



# NANDHA ENGINEERING COLLEGE

(AUTONOMOUS)

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)

ERODE – 638 052 TAMILNADU

Email : [principal@nandhaengg.org](mailto:principal@nandhaengg.org) Mobile : 73737 12234

## Criteria II – Teaching Learning and Evaluation

2.6	Student Performance and Learning Outcomes
2.6.1	Program Outcomes



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## Program Outcomes

Program Outcomes	
B.E	<a href="#">Agriculture Engineering</a>
B.Tech	<a href="#">Artificial Intelligence and Data Science</a>
B.E	<a href="#">Bio Medical Engineering</a>
B.Tech	<a href="#">Chemical Engineering</a>
B.E	<a href="#">Civil Engineering</a>
B.E	<a href="#">Computer Science and Engineering</a>
B.E	<a href="#">Electronics and communication Engineering</a>
B.E	<a href="#">Electrical and Electronics Engineering</a>
B.Tech	<a href="#">Information Technology</a>
B.E	<a href="#">Mechanical Engineering</a>
B.E	<a href="#">Open Elective Courses</a>
B.E	<a href="#">Non Credit Courses</a>



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## AGRICULTURE ENGINEERING



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Regulation :	R17
Program Code :	AG
Program Name :	Agriculture Engineering

## VISION OF THE DEPARTMENT

- To provide education to the students in Agriculture, processing, Farm power and machines, soil and water management and natural resources management.
- To produce skillful and high-quality engineers supported by up-to-date curriculum and scientific and industrial research to suit the Agro based industries both within the country abroad.
- To educate agricultural engineers who can follow and utilize the technological developments that may occur during their careers and eco-friendly development of the society.

## MISSION OF THE DEPARTMENT

To develop agricultural engineering professionals, create and disseminate knowledge and promote the application of engineering principles to meet social needs with respect to agricultural, farm mechanization, irrigation, soil and water conservations, agricultural processing and natural resource systems etc.

## PROGRAM EDUCATIONAL OBJECTIVES (PEOS):

### List of PEOS

PEO 1:	To provide a sound theoretical knowledge in engineering principles applied to agriculture.
PEO 2:	To train and educate students with general knowledge and skills in agricultural water management, farm machinery and management, processing and energy management in agriculture.
PEO 3:	To develop innovative capacity of students for increasing agricultural production with scarce water resources available.
PEO 4:	To pursue higher education, research and entrepreneurship in agricultural and related fields.
PEO 5:	To understand ethical issues and responsibility of serving the society and the environment at large.



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## PROGRAM OUTCOMES:

ATTRIBUTE	GA'S
Engineering Knowledge	An ability to apply knowledge of mathematics, science and engineering principles for providing engineering solutions pertaining to agriculture
Problem Analysis	An ability to identify, formulate analyze and solve problems related to agriculture
Design and Development of Solutions	An ability to design a system, components or process to increase agricultural production to meet the growing population
Investigation of Complex Problems	An ability to conduct experiments, analyze and interpret experimental results to provide valid conclusion.
Modern Tool Usage	An ability to apply techniques, skills and modern engineering tools required for agriculture engineering practices.
The Engineer and Society	An ability to perform in multidisciplinary areas with social consciousness.
Environment and Sustainability	An ability to display social responsibility in sustaining natural environment.
Ethics	An ability to apply professional and ethical principles with responsibility.
Individual and Teamwork.	An ability to function effectively as an individual, as a part of team and in a multi-disciplinary environment.
Communication	An ability to communicate effectively.
Project Management and Finance	An ability to devise a strategy or action plan to utilize the acquired knowledge in increasing water-use efficiency, farm mechanization and postharvest technology
Lifelong Learning	An ability to engage in independent and lifelong learning in agricultural production processes



  
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## PROGRAM SPECIFIC OUTCOMES (PSOs) OF THE DEPARTMENT:

Graduates should be able to

<b>PSO1:</b>	To design, develop agricultural implements for effective and efficient agricultural production.
<b>PSO2:</b>	To engage in lifelong learning, commitment to quality and continuous improvement in agricultural production system.
<b>PSO3:</b>	Ability to work in multidisciplinary teams.
<b>PSO4:</b>	Effectively use the technology in post harvest operations.



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## SEMESTER 1:

<b>Course Code/ Course Name:</b>	<b>17EYA01- PROFESSIONAL ENGLISH – I</b>
<b>Course Outcomes:</b>	
1	The students will be able to construct clear, grammatically correct sentences using a variety of sentence structures and appropriate vocabulary.
2	The students will be able to utilize listening skills to articulate one's own point of view in different circumstances.
3	The students will be able to apply appropriate communication skills across settings, purposes, and audiences.
4	The students will be able to distinguish main ideas and supporting details and employ active reading strategies to understand texts at the maximum level.
5	The students will be able to equip themselves with writing skills needed for academic as well as workplace contexts.

<b>Course Code/ Course Name:</b>	<b>17MYB01-CALCULUS AND SOLID GEOMETRY</b>
<b>Course Outcomes:</b>	
1	Apply the concept of orthogonal reduction to diagonalize the given matrix.
2	Have knowledge about the geometrical aspects of sphere.
3	Find the radius of curvature, circle of curvature and center of curvature for a given curve.
4	Classify the maxima and minima for a given function with several variables, through by finding stationary points.
5	Demonstrate the use of double and triple integrals to compute area and volume.

<b>Course Code/ Course Name:</b>	<b>17PYB01- PHYSICS FOR ENGINEERS</b>
<b>Course Outcomes:</b>	
1	Acquire knowledge regarding Acoustics and ultrasonic
2	Applying knowledge in the fields of optics & laser technology
3	Design the sensors using the knowledge of fiber optics
4	Gain the knowledge of wave, particle nature and matter waves
5	Analyze the different kind of crystal structures and crystal growth



  
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<b>Course Code/ Course Name:</b>	<b>17CYB01 - APPLIED CHEMISTRY</b>
<b>Course Outcomes:</b>	
1	Apply knowledge of fundamental principles of chemistry
2	Define and solve engineering problems, including the utilization of creative and innovative skills
3	Gain practical experience with chemical process equipment as well as to analyze and interpret data
4	Understand the impact of engineering solutions in a global, economic, environmental, and societal content
5	Understand the concept of engineering materials

<b>Course Code/ Course Name:</b>	<b>17EEC01-BASIC ELECTRICAL AND ELECTRONICS ENGINEERING</b>
<b>Course Outcomes:</b>	
1	Apply the basic laws and investigates the behavior of electric circuits by analytical instruments.
2	Identify the electrical components and explore the characteristics of electrical machines.
3	Analyze the various characteristics of semiconductor devices and applications.
4	Expose the concept of digital electronics
5	Understand the fundamental of communication systems.

<b>Course Code/ Course Name:</b>	<b>17CSC01 – PROBLEM SOLVING AND PYTHON PROGRAMMING</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the working of computers
2	The students will be able to solve problems using various strategies
3	The students will be able to understand the basics of Python Programming constructs
4	The students will be able to realize the need of strings, list, and tuples
5	The students will be able to design programs involving dictionaries and function



  
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<b>Course Code/ Course Name:</b>	<b>17GYP01 - PHYSICS AND CHEMISTRY LABORATORY</b>
<b>Course Outcomes:</b>	
1	Acquire the fundamental knowledge in optics such as interference, Diffraction and Understand about the spectral instruments etc
2	Gain the basic knowledge about handling the laser light and Identify the basic parameters of an optical fibre
3	Analyze the properties of matter with sound waves
4	Apply knowledge of measurement of hardness producing ions, chloride, alkalinity, DO, conductance, EMF and pH
5	Understand the impact of water quality and solve engineering problems

<b>Course Code/ Course Name:</b>	<b>17CSP01 – PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY</b>
<b>Course Outcomes:</b>	
1	The student will be able to use MS Word and MS Excel for document preparation.
2	The students will be able to understand the basics of Python Programming constructs
3	The students will be able to realize the need of string manipulation, list, and tuples
4	The students will be able to design programs involving dictionaries, function and modules
5	The students will be able to develop simple programs with exception handling

<b>Course Code/ Course Name:</b>	<b>17EYA02 – PROFESSIONAL ENGLISH – II</b>
<b>Course Outcomes:</b>	
1	The students will be able to communicate using a variety of sentence structures and appropriate vocabulary.
2	The students will be able to comprehend conversations and short talks delivered in English and respond accordingly.
3	The students will be able to speak appropriately and effectively in various situations.
4	The students will be able to employ active reading strategies to understand texts at the maximum level.
5	The students will be able to equip themselves with writing formal letters and winning Job Application.



  
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<b>Course Code/ Course Name:</b>	<b>17MYB02 - COMPLEX ANALYSIS AND LAPLACE TRANSFORMS</b>
<b>Course Outcomes:</b>	
1	Predict the suitable method to solve second and higher order differential equations
2	Apply the concepts of Differentiation and Integration to Vectors.
3	Compute an analytic function, when its real or imaginary part is known.
4	Identify the Singularities and its corresponding Residues for the given function.
5	Predict a suitable method to evaluate the Contour integration.

<b>Course Code/ Course Name:</b>	<b>17CYB03 -ENVIRONMENTAL SCIENCE</b>
<b>Course Outcomes:</b>	
1	Design a system, component, or process to meet desired needs.
2	Identify, formulate, and solve environmental engineering problems
3	Understand the professional and ethical responsibility as related to the practice of environmental engineering and the impact of engineering solutions in a global context.
4	Use the techniques, skills, and modern engineering tools necessary for environmental engineering practice.
5	Acquire the knowledge of information technology in environmental science.

<b>Course Code/ Course Name:</b>	<b>17AGC01 -PRINCIPLES AND PRACTICES OF CROP PRODUCTION</b>
<b>Course Outcomes:</b>	
1	Possesses knowledge on rainfed and dry land agriculture
2	Able to identify and select suitable crops for adequate production
3	Possess knowledge on water, nutrient weed, pest and insect management.
4	Possess knowledge on food, feed and fiber crops
5	Possess knowledge on high value horticultural crop production and green house cultivation



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<b>Course Code/ Course Name:</b>	<b>17MEC01 – ENGINEERING GRAPHICS</b>
<b>Course Outcomes:</b>	
1	The Students can be able to construct conic sections and special curves of required specifications
2	The Students can be able to apply the concept of first angle projection to create project of straight lines, planes, solids and section of solids
3	The Students can be able to develop a surface drawing of a solid model with given dimensions
4	The Students can be able to build orthographic, isometric projections of a three dimensional object
5	The Students can be able to make use of the knowledge of engineering drawing to create physical models

<b>Course Code/ Course Name:</b>	<b>17MEC02 – ENGINEERING MECHANICS</b>
<b>Course Outcomes:</b>	
1	The students will be able to solve the engineering problems on stable particles using conditions for equilibrium
2	The students will be able to calculate the reaction forces of various supports and resultant forces on rigid bodies
3	The students will be able to solve the problems involving dry friction under equilibrium conditions
4	The students will be able to determine the centroid, centre of gravity and moment of inertia of various surfaces and solids.
5	The students will be able to solve the problems involving dynamics of particles and rigid bodies



  
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<b>Course Code/ Course Name:</b>	<b>17AGP01- CROP PRODUCTION AND HUSBANDRY LABORATORY</b>
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### Course Outcomes:

1	Possesses knowledge on different agronomic practices
2	Able to prepare nursery for different crops
3	Acquire adequate knowledge on crop protection
4	Able to select suitable harvesting techniques
5	Able to minimize post harvest losses

<b>Course Code/ Course Name:</b>	<b>17GYP02 – ENGINEERING PRACTICES LABORATORY</b>
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### Course Outcomes:

1	The students will be able to understand various civil engineering practices like plumbing, carpentry and relevant tools
2	The students will be able to understand various manufacturing processes like welding, machining and sheet metal work
3	The students will be able to do residential house wiring and Measure energy and resistance to earth of an electrical equipment
4	The students will be able to perform the assembling and testing of the PCB based electronic circuits.
5	The students will be able to make / operate / utilize the simple engineering components

<b>Course Code/ Course Name:</b>	<b>17MYB03- FOURIER SERIES AND PARTIAL DIFFERENTIAL EQUATION</b>
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### Course Outcomes:

1	Ability to have fundamental understanding of Fourier series and give Fourier expansions of a given function.
2	Apply transform techniques to solve engineering problems.
3	Analyze and simulate the first and second order linear partial differential equations.
4	Demonstrate a firm understanding of the solution techniques for homogeneous linear PDE's.
5	Ability to apply partial differential techniques to solve the physical engineering problems.



  
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<b>Course Code/ Course Name:</b>	<b>17AGC02 - SOIL SCIENCE AND ENGINEERING</b>
<b>Course Outcomes:</b>	
1	Apply techniques to conserve soil
2	Apply knowledge for effective crop production
3	Helps to suggest nutrient, fertilizers to effective production
4	Able to suggest suitable crop
5	Suggest suitable irrigation methods for effective utilization of water

<b>Course Code/ Course Name:</b>	<b>17AGC03 - FLUID MECHANICS AND HYDRAULICS</b>
<b>Course Outcomes:</b>	
1	Involved in design of pipes and channels
2	Apply conceptual knowledge in selection of pipes for water flow
3	Apply knowledge in construction of channels
4	Apply knowledge in design of drip and sprinkler irrigation system
5	Determine the quantity of water required, water loss etc.

<b>Course Code/ Course Name:</b>	<b>17AGC04 - SURVEYING AND LEVELLING</b>
<b>Course Outcomes:</b>	
1	The students will become acquainted with different surveying methods
2	Calculate area and volume of earth work needed in construction of farm structures
3	Able to determine the contours
4	Conduct leveling and contouring in plains and hilly regions for efficient irrigation
5	To conduct survey of a given field using Total station



  
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<b>Course Code/ Course Name:</b>	<b>17AGC05- MECHANICS OF FARM MACHINES</b>
<b>Course Outcomes:</b>	
1	Design suitable farm implements, material handling equipments
2	Apply in tractors and power tillers
3	Know the mechanism of gear and gear trains
4	Understand the working of cam and flywheel
5	Gain knowledge on governors

<b>Course Code/ Course Name:</b>	<b>17AGC06 - THERMODYNAMICS FOR AGRICULTURAL ENGINEERS</b>
<b>Course Outcomes:</b>	
1	Adopt suitable heat exchange mechanism
2	Able to select suitable substance for refrigeration
3	Apply in design of refrigerator, cold storage and heat exchanger
4	Design suitable mechanism for effective utilization of bio gas
5	Apply knowledge in biogas production, charcoal preparation

<b>Course Code/ Course Name:</b>	<b>17AGP02 - SURVEYING AND LEVELLING LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will become acquainted with different surveying methods
2	Able to choose suitable method of survey to the given field
3	Able to determine the contours
4	Calculate area and volume of earth work needed in construction of farm structures
5	Conduct leveling and contouring in plains and hilly regions



  
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<b>Course Code/ Course Name:</b>	<b>17AGP03 - FLUID MECHANICS AND HYDRAULICS LABORATORY</b>
<b>Course Outcomes:</b>	
1	Involved in design of pipes and channels
2	Apply conceptual knowledge in selection of pipes for water flow
3	Apply knowledge in construction of channels
4	Apply knowledge in design of drip and sprinkler irrigation system
5	Determine the quantity of water required, water loss etc.

