.
Course Code: C107 Course Name:GE6161 Computer Practices Laboratory	
C107.1	Apply good programming design methods for program development.
C107.2	Design and implement C programs for simple applications.
C107.3	Develop recursive programs.
C107.4	Develop applications in C using structures
C107.5	Design applications using sequential and random access file processing
Course Code:C108 Course Name: GE6162 Engineering Practices Laboratory	
C108.1	Design different philosophies for steel structures and the basic steps in the design process
C108.2	Develop problem solving skills, including the ability to convert an open-ended problem statement into a statement of work and/or a set of design specifications
C108.3	Understand the plumbing and carpentry components of residential and industrial buildings
C108.4	Understand about various recent tools in mechanical engineering
C108.5	Students will able to learnt welding and basic machinery
Course Code:C109 Course Name:GE6163 Physics and Chemistry Laboratory - I	
C109.1	To provide the basic practical exposure to all the engineering and technological streams in the field of physics
C109.2	To provide the basic practical exposure to all the engineering and technological streams in the field of chemistry
C109.3	The students are able to know about the water containing impurities and some physical parameters
C109.4	To gain the knowledge about light, sound, laser, fiber optics and magnetism.
C109.5	To develop the knowledge of conductometric titration and viscometry
Course Code:C110 Course Name:HS6251 Technical English – II	
C110.1	Read different genres of texts, infer implied meanings and critically analyse and evaluate them for ideas as well as for method of presentation.

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C110.2	Write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
C110.3	Listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.
C110.4	Speak convincingly, express their opinions clearly.
C110.5	Initiate a discussion, negotiate, argue using appropriate communicative strategies.
Course Code:C111 Course Name:MA6251 Mathematics – II	
C111.1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
C111.2	Gradient, divergence and curl of a vector point function and related identities.
C111.3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
C111.4	Analytic functions, conformal mapping and complex integration
C111.5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients
Course Code:C112 Course Name:PH6251 Engineering Physics – II	
C112.1	Electric conduction, electrical conductivity, carrier concentration of metals.
C112.2	Semiconductors, carrier concentration of semiconductors, Hall effect and semiconductor devices.
C112.3	Types of magnetic materials, ferro magnetic materials, magnetic storage devices, Super conductors and their properties and applications.
C112.4	Dielectrics, properties and its applications, ferro electricity.
C112.5	Modern engineering materials, Nano materials and Carbon nano tubes.
Course Code:C113 Course Name:CY6251 Engineering Chemistry – II	
C113.1	To make the students conversant with boiler feed water requirements, related problem and water treatment techniques.
C113.2	Principles of electrochemical reactions, redox reactions in corrosion of materials and methods for corrosion prevention and protection of materials.
C113.3	Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.
C113.4	Preparation, properties and applications of engineering materials
C113.5	Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.
Course Code: CS6201 Course Name : DIGITAL PRINCIPLES AND SYSTEM DESIGN	
C114.1	Perform arithmetic operations in any number system.
C114.2	Simplify the Boolean expression using K-Map and Tabulation techniques.
C114.3	Use Boolean simplification techniques to design a combinational hardware circuit.
C114.4	Design and Analysis of a given digital circuit – combinational and sequential.
C114.5	Design using PLD.
Course Code: CS6202 Course Name : Programming and Data Structures I	
C115.1	Use the control structures of C appropriately for problems.
C115.2	Implement abstract data types for linear data structures.
C115.3	Apply the different linear data structures to problem solutions.
C115.4	Critically analyse the various algorithms.
C115.5	Apply different Hashing and set algorithms
Course Code: GE6262 Course Name : PHYSICS AND CHEMISTRY LABORATORY – II	
C116.1	To provide the basic practical exposure to all the engineering and technological streams in the field of physics. .
C116.2	To provide the basic practical exposure to all the engineering and technological streams in the field of chemistry.
C116.3	The students are able to know about the water containing impurities and some physical parameters.
C116.4	To gain the knowledge about properties of matter, semiconductors and solar cells
C116.5	To develop the knowledge of spectrophotometry.
Course Code: IT6211 Course Name : DIGITAL LABORATORY	
C117.1	Use boolean simplification techniques to design a combinational hardware circuit.
C117.2	Design and Implement combinational and sequential circuits.
C117.3	Design the different functional units in a digital computer system.
C117.4	Analyze a given digital circuit – combinational and sequential.
C117.5	Design and Implement a simple digital system.
Course Code: IT6212 Course Name : PROGRAMMING AND DATA STRUCTURES LABORATORY I	
IT6212 .1	Design and implement C programs for implementing stacks, queues, linked lists.
IT6212 .2	Apply the different data structures for implementing solutions to practical problems.
IT6212 .3	Apply good programming design methods for program development
IT6212 .4	Develop searching and sorting programs.
IT6212 .5	Develop C programs for various hashing techniques.
Course Code: MA6351 Course Name : Transforms and Partial Differential Equations	
C201.1	Understand how to solve the given standard partial differential equations.
C201.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications
C201.3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations
C201.4	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.
C201.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.
Course Code: C202 Course Name:CS6301 PROGRAMMING AND DATA STRUCTURES II	
C202.1	Design problem solutions using Object Oriented Techniques.
C202.2	Apply the concepts of data abstraction, encapsulation and inheritance for problem solutions.
C202.3	Use the control structures of C++ appropriately
C202.4	Critically analyze the various algorithms.
C202.5	Apply the different data structures to problem solutions
Course Code: C203 Course Name:CS6302 DATABASE MANAGEMENT SYSTEMS	
C203.1	Design Databases for applications.
C203.2	Use the Relational model, ER diagrams
C203.3	Apply concurrency control and recovery mechanisms for practical problems.
C203.4	Design the Query Processor and Transaction Processor
C203.5	Apply security concepts to databases.

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Course Code: C204 Course Name:CS6303 COMPUTER ARCHITECTURE	
C204.1	Design arithmetic and logic unit
C204.2	Design and analyze pipelined control units
C204.3	Evaluate performance of memory systems
C204.4	Understand parallel processing architectures.
C204.5	Understand Different ways of communicating with I/O devices and standard I/O interfaces
Course Code: C205 Course Name:CS6304 ANALOG AND DIGITAL COMMUNICATION	
C205.1	Apply analog and digital communication techniques.
C205.2	Use data and pulse communication techniques.
C205.3	Analyze Source and Error control coding.
C205.4	Utilize multi-user radio communication
C205.5	operational amplifiers and their applications in the processing of analog signals
Course Code: C206 Course Name: IT6311: PROGRAMMING AND DATA STRUCTURES LABORATORY II	
C206.1	Apply the different data structures for implementing solutions to practical problems
C206.2	Design and implement C++ programs for implementing stacks, queues, linked lists.
C206.3	Develop recursive programs using tree and graphs.
C206.4	Apply good programming design methods for program development.
C206.5	Develop recursive programs using trees and graphs.
Course Code: 207 Course Name: IT 6312 DATABASE MANAGEMENT SYSTEMS LABORATORY	
C207.1	Populate and query a database
C207.2	Design and implement a database schema for a given problem-domain
C207.3	Create and maintain tables using PL/SQL.
C207.4	Develop different applications
C207.5	Critically analyze the use of Tables, Views, Functions and Procedures
Course Code: C208 Course Name: IT6313 DIGITAL COMMUNICATION LAB	
C208.1	Develop necessary skill in designing, analyzing and constructing digital electronic circuits.
C208.2	Differentiate cascade and cascade amplifier.
C208.3	Analyze the limitation in bandwidth of single stage and multi stage amplifier
C208.4	Apply various channel coding schemes & demonstrate their capabilities towards the improvement of the noise perfonnance of communication system
C208.5	Simulate & validate the various functional modules of a communication system
Course Code: 209 Course Name:MA6453 PROBABILITY AND QUEUING THEORY	
C209.1	Be through with probability concepts
C209.2	To acquire knowledge on Probability Distributions
C209.3	Get exposed to the testing of hypothesis using distributions
C209.4	Gain strong knowledge inn principles of Queueing theory
C209.5	Get exposed to Discrete time Markov chain
Course Code: 210 Course Name:EC6504 MICROPROCESSOR AND MICROCONTROLLER	
C210.1	Design and implement programs on 8086 microprocessor.
C210.2	Design I/O circuits.
C210.3	Design Memory Interfacing circuits.
C210.4	Design and implement 8051 microcontroller based systems.
C210.5	Illustrate the Bus structure and communication of microprocessor
Course Code: C211.1 Course Name:CS6402 DESIGN AND ANALYSIS OF ALGORITHMS	
C211.1	Design algorithms for various computing problems
C211.2	Analyze the time and space complexity of algorithms.
C211.3	Critically analyze the different algorithm design techniques for a given problem.