<b>Course Code/ Course Name:</b>	<b>17MYB06 - STATISTICS AND NUMERICAL METHODS</b>
<b>Course Outcomes:</b>	
1	Ability to understand the common statistical techniques.
2	Apply Analysis of Variance for the data set of selected number factors for analyzing the significance
3	Apply the suitable numerical techniques to solve practical engineering problems.
4	Demonstrate the concept of interpolation and numerical integration when dealing with empirical data sets.
5	Make use of numerical methods in the solution of ordinary differential equations which are useful in solving engineering problems

<b>Course Code/ Course Name:</b>	<b>17AGC07 - HEAT AND MASS TRANSFER FOR AGRICULTURAL ENGINEERS</b>
<b>Course Outcomes:</b>	
1	Able to apply conduction mode of heat transfer in concentration and drying of food materials
2	Able to apply convection mode of heat transfer in concentration and drying of food materials
3	Able to apply radiation mode of heat transfer in drying of food materials
4	Design and alter the available heat exchanger for effective heat utilization
5	Apply knowledge in mass transfer mechanism



  
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<b>Course Code/ Course Name:</b>	<b>17AGC08 - CROP PROCESS ENGINEERING</b>
<b>Course Outcomes:</b>	
1	Able to minimize post harvest losses
2	To design material handling equipment, storage structures and dryers for different type of crops
3	Able to design cleaners, graders and conveying equipments
4	Able to design or alter the existing methods of drying and storage structure to minimize post harvest losses
5	Able to apply various techniques to minimize post harvest losses during milling

<b>Course Code/ Course Name:</b>	<b>17AGC09 - FARM TRACTOR SYSTEMS</b>
<b>Course Outcomes:</b>	
1	Able to suggest suitable tractor for different field
2	Apply knowledge for effective utilization of power
3	It involves effective utilization of power
4	Helps to avoid accidents at farm level
5	Able to test tractors and power tillers

<b>Course Code/ Course Name:</b>	<b>17AGC10 - HYDROLOGY AND WATER RESOURCES ENGINEERING</b>
<b>Course Outcomes:</b>	
1	Know about the availability of water
2	Able to take measures to increase infiltration rate to increase groundwater level and minimize runoff to control soil erosion
3	Able to construct check dams and other preventive measures to avoid flooding
4	Able to increase groundwater level and effective utilization
5	Able to locate and effectively utilize the groundwater



  
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<b>Course Code/ Course Name:</b>	<b>17AGC11 - MECHANICS OF MATERIALS</b>
<b>Course Outcomes:</b>	
1	Apply the concepts of mechanics of deformable solids in different applications
2	Helps in designing farm structures
3	Solve solid mechanics related engineering problems in systematic methods
4	Able to construct storage godowns and farm structures
5	Able to construct farm structures

<b>Course Code/ Course Name:</b>	<b>17AGP04 - CROP PROCESS ENGINEERING LABORATORY</b>
<b>Course Outcomes:</b>	
1	Able to minimize post harvest loss during storage, milling
2	Able to design various post harvest equipments
3	Able to design cleaners and graders
4	Able to design different conveying equipment
5	Able to design or alter the existing methods to minimize post harvest loss

<b>Course Code/ Course Name:</b>	<b>17AGP05 - FARM TRACTORS AND ENGINES LABORATORY</b>
<b>Course Outcomes:</b>	
1	Able to suggest suitable tractor for different field
2	Apply knowledge for effective utilization of power
3	It involves effective utilization of power
4	Helps to avoid accidents at farm level
5	Able to test tractors and power tillers



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<b>Course Code/ Course Name:</b>	<b>17AGC12 - UNIT OPERATIONS IN AGRICULTURAL PROCESSING</b>
<b>Course Outcomes:</b>	
1	Able to select and design suitable evaporators for different agricultural processing
2	Able to select suitable mechanical separators for different agricultural processing
3	Able to calculate, select and design suitable size reduction machineries for various agricultural processing operations
4	Able to apply crystallization and distillation process in agricultural processing
5	Able to apply membrane separation process in food processing

<b>Course Code/ Course Name:</b>	<b>17AGC13 - FARM IMPLEMENT AND EQUIPMENT</b>
<b>Course Outcomes:</b>	
1	Able to effectively utilize the implements for better production
2	Able to select and calculate the forces involved in primary tillage implements
3	Able to select and adjust the various secondary tillage implements
4	Able to select and test the sowing equipment
5	Able to select suitable fertilizer applicators

<b>Course Code/ Course Name:</b>	<b>17AGC14- IRRIGATION AND DRAINAGE ENGINEERING</b>
<b>Course Outcomes:</b>	
1	Able to describe the soil-water relationship
2	Able to calculate the irrigation water requirement
3	Able to select suitable irrigation methods for effective utilization of water resources
4	Able to implement new techniques for command area development
5	Able to design suitable drainage system for effective crop production



  
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<b>Course Code/ Course Name:</b>	<b>17AGC15 - BIO AND THERMO- CHEMICAL CONVERSION OF BIOMASS</b>
<b>Course Outcomes:</b>	
1	Able to suggest suitable biomass conversion methods
2	Able to effectively utilize the biochemical conversion
3	Able to effectively convert biomass for energy generation
4	Able to utilize the biomass for production for various end products
5	Able to suggest suitable methods for effective utilization of heat energy

<b>Course Code/ Course Name:</b>	<b>17AGX12 - SOIL AND WATER CONSERVATION ENGINEERING</b>
<b>Course Outcomes:</b>	
1	Able to apply universal soil loss equation to estimate the soil erosion process.
2	Able to adopt the techniques bunds and terraces to control erosion
3	Able to adopt the techniques wind breaks and shelter breaks to control gully erosion
4	Able to know planning and development watershed
5	Able to adopt the water harvesting techniques like farm pond and percolation pond

<b>Course Code/ Course Name:</b>	<b>17AGX05 - REFRIGERATION AND AIR CONDITIONING FOR AGRICULTURAL ENGINEERS</b>
<b>Course Outcomes:</b>	
1	Able to explain refrigeration cycle
2	Able to detect problems in refrigerator
3	Able to select suitable refrigerant for effective refrigeration without environmental pollution
4	Able to apply air conditioning according to weather
5	Able to design refrigerator vehicle and cold storage



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<b>Course Code/ Course Name:</b>	<b>17AGP06 - UNIT OPERATIONS IN AGRICULTURAL PROCESSING LABORATORY</b>
<b>Course Outcomes:</b>	
1	Able to calculate and design various separators involved in agricultural processing operations
2	Able to calculate energy requirement and select suitable size reduction equipment
3	Able to determine the mixing index
4	Able to select and design suitable evaporators for concentration of heat sensitive materials
5	Able to design and minimize loss in agricultural processing units

<b>Course Code/ Course Name:</b>	<b>17AGP07 - IRRIGATION AND DRAINAGE ENGINEERING LABORATORY</b>
<b>Course Outcomes:</b>	
1	Able to effectively utilize the water resources
2	Able to determine moisture content
3	Able to minimize water loss
4	Able to select and design suitable irrigation system
5	Able to design micro irrigation system for effective utilization of available water resources

<b>Course Code/ Course Name:</b>	<b>17GED07- CONSTITUTION OF INDIA</b>
<b>Course Outcomes:</b>	
1	The students will be able to Gain Knowledge about the Constitutional Law of India
2	The students will be able to Understand the Fundamental Rights and Duties of a citizen
3	The students will be able to Apply the concept of Federal structure of Indian Government
4	The students will be able to Analyze the Amendments and Emergency provisions in the Constitution
5	The students will be able Develop a holistic approach in their life as a Citizen of India



  
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<b>Course Code/ Course Name:</b>	<b>17AGC16 - PLANT PROTECTION AND HARVESTING MACHINERY</b>
<b>Course Outcomes:</b>	
1	Able to select and design interculture equipment
2	Able to calculate the particle size and area covered by different sprayers
3	Able to maintain the duster for effective utilization
4	Able to select suitable harvesting equipment
5	Able to use fruit pluckers, tree shakers, post hole diggers and chaff cutter

<b>Course Code/ Course Name:</b>	<b>17AGC18 - DESIGN OF MICRO IRRIGATION SYSTEM</b>
<b>Course Outcomes:</b>	
1	Able to categorize the different types of pumps and water lifting devices
2	Able to differentiate, select and maintain the pump valves
3	Able to differentiate traditional and micro irrigation methods and advantages
4	Able to design drip irrigation system
5	Able to design sprinkler irrigation system

<b>Course Code/ Course Name:</b>	<b>17AGX01 - DESIGN OF AGRICULTURAL MACHINERY</b>
<b>Course Outcomes:</b>	
1	Able to calculate the stress involved in machine members
2	Able to design power transmission systems
3	Able to design shafts and couplings
4	Able to design various energy storing elements
5	Able to design gears



  
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<b>Course Code/ Course Name:</b>	<b>17AGX07 - SEED TECHNOLOGY APPLICATIONS</b>
<b>Course Outcomes:</b>	
1	Able to classify seed based on seed characters
2	Able to apply techniques for seed production and certify seed
3	Able to apply techniques for seed processing
4	Able to plan programmes for seed development
5	Able to produce seeds in specific crops

<b>Course Code/ Course Name:</b>	<b>17AGX08 - WATERSHED MANAGEMENT</b>
<b>Course Outcomes:</b>	
1	Able to apply the land use pattern in watershed
2	Able to estimate watershed
3	Able to apply water conservation practices in irrigated lands and dry lands
4	Able to implement the water harvesting techniques for effective ground water recharge
5	Able to adopt suitable techniques in watershed development

<b>Course Code/ Course Name:</b>	<b>17AGX06 – PACKAGING AND STORAGE TECHNIQUES FOR AGRICULTURAL COMMODITIES</b>
<b>Course Outcomes:</b>	
1	Able to control the losses of food grains
2	Able to select suitable storage methods to minimize loss
3	Able to suggest suitable packaging materials for different kinds of food
4	Able to test the properties of packaging materials
5	Able to assess the packaging techniques for different kinds of food



  
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<b>Course Code/ Course Name:</b>	<b>17AGP08 - CAD FOR AGRICULTURAL ENGINEERING</b>
<b>Course Outcomes:</b>	
1	Able to draw orthographic views
2	Able to draw two dimensional and three dimensional views of machine components
3	Able to design machine components
4	Able to create three dimensional assembly model
5	Able to effectively utilize the software skills

<b>Course Code/ Course Name:</b>	<b>17AGP09 - DRAWING OF FARM STRUCTURES</b>
<b>Course Outcomes:</b>	
1	Able to design farmstead, machine shed and workshop
2	Able to design dairy and poultry house
3	Abel to design ventilation system for dairy and poultry house
4	Able to design different storage structure for foods and silage
5	Able to design fencing and sanitary structure

<b>Course Code/ Course Name:</b>	<b>17GED06 - COMPREHENSION</b>
<b>Course Outcomes:</b>	
1	The Student will be able to Understand and comprehend any given problem related to Agriculture Engineering field

<b>Course Code/ Course Name:</b>	<b>17AGC19 - FOOD AND DAIRY ENGINEERING</b>
<b>Course Outcomes:</b>	
1	Able to explain the different food concentration methods
2	Able to apply thermal processing technique to improve shelf life of foods
3	Able to apply suitable drying and dehydration methods to minimize food loss
4	Able to assess the suitable preservation technique for milk
5	Able to test milk and produce value added products from milk



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<b>Course Code/ Course Name:</b>	<b>17AGC20 - TESTING AND MANAGEMENT OF FARM MACHINERY</b>
<b>Course Outcomes:</b>	
1	Able to manage the constrains involved in field machinery system
2	Able to analysis the performance of tractor
3	Able to analysis the performance of power tiller
4	Able to test and evaluate tillage and sowing equipment
5	Able to test and evaluate plant protection and harvesting machinery

<b>Course Code/ Course Name:</b>	<b>17AGC21 - REMOTE SENSING AND GIS FOR AGRICULTURAL ENGINEERS</b>
<b>Course Outcomes:</b>	
1	Able to describe basics of remote sensing
2	Able to describe and effective utilize remote sensing satellite and sensors
3	Able to interpret digital image for vegetation, soil mapping, water quality analysis
4	Able to assess the GIS techniques
5	Able to apply GIS in land and water resource management

<b>Course Code/ Course Name:</b>	<b>17AGC17 - PROTECTED CULTIVATION</b>
<b>Course Outcomes:</b>	
1	Able to understand the importance and methods of protected cultivation
2	Able to apply hi-tech techniques for effective production
3	Able to apply hi-tech techniques for effective production
4	Able to apply precision farming techniques for effective production
5	Able to assesses the technology for horticulture crops



  
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<b>Course Code/ Course Name:</b>	<b>17AGP10 - FOOD AND DAIRY ENGINEERING LABORATORY</b>
<b>Course Outcomes:</b>	
1	Able to detect the type and concentration of microbial load
2	Able to select and design suitable dryers for agricultural produce
3	Able to produce value added products of fruits
4	Able to assess the suitable preservation technique for milk
5	Able to test milk and produce value added products from milk

<b>Course Code/ Course Name:</b>	<b>17AGP11 - OPERATION AND MAINTENANCE OF FARM MACHINERY LABORATORY</b>
<b>Course Outcomes:</b>	
1	Able to identify the major tractor system
2	Able to hitch and operate farm implements with the tractor
3	Able to implement various maintenance techniques for various farm implements and equipment
4	Able to operate, adjust seed drill with tractor
5	Able to take remedial action for maintenance for tractor

<b>Course Code/ Course Name:</b>	<b>17AGP12 – Industrial Training (4 weeks)</b>
<b>Course Outcomes:</b>	
1	Better experience in practical knowledge at farm level.
2	Able to implement and rectify the problems of implements/ equipments at field level.



  
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<b>Course Code/ Course Name:</b>	<b>17AGX02 - AGRICULTURAL BUSINESS MANAGEMENT</b>
<b>Course Outcomes:</b>	
1	Able to describe the concept of agricultural business
2	Able to assess the management technique in agri-business
3	Able to plan and estimate agricultural product marketing
4	Able to plan agri-business project
5	Able to apply the skills for effective marketing by utilization of human resources

<b>Course Code/ Course Name:</b>	<b>17AGD01 – PROJECT WORK-I</b>
<b>Course Outcomes:</b>	
1	The students will be able to study problems in the field of Agriculture Engineering through literature survey and its reviews.
2	The students will be able Undertake problem identification, formulation and solution.
3	The students will be able to Design engineering solutions to agricultural problems utilising a systems approach and develop projects
4	The students will be able to communicate effectively and to present ideas clearly
5	The students will be able to demonstrate the knowledge, skills and work as a team to achieve common goal

<b>Course Code/ Course Name:</b>	<b>17AGD02 – PROJECT WORK-II</b>
<b>Course Outcomes:</b>	
1	The students will be able to study problems in the field of Agriculture Engineering through literature survey and its reviews.
2	The students will be able Undertake problem identification, formulation and solution.
3	The students will be able to Design engineering solutions to complex problems utilising a systems approach and develop projects
4	The students will be able to communicate effectively and to present ideas clearly
5	The students will be able to demonstrate the knowledge, skills and work as a team to achieve common goal



  
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## **ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**



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## B.TECH –ARTIFICIAL INTELLIGENCE AND DATA SCIENCE REGULATIONS – 2017

### VISION OF THE DEPARTMENT

To emerge as a renowned department in providing quality Artificial Intelligence and Data Science education to meet the ever growing needs of the society.

### MISSION OF THE DEPARTMENT

Artificial Intelligence and Data Science department is committed

- To provide quality and value based education to produce Artificial Intelligence professionals with ethical and social responsibility
- To excel in the thrust areas of Artificial Intelligence, Machine Learning and Data Science by imparting programming knowledge and Mathematical skill set to solve real world problems
- To create a learner centric environment that motivates the students in adopting emerging technologies of the rapidly changing artificial intelligence and data science society.

### PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO 1	<b>Core Competency</b>	To apply mathematical, scientific and engineering concepts for an artificial intelligence and data scientist to remit the various challenges using emerging AI technologies.
PEO 2	<b>Research, Innovation and Entrepreneurship</b>	To work productively in multidisciplinary teams and provide innovative ideas for real time problems through research.
PEO 3	<b>Ethics, Human values and Life-long learning</b>	To embrace lifelong learning with higher ethical standards and be the source for socio economic growth.

### PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1	<b>Analytical Skill</b>	Ability to Design and develop innovative automated systems applying mathematical, analytical, programming and operational skills to meet society needs.
PSO2	<b>Knowledge Proficiency</b>	Provide a tangible foundation and enhance the abilities to qualify for Employment, Higher Studies and Research in Artificial Intelligence and Data science with ethical values.



  
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## PROGRAMME OUTCOMES (POs)

GRADUATE ATTRIBUTES	PROGRAM OUTCOME'S
Engineering Knowledge	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
Problem Analysis	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
Design And Development of Solutions	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
Investigation of Complex Problems	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
Modern Tool Usage	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
The Engineer and Society	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
Environment & Sustainability	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
Individual And Team Work	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
Communication	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
Project Management And Finance	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
Lifelong Learning	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



  
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## COURSE OUTCOMES

Course Code & Name: C101 - 17EYA01 & PROFESSIONAL ENGLISH – I

Course Outcomes:

At the end of this course, the students will be able to	
C101.1	Construct clear, grammatically correct sentences using a variety of sentence structures and appropriate vocabulary.
C101.2	Utilize listening skills to articulate one's own point of view in different circumstances.
C101.3	Apply appropriate communication skills across settings, purposes, and audiences.
C101.4	Distinguish main ideas and supporting details and employ active reading strategies to understand texts at the maximum level.
C101.5	Equip themselves with writing skills needed for academic as well as workplace contexts.

Course Code & Name: C102 - 17MYB01 & CALCULUS AND SOLID GEOMETRY

Course Outcomes:

At the end of this course, the students will be able to	
C102.1	Apply the concept of orthogonal reduction to diagonalise the given matrix.
C102.2	Gain knowledge about the geometrical aspects of sphere.
C102.3	Find the radius of curvature, circle of curvature and centre of curvature for a given curve.
C102.4	Classify the maxima and minima for a given function with several variables, through by finding stationary points.
C102.5	Demonstrate the use of double and triple integrals to compute area and volume.

Course Code & Name: C103 - 17PYB02 & PHYSICS FOR COMPUTER ENGINEERS

Course Outcomes:

At the end of this course, the students will be able to	
C103.1	Acquire knowledge regarding Acoustics and ultrasonic.
C103.2	Apply knowledge in the fields of optics & laser technology.
C103.3	Design the sensors using the knowledge of fiber optics.
C103.4	Gain the knowledge of wave, particle nature and matter waves.
C103.5	Analyze the different kind of crystal structures and crystal growth.



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## Course Code & Name: C104- 17CYB03& ENVIRONMENTAL SCIENCE

### Course Outcomes:

At the end of this course, the students will be able to	
C104.1	Design a system, component, or process to meet desired needs.
C104.2	Identify, formulate, and solve environmental engineering problems
C104.3	Understand the professional and ethical responsibility as related to the practice of environmental engineering and the impact of engineering solutions in a global context
C104.4	Use the techniques, skills, and modern engineering tools necessary for environmental engineering practice.
C104.5	Acquire the knowledge of information technology in environmental science.

## Course Code & Name: C105 - 17CSC02 & PYTHON PROGRAMMING

### Course Outcomes:

At the end of this course, the students will be able to	
C105.1	Understand the working of computers.
C105.2	The basics of Python Programming constructs.
C105.3	Realize the need of strings, list, and tuples.
C105.4	Design programs involving dictionaries and function.
C105.5	Develop simple programs using file concept and Modules.

## Course Code & Name: C108 - 17MEP01&ENGINEERING GRAPHICS LABORATORY

### Course Outcomes:

At the end of this course, the students will be able to	
C108.1	Construct conic sections and special curves of required specifications
C108.2	Apply the concept of first angle projection to create project of straight lines, planes, solids and section of solids
C108.3	Develop a surface drawing of a solid model with given dimensions
C108.4	Build orthographic, isometric projections of a three dimensional object
C108.5	Make use of the knowledge of engineering drawing to create physical models

## Course Code & Name: C107 - 17CSP02 & PYTHON PROGRAMMING LABORATORY

### Course Outcomes:

At the end of this course, the students will be able to	
C107.1	Understand the basics of Python Programming constructs.
C107.2	Understand the various operators of Python Programming.
C107.3	Realize the need of string manipulation, list, and tuples.
C107.4	Design programs involving dictionaries, function and modules.
C107.5	Develop simple programs with exception handling.



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## Course Code & Name: C108 - 17GEP01&PERSONAL VALUES

### Course Outcomes:

At the end of this course, the students will be able to	
C108.1	To become an individual in knowing the self
C108.2	Acquire and express Gratitude, Truthfulness, Punctuality, Cleanliness & fitness.
C108.3	Practice simple physical exercise and breathing techniques
C108.4	Practice Yoga asana which will enhance the quality of life.
C108.5	Practice meditation and get benefited.

## Course Code & Name: C201 - 17EYA02 & PROFESSIONAL ENGLISH – II

### Course Outcomes:

At the end of this course, the students will be able to	
C201.1	To communicate using a variety of sentence structures and appropriate vocabulary.
C201.2	Comprehend conversations and short talks delivered in English and respond accordingly.
C201.3	Speak appropriately and effectively in various situations.
C201.4	Employ active reading strategies to understand texts at the maximum level.
C201.5	Equip themselves with writing formal letters and winning Job Application.

## Course Code & Name: C202 - 17MYB02 & COMPLEX ANALYSIS AND LAPLACE TRANSFORMS

### Course Outcomes:

At the end of this course, the students will be able to	
C202.1	Predict the suitable method to solve second and higher order differential equations.
C202.2	Apply the concepts of Differentiation and Integration to Vectors.
C202.3	Compute an analytic function, when its real or imaginary part is known.
C202.4	Identify the Singularities and its corresponding Residues for the given function.
C202.5	Predict a suitable method to evaluate the Contour integration.

## Course Code & Name: C203 - 17PYB04 & APPLIED PHYSICS

### Course Outcomes:

At the end of this course, the students will be able to	
C203.1	Acquire knowledge about electron theory of metals and conductivity
C203.2	Distinguish between conductors, semiconductors and super conductors.
C203.3	Understand the magnetism and its applications .
C203.4	Design various optoelectronic devices
C203.5	Know of recent trends in nanotechnology.



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## Course Code & Name: C204 - 17CYB04 & CHEMISTRY FOR COMPUTER ENGINEERS

### Course Outcomes:

At the end of this course, the students will be able to	
C204.1	Apply knowledge of fundamental principles of chemistry.
C204.2	Define and solve engineering problems, including the utilization of creative and innovative skills
C204.3	Gain practical experience with chemical process equipment as well as to analyze and interpret data.
C204.4	Understand the impact of engineering solutions in a global, economic, environmental and societal content.
C204.5	Understand the management of electronic waste.

## Course Code & Name: C205 – 17CSC03 & STRUCTURED PROGRAMMING

### Course Outcomes:

At the end of this course, the students will be able to	
C205.1	Understand the basic terminology used in computer programming.
C205.2	Use different data types and operators in a computer program.
C205.3	Design programs involving decision structures and loops
C205.4	Write programs using arrays and strings.
C205.5	Develop programs using functions by different parameter passing techniques.

## Course Code & Name: C206 - 17ECC04 & BASICS OF ELECTRONICS ENGINEERING

### Course Outcomes:

At the end of this course, the students will be able to	
C206.1	Apply the Ohm's law and Kirchoff's law and investigates the behavior of electric circuits by analytical techniques
C206.2	Analyze and forecast the Network theorems in DC and AC circuits.
C206.3	Understand the characteristics of semiconductor devices.
C206.4	Understand the concept of rectifiers, filters and amplifier.
C206.5	Design transducers, measuring instruments and logic circuits.

## Course Code & Name: C207 – 17CSP03 & STRUCTURED PROGRAMMING LABORATORY

### Course Outcomes:

At the end of this course, the students will be able to	
C207.1	Implement programs using decision making statements and looping
C207.2	Write simple programs on arrays of different dimensions.
C207.3	Develop function programs using recursion and pointers.
C207.4	Design structure and union programs
C207.5	Handle memory locations manually using dynamic memory allocation functions



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## Course Code & Name: C208 - 17ECP02 & ELECTRONICS LABORATORY

### Course Outcomes:

At the end of this course, the students will be able to	
C208.1	Analyze the characteristics of diodes and transistors
C208.2	Evaluate the characteristics of electronic devices such as BJT, FET and UJT
C208.3	Verify the Half wave and Full wave Rectifier.
C208.4	Verify the theorems such as Thevenin's theorem, Norton theorems, KVL and KCL
C208.5	Verify the Logic Gates.

## Course Code & Name: C209 & 17GEP02 & INTERPERSONAL VALUES

### Course Outcomes:

At the end of this course, the students will be able to	
C209.1	Develop a healthy relationship & harmony with others
C209.2	Practice respecting every human being
C209.3	Practice to eradicate negative temperaments
C209.4	Acquire Respect, Honesty, Empathy, Forgiveness and Equality
C209.5	Practice Exercises and Meditation to lead a healthy life and Manage the cognitive abilities of an Individual

## Course Code & Name: C301 & 17MYB04 & PROBABILITY AND STATISTICS

### Course Outcomes:

At the end of this course, the students will be able to	
C301.1	Infer expectation, variance, standard deviation moments and moment generating function for discrete and continuous random variables.
C301.2	Apply the concept of expectation and moment generating functions to discrete and Continuous distributions and find the probability values for the defined distributions.
C301.3	Acquire skills in handling situations involving more than one random variable and functions of random variables
C301.4	Select a hypothesis testing method for the given numerical set of data to analyze the significance
C301.5	Analysis of Variance for the data set of selected number factors for analyzing the significance..

## Course Code & Name: C302 - 17AIC01 & DATA STRUCTURES

### Course Outcomes:

At the end of this course, the students will be able to	
C302.1	Understand the basic concepts of data structures and algorithms.
C302.2	Exemplify and implement how linked list can be implemented to manage the memory using static and dynamic allocations.
C302.3	Understand and distinguish the conceptual and applicative differences in stack and queue.
C302.4	Design various trees concepts by using appropriate data structures.
C302.5	Understand complex data structures like graph and its traversal with algorithms.



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## Course Code & Name: C303 - 17ITC01& OOPS using JAVA

### Course Outcomes:

At the end of this course, the students will be able to	
C303.1	Explain the basics of object oriented concepts of java.
C303.2	Develop applications using inheritance, packages and interfaces.
C303.3	Construct applications with exception handling.
C303.4	Build applications using threads and collection framework.
C303.5	Build simple java application with neat GUI and database connectivity.

## Course Code & Name: C304- 17AIC02 &INTRODUCTION TO ARTIFICIAL INTELLIGENCE

### Course Outcomes:

At the end of this course, the students will be able to	
C304.1	Paraphrase Artificial Intelligence, intelligent agents, and apply blind search to solve problems.
C304.2	Demonstrate the effectiveness of heuristics in informed search methods.
C304.3	Apply game playing in problem solving..
C304.4	Make use of propositional logic and first order logic in knowledge-based reasoning.
C304.5	Apply knowledge representation and planning to real world problems.

## Course Code & Name: C305 - 17CSC05 &OPERATING SYSTEMS

### Course Outcomes:

At the end of this course, the students will be able to	
C305.1	Identify the systematic approach of the system.
C305.2	Develop real-time operating systems for task scheduling
C305.3	Analyze the working of memory related hardware
C305.4	Work on design and development of disk and file related hardware.
C305.5	Know the real time meaning of security and production in the field of operating system.

## Course Code & Name: C306 - 17CSC08 & COMPUTER NETWORKS

### Course Outcomes:

At the end of this course, the students will be able to	
C306.1	Familiarize with the Data Communication Concepts
C306.2	Implement the Data Link Layer Concepts
C306.3	Realize the need of Addressing and Routing.
C306.4	Build a clear concern on Transport Layer Services
C306.5	Work with Application layer protocols



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## Course Code & Name: C307 - 17ITP01 & OOPS using JAVA LABORATORY

### Course Outcomes:

At the end of this course, the students will be able to	
C307.1	Design and develop java programs using object oriented programming concepts
C307.2	Develop simple applications using package, multithreading, and generics concepts
C307.3	Create guis and event driven programming applications for real world problems
C307.4	Construct applications with exception handling
C307.5	Build applications using threads and collection framework

## Course Code & Name: C308 - 17AIP01 & ARTIFICIAL INTELLIGENCE LABORATORY

### Course Outcomes:

At the end of this course, the students will be able to	
C308.1	Implement simple PEAS descriptions for given AI tasks
C308.2	Develop programs to implement simulated annealing and genetic algorithms
C308.3	Demonstrate the ability to solve problems using searching and backtracking
C308.4	Implement simple reasoning systems using either backward or forward inference mechanisms
C308.5	Choose and implement a suitable techniques for a given AI task

## Course Code & Name: C309 - 17GED01 & SOFT SKILLS – LISTENING AND SPEAKING

### Course Outcomes:

At the end of this course, the students will be able to	
C309.1	Apply the knowledge of basic grammar to classify the types of verbs and questions and to construct the sentences
C309.2	Develop the listening skills through note completion, matching and multiple choice modes
C309.3	Organize a presentation on the given topic

## Course Code & Name: C401 - 17MYB08 & DISCRETE MATHEMATICS

### Course Outcomes:

At the end of this course, the students will be able to	
C401.1	Rephrase real world statements as logical propositions and demonstrate whether the proposition is satisfy, tautology or a contradiction.
C401.2	Infer whether a logical argument is valid from the given set of premises by applying the inference rules of predicate calculus.
C401.3	Show mathematical reasoning and arrive at conclusions about sets and relations.
C401.4	Construct the number of arrangements and selections using the principles of counting.
C401.5	Avail the concept of Lattices and its properties.



  
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## Course Code & Name: C402 - 17AIC03 & INTRODUCTION TO THE DESIGN AND ANALYSIS OF ALGORITHMS

### Course Outcomes:

At the end of this course, the students will be able to	
C402.1	Apply algorithm analysis techniques for a given algorithms
C402.2	Design and analyze problems using decrease, transform and conquer techniques.
C402.3	Identify optimal solution by applying dynamic techniques.
C402.4	Develop applications using backtracking, branch and bound techniques.
C402.5	Summarize the knowledge about P and NP problems

## Course Code & Name: C403 - 17CSC07 & DATABASE MANAGEMENT SYSTEM

### Course Outcomes:

At the end of this course, the students will be able to	
C403.1	Identify suitable data models for real time application and conceptualize a database system using ER Diagram
C403.2	Write queries in relational algebra and SQL.
C403.3	Normalize the database design.
C403.4	Choose appropriate storage structure and optimize Queries.
C403.5	Apply concepts of transaction processing, and concurrency control.

## Course Code & Name: C404 - 17AIC04 & DATA ANALYTICS AND VISUALIZATION

### Course Outcomes:

At the end of this course, the students will be able to	
C404.1	Apply the skills of data inspecting and cleansing.
C404.2	Determine the relationship between data dependencies using statistics
C404.3	Can handle data using primary tools used for data science in Python
C404.4	Represent the useful information using mathematical skills
C404.5	Can apply the knowledge for data describing and visualization using tools.

## Course Code & Name: C405 - 17AIC05 & MACHINE LEARNING

### Course Outcomes:

At the end of this course, the students will be able to	
C405.1	Explain the basics of ML
C405.2	Explain various Machine Learning methods
C405.3	Demonstrate various ML techniques using standard packages.
C405.4	Explore knowledge on Machine learning and Data Analytics
C405.5	Apply ML to various real time examples



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## Course Code & Name: C406& 17GEA01 ENGINEERING ECONOMICS AND FINANCIAL ACCOUNTING

### Course Outcomes:

At the end of this course, the students will be able to	
C406.1	Know the importance of Engineering Economics and Principles of Micro and Macro Economics.
C406.2	Estimate the market position with the knowledge in demand forecasting and supply.
C406.3	Develop and estimate cost for any project.
C406.4	Fix the price of the product with the knowledge in different market structure and taxation design.
C406.5	Analyze the financial statement to determine the optimal managerial decisions.

## Course Code & Name: C407 - 17CSP05 - DATABASE MANAGEMENT SYSTEM LABORATORY

### Course Outcomes:

At the end of this course, the students will be able to	
C407.1	Define database with various integrity constraints.
C407.2	Work with various DDL, DML queries.
C407.3	Create various views and make use of various types of joins and procedures and functions
C407.4	Do conceptual design using E-R model and normalize the design.
C407.5	Work with real time data base connectivity

## Course Code & Name: C408 - 17AIP02 & MACHINE LEARNING LABORATORY

### Course Outcomes:

At the end of this course, the students will be able to	
C408.1	Implement procedures for the machine learning algorithms.
C408.2	Design Java/Python programs for various Learning algorithms.
C408.3	Apply appropriate Machine Learning algorithms to data sets.
C408.4	Identify machine learning algorithms to solve real world problems.
C408.5	Apply machine learning algorithms to solve real world problems.

## Course Code & Name: C410 - 17GED02 & SOFT SKILLS & READING AND WRITING

### Course Outcomes:

At the end of this course, the students will be able to	
C410.1	Apply the knowledge to identify the parts of speech and construct the sentences
C410.2	Develop the reading skills through cloze texts, matching and multiple choice modes
C410.3	Interpret effectively through writing for a variety of purposes



  
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## BIOMEDICAL ENGINEERING



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Regulation :	R17
Program Code :	BM
Program Name :	Biomedical Engineering

## VISION OF THE DEPARTMENT

The Department of Biomedical Engineering focuses on producing graduates as driving force in creating engineering knowledge and novel biomedical technology.

## MISSION OF THE DEPARTMENT

- Provide quality biomedical engineering education through integration of engineering with the biomedical sciences.
- Create multidisciplinary engineering environment that focuses on producing graduates who apply scientific knowledge and engineering design principles to contribute usefully to society.

## PROGRAM EDUCATIONAL OBJECTIVES (PEOS):

### List of PEOs

PEO 1:	Basic Engineering Analysis	To provide students with sound foundation in Mathematical, Scientific and Engineering fundamentals necessary to formulate, analyze and solve engineering problems.
PEO 2:	Continuous Learning	To enable the students to adapt to the emerging technologies through continuous learning.
PEO 3:	Higher Education	To encourage the students to pursue post graduate programs in Engineering and interdisciplinary areas to emerge as educators and research experts.
PEO 4:	Leadership Qualities	To empower the students with the leadership qualities along with technical skills.
PEO 5:	Societal Benefits	To inculcate the ethical values for professional development of the students to solve complex problems and provide solutions leading to societal benefits.



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## PROGRAM OUTCOMES:

ATTRIBUTE	GA'S
<b>Engineering Knowledge</b>	An ability to apply knowledge of mathematics, sciences, semiconductor theory to solve problems in the area of Signal processing, Embedded systems, VLSI & Communication systems.
<b>Problem Analysis</b>	An ability to identify, formulate and analyze complex Electronics & Communication problems in the real world.
<b>Design And Development of Solutions</b>	An ability to design system components or process to meet desired needs within realistic constraints such as economic, environmental, social, ethical and sustainability.
<b>Investigation of Complex Problems</b>	An ability to conduct experiments, analyze and interpret experimental results to provide valid conclusion.
<b>Modern Tool Usage</b>	An ability to apply techniques, skills and modern engineering tools required for ECE applications.
<b>The Engineer and Society</b>	An ability to perform in multidisciplinary areas.
<b>Environment &amp; Sustainability</b>	An ability to understand the impact of ECE solutions in a global, economic, environmental and societal context.
<b>Ethics</b>	An ability to apply professional and ethical principles with responsibility.
<b>Individual And Team Work</b>	An ability to function in multidisciplinary teams exhibiting innate abilities towards team building.
<b>Communication</b>	An ability to communicate effectively.
<b>Project Management And Finance</b>	An ability to apply, design and implement application oriented projects.
<b>Lifelong Learning</b>	An ability to engage in independent and lifelong learning in the broadest context of technological change.



  
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## PROGRAM SPECIFIC OUTCOMES (PSOs) OF THE DEPARTMENT:

Graduates should be able to

<b>PSO1:</b>	Apply a systematic approach to the solution of problems in the field of Electronics and Communication Engineering.
<b>PSO2:</b>	Engage in lifelong learning, commitment to quality and continuous improvement.
<b>PSO3:</b>	Ability to work in multidisciplinary groups.
<b>PSO4:</b>	Design applications related to Signal Processing, Computer Networks and Communication.



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## SEMESTER 1:

<b>Course Code/ Course Name:</b>	<b>17EYA01/ PROFESSIONAL ENGLISH – I</b>
<b>Course Outcomes:</b>	
1	The students will be able to construct clear, grammatically correct sentences using a variety of sentence structures and appropriate vocabulary.
2	The students will be able to utilize listening skills to articulate one's own point of view in different circumstances.
3	The students will be able to apply appropriate communication skills across settings, purposes, and audiences.
4	The students will be able to distinguish main ideas and supporting details and employ active reading strategies to understand texts at the maximum level.
5	The students will be able to equip themselves with writing skills needed for academic as well as workplace contexts.

<b>Course Code/ Course Name:</b>	<b>17MYB01/CALCULUS AND SOLID GEOMETRY</b>
<b>Course Outcomes:</b>	
1	Apply the concept of orthogonal reduction to diagonalise the given matrix.
2	Have knowledge about the geometrical aspects of sphere.
3	Find the radius of curvature, circle of curvature and centre of curvature for a given curve.
4	Classify the maxima and minima for a given function with several variables, through by finding stationary points.
5	Demonstrate the use of double and triple integrals to compute area and volume.

<b>Course Code/ Course Name:</b>	<b>17PYB01- PHYSICS FOR ENGINEERS</b>
<b>Course Outcomes:</b>	
1	Acquire knowledge regarding Acoustics and ultrasonic
2	Applying knowledge in the fields of optics & laser technology
3	Design the sensors using the knowledge of fiber optics
4	Gain the knowledge of wave, particle nature and matter waves
5	Analyze the different kind of crystal structures and crystal growth



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<b>Course Code/ Course Name:</b>	<b>17CYB02 – APPLIED ELECTRO CHEMISTRY</b>
<b>Course Outcomes:</b>	
1	Apply knowledge of fundamental principles of chemistry.
2	Define and solve engineering problems, including the utilization of creative and innovative skills .
3	Gain practical experience with chemical process equipment as well as to analyze and interpret data.
4	Understand the impact of engineering solutions in a global, economic, environmental and societal content.
5	Understand the management of electronic waste

<b>Course Code/ Course Name:</b>	<b>17CSC02 - PYTHON PROGRAMMING</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the working of computers.
2	The students will be able to understand the basics of Python Programming constructs
3	The students will be able to realize the need of strings, list, and tuples
4	The students will be able to design programs involving dictionaries and function.
5	The students will be able to develop simple programs using file concept and Modules

<b>Course Code/ Course Name:</b>	<b>17ECC01– ELECTRONIC DEVICES</b>
<b>Course Outcomes:</b>	
1	The Students can be able to design components using basic devices.
2	The Students will be able to analyze characteristics of BJT for various operations.
3	The Students will be able to understand the characteristics of Field Effect Transistor.
4	The students will be able to analyze the operation of Special semiconductor diodes.
5	The Students can implement the project using Power devices and Display devices.



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<b>Course Code/ Course Name:</b>	<b>17CSP02 -PYTHON PROGRAMMING LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the basics of Python Programming constructs
2	The students will be able to understand the various operators of Python Programming.
3	The students will be able to realize the need of string manipulation, list, and tuples
4	The students will be able to design programs involving dictionaries, function and modules
5	The students will be able to develop simple programs with exception handling

<b>Course Code/ Course Name:</b>	<b>17GYP02- ENGINEERING PRACTICES LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand various civil engineering practices like plumbing, carpentry and relevant tools
2	The students will be able to understand various manufacturing processes like welding, machining and sheet metal work
3	The students will be able to do residential house wiring and Measure energy and resistance to earth of an electrical equipment
4	The students will be able to perform the assembling and testing of the PCB based electronic circuits.
5	The students will be able to make / operate / utilize the simple engineering components.



  
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## SEMESTER 2:

<b>Course Code/ Course Name:</b>	<b>17EYA02/ PROFESSIONAL ENGLISH – II</b>
<b>Course Outcomes:</b>	
1	The students will be able to communicate using a variety of sentence structures and appropriate vocabulary.
2	The students will be able to comprehend conversations and short talks delivered in English and respond accordingly
3	The students will be able to speak appropriately and effectively in various situations.
4	The students will be able to employ active reading strategies to understand texts at the maximum level.
5	The students will be able to equip themselves with writing formal letters and winning Job Application.

<b>Course Code/ Course Name:</b>	<b>17MYB02/COMPLEX ANALYSIS AND LAPLACE TRANSFORMS</b>
<b>Course Outcomes:</b>	
1	Predict the suitable method to solve second and higher order differential equations
2	Apply the concepts of Differentiation and Integration to Vectors.
3	Compute an analytic function, when its real or imaginary part is known.
4	Identify the Singularities and its corresponding Residues for the given function.
5	Predict a suitable method to evaluate the Contour integration.

<b>Course Code/ Course Name:</b>	<b>17PYB07- PHYSICS FOR BIOMEDICAL ENGINEERS</b>
<b>Course Outcomes:</b>	
1	Acquire knowledge about conduction process in metals.
2	Understanding the origin of magnetic field and super conduction
3	Understand the applications of radiation based instruments.
4	Understanding the importance of imaging systems in engineering and medial field.
5	Know of recent trends in nanotechnology and biomaterials



  
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<b>Course Code/ Course Name:</b>	<b>17CYB05 – CHEMISTRY FOR BIOMEDICAL ENGINEERS</b>
<b>Course Outcomes:</b>	
1	Apply knowledge of fundamental of biochemistry
2	Explain how the properties of carbohydrates impact on the processing and quality of the finished products
3	Recognize lipid structures including lipids found in cell membranes and their transport across membranes.
4	Describe the chemical nature of enzymes and their function in biochemical reactions.
5	Provide students with knowledge on how the immune system works building on their previous knowledge from biochemistry

<b>Course Code/ Course Name:</b>	<b>17MECO1 – ENGINEERING GRAPHICS</b>
<b>Course Outcomes:</b>	
1	The Students can be able to construct conic sections and special curves of required specifications.
2	The Students can be able to apply the concept of first angle projection to create project of straight lines, planes, solids and section of solids.
3	The Students can be able to develop a surface drawing of a solid model with given dimensions.
4	The Students can be able to build orthographic, isometric projections of a three dimensional object.
5	The Students can be able to make use of the knowledge of engineering drawing to create physical models.

<b>Course Code/ Course Name:</b>	<b>17ECC03– CIRCUIT THEORY</b>
<b>Course Outcomes:</b>	
1	The Students can apply the Ohm's law and Kirchhoff's law and investigates the behavior of electric circuits by analytical techniques.
2	The Students will be able to Evaluate the voltage, current of electric circuit using Graph theory techniques
3	The Students will be able to Design simple network for the complex network by exploring circuit theorems.
4	The students will be able to Design and test the dc and ac transient circuits using test signals.
5	Design and test circuit for a desired cut off frequency using resonant and coupled circuits.



  
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<b>Course Code/ Course Name:</b>	<b>17GYP01 –PHYSICS AND CHEMISTRY LABORATORY</b>
<b>Course Outcomes:</b>	
1	Acquire the fundamental knowledge in optics such as interference, Diffraction and Understand about the spectral instruments etc
2	Gain the basic knowledge about handling the laser light and Identify the basic parameters of an optical fibre.
3	Analyze the properties of matter with sound waves.
4	Apply knowledge of measurement of hardness producing ions, chloride, alkalinity, DO, conductance, EMF and pH
5	Understand the impact of water quality and solve engineering problems.

<b>Course Code/ Course Name:</b>	<b>17ECP01- CIRCUITS AND DEVICES LABORATORY</b>
<b>Course Outcomes:</b>	
1	The Students can be able to analyze the characteristics of diodes and transistors.
2	The Students will be able to evaluate the characteristics of electronic devices such as FET, UJT and SCR etc based on their operations.
3	The Students will be able to verify the characteristics of clipper and clamper.
4	The students will be able to verify the theorems such as Thevenin's theorem, Norton theorems etc.
5	The Students will be able to measure the voltage and frequency using resonance circuits.



  
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## SEMESTER 3:

<b>Course Code/ Course Name:</b>	<b>17MYB05/ TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS</b>
<b>Course Outcomes:</b>	
1	The students will be able to analysis the Fourier series problem.
2	Know the formation of partial differential equations.
3	Apply the partial differential equations to solve the various electrical and electronics application.
4	Solve the problems using Fourier integral theorem and convolution theorem technique.
5	Formulate the difference equations and solve them using Z-transform techniques.

<b>Course Code/ Course Name:</b>	<b>17ECC23/ BASICS OF ELECTRICAL ENGINEERING</b>
<b>Course Outcomes:</b>	
1	Predict the behavior of any electrical and magnetic circuits.
2	Formulate and solve complex AC, Dc circuits.
3	Identify the type of electrical machine used for that particular application.
4	Knowledge on different measuring equipments
5	Exercise and practical exposure on safety measure in electrical wiring

<b>Course Code/ Course Name:</b>	<b>17MEC23- ENGINEERING MECHANICS FOR BIOMEDICAL ENGINEERS</b>
<b>Course Outcomes:</b>	
1	Solve the problems on static equilibrium of particles
2	Calculate the effect of force on rigid bodies
3	Determine the centroid and moment of inertia of various surfaces and solids
4	Explain the fluid properties and relate it to bio- fluids
5	Apply the dynamic equilibrium equation and solve problems



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<b>Course Code/ Course Name:</b>	<b>17ITC03 – DATA STRUCTURES AND ALGORITHMS</b>
<b>Course Outcomes:</b>	
1	The students can Understand and apply the concept of abstract data type to represent and implement heterogeneous data structures.
2	The Students can Exemplify and implement how Stack ADT & Queue ADT can be implemented to manage the memory using static and dynamic allocations.
3	The students can Compare and contrast various techniques in Hashing and Trees.
4	The students can Understand the various types of sorting algorithms.
5	The students can Analyze and implement different types of sorting and searching algorithms.

<b>Course Code/ Course Name:</b>	<b>17ECC06 – DIGITAL LOGIC DESIGN</b>
<b>Course Outcomes:</b>	
1	The Students can apply the Boolean laws and theorems can able to minimize the Boolean expressions.
2	The Students will be able to construct Programmable arrays and memory logics.
3	The Students will be able to Design simple combinational logic circuits in hardware and simulation using Verilog.
4	The Students will be able to Design synchronous sequential logic circuits in hardware and simulation using Verilog.
5	The Students will be able to Design asynchronous sequential logic circuits.

<b>Course Code/ Course Name:</b>	<b>17BMC01– ANATOMY AND HUMAN PHYSIOLOGY</b>
<b>Course Outcomes:</b>	
1	Students will be able to explain basic structure and functions of cell
2	Students will be able to explain various Physiological systems
3	Students will be able to learn about the functions of the various systems.
4	Students will be able to explain the internal nervous system and its function.
5	Students will be able to analyze relation between various systems.



  
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<b>Course Code/ Course Name:</b>	<b>17ECPO3 –DIGITAL LOGIC DESIGN LABORATORY</b>
<b>Course Outcomes:</b>	
1	The Students can be able to analyze the characteristics of diodes and transistors.
2	The Students will be able to design the combinational circuits like adder, subtractor, code convertors, encoder & decoders.
3	The Students will be able to design the sequential circuits like counters and shift registers.
4	The students will be able to Implement combinational and sequential circuits using Verilog codes.
5	The Students will be able to design own projects based on digital logic.

<b>Course Code/ Course Name:</b>	<b>17BMP01- HUMAN PHYSIOLOGY LABORATORY</b>
<b>Course Outcomes:</b>	
1	Students will be able to handle Microscope and testing samples
2	Students will be able to analyze the structure of blood cell
3	Students will be able to identify and enumerate blood cells
4	Students will be able to enumerate haematological parameters
5	Analysis of special sensory organs test like eye and ear



  
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## SEMESTER 4:

<b>Course Code/ Course Name:</b>	<b>17MYB09/ PROBABILITY AND RANDOM PROCESSES</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the fundamental knowledge of the basic probability concepts.
2	Have a well-founded knowledge of standard distributions which can describe real life phenomena.
3	Acquire skills in handling situations involving more than one random variable and functions of random variables.
4	Understand and characterize phenomena which evolve with respect to time in probabilistic manner.
5	Apply concept and properties of spectral density function and cross correlation functions.

<b>Course Code/ Course Name:</b>	<b>17ECC07/ SIGNALS AND SYSTEMS</b>
<b>Course Outcomes:</b>	
1	The students will be able to Understand the operation of continuous time & Discrete time signals
2	The students will be able to Analyze the properties of signals & systems
3	The students will be able to Apply Laplace transform, Fourier transform, Z transform in signal analysis
4	The students will be able to Implementation of continuous time LTI systems using Fourier and Laplace Transforms.
5	The students will be able to Designing of discrete time LTI systems using Z transform

<b>Course Code/ Course Name:</b>	<b>17ECC11- ANALOG CIRCUIT DESIGN</b>
<b>Course Outcomes:</b>	
1	The Students can able to understand basic concepts of Linear IC's.
2	The Students will be able to design all Linear and Non linear op-amp configurations.
3	The Students will be able to Design simple analog multiplier circuits and PLL applications.
4	The Students will be able to Design A to D and D to A converters.
5	The Students will be able to Design simple analog circuits using op-amp.



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<b>Course Code/ Course Name:</b>	<b>17BMC02 – SENSORS AND SIGNAL CONDITIONING</b>
<b>Course Outcomes:</b>	
1	The Students can able to measure various electrical parameters with accuracy, precision, resolution.
2	The Students would be able to select appropriate passive or active transducers for measurement of physical phenomenon.
3	The Students can able to choose appropriate light sensors for measurement of physical phenomenon
4	The Students can able to use AC and DC bridges for relevant parameter measurement.
5	The Students can able to handle Multimeter, CRO and different types of recorders for appropriate measurement

<b>Course Code/ Course Name:</b>	<b>17BMC03 – BIO CONTROL SYSTEMS</b>
<b>Course Outcomes:</b>	
1	The Students will be able to explain the necessity of various modeling system used in biological control systems
2	The Students will be able to analyze the time response characteristics
3	The Students will be able to derive various system characteristics in frequency domain
4	The Students will be able to explain the basic physiological system and its Models
5	Comprehend the application aspects of time and frequency response analysis in physiological control systems.

<b>Course Code/ Course Name:</b>	<b>17ITCO8– FUNDAMENTALS OF JAVA PROGRAMMING</b>
<b>Course Outcomes:</b>	
1	The students will be able to learn fundamental concepts of Java.
2	The students will be able to design concepts with inheritance.
3	The students will be able to implement exception handling and Files.
4	The students will be able to create threads and interfaces in Java classes.
5	The students will be able to implement GUI and generics concepts.



  
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<b>Course Code/ Course Name:</b>	<b>17ECPO6 –ANALOG CIRCUIT DESIGN LABORATORY</b>
<b>Course Outcomes:</b>	
1	The Students can be able to analyze the characteristics of Inverting and Non inverting amplifiers.
2	The Students will be able to design the Oscillator circuits and Integrator and Differentiators.
3	The Students will be able to design the astable and monostable multivibrator circuits using 555 timers.
4	The students will be able to Implement filter circuits using op-amp.
5	The Students will be able to design own projects using analog IC. .

<b>Course Code/ Course Name:</b>	<b>17BMP02- SENSORS AND SIGNAL CONDITIONING LABORATORY</b>
<b>Course Outcomes:</b>	
1	The Students can be able to analyze the characteristics various bridges and its response.
2	The Students would be able to understand about various measurement methods.
3	The Students would be able to analyse the step response of the transducer
4	The students would be able to describe the necessity of calibration
5	The Students would be able to formulate a real world problem, identify the requirement and develop the design solutions



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## SEMESTER 5:

<b>Course Code/ Course Name:</b>	<b>17CYB03/ ENVIRONMENTAL SCIENCE</b>
<b>Course Outcomes:</b>	
1	Design a system, component, or process to meet desired needs.
2	Identify, formulate, and solve environmental engineering problems
3	Understand the professional and ethical responsibility as related to the practice of environmental engineering and the impact of engineering solutions in a global context.
4	Use the techniques, skills, and modern engineering tools necessary for environmental engineering practice.
5	Acquire the knowledge of information technology in environmental science.

<b>Course Code/ Course Name:</b>	<b>17GEA02/ PRINCIPLES OF MANAGEMENT</b>
<b>Course Outcomes:</b>	
1	The Students will acquire comprehensive knowledge on management concepts.
2	The Students will be able to understand and apply planning concepts at different conditions and situations.
3	The Students will accomplish organizational structures and understand the staffing process.
4	The Students will be able to employee's motivation and project managements in working environments.
5	The Students will be able to do the budgetary and non-budgetary control of projects.



  
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<b>Course Code/ Course Name:</b>	<b>17ECC16- ANALOG AND DIGITAL COMMUNICATION</b>
<b>Course Outcomes:</b>	
1	The students will be able to acquire the knowledge about Analog modulation and demodulation schemes
2	The students will be able to acquire the knowledge about Pulse modulation and demodulation schemes
3	The students will be able to calculate SNR of various communication systems and perform error control coding.
4	The students will be able to analyze the methods of baseband data transmission and reception.
5	The students will be able to analyze the performance of various Pass band data transmission and reception techniques.

<b>Course Code/ Course Name:</b>	<b>17BMC04 – BIOSIGNAL PROCESSING</b>
<b>Course Outcomes:</b>	
1	The students can apply DFT and FFT for the analysis of biomedical signals.
2	The students will be able to design and implement digital filters in the field of biomedical signal analysis.
3	The students will be able to distinguish various biomedical signals and methods to remove the artifacts
4	The students will be able to identify the events in ECG and EEG signal
5	The students will be able to apply the Wavelet concepts for various biomedical signals.

<b>Course Code/ Course Name:</b>	<b>17BMC05 BIOMEDICAL INSTRUMENTATION -I</b>
<b>Course Outcomes:</b>	
1	The students will differentiate different bio potentials and its propagations.
2	The students can illustrate different electrode placement for various physiological recordings
3	The students can design bio amplifier for various physiological recordings
4	The students can explain various technique for non-electrical physiological measurements
5	The students can demonstrate different biochemical measurement techniques.



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<b>Course Code/ Course Name:</b>	<b>17BMP03– BIOSIGNAL PROCESSING LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will be able to analysis various biomedical signals.
2	The students will be able to able to design FIR and IIR filters for biomedical signals.
3	The students will be able to design the concepts of Butterworth and Chebyshev filter.
4	The student able to identify the concepts of event detection in ECG and EEG.
5	The student able to apply the concepts of wavelet.

<b>Course Code/ Course Name:</b>	<b>17BMP04 – BIOMEDICAL INSTRUMENTATION-I LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will able to design preamplifiers and amplifiers for various bio signal recordings.
2	The students will able to measure physiological parameters.
3	The students can analyze biochemical parameters.
4	The students can design PCB layout for any bio amplifier.
5	The students can able to Measure various non-electrical parameters using suitable sensors/transducers.

## SEMESTER 6:

<b>Course Code/ Course Name:</b>	<b>17ECC13/ MICROPROCESSORS AND MICROCONTROLLERS INTERFACING</b>
<b>Course Outcomes:</b>	
1	The students will be able to apply the basic concepts of peripherals and develop the real time applications
2	The students will be able to program Microprocessor and Microcontroller for different applications using assembly language programming.
3	The students will be able to develop Microcontroller based system using higher level language
4	The students will be able to design and develop real time applications using Microcontrollers
5	The students will be able to acquire knowledge about peripherals and develop the real time applications



  
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<b>Course Code/ Course Name:</b>	<b>17BMC06/ MEDICAL IMAGE PROCESSING</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the basics of Digital Image and acquiring of Medical Images.
2	The students will be able to distinguish the enhancement techniques in spatial and frequency domain
3	The students will be able to apply the knowledge of compression standards in real time image transmission
4	The students will be able to choose the most appropriate technique for a particular image
5	The students will be able to select potential strategies for analysing images from a variety of applications

<b>Course Code/ Course Name:</b>	<b>17BMC07/BIOMEDICAL INSTRUMENTATION-II</b>
<b>Course Outcomes:</b>	
1	The students will able to describe the working and recording setup of all basic cardiac equipment.
2	The students will able to understand the working and recording of all basic neurological equipments.
3	The students can discuss the recording Of diagnostic and therapeutic equipments related to EMG.
4	The students can explain about measurements of parameters related to respiratory system.
5	The students can able to describe the measurement techniques of sensory responses.



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<b>Course Code/ Course Name:</b>	<b>17ECP08/ MICROPROCESSORS AND MICROCONTROLLERS LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will be able to develop applications using 8085 processor program.
2	The students will be able to evaluate various arithmetic & Logical operations using 8085 processor.
3	The students will be able to verify the various arithmetic & Logical operations using 8051 controller.
4	The Students will be able to verify the basic peripherals in 8051 using HLP.
5	The Students will be able to implement the interfacing concepts for various real world applications.

<b>Course Code/ Course Name:</b>	<b>17BMP05/ BIOMEDICAL INSTRUMENTATION-II LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will able to Measure different bioelectrical signals using various methods.
2	The students will able to Assess different non- electrical parameters using various methodologies
3	The students can Illustrate various diagnostic and therapeutic techniques.
4	The students can Examine the electrical safety measurements.
5	The students can able to Analyze the different bio signals using suitable tools.

<b>Course Code/ Course Name:</b>	<b>17GED06/ COMPREHENSION</b>
<b>Course Outcomes:</b>	
1	The Student will be able to Understand and comprehend any given problem related to Biomedical Engineering field



  
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## SEMESTER 7:

Course Code/ Course Name:	17BMC08/ MEDICAL IMAGING TECHNIQUES
<b>Course Outcomes:</b>	
1	The students can able to explain the concepts of radiographic and fluoroscopic principles.
2	The students can able to summarize the working principles of CT machines, hardware and to differentiate between its reconstructions techniques.
3	The students can able to describe the concepts of radioisotopes and working of Nuclear imaging systems.
4	The students can able to interpret the principles of Ultrasound and the working concept of Ultrasound scanners
5	The students can able to relate the knowledge about the principles of MRI, hardware, reconstruction techniques and its effect on the body

Course Code/ Course Name:	17BMC09/ REHABILITATION ENGINEERING
<b>Course Outcomes:</b>	
1	The Students can able to gain adequate knowledge about the needs of rehabilitations and its future development.
2	The Students can able to illustrate depth idea about the design of Wheel Chairs.
3	The students can design and apply different types Hearing aids, visual aids and their application in biomedical field and hence the benefit of the society.
4	The students can design various motor rehabilitation and their application in biomedical field.
5	The students will be able to build computer based applications to improve the quality of life of individuals with disabilities.



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<b>Course Code/ Course Name:</b>	<b>17BMP06/ HOSPITAL TRAINING</b>
<b>Course Outcomes:</b>	
1	The students can advocate a patient-centred approach in healthcare
2	The student can communicate with other health professionals in a respectful and responsible manner
3	The students will be able to recognize the importance of inter-professional collaboration in healthcare.
4	The student can propose a patient-centred inter-professional health improvement plan based upon the patient's perceived needs
5	The students can use the knowledge of one's own role and those of other professions to address the healthcare needs of populations and patients served.

<b>Course Code/ Course Name:</b>	<b>17BMD01– PROJECT WORK- I</b>
<b>Course Outcomes:</b>	
1	The students will be able to identify specific problems in the field of Biomedical Engineering
2	The students will be able formulate new ideas for the identified problem either as individual or as team.
3	The students will be able to provide solutions to complex problems addressing technical and social issues
4	The students will be able to demonstrate their skills effectively
5	The students will be able to present their report in a professional manner



  
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## SEMESTER 8:


<b>Course Code/ Course Name:</b>	<b>17BMD02/ PROJECT WORK- II</b>
<b>Course Outcomes:</b>	
1	The students will be able to identify specific problems in the field of Biomedical Engineering
2	The students will be able formulate new ideas for the identified problem either as individual or as team.
3	The students will be able to provide solutions to complex problems addressing technical and social issues
4	The students will be able to demonstrate their skills effectively
5	The students will be able to present their report in a professional manner

## PROGRAM SPECIFIC ELECTIVES

<b>Course Code/ Course Name:</b>	<b>17MEX36/ BIOMECHANICS</b>
<b>Course Outcomes:</b>	
1	The students will be able to utilize mechanics in medicine
2	The students will be able to explain the mechanics of physiological systems
3	The students will be able to distinguish the reason for abnormal patterns.
4	The students will be able to analyze the biomechanical systems using mathematical models
5	The students will be able to design and develop the models specific to orthopedic applications

<b>Course Code/ Course Name:</b>	<b>17BMX01/ BIOMATERIALS</b>
<b>Course Outcomes:</b>	
1	The students can Analyze different types of Biomaterials and its classification and apply the concept of nanotechnology towards biomaterials use.
2	The students can Identify significant gap required to overcome challenges and further development in metallic and ceramic materials.
3	The students can Identify significant gap required to overcome challenges and further development in polymeric materials
4	The students can analyze combinations of materials that could be used as a tissue replacement implant.
5	The students can understand the testing standards applied for biomaterials.



  
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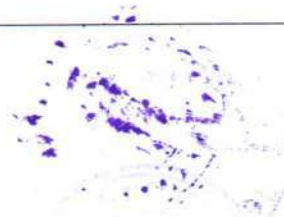
<b>Course Code/ Course Name:</b>	<b>17BMX02/ MEDICAL PHYSICS</b>
<b>Course Outcomes:</b>	
1	The students can understand the impact of sound in Human Body.
2	The students will be able to apply the Radioactive nuclides in the field of biomedical Engineering.
3	The students will be able to apply the radioactive nuclides in the field of biomedical Engineering.
4	The students will be able to apply the concepts of sounds in Cardiopulmonary systems.
5	The students will be able to demonstrate various radiation instruments.

<b>Course Code/ Course Name:</b>	<b>17BMX03/ TELEHEALTH TECHNOLOGY</b>
<b>Course Outcomes:</b>	
1	The students can apply multimedia technologies in telemedicine.
2	The students can gain knowledge about types and techniques of Telemedicine.
3	The students can gain knowledge about Ethical and legal aspects of Telemedicine
4	The students can explain protocols behind encryption techniques for secure transmission of data.
5	The students can Apply telehealth in healthcare.

<b>Course Code/ Course Name:</b>	<b>17BMX04/ ARTIFICIAL ORGANS AND IMPLANTS</b>
<b>Course Outcomes:</b>	
1	The students can gain adequate Knowledge about artificial organs & transplants.
2	The students can get clear idea about implant design and its parameters and solution.
3	The students can acquire in-depth knowledge about blood interfacing implants.
4	The students can able to describe different types of soft tissue replacement and hard tissue replacement.
5	The students can able to gain adequate knowledge about implantable medical devices and organs.



  
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<b>Course Code/ Course Name:</b>	<b>17BMX05/ ROBOTICS IN MEDICINE</b>
<b>Course Outcomes:</b>	
1	The students can gain adequate knowledge about the basics of robotic systems.
2	The students can design basic Robotics system and formulate Kinematics.
3	The students can gain knowledge Robotic vision.
4	The students can construct Inverse Kinematic motion planning solutions for various Robotic configurations.
5	The students can design Robotic systems for Medical application.

<b>Course Code/ Course Name:</b>	<b>17BMX06/ PHYSIOLOGICAL MODELING</b>
<b>Course Outcomes:</b>	
1	The students can gain knowledge about the application of Physiological models.
2	The students can describe the methods And techniques for analysis and synthesis of Linear and dynamic system.
3	The students can develop differential equations to describe the compartmental physiological model.
4	The students can Describe Nonlinear models of physiological systems.
5	The students can Illustrate the Simulation of physiological systems.

<b>Course Code/ Course Name:</b>	<b>17BMX07/ NEURAL ENGINEERING</b>
<b>Course Outcomes:</b>	
1	The students can gain knowledge about the application of Physiological models.
2	The students can describe the methods And techniques for analysis and synthesis of Linear and dynamic system.
3	The students can develop differential equations to describe the compartmental physiological model.
4	The students can Describe Nonlinear models of physiological systems.
5	The students can Illustrate the Simulation of physiological systems.



  
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<b>Course Code/ Course Name:</b>	<b>17BMX08/ FUNDAMENTALS OF NANOSCIENCE</b>
<b>Course Outcomes:</b>	
1	The students will familiarize about the science of nano materials.
2	The students will demonstrate the preparation of nano materials.
3	The students will develop knowledge in characteristic nanomaterial.
4	The students know various characterization techniques.
5	The students can differentiate various applications of nano science.

<b>Course Code/ Course Name:</b>	<b>17BMX09/ DISASTER MANAGEMENT</b>
<b>Course Outcomes:</b>	
1	The students will be able to exposure to disasters, their significance and types.
2	The students will be able differentiate the types of disasters, causes and their impact on environment and society.
3	The students will be able to Assess vulnerability and various methods of risk reduction measures as well as mitigation.
4	The students will be able to enhance awareness of institutional processes in the country.
5	Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management.



  
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<b>Course Code/ Course Name:</b>	<b>17BMX10/ BRAIN COMPUTER INTERFACE AND ITS APPLICATIONS</b>
<b>Course Outcomes:</b>	
1	The students will be able to have comprehended and appreciate the significance and role of this course in the present contemporary world.
2	The students will be able to evaluate concept of BCI.
3	The students will be able to assign functions appropriately to the human and to the machine.
4	The students will be able to select appropriate feature extraction methods.
5	The students will be able to use machine learning algorithms for translation.

<b>Course Code/ Course Name:</b>	<b>17BMX11/ VIRTUAL INSTRUMENTATION FOR BIOMEDICAL ENGINEERS</b>
<b>Course Outcomes:</b>	
1	The students will be able to explain the Concepts of Virtual Instrumentation Concepts.
2	The students will be able to program for any real time applications.
3	The students will be able to communication and interface LABVIEW with applications.
4	The students will be able to develop control programs on VI and Sub VI Platform.
5	The students will be able to familiarize With the concepts of Biomedical applications.



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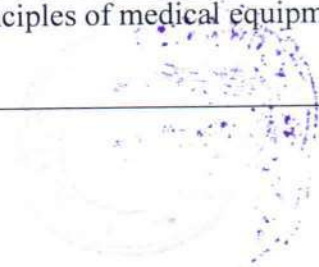
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<b>Course Code/ Course Name:</b>	<b>17BMX12/ HOSPITAL MANAGEMENT</b>
<b>Course Outcomes:</b>	
1	Explain the principles of hospital administration.
2	Identify the importance of human source management.
3	List various marketing research techniques.
4	Identify information management systems and its uses.
5	Understand safety procedures followed in hospitals.

<b>Course Code/ Course Name:</b>	<b>17BMX13/ MEDICAL ETHICS AND STANDARDS</b>
<b>Course Outcomes:</b>	
1	The Students can able to identify the scope of medical ethics.
2	The Students can able to apply the concepts of ethical theories and moral principles for the health professions.
3	The Students can able to apply medical standards in their practice.
4	The Students can able to summarize the importance of hospital safety standards.
5	The Students can able to recommend the suitable principles of medical equipment safety standards in hospitals.



  
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<b>Course Code/ Course Name:</b>	<b>17GEA04/ PROFESSIONAL ETHICS AND HUMAN VALUES</b>
<b>Course Outcomes:</b>	
1	Students know the concepts of ethics and values.
2	Students acquire the knowledge of interpersonal and organizational issues in ethics
3	Students will be able to Highlight the ethical issues related to engineering.
4	Students can learn the concepts of engineer's responsibilities and their rights.
5	Students will be able to understand the role of global issues and professional bodies.

<b>Course Code/ Course Name:</b>	<b>17ECX12/ PROTOCOLS AND ARCHITECTURES FOR WIRELESS SENSOR NETWORKS</b>
<b>Course Outcomes:</b>	
1	The Students can apply their knowledge in the sensor network applications.
2	The Students will be able to analyse about the energy efficient network design.
3	The Students will be able to design sensor network
4	The students will be able to analyse the Time Synchronization, Localization and Positioning, Sensor Tasking and Control of sensors.
5	The students will be able to routing protocol secured network design



  
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<b>Course Code/ Course Name:</b>	<b>17ECC21/ EMBEDDED AND REAL TIME SYSTEMS</b>
<b>Course Outcomes:</b>	
1	The students will be able to Describe the architecture of different ARM processor cores.
2	The students will be able to Understand the instruction set and Assembly Language Programming in ARM.
3	The students will be able to Categorize and understand the recent trends in Embedded Systems.
4	The students will be able to Outline the concepts of embedded systems and explain the basic concepts of real time Operating system design.
5	The students will be able to Develop real time solutions in different RTOS environment.

<b>Course Code/ Course Name:</b>	<b>17ECX16/ INTERNET OF THINGS AND ITS APPLICATIONS</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand basics of Electrical circuits and Electronic devices
2	The students will be able to understand IOT characteristics and its essential components.
3	The students will be able to describe Arduino processor and working of Analog and Digital I/O pins
4	The students will be able to understand Raspberry pi and its interface with other devices
5	The students will be able to implement a IoT system using Arduino/Raspberry Pi.

<b>Course Code/ Course Name:</b>	<b>17CSX31/ PROBLEM SOLVING AND PROGRAMMING</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the basics of Python Programming constructs.
2	The students will be able to design programs involving selection structure
3	The students will be able to design programs involving function, modules and loops.
4	The students will be able to realize the need of strings.
5	The students will be able to realize the need of list, tuples and dictionary.



  
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<b>Course Code/ Course Name:</b>	<b>17ITX26/ PROBLEM SOLVING AND ALGORITHMIC SKILLS</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the basics of object oriented concepts in python.
2	The students will be able to develop applications using inheritance and polymorphism
3	The students will be able to implement the ADTs and trees
4	The students will be able to design graph abstract data type and heap
5	The students will be able to implement the sorting techniques and shortest path algorithms.

<b>Course Code/ Course Name:</b>	<b>17ITC12/ DATABASE SYSTEMS CONCEPTS</b>
<b>Course Outcomes:</b>	
1	The students will be able to describe the role of Database Management System in an Organization.
2	The students will be able to study basic database concepts including the structure and operations of the relational data model.
3	The students will be able to construct simple and Moderately advanced database queries using SQL.
4	The students will be able to apply logical database design principles includes E-R diagrams & Normalization.
5	The students will be able to explain various file organizing & Indexing structure.

<b>Course Code/ Course Name:</b>	<b>17GEA03/ TOTAL QUALITY MANAGEMENT</b>
<b>Course Outcomes:</b>	
1	Students can acquire various concepts of quality management.
2	Students can implement various principles of quality management.
3	Students will be able to impart quality using statistical process.
4	Students can learn to use the various tools to maintain quality.
5	Students can implement the quality system for ISO certification.



  
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## CHEMICAL ENGINEERING



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Regulation :	R17
Program Code :	CH
Program Name :	Chemical Engineering

## VISION OF THE DEPARTMENT

To produce globally Competent Chemical Engineers with societal consciousness

## MISSION OF THE DEPARTMENT

- To develop skilled and employable graduates to meet the challenges in emerging fields of Engineering and Technology.
- To prepare the students for prosperous career in Engineering / Entrepreneurship by inculcating the leadership qualities with professional and ethical responsibilities for the benefit of the society.
- To encourage Research and Development in the emerging areas

## PROGRAM EDUCATIONAL OBJECTIVES (PEOS):

### List of PEOs

PEO 1:	To enable our graduates to excel in their field by keeping abreast of latest technologies
PEO 2:	To equip the graduates with unique leadership and interpersonal skills.
PEO 3:	To empower the graduates to be able to explore innovative solutions to real life.
PEO 4:	To enable them to pursue higher studies and explore new path in teaching and research.
PEO 5:	To ensure that our graduates deliver their task with ethical dimension and contribute to societal growth.



  
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## PROGRAM OUTCOMES:

ATTRIBUTE	Program Outcome
Engineering Knowledge	Apply fundamental concept gained from mathematics, science & chemical engineering courses.
Problem Analysis	Design and conduct experiments, as well as to analyze and interpret data.
Design And Development of Solutions	Design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, ethical, safety, manufacturability and sustainability.
Investigation of Complex Problems	Apply research methods like design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
Modern Tool Usage	Apply modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
The Engineer and Society	Infer societal, health, safety, legal & cultural issues and consequent responsibilities relevant to the professional engineering practice.
Environment & Sustainability	Understand the impact of engineering solutions in societal and environmental contexts, and demonstrate the need for sustainable development.
Ethics	Apply ethical principles and commit to professional ethics and responsibilities of the engineering practice.
Individual And Team Work	Function effectively as an individual /team in diverse and multi disciplinary environments.
Communication	Communicate effectively through reports, presentations and discussions within both the engineering domain and the community at large.
Project Management And Finance	Demonstrate knowledge and understanding of engineering, management, principles, finance and apply these to manage projects in multidisciplinary environments.
Lifelong Learning	Acknowledge the need for learning and engage in life-long learning in the broadest context of technological change.



  
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## PROGRAM SPECIFIC OUTCOMES (PSOs) OF THE DEPARTMENT:

Graduates should be able to

PSO1:	Accomplish the contemporary needs of Chemical and related industries
PSO2:	Contribute to multidisciplinary research using relevant Chemical Engineering tools.
PSO3:	Acquire a working knowledge in professional courses and also frontier area of Chemical Engineering.
PSO4:	Apply and develop relevant innovative projects to optimize Chemical process.



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## SEMESTER 1:

<b>Course Code/ Course Name:</b>	<b>17EYA01/ PROFESSIONAL ENGLISH – I</b>
<b>Course Outcomes:</b>	
1	The students will be able to construct clear, grammatically correct sentences using a variety of sentence structures and appropriate vocabulary.
2	The students will be able to utilize listening skills to articulate one's own point of view in different circumstances.
3	The students will be able to apply appropriate communication skills across settings, purposes, and audiences.
4	The students will be able to distinguish main ideas and supporting details and employ active reading strategies to understand texts at the maximum level.
5	The students will be able to equip themselves with writing skills needed for academic as well as workplace contexts.

<b>Course Code/ Course Name:</b>	<b>17MYB01/CALCULUS AND SOLID GEOMETRY</b>
<b>Course Outcomes:</b>	
1	Apply the concept of orthogonal reduction to diagonalise the given matrix.
2	Have knowledge about the geometrical aspects of sphere.
3	Find the radius of curvature, circle of curvature and centre of curvature for a given curve.
4	Classify the maxima and minima for a given function with several variables, through by finding stationary points.
5	Demonstrate the use of double and triple integrals to compute area and volume.

<b>Course Code/ Course Name:</b>	<b>17PYB01- PHYSICS FOR ENGINEERS</b>
<b>Course Outcomes:</b>	
1	Acquire knowledge regarding Acoustics and ultrasonic
2	Applying knowledge in the fields of optics & laser technology
3	Design the sensors using the knowledge of fiber optics
4	Gain the knowledge of wave, particle nature and matter waves
5	Analyze the different kind of crystal structures and crystal growth



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<b>Course Code/ Course Name:</b>	<b>17CYB01 - APPLIED CHEMISTRY</b>
<b>Course Outcomes:</b>	
1	Apply knowledge of fundamental principles of chemistry.
2	Define and solve engineering problems, including the utilization of creative and innovative skills.
3	Gain practical experience with chemical process equipment as well as to analyze and interpret data.
4	Understand the impact of engineering solutions in a global, economic, environmental and societal content.
5	Understand the concept of engineering materials

<b>Course Code/ Course Name:</b>	<b>17MEC01- ENGINEERING GRAPHICS</b>
<b>Course Outcomes:</b>	
1	The Students can be able to construct conic sections and special curves of required specifications.
2	The Students can be able to apply the concept of first angle projection to create project of straight lines, planes, solids and section of solids
3	The Students can be able to develop a surface drawing of a solid model with given dimensions
4	The Students can be able to build orthographic, isometric projections of a three dimensional object
5	The Students can be able to make use of the knowledge of engineering drawing to create physical models

<b>Course Code/ Course Name:</b>	<b>17CSC01 - PROBLEM SOLVING AND PYTHON PROGRAMMING</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the working of computers
2	The students will be able to solve problems using various strategies
3	The students will be able to understand the basics of Python Programming constructs
4	The students will be able to realize the need of strings, list, and tuples
5	The students will be able to design programs involving dictionaries and function



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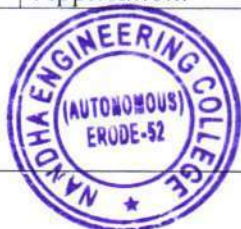
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<b>Course Code/ Course Name:</b>	<b>17GYP01 - PHYSICS AND CHEMISTRY LABORATORY</b>
<b>Course Outcomes:</b>	
1	Acquire the fundamental knowledge in optics such as interference, Diffraction and Understand about the spectral instruments etc
2	Gain the basic knowledge about handling the laser light and Identify the basic parameters of an optical fibre
3	Analyze the properties of matter with sound waves
4	Apply knowledge of measurement of hardness producing ions, chloride, alkalinity, DO, conductance, EMF and pH
5	Understand the impact of water quality and solve engineering problems

<b>Course Code/ Course Name:</b>	<b>17CSP01 - PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY</b>
<b>Course Outcomes:</b>	
1	The student will be able to use MS Word and MS Excel for document preparation.
2	The students will be able to understand the basics of Python Programming constructs
3	The students will be able to realize the need of string manipulation, list, and tuples
4	The students will be able to design programs involving dictionaries, function and modules
5	The students will be able to develop simple programs with exception handling

SEMESTER 2:

<b>Course Code/ Course Name:</b>	<b>17EYA02 – PROFESSIONAL ENGLISH – II</b>
<b>Course Outcomes:</b>	
1	The students will be able to communicate using a variety of sentence structures and appropriate vocabulary.
2	The students will be able to comprehend conversations and short talks delivered in English and respond accordingly
3	The students will be able to speak appropriately and effectively in various situations.
4	The students will be able to employ active reading strategies to understand texts at the maximum level.
5	The students will be able to equip themselves with writing formal letters and winning Job Application.



  
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<b>Course Code/ Course Name:</b>	<b>17MYB02 - COMPLEX ANALYSIS AND LAPLACE TRANSFORMS</b>
<b>Course Outcomes:</b>	
1	Predict the suitable method to solve second and higher order differential equations
2	Apply the concepts of Differentiation and Integration to Vectors.
3	Compute an analytic function, when its real or imaginary part is known.
4	Identify the Singularities and its corresponding Residues for the given function.
5	Predict a suitable method to evaluate the Contour integration.

<b>Course Code/ Course Name:</b>	<b>17PYB06- PHYSICS OF MATERIALS AND FLUIDS</b>
<b>Course Outcomes:</b>	
1	Acquire knowledge about conductors, semiconductors and super conductors
2	Understand the various form of heat conduction and thermal conductivity of good and bad conductors
3	Acquire knowledge about flow of liquids and liquids viscosities
4	The different types of Material testing under NDT
5	Knowledge of new engineering materials and recent trends in nanotechnology

<b>Course Code/ Course Name:</b>	<b>17CYB03 ENVIRONMENTAL SCIENCE</b>
<b>Course Outcomes:</b>	
1	Design a system, component, or process to meet desired needs.
2	Identify, formulate, and solve environmental engineering problems
3	Understand the professional and ethical responsibility as related to the practice of environmental engineering and the impact of engineering solutions in a global context.
4	Use the techniques, skills, and modern engineering tools necessary for environmental engineering practice.
5	Acquire the knowledge of information technology in environmental science.



  
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<b>Course Code/ Course Name:</b>	<b>17EEC01 - BASIC ELECTRICAL AND ELECTRONICS ENGINEERING</b>
<b>Course Outcomes:</b>	
1	Apply the basic laws and investigates the behavior of electric circuits by analytical instruments.
2	Identify the electrical components and explore the characteristics of electrical machines.
3	Analyze the various characteristics of semiconductor devices and applications.
4	Expose the concept of digital electronics
5	Understand the fundamental of communication systems.

<b>Course Code/ Course Name:</b>	<b>17CHC01 -INTRODUCTION TO CHEMICAL ENGINEERING</b>
<b>Course Outcomes:</b>	
1	Understand the concepts of unit operations and unit processes
2	Apply the principles of size reduction, separation and transportation for handling solids in Chemical process industries.
3	Comprehend the importance of fluid properties, types of fluids and select the manometers for pressure measurement
4	Familiarize with modes of heat transfer and acquire knowledge on types of heat exchangers.
5	Understand and apply the concepts of units and dimensions, mole, weight percentage, mole percentage in process calculations.

<b>Course Code/ Course Name:</b>	<b>17GYP02 – ENGINEERING PRACTICES LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand various civil engineering practices like plumbing, carpentry and relevant tools
2	The students will be able to understand various manufacturing processes like welding, machining and sheet metal work
3	The students will be able to do residential house wiring and Measure energy and resistance to earth of an electrical equipment
4	The students will be able to perform the assembling and testing of the PCB based electronic circuits.
5	The students will be able to make / operate / utilize the simple engineering components



  
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<b>Course Code/ Course Name:</b>	<b>17CHP01 –CHEMICAL ANALYSIS LAB</b>
<b>Course Outcomes:</b>	
1	Familiarization with equipments like Viscometers, Flash and Fire point etc.
2	Determine acid value and iodine value of oils and perform cement analysis
3	Undergo proximate, ultimate analysis of coal and estimate the total acid and alkali content in soap
4	Perform flue gas analysis by Orsat's apparatus and estimation of phenol
5	Conduct experiment to predict calorific value using Bomb calorimeter amount of nitrite in water

## SEMESTER 3:

<b>Course Code/ Course Name:</b>	<b>17MYB03- FOURIER SERIES AND PARTIAL DIFFERENTIAL EQUATIONS</b>
<b>Course Outcomes:</b>	
1	Ability to have fundamental understanding of Fourier series and give Fourier expansions of a given function.
2	Apply transform techniques to solve engineering problems.
3	Analyze and simulate the first and second order linear partial differential equations.
4	Demonstrate a firm understanding of the solution techniques for homogeneous linear PDE's.
5	Ability to apply partial differential techniques to solve the physical engineering problems.

<b>Course Code/ Course Name:</b>	<b>17MEC07- HEAT POWER ENGINEERING</b>
<b>Course Outcomes:</b>	
1	Understand the conceptual laws of thermodynamics for application in thermodynamic cycles
2	The students will be able to explain different thermodynamic cycles
3	The students will be able to understand the steam distribution and utilization systems to identify the energy conservation opportunities
4	The students will be able to understand the basics of boilers and perform simple calculations of boiler efficiencies
5	Comprehend principles of steam turbines and calculation of turbine efficiencies and understand



  
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<b>Course Code/ Course Name:</b>	<b>17CHC02 - INDUSTRIAL CHEMISTRY</b>
<b>Course Outcomes:</b>	
1	Apply the phase rule concepts to material technology, thermodynamics systems and phase equilibria.
2	Understand kinetics and theory of reaction rates for application in reactor design
3	Understand the basic principles of catalysis and colloids to apply for their application in chemical engineering practice
4	Understand the classification and composition of carbohydrates and amino acids
5	Use the concepts of reaction mechanism in order to explain the reactivity and the role of reactants in organic reactions.

<b>Course Code/ Course Name:</b>	<b>17CHC03 - MATERIAL TECHNOLOGY</b>
<b>Course Outcomes:</b>	
1	Understand the properties of Iron and its alloys, Stainless Steel and their application in chemical process industries
2	Comprehend the criterion for selection of materials for chemical process industries
3	Gain an insight into the properties of non ferrous metals and its alloys for applications in chemical process industries.
4	Apply the knowledge about various materials used in chemical process industries
5	Select materials for high temperature and sour service

<b>Course Code/ Course Name:</b>	<b>17CHC04 - CHEMICAL ENGINEERING FLUID MECHANICS</b>
<b>Course Outcomes:</b>	
1	Understand the concept of fluid statics and its applications; Apply the principles of dimensional analysis for engineering applications.
2	Analyze the types of fluid flow in pipes; Understand the basic equations in fluid flow operations.
3	Retrieve and apply the concepts of flow around solids in packed and fluidized beds.
4	Appraise and select the flow measuring devices in process industries.
5	Analyze the performance of fluid moving machinery and appraise the types of valves and pipe fittings in process industries.



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<b>Course Code/ Course Name:</b>	<b>17CHC05- CHEMICAL PROCESS CALCULATIONS</b>
<b>Course Outcomes:</b>	
1	Understand and apply composition of mixtures/solution and determine Pressure, volume and temperature of gas using equation of state
2	Apply the law of conservation of mass for different batch and continuous unit operations
3	Apply the law of conservation of mass for unit processes and evaluate yield, conversion, recycle ratio/purge/bypass of chemical reactors
4	Apply energy balance for reacting system and understand the effect of temperature and pressure on heat of reaction
5	Evaluate the combined material and energy balance of specific industries and understand industrial need for material and energy balance

<b>Course Code/ Course Name:</b>	<b>17CHP02-CHEMICAL TECHNOLOGY LABORATORY</b>
<b>Course Outcomes:</b>	
1	Understand the impact of COD, pH measurements on given sample and solving the engineering problems
2	Determine the available chlorine content in bleaching powder, purity of washing soda.
3	Conduct experiment to predict aniline point of oil, Saponification of oil
4	Perform to determination of purity of glycerol, hydrogen peroxide strength.
5	Conduct experiment to predict molecular weight, conductivity of electrolyte solution

<b>Course Code/ Course Name:</b>	<b>17CHP03 – FLUID MECHANICS LABORATORY</b>
<b>Course Outcomes:</b>	
1	Determine the coefficient of discharge of venturimeter, orifice meter, rotameter, open drum orifice and $V_1$ notch.
2	Verify the Moody's chart for flow through straight pipe/concentric pipes and helical coil
3	Predict the frictional loss coefficient for different valves and pipe fittings
4	Determine the pressure drop through packed bed and minimum fluidization velocity in fluidized bed
5	Draw the characteristics curves of centrifugal pump and reciprocating pump



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## SEMESTER 4:

<b>Course Code/ Course Name:</b>	<b>17MYB07- NUMERICAL METHODS</b>
<b>Course Outcomes:</b>	
1	Solve an algebraic or transcendental equation using an appropriate numerical method
2	Numerically approximate functions with Lagrange polynomials
3	Understand and apply appropriate techniques for numerical differentiation and integration.
4	Make use of numerical methods in the solution of ordinary differential equations which are useful in solving engineering problems
5	Solve initial value problem ordinary differential equations with explicit or implicit methods as appropriate.

<b>Course Code/ Course Name:</b>	<b>17CHC06- PROCESS ORGANIC SYNTHESIS</b>
<b>Course Outcomes:</b>	
1	Understand the various unit process in synthesis of organic compounds
2	Understand the application of organic compounds in various industries
3	Analysis chemicals reaction and reaction conditions
4	Identify reaction schemes and mechanisms for a number of important reaction used in organic synthesis
5	Understand the synthesis of important dyes and drugs

<b>Course Code/ Course Name:</b>	<b>17CHC07-PROCESS HEAT TRANSFER</b>
<b>Course Outcomes:</b>	
1	Understand the fundamental principles of conduction
2	Acquire knowledge in convection and radiation heat transfer
3	Familiarize with the fundamentals of radiation and radiation shield
4	Apply the knowledge of heat transfer in the design of evaporators, boiling and condensation
5	Design and analyze the performance of heat exchangers



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<b>Course Code/ Course Name:</b>	<b>17CHC08– MECHANICAL OPERATIONS</b>
<b>Course Outcomes:</b>	
1	Demonstrate the knowledge of particle characterization, size analysis, storage and transportation of solids
2	Appraise and select the size reduction equipments and industrial screens
3	Understand and select the mechanical separation equipments based on surface properties of solids
4	Exhibit the principle of filtration and types of industrial filters
5	Compare and recognize mixing and agitation equipments

<b>Course Code/ Course Name:</b>	<b>17CHC09-CHEMICAL ENGINEERING THERMODYNAMICS</b>
<b>Course Outcomes:</b>	
1	Apply thermodynamic concepts and the laws of thermodynamics to various systems and processes
2	Evaluate the PVT behavior of ideal and real gases
3	Understand the properties of solution and determine the partial molar properties from mixture properties and vice-versa
4	Apply chemical reaction equilibrium between phase to engineering system with two or more coexisting phases
5	Apply chemical reaction equilibrium for thermodynamic analysis of homogeneous reaction

<b>Course Code/ Course Name:</b>	<b>17CHP04-PHYSICAL AND ORGANIC CHEMISTRY LABORATORY</b>
<b>Course Outcomes:</b>	
1	Handle Nephelometer to estimate the turbidity of water
2	Perform the experiment on nitrogen content in urea
3	Utilize UV Spectrophotometer and flame photometer to estimate the ions in solution
4	Prepare m-Dinitrobenzene and Benzoic Acid from organic chemicals
5	Identify the nature and functional groups of organic compounds



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<b>Course Code/ Course Name:</b>	<b>17CHP05 – MECHANICAL OPERATIONS LABORATORY</b>
<b>Course Outcomes:</b>	
1	Assess power requirements and crushing laws constant using Jawand Roll Crusher.
2	Determine the critical speed and assess work index by using Ball mill
3	Estimate average particle size and specific surface area by conducting Sieve Analysis, Beaker Decantation and Air Permeability experiments
4	Estimate specific cake and filter medium resistance using Filter press, Leaf filter and Rotary drum filters.
5	Design a thickener using batch sedimentation test data and assess the efficiency of cyclone separator

## SEMESTER 5:

<b>Course Code/ Course Name:</b>	<b>17CHC10 – MASS TRANSFER I</b>
<b>Course Outcomes:</b>	
1	Understand diffusion operations in gases liquids and solids.
2	Understand the concept of interphase mass transfer coefficients and equipment
3	Understand the concept humidifiers and cooling towers.
4	Retrieve and apply the knowledge gained in mass transfer to perform simple calculations in drying
5	Apply the knowledge gained in mass transfer to perform simple calculations in crystallization process

<b>Course Code/ Course Name:</b>	<b>17CHC11 – CHEMICAL PROCESS INDUSTRIES</b>
<b>Course Outcomes:</b>	
1	Understand the concept block diagram and can differentiate the unit processes and unit operations.
2	Understand the production of inorganic chemicals and its importance.
3	Gain knowledge about pharmaceuticals and purpose using it
4	Understand the method of producing starch and sugar.
5	Gain knowledge about the various processes involved in petroleum refining



  
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<b>Course Code/ Course Name:</b>	<b>17CHC12 – CHEMICAL REACTION ENGINEERING</b>
<b>Course Outcomes:</b>	
1	Understand the concept of stoichiometric equations, order of reaction and chemical kinetic theories.
2	Understand the performance equations of ideal reactors.
3	Apply knowledge of performance studies to compare reactors of different types in series and parallel.
4	Learn the concepts of multiple reactions involved in PFR and MFR.
5	Analyze the performance of reactors under steady state non-isothermal conditions.

<b>Course Code/ Course Name:</b>	<b>17CHC13 –CHEMICAL EQUIPMENT DESIGN - I</b>
<b>Course Outcomes:</b>	
1	Able to design machine elements; Develop Process Flow Diagrams and Piping Instrumentation Diagrams
2	Able to design various reactors used in chemical industry.
3	Able to design heat exchangers for chemical process
4	Able to design evaporators for chemical process
5	Able to design crystallizers and centrifuges for chemical process

<b>Course Code/ Course Name:</b>	<b>17CHP06 – PROCESS HEAT TRANSFER LABORATORY</b>
<b>Course Outcomes:</b>	
1	Determine heat transfer coefficient for packed column apparatus and determine the thermal conductivity of given material
2	Evaluate the performance and determine individual and overall HTC
3	Able to understand radiation heat transfer
4	Estimate the HTC for heat transfer through double pipe heat exchangers and shell and tube heat exchangers.
5	Appraise the performance of evaporator and determine steam economy



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Course Code/ Course Name:	17CHP07 – CHEMICAL REACTION ENGINEERING LABORATORY
<b>Course Outcomes:</b>	
1	Determine the rate constant and order of the reaction.
2	Verify the dispersion number of PFR and MFR.
3	Predict the percentage conversion of reactions carried out in combined reactors.
4	Determine the rate constant, reactor size and conversion.
5	Determine the rate constant and performance studies of multiple reactors.

## SEMESTER 6:

Course Code/ Course Name:	17CHC14 – MASS TRANSFER II
<b>Course Outcomes:</b>	
1	Understand absorption operations
2	Understand the concept of distillation and their types.
3	Understand the types of extraction and design of extraction column.
4	Understand the principle of adsorption and their types applied in process industries
5	Apply the ternary equilibrium diagram concepts to determine the number of stages required for separation of liquid-liquid and solid-liquid mixtures

Course Code/ Course Name:	17CHC15 –CHEMICAL EQUIPMENT DESIGN-II
<b>Course Outcomes:</b>	
1	Able to calculate the number of plate and height of distillation column
2	Able to Design absorption column by calculating height and number of plate of the column
3	Able to design drying rate in the process calculation
4	Able to design pressure vessels for chemical process
5	Able to design storage vessels



  
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<b>Course Code/ Course Name:</b>	<b>17CHC16 - PROCESS INSTRUMENTATION DYNAMICS AND CONTROL</b>
<b>Course Outcomes:</b>	
1	Acquire the importance of measurement in process industries
2	Gain knowledge of systems and their responses to different input methods
3	Comprehend the principles of controllers and control elements for different applications and development of block diagram
4	Gain familiarity with transient response & Stability of closed loops
5	Understand frequency response and stability analyses & Exhibit familiarity with advance technique

<b>Course Code/ Course Name:</b>	<b>17CHC17 - CHEMICAL PROCESS PLANT SAFETY AND HAZARD ANALYSIS</b>
<b>Course Outcomes:</b>	
1	Demonstrate the awareness of plant safety, plant layout and the usage of safety codes.
2	Understand the selection and replacement of process equipment
3	Exhibit the skill in classifying chemical, fire, explosion hazards
4	Analyze the response to health hazards and to implement the effective process control
5	Understand the rules and act framed by government for safe working environment

<b>Course Code/ Course Name:</b>	<b>17CHP08 – PROCESS COMPUTATION LABORATORY</b>
<b>Course Outcomes:</b>	
1	Use spread sheets to estimate the molecular weight, density, enthalpy of the reaction and cell potential
2	Apply Newton Raphson method to determine the concentration of species and solubility of solute in aqueous solutions
3	Able to determine the free energy changes and equilibrium constant for a given reaction
4	Assess the kinetics and rate of a reaction and estimate heat transfer area by applying composite curve method
5	Using MATLAB/ C program able to design shell and tube, double pipe heat exchangers, evaporators and condenser



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<b>Course Code/ Course Name:</b>	<b>17CHP09 – INDUSTRIAL TRAINING</b>
<b>Course Outcomes:</b>	
1	To provide hands-on experience on the principles and operations of any chemical process industry

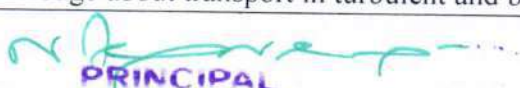
<b>Course Code/ Course Name:</b>	<b>17GED06 - COMPREHENSION</b>
<b>Course Outcomes:</b>	
1	The Student will be able to understand and comprehend any given problem related to Chemical Engineering field.

## SEMESTER 7:

<b>Course Code/ Course Name:</b>	<b>17CHC18 - PROCESS ENGINEERING ECONOMICS AND MANAGEMENT</b>
<b>Course Outcomes:</b>	
1	Able to understand value of money and depreciation with time
2	Able to select profitable project and calculate economic balance sheet
3	Can make economic balance on unit operations
4	Able to understand the theory behind Inventory Control and organization Types
5	Able to understand the theory behind the process development

<b>Course Code/ Course Name:</b>	<b>17CHC19 - TRANSPORT PHENOMENA</b>
<b>Course Outcomes:</b>	
1	Understand the basic knowledge of momentum, heat and mass transport.
2	Understand the knowledge of momentum transport
3	Understand the knowledge of energy transport
4	Understand the knowledge of mass transport
5	Understand the knowledge about transport in turbulent and boundary layer flow.



  
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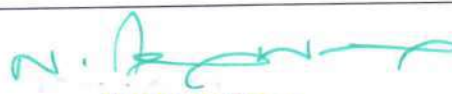
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<b>Course Code/ Course Name:</b>	<b>17CHC20 - PROCESS MODELING AND SIMULATION</b>
<b>Course Outcomes:</b>	
1	Understand the fundamentals of modeling and their applications to transport/energy equations, chemical and phase equilibria kinetics
2	Create mathematical models for fluid flow operations and various models on momentum transfer
3	Understand the physical phenomena occurring in the heat transfer system
4	Develop mathematical models for Distillation / Absorption / Extraction Columns
5	Create the mathematical models for reactors and to know about the process simulators like ASPEN and HYSYS

<b>Course Code/ Course Name:</b>	<b>17CHP10 – PROCESS DYNAMIC AND CONTROL LABORATORY</b>
<b>Course Outcomes:</b>	
1	Determine time constant for first order and second order system
2	Analyze the response of interacting & non-interacting level systems
3	Behavior & Performance analyses of P, PI, PD, PID & ON-OFF control in thermal, liquid, flow and pressure process
4	Draw the performance characteristics of various control valves
5	Evaluate the optimum controller settings for controller & Application of Simulink (MAT LAB)

<b>Course Code/ Course Name:</b>	<b>17CHD01– PROJECT WORK-I</b>
<b>Course Outcomes:</b>	
1	The students will be able to study problems in the field of chemical Engineering through literature survey and its reviews.
2	The students will be able to Undertake problem identification, formulation and solution.
3	The students will be able to Design engineering solutions to complex problems utilizing a systems approach and develop projects
4	The students will be able to Communicate effectively and to present ideas clearly
5	The students will be able to demonstrate the knowledge, skills and work as a team to achieve common goal



  
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## SEMESTER 8

Course Code/ Course Name:	17CHD02 – PROJECT WORK-II
<b>Course Outcomes:</b>	
1	The students will be able to study problems in the field of chemical Engineering through literature survey and its reviews.
2	The students will be able Undertake problem identification, formulation and solution.
3	The students will be able to Design engineering solutions to complex problems utilizing a systems approach and develop projects
4	The students will be able to Communicate effectively and to present ideas clearly
5	The students will be able to demonstrate the knowledge, skills and work as a team to achieve common goal

## PROFESSIONAL ELECTIVES:

Course Code/ Course Name:	17CHX01 - OIL AND NATURAL GAS ENGINEERING
<b>Course Outcomes:</b>	
1	Understand the occurrence of petroleum, exploration techniques, types of rings and platforms.
2	Examine the composition of natural gas, compression, purification, liquefaction and shale oil occurrence, extraction and purification.
3	Understand the storage and transportation of natural gas and power generation in domestic and industrial needs.
4	Examine the hydrodynamics equation for flow through porous media, PVT properties of gas and multiphase flow correlations.
5	Recognize legal aspects governing gas oil spill management and case studies.

Course Code/ Course Name:	17CHX02 - BIOCHEMICAL ENGINEERING
<b>Course Outcomes:</b>	
1	Understand the growth kinetics of microorganisms and immobilization techniques
2	Apply the knowledge of micro- organism and immobilization techniques
3	Understand sterilization concept to design and analysis bioreactors
4	Understand the transport mechanism of oxygen inside the microbial cell
5	Apply the knowledge of industrial bioreactor and downstream processes in process industries



  
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<b>Course Code/ Course Name:</b>	<b>17CHX03 - INSTRUMENTAL METHODS OF ANALYSIS</b>
<b>Course Outcomes:</b>	
1	Gain the knowledge about sampling and processing of materials
2	Grasp the principles, working and applications of various chromatography methods
3	Appreciate the particle size distribution and rheological behavior
4	Gain knowledge about various electroanalytical techniques and their application
5	Appreciate the principles and application of various spectroscopic methods

<b>Course Code/ Course Name:</b>	<b>17CHX04 - FOOD TECHNOLOGY</b>
<b>Course Outcomes:</b>	
1	Understand the concept of chemical engineer role in food industry.
2	Gain knowledge about various unit operations involved in food processing.
3	Get the exposure on use of different chemical additives in foods during food processing and preservation.
4	Gain knowledge about the various food industries like bakery, chocolate and dairy.
5	Understand the requirements for food packaging and waste disposal.

<b>Course Code/ Course Name:</b>	<b>17CHX05 – FLUID MOVERS</b>
<b>Course Outcomes:</b>	
1	Able to select and assess the performance of different types of pumps
2	Familiarize with drives and power transmission of pumps and testing of pumps
3	Able to select and assess the performance of different types compressors
4	Familiarize with the types, theory and performance of blowers; Estimate the power requirement and efficiency of blowers
5	Able to select and analyze the performance of different types of fans



  
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<b>Course Code/ Course Name:</b>	<b>17CHX06 – PETROLEUM REFINING ENGINEERING</b>
<b>Course Outcomes:</b>	
1	Understand the concept of formation of crude oil and initial reforming process.
2	Understand the cracking process of higher petroleum fractions to lower fractions.
3	Apply knowledge of unit processes for sulphur removal, wax removal and oil/water separation.
4	Learn the petrochemicals derived from naphtha using thermal treatment.
5	Understand the process flow diagrams of the petrochemicals production and its applications.

<b>Course Code/ Course Name:</b>	<b>17CHX07 - DRUGS AND PHARMACEUTICALS TECHNOLOGY</b>
<b>Course Outcomes:</b>	
1	Understand the concept of drugs manufacturing and its applications.
2	Understand the Drug Metabolism and pharmaco–kinetics principles
3	Apply knowledge of unit processes and analytical methods to develop new processes and product formulations.
4	Demonstrate statistical quality control procedure and quality assurance programmes in various stages of pharmaceutical process.
5	Analyze the pharma products using modern techniques.

<b>Course Code/ Course Name:</b>	<b>17CHX08 – COMPUTATIONAL FLUID DYNAMICS IN CHEMICAL ENGINEERING</b>
<b>Course Outcomes:</b>	
1	Develop models for fluid flow and heat transfer problems
2	Apply finite volume method for developing solution of steady state diffusion and convection diffusion problems
3	Apply SIMPLER, SIMPLEC and PISO algorithms for solution of industrial and R & D problems
4	Solve unsteady flow heat conduction and convection diffusion problems
5	Comprehend the nature and different models for turbulence flow



  
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<b>Course Code/ Course Name:</b>	<b>17CHX09 - CHEMICAL PROCESS UTILITIES</b>
<b>Course Outcomes:</b>	
1	Recognize the importance of compressed air, humidification and dehumidification process and PSA systems
2	Comprehend the water treatment and steam utilization practices in process industries
3	Select suitable vacuum systems for different chemical processes
4	Grasp the principles of refrigeration process for application in chemical process industries
5	Understand the importance of insulation and calculate critical thickness of insulation; Gain an insight into the characteristics of inert gases.

<b>Course Code/ Course Name:</b>	<b>17CHX10 – SEPARATION AND PURIFICATION PROCESSES</b>
<b>Course Outcomes:</b>	
1	Understand the separation processes for selecting optimal process for new and innovative applications.
2	Able to select a suitable membrane separation technique.
3	Understand the adsorption separation process and chromatography methods.
4	Can apply the latest concepts like super critical fluid extraction, pervaporation, lyophilisation etc., in Chemical process industries.
5	Understand Innovative techniques of controlling and managing oil spills.

<b>Course Code/ Course Name:</b>	<b>17CHX11 – AIR POLLUTION AND CONTROL</b>
<b>Course Outcomes:</b>	
1	Know about the various sources of air pollution and its effect
2	Analyze the chemical and physical properties of gases; Able to design incinerators
3	Asses the fundamentals of particulate matter and design absorber to control air pollution
4	Perform the design of air cleaning equipments and evaluate their performance
5	Remember the air pollution regulation and different laws related to air pollution and control



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<b>Course Code/ Course Name:</b>	<b>17CHX12 – EMPLOYABILITY SKILLS</b>
<b>Course Outcomes:</b>	
1	Apply verbal, non verbal, written and communicationskills during employment
2	Perform in a team with collaboration and ability to make decision in work place
3	React under critical situation and able to solve problem arising out of it in chemical industries
4	Apply the leadership and assertiveness skills in work place
5	Apply computer literacy in solving problems through chemical engineering software/simulation

<b>Course Code/ Course Name:</b>	<b>17CHX13 – POLYMER TECHNOLOGY</b>
<b>Course Outcomes:</b>	
1	Understand the principles and classify polymerization processes
2	Explain the structure and properties of polymers
3	Assess the principles and methods of moulding plastics
4	Comprehend techniques microscopic instruments
5	Describe the properties and manufacturing processes of polymers

<b>Course Code/ Course Name:</b>	<b>17CHX14 – PILOT PLANT AND SCALE UP METHODS</b>
<b>Course Outcomes:</b>	
1	Comprehend the principles of pilot plants, models, similarity and scale up methods
2	Solve the problems in scale-up of mixing and heat transfer equipment
3	Able to scale-up of columns and dryers
4	Able to scale-up of different types of reactors
5	Examine the scale-up of ball mills, furnaces, screw extruders, etc



  
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<b>Course Code/ Course Name:</b>	<b>17CHX15 – POWER PLANT MANAGEMENT</b>
<b>Course Outcomes:</b>	
1	Gain the knowledge about principles of power plant and boilers
2	Grasp the principles, working and applications of various power plant components.
3	Familiarize with the nuclear and hydel power plants
4	Perceive the principles of selection operation and design features of diesel and gas turbine power systems
5	Comprehend economic viability of various alternate energy sources.

<b>Course Code/ Course Name:</b>	<b>17CHX16 – PULP AND PAPER TECHNOLOGY</b>
<b>Course Outcomes:</b>	
1	Recognize various methods of wood preparation and pulping
2	Apply the knowledge of processing and bleaching of pulp in paper making process
3	Comprehend the finishing and surface treatment of various grades of paper
4	Exhibit familiarity with various methods for testing of pulp and paper
5	Identify the type of pollution and apply appropriate techniques to control pollution

<b>Course Code/ Course Name:</b>	<b>17CHX17 – HETEROGENOUS CATALYTIC REACTIONS</b>
<b>Course Outcomes:</b>	
1	Understand the concept of different models in the reactor design to determine the performance based on RTD.
2	Understand the kinetic studies on homogeneous catalytic reactions with different models.
3	Apply knowledge of diffusion effects during heterogeneous reactions and its effect in packed beds.
4	Apply the concepts of diffusion mechanism in catalyst and determine the reaction limiting regimes.
5	Apply the knowledge for design of heterogeneous reactors.



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<b>Course Code/ Course Name:</b>	<b>17CHX18 - PROCESS OPTIMIZATION</b>
<b>Course Outcomes:</b>	
1	Able to design experiments and formulate models of chemical processes/equipment.
2	Able to understand and formulate various optimization methods.
3	Able to understand and formulate single variable problem.
4	Able to understand and formulate multi variable problem
5	Understand optimization of process variables to get maximum yield/conversion, product mix pattern product distribution etc

<b>Course Code/ Course Name:</b>	<b>17GEA03 – TOTAL QUALITY MANAGEMENT</b>
<b>Course Outcomes:</b>	
1	Understand the meaning of quality and its importance
2	Implement the principles of total quality management and address the peculiarities in it.
3	Assess various tools and techniques of quality management
4	Apply quality tools and techniques in both manufacturing and service industry
5	Analyze quality management issues in the industry and suggest solutions to those issues

<b>Course Code/ Course Name:</b>	<b>17CHX20 - MULTICOMPONENT DISTILLATION</b>
<b>Course Outcomes:</b>	
1	Able to determine bubble point and dew point for multicomponent mixtures using K-values and relative volatility.
2	Able to determine minimum reflux ratio, minimum no. of stages, feed tray location, and distribution of key components using various shortcut methods.
3	Able to determine the number of stages in multi-stage multicomponent towers by various rigorous calculation methods.
4	Able to determine the number of stages in multi-stage multicomponent towers by various rigorous calculation methods.
5	Able to carry out the design of azeotropic distillation and extractive distillation systems. Design a tray and packed columns accounting efficiency terms.



  
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<b>Course Code/ Course Name:</b>	<b>17CHX21 - CHEMICAL PROCESS EQUIPMENT AND AUXILIARIES</b>
<b>Course Outcomes:</b>	
1	Understand the knowledge of characteristics, handling and storage of particulate solids
2	Understand the working and selection of machinery equipments
3	Understand the selection and importance of valves used in petroleum industry
4	Understand the selection of usage of dryer with case studies
5	Understand the knowledge of various utility equipments

<b>Course Code/ Course Name:</b>	<b>17CHX22 - DRILLING AND WELL ENGINEERING</b>
<b>Course Outcomes:</b>	
1	Understand the basic concept of drilling and fluid behavior
2	Understand the selection of drilling methods and design of equipments used
3	Understand and analyze the importance of selecting drill bits the drilling fluid
4	Analyze the well types and importance of casing and cementing
5	Understand the safety to be followed at the well site and environment impact.

<b>Course Code/ Course Name:</b>	<b>17GEA04 – ENGINEERING ETHICS AND HUMAN VALUES</b>
<b>Course Outcomes:</b>	
1	Aware of components of ethics and human values
2	Handle the knowledge interpersonal and organizational issues in ethics.
3	Acquire knowledge on safety and perform risk analysis
4	Highlight the responsibilities and rights in risky situation
5	Identify the role of professional bodies and address global issues



*N. Jagan*

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<b>Course Code/ Course Name:</b>	<b>17CHX24 - DESIGN OF HEAT EXCHANGERS</b>
<b>Course Outcomes:</b>	
1	Demonstrate a basic understanding of several types of heat exchangers
2	Learn how to design and sizing of double pipe heat exchanger
3	Learn how to design and sizing of shell-and-tube heat exchangers
4	Learn how to design and sizing of compact heat exchangers
5	Learn to select appropriate heat exchanger for the given application

<b>Course Code/ Course Name:</b>	<b>17CHX25 – DESIGN OF PRESSURE VESSELS AND PIPING</b>
<b>Course Outcomes:</b>	
1	Exhibit knowledge on stresses in cylindrical, conical and spherical pressure vessels
2	Familiarize with pressure vessel codes and their application in design
3	Able to design the supports for vertical and horizontal vessels
4	Determine the buckling of cylinders and design stiffeners
5	Assess piping layout and design piping system as per piping code

<b>Course Code/ Course Name:</b>	<b>17CHX26 – DRYING TECHNOLOGY</b>
<b>Course Outcomes:</b>	
1	Evaluate moisture content, moisture removal and its requirement
2	Measure thermal properties related to drying
3	Can select suitable dryer meeting requirement
4	Can judge quality of dried products
5	Can develop functional design of dryers assess novel and hybrid drying technology



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<b>Course Code/ Course Name:</b>	<b>17CHX27 COMPUTATIONAL TECHNIQUES FOR CHEMICAL ENGINEERS</b>
<b>Course Outcomes:</b>	
1	The students will be able to use the basic MATLAB commands.
2	The students will be able to do simple matrix, algebraic and vector calculations using MATLAB commands.
3	The students will be able to solve the differential and integral equations using MATLAB commands.
4	The students will be able to generate plots and export this for use in reports and presentations.
5	The students will be able to run the Simulink file for the transfer functions.

<b>Course Code/ Course Name:</b>	<b>17CHX28 INTERNET OF THINGS (IOT) IN CHEMICAL PROCESS INDUSTRIES</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand basics of Electrical circuits and Electronic devices
2	The students will be able to understand IOT characteristics and its essential components
3	The students will be able to describe Arduino processor and working of Analog and Digital I/O pins
4	The students will be able to understand Raspberry pi and its interface with other devices
5	The students will be able to understand the application of IOT in industries.

<b>Course Code/ Course Name:</b>	<b>17MYB12 BASIC STATISTICS AND NUMERICAL ANALYSIS</b>
<b>Course Outcomes:</b>	
1	The students will be able to use statistical tools to solve problems from different fields.
2	The students will be able to acquaint the basic concepts in numerical methods and their uses.
3	The students will be able to represent the data and find the intermediate values, when huge amounts of experimental data are involved, the methods discussed on interpolation will be useful in constructing approximate polynomial.
4	The students will be able to explain the consequences of finite precision and the inherent limits of the numerical methods considered and by using differentiation and integration.
5	The students will be able to understand the solution of ordinary differential equations will be useful in attempting any engineering problem.



  
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<b>Course Code/ Course Name:</b>	<b>17CAX11 – INTERNET OF THINGS</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand basics of Electrical circuits and Electronic devices
2	The students will be able to understand IOT characteristics and its essential components.
3	The students will be able to describe Arduino processor and working of Analog and Digital I/O pins
4	The students will be able to understand Raspberry pi and its interface with other devices
5	The students will be able to implement a IoT system using Arduino/Raspberry Pi.

  
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<b>Regulation :</b>	<b>R17</b>
<b>Program Code :</b>	<b>CE</b>
<b>Program Name :</b>	<b>Civil Engineering</b>

## VISION OF THE DEPARTMENT

The Civil Engineering Department is committed to rendering our students with the latest technology and modern methods to acquire knowledge and skills in all sectors to make them nationally and globally competent Civil Engineers.

## MISSION OF THE DEPARTMENT

- To make highly competent and technologically capable professionals by augmenting their knowledge through interactions and camps.
- To impart education to transfer the knowledge and skills for challenging applications such as computer based analysis, design using relevant standards, execution and maintenance of life line Civil Engineering projects.
- To imbibe the leadership quality, professional ethics, environmental consciousness and social responsibilities to serve the society through co-curricular and extra-curricular activities.

## PROGRAM EDUCATIONAL OBJECTIVES (PEOS):

### List of PEOs

<b>PEO 1:</b>	To exhibit an in-depth knowledge in the core areas of Civil and allied engineering
<b>PEO 2:</b>	To acquire profound knowledge in fundamentals, techniques and design of Civil Engineering system that encourages them to develop innovative techniques in their professional practice.
<b>PEO 3:</b>	To engage in life-long learning through independent study and participation in professional conferences, seminars and workshops.
<b>PEO 4:</b>	To become a successful Civil Engineer so as to meet the demand and be industry ready in the field of Civil Engineering and related fields.
<b>PEO 5:</b>	To develop an understanding of the multidisciplinary approach with a view to relating Engineering issues to social and human context in which their engineering contributions will be utilized.



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## CIVIL ENGINEERING



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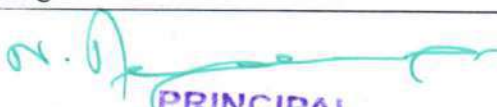
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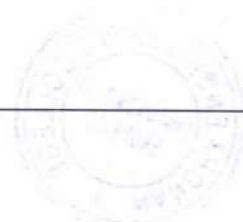
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## PROGRAM OUTCOMES:

ATTRIBUTE	GA'S
Engineering Knowledge	An ability to apply knowledge of computing, fundamental mathematics, algorithmic principles and Civil Engineering theory in design to solve the real-world problems.
Problem Analysis	Ability to identify the basic principles, mathematical tools and apply the fundamentals in the field of engineering sciences.
Design And Development of Solutions	An ability to make the graduates, who come with a background of social science and humanities, realize the impact of engineering solutions on the quality of life and physical environment in a global and societal context.
Investigation of Complex Problems	An ability to make graduates be aware of the continued research in the field of civil engineering and will actively engages themselves in research and development.
Modern Tool Usage	An ability to be aware of the emerging technologies, equip themselves with current techniques, tools and utilize the same to solve issues in the professional field.
The Engineer and Society	An ability to understand the duties as professional engineers in the society, protect the public health, safety and welfare, act against plagiarism and respect the copyrights and patents of others.
Environment & Sustainability	An ability to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
Ethics	An ability to apply the basic ethical principles with commitments in Civil Engineering field.
Individual And Team Work	Ability to realize the importance of teamwork and work with in multi-disciplinary team.
Communication	An ability to communicate effectively on Civil Engineering activities with engineering society to produce reports through written, oral and graphical methods
Project Management And Finance	An ability to recognize the role of a leader, leadership principles to manage projects in multi-disciplinary environments
Lifelong Learning	An ability to engage in continual professional development and life-long learning.



  
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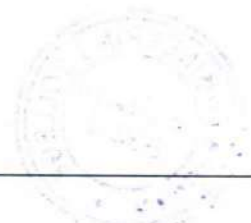
## PROGRAM SPECIFIC OUTCOMES (PSOs) OF THE DEPARTMENT:

Graduates should be able to

PSO1:	An ability to recognize the importance of Civil Engineering professional development by pursuing postgraduate studies
PSO2:	An ability to face competitive examinations that offer challenging and rewarding careers
PSO3:	An ability to apply design, develop and execution of projects in the construction of various Civil Engineering disciplines
PSO4:	An ability to become a good entrepreneur and to improve the management skills.



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## SEMESTER I:

<b>Course Code/ Course Name:</b>	<b>17EYA01 - PROFESSIONAL ENGLISH - I</b>
<b>Course Outcomes:</b>	
1	The students will be able to construct clear, grammatically correct sentences using a variety of sentence structures and appropriate vocabulary.
2	The students will be able to utilize listening skills to articulate one's own point of view in different circumstances.
3	The students will be able to apply appropriate communication skills across settings, purposes, and audiences.
4	The students will be able to distinguish main ideas and supporting details and employ active reading strategies to understand texts at the maximum level.
5	The students will be able to equip themselves with writing skills needed for academic as well as workplace contexts.

<b>Course Code/ Course Name:</b>	<b>17MYB01 - CALCULUS AND SOLID GEOMETRY</b>
<b>Course Outcomes:</b> The students will be able to	
1	Apply the concept of orthogonal reduction to diagonalise the given matrix.
2	Have knowledge about the geometrical aspects of sphere.
3	Find the radius of curvature, circle of curvature and centre of curvature for a given curve.
4	Classify the maxima and minima for a given function with several variables, through by finding stationary points.
5	Demonstrate the use of double and triple integrals to compute area and volume.

<b>Course Code/ Course Name:</b>	<b>17PYB01- PHYSICS FOR ENGINEERS</b>
<b>Course Outcomes:</b>	
1	Acquire knowledge regarding Acoustics and ultrasonic
2	Applying knowledge in the fields of optics & laser technology
3	Design the sensors using the knowledge of fiber optics
4	Gain the knowledge of wave, particle nature and matter waves
5	Analyze the different kind of crystal structures and crystal growth



  
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<b>Course Code/ Course Name:</b>	<b>17CYB01 - APPLIED CHEMISTRY</b>
<b>Course Outcomes:</b> The students will be able to	
1	Apply knowledge of fundamental principles of chemistry
2	Define and solve engineering problems, including the utilization of creative and innovative skills
3	Gain practical experience with chemical process equipment as well as to analyze and interpret data
4	Understand the impact of engineering solutions in a global, economic, environmental and societal content
5	Understand the concept of engineering materials

<b>Course Code/ Course Name:</b>	<b>17MEC01 - ENGINEERING GRAPHICS</b>
<b>Course Outcomes:</b> The students will be able to	
1	The Students will be able to construct conic sections and special curves of required specifications
2	The Students will be able to apply the concept of first angle projection to create project of straight lines, planes, solids and section of solids
3	The Students will be able to develop a surface drawing of a solid model with given dimensions
4	The Students will be able to build orthographic, isometric projections of a three dimensional object
5	The Students will be able to make use of the knowledge of engineering drawing to create physical models

<b>Course Code/ Course Name:</b>	<b>17CEC01- FUNDAMENTALS OF ENGINEERING MECHANICS</b>
<b>Course Outcomes:</b> The students will be able to	
1	Understand the Equilibrium of a particle and Forces in space
2	Analyze the problems in static equilibrium of particles and rigid bodies in two dimensions
3	Evaluate various sectional properties like Centroid, Moment of Inertia
4	Identify with the laws of motion, the kinematics of motion and the interrelationship
5	Realize the effect of friction on equilibrium.



  
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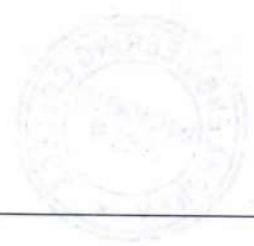
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<b>Course Code/ Course Name:</b>	<b>17GYP01 - PHYSICS AND CHEMISTRY LABORATORY</b>
<b>Course Outcomes:</b> The students will be able to	
1	Acquire the fundamental knowledge in optics such as interference, Diffraction and Understand about the spectral instruments etc
2	Gain the basic knowledge about handling the laser light and Identify the basic parameters of an optical fibre
3	Analyze the properties of matter with sound waves
4	Apply knowledge of measurement of hardness producing ions, chloride, alkalinity, DO, conductance, EMF and pH
5	Understand the impact of water quality and solve engineering problems

<b>Course Code/ Course Name:</b>	<b>17GYP02 ENGINEERING PRACTICES LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand various civil engineering practices like plumbing, carpentry and relevant tools
2	The students will be able to understand various manufacturing processes like welding, machining and sheet metal work
3	The students will be able to do residential house wiring and Measure energy and resistance to earth of an electrical equipment
4	The students will be able to perform the assembling and testing of the PCB based electronic circuits.
5	The students will be able to make / operate / utilize the simple engineering components



  
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## SEMESTER II

<b>Course Code/ Course Name:</b>	<b>17EYA02 - PROFESSIONAL ENGLISH - II</b>
<b>Course Outcomes:</b>	
1	The students will be able to communicate using a variety of sentence structures and appropriate vocabulary.
2	The students will be able to comprehend conversations and short talks delivered in English and respond accordingly.
3	The students will be able to speak appropriately and effectively in various situations.
4	The students will be able to employ active reading strategies to understand texts at the maximum level.
5	The students will be able to equip themselves with writing formal letters and winning Job Application.

<b>Course Code/ Course Name:</b>	<b>17MYB02 - COMPLEX ANALYSIS AND LAPLACE TRANSFORMS</b>
<b>Course Outcomes:</b> The students will be able to	
1	Predict the suitable method to solve second and higher order differential equations.
2	Apply the concepts of Differentiation and Integration to Vectors.
3	Compute an analytic function, when its real or imaginary part is known.
4	Identify the Singularities and its corresponding Residues for the given function.
5	Predict a suitable method to evaluate the Contour integration.

<b>Course Code/ Course Name:</b>	<b>17PYB03 - MATERIALS PHYSICS</b>
<b>Course Outcomes:</b> The students will be able to	
1	Understand the electrical and thermal conduction in different materials.
2	Understand magnetic properties of materials and maneuver those materials for different applications.
3	Understand the various form of heat conduction and thermal conductivity of good and bad Conductors.
4	Examine the materials using different methods during the manufacturing