C211.4	Modify existing algorithms to improve efficiency.
C211.5	Become familiar with the limitations of Algorithm power.
Course Code: 212 Course Name:CS6401 OPERATING SYSTEMS	
C212.1	Design various Scheduling algorithms.
C212.2	Apply the principles of concurrency
C212.3	Design deadlock, prevention and avoidance algorithms.
C212.4	Compare and contrast various memory management schemes.
C212.5	Design and Implement a prototype file systems.
Course Code: 214 Course Name:CS6403 SOFTWARE ENGINEERING	
C214.1	Identify the key activities in managing a software project.
C214.2	Compare different process model.
C214.3	Concepts of requirements engineering and Analysis Modeling.
C214.4	Apply systematic procedure for software design and deployment
C214.5	Compare and contrast the various testing and maintenance.
Course Code: 215 Course Name:IT6412 MICROPROCESSOR & MICROCONTROLLER LABORATORY	
C215.1	Write ALP programs for fixed and floating point arithmetic
C215.2	interface different I/O s with processor
C215.3	Generate waveforms using microprocessor
C215.4	Execute programs in 8051
C215.5	Explain the difference between simulator and emulator
Course Code: 216 Course Name : IT6412 OPERATING SYSTEMS LABORATORY	
C216.1	Implement deadlock avoidance, and Detection Algorithms
C216.2	Critically analyze the performance of the various page replacement algorithms
C216.3	Compare the performance of various CPU Scheduling Algorithm

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C216.4	Create processes and implement IPC
C216.5	Implement file system concepts
Course Code: 217 Course Name : IT6413 SOFTWARE ENGINEERING LAB	
C217.1	Students should be able to use open source case tools to develop software
C217.2	Analyze and design software requirements in efficient manner
C217.3	Use the UML analysis and design diagrams
C217.4	Apply appropriate design patterns
C217.5	Compare and contrast various testing techniques
Course Code: C301 Course Name:CS6551 COMPUTER NETWORKS	
C301.1	Identify the components required to build different types of networks
C301.2	Choose the required functionality at each layer for given application
C301.3	Identify solution for each functionality at each layer
C301.4	Trace the flow of information from one node to another node in the network
C301.5	Demonstrate various types of routing techniques
Course Code: C302 Course Name: IT6501 GRAPHICS AND MULTIMEDIA	
C302.1	Effectively and creatively solve a wide range of graphic design problem
C302.2	Form effective and compelling interactive experiences for a wide range of audiences
C302.3	Use various software programs used in the creation and implementation of multi-media (interactive, motion/animation, presentation, etc.)
C302.4	Discuss issues related to emerging electronic technologies and graphic design
C302.5	Discuss issues related to hypermedia message creation & data management
Course Code: 303 Course Name:CS6502 OBJECT ORIENTED ANALYSIS AND DESIGN	
C303.1	Design and implement projects using OO concepts
C303.2	Use the UML analysis and design diagrams
C303.3	Apply appropriate design patterns
C303.4	Create code from design
C303.5	Compare and contrast various testing techniques
Course Code: 304 Course Name : IT6502 DIGITAL SIGNAL PROCESSING	
C304.1	Perform frequency transforms for the signals.
C304.2	Design IIR and FIR filters
C304.3	Finite word length effects in digital filters
C304.4	continuous and discrete time signals and systems
C304.5	To impart knowledge about the basics of signals and systems
Course Code: 305 Course Name : IT6503 WEB PROGRAMMING	
C305.1	Design web pages.
C305.2	Use technologies of Web Programming
C305.3	Apply object oriented aspects to Scripting
C305.4	Create databases with connectivity using JDBC
C305.5	Build web based application using sockets.
Course Code: 306 Course Name : EC6801 WIRELESS COMMUNICATION	
C306.1	Characterize wireless channels
C306.2	Design and implement various signaling schemes for fading channels
C306.3	Design a cellular system
C306.4	Compare multipath mitigation techniques and analyze their performance
C306.5	Design and implement systems with transmit/receive diversity and MIMO systems and analyze their performance
Course Code: 307 Course Name : IT6511 NETWORKS LABORATORY	
C307.1	Use simulation tools
C307.2	Implement the various protocols.
C307.3	Analyse the performance of the protocols in different layers.
C307.4	Analyze various routing algorithms
C307.5	Understand different transmission media and design cables for establishing a network
Course Code : 308 Course Name : IT6512 WEB PROGRAMMING LABORATORY	
C308.1	Design Web pages using HTML/DHTML and style sheets
C308.2	Design and Implement database applications.
C308.3	Create dynamic web pages using server side scripting.
C308.4	Write Client Server applications.
C308.5	Build web based application using sockets.
Course Code: 309 Course Name : IT6513 CASE TOOLS LABORATORY	
C309.1	Design and implement projects using OO concepts.
C309.2	Use the UML analysis and design diagrams.
C309.3	Apply appropriate design patterns.
C309.4	Create code from design.
C309.5	Compare and contrast various testing techniques
Course Code: 310 Course Name : CS6601 DISTRIBUTED SYSTEMS	
C310.1	Discuss trends in Distributed Systems
C310.2	Apply network virtualization
C310.3	Apply remote method invocation and objects.
C310.4	Design process and resource management systems
C310.5	Discuss and design process of peer to peer services , file system ,synchronization and replication
Course Code: 311 Course Name : IT6601 MOBILE COMPUTING	
C310.1	Explain the basics of mobile telecommunication system
C310.2	Choose the required functionality at each layer for given application
C310.3	Identify solution for each functionality at each layer
C310.4	Use simulator tools and design Ad hoc networks
C310.5	Develop a mobile application

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Course Code: 311 Course Name :CS6659 ARTIFICIAL INTELLIGENCE	
C311.1	Identify problems that are amenable to solution by AI methods.
C311.2	Identify appropriate AI methods to solve a given problem
C311.3	Formalise a given problem in the language/framework of different AI methods
C311.4	Implement basic AI algorithms
C311.5	Design and carry out an empirical evaluation of different algorithms on a problem formalisation, and state the conclusions that the evaluation supports.
Course Code: 312 Course Name:CS6660 COMPILER DESIGN	
C312.1	Design and implement a prototype compiler
C312.2	Apply the various optimization techniques
C312.3	Use the different compiler construction tools
C312.4	Describe techniques for intermediate code and machine code optimisation
C312.5	Turn fully processed source code for a novel language into machine code for a novel computer
Course Code: 314 Course Name : IT6602 SOFTWARE ARCHITECTURES	
C313.1	Explain influence of software architecture on business and technical activities
C313.2	Identify key architectural structures
C313.3	Use styles and views to specify architecture
C313.4	Examine the architectural styles
C313.5	Design document for a given architecture
Course Code: 314 Course Name:GE6757 Total Quality Management	
C314.1	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.
C314.2	Explain the importance of Quality Systems and Standards
C314.3	Facilitate the understanding of Quality Management principles and process
C314.4	Develop an understanding on quality management philosophies and frameworks
C314.5	Outline the Dimensions and Barriers regarding with Quality
Course Code: 315 Course Name : IT6611 MOBILE APPLICATION DEVELOPMENT LABORATORY	
C315.1	Design and Implement various mobile applications using emulators.
C315.2	Deploy applications to hand-held devices
C315.3	Develop a mobile application
C315.4	Develop an application using basic graphical primitives and databases
C315.5	Make use of location identification using multithreading,RSS feed,GPS in an application
Course Code: 316 Course Name : IT6612 COMPILER LABORATORY	
C316.1	Apply different compiler writing tools to implement the different Phases
C316.2	Analyze the control flow and data flow of a typical program
C316.3	Construct the intermediate representation
C316.4	Design the back end of a compiler for 8086 assembler
C316.5	Compare various code optimization techniques
Course Code: 317 Course Name:GE6674 COMMUNICATION AND SOFT SKILLS LABORATORY BASED	
C317.1	Take international examination such as IELTS and TOEFL
C317.2	Make presentations and Participate in Group Discussions
C317.3	Successfully answer questions in interviews.
C317.4	Help to develop soft skills and inter personal skills.
C317.5	To equip students with effective speaking and listening skills in English.
Course Code: 401 Course Name : IT6701 INFORMATION MANAGEMENT	
C401.1	Cover core relational database topics including logical and physical design and modeling
C401.2	Design and implement a complex information system that meets regulatory requirements; define and manage an organization's key master data entities
C401.3	Design, Create and maintain data warehouses.
C401.4	Learn recent advances in NOSQL, Big Data and related tools.
C401.5	Gain knowledge of Data Privacy, Data security and Organizing the structure, content and flow of a website to support effective communication
Course Code: 402 Course Name : CS6701 CRYPTOGRAPHY AND NETWORK SECURITY	
C402.1	Compare various Cryptographic Techniques
C402.2	Design Secure applications
C402.3	Inject secure coding in the developed applications
C402.4	To understand the fundamentals of various key distribution and management schemes.
C402.5	To acquire knowledge on standard algorithms & encryption techniques used to provide confidentiality, integrity and authenticity.
Course Code: 403 Course Name : IT6702 DATA WAREHOUSING AND DATA MINING	
C403.1	Design and build datawarehouse
C403.2	Apply tool categories for buissness analysis
C403.3	Apply data mining techniques and methods to large data sets
C403.4	Use data mining tools
C403.5	Compare and contrast the various classifiers
Course Code: 404 Course Name:CS6703 GRID AND CLOUD COMPUTING	
C404.1	Apply grid computing techniques to solve large scale scientific problems
C404.2	Apply the concept of virtualization
C404.3	Use the grid and cloud tool kits
C404.4	Apply the security models in the grid and the cloud environment
C404.5	Apply the Grid Service allows deployments of arbitrary user-defined service on the cluster.
Course Code: 405 Course Name : IT6711 DATA WAREHOUSING AND DATA MINING LAB	
C405.1	Apply data mining techniques and methods to large data sets.
C405.2	Use data mining tools.

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C405.3	Compare and contrast the various classifiers
C405.4	To evaluate the different models of OLAP and data preprocessing
C405.5	Demonstrate the working of algorithms for data mining tasks such association rule mining, classification, clustering and regression.
Course Code: 406 Course Name : IT6711 SECURITY LABORATORY	
C406.1	Implement the cipher techniques
C406.2	Develop the various security algorithms
C406.3	Use different open source tools for network security and analysis
C406.4	Utilize the different open source tools for network security and analysis
C406.5	Demonstrate intrusion detection system using network security tool.
Course Code: 409 Course Name : IT6713 GRID AND CLOUD COMPUTING LABORATORY	
C407.1	Make use of the Grid Toolkit.
C407.2	Design and Implement new Grid applications Grid.
C407.3	Make use of the Cloud Toolkit.
C407.4	Build cloud applications on Cloud.
C407.5	Construct the applications according to the services.
Course Code: 410 Course Name : IT6004 SOFTWARE TESTING	
C409.1	Design test cases suitable for a software development for different domains.
C409.2	Identify suitable tests to be carried out.
C409.3	Prepare test planning based on the document.
C409.4	Document test plans and test cases designed.
C409.5	Use of automatic testing tools.
Course Code: 410 Course Name : IT6801 SERVICE ORIENTED ARCHITECTURE	
C410.1	Infer the XML schema, name spaces and document structure
C410.2	Build applications based on XML.
C410.3	Outline the service oriented architecture principles and service layers
C410.4	Develop web services using technology elements.
C410.5	Build SOA-based applications for intra-enterprise and inter-enterprise applications.
Course Code : 411 Course Name : GE6075 Professional Ethics in Engineering	
C411.1	Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society
C411.2	The students will understand the basic perception of profession, professional ethics, various moral & social issues and ethical theories .
C411.3	The students will understand the industrial standards, code of ethics and role of professional ethics in engineering field.
C411.4	The students will aware of professional rights and responsibilities of an engineer, responsibilities of an engineer for safety and risk benefit analysis.
C411.5	The students will acquire knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives.
Course Code: 412 Course Name : CS6004 CYBER FORENSICS	
C412.1	• Discuss the security issues network layer and transport layer.
C412.2	• Apply security principles in the application layer
C412.3	• Explain computer forensics.
C412.4	• Use forensics tools.
C412.5	• Analyze and validate forensics data.
Course Code: 412 Course Name:MG6088 Software Project Management	
C413.1	At the end of the course the students will be able to practice Project Management principles while developing a software.
C413.2	classify the various activities of project schdulding and evaluation
C413.3	outline the risk assessment and management process
C413.4	DEMONSTRATE DIFFERENET MODELS OF SOFTWARE PROCESS AND NETWORK PLANNING
C413.5	SUMMARISE ORGANIZATIONAL BEHAVIORS AND MANGEMENT
Course Code: 414 Course Name:IT6811 PROJECT WORK	
C414.1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology
C414.2	Get knowledge on how to gather requirements from customers so that we can understand the problem in good manner.
C414.3	Get knowledge on all the phases of software development.
C414.4	Students will be in position to analyze more on problem and come to decision what algorithm and methodology should use to get best output.
C414.5	Students will be industry ready person so that recruitment will be high probability.

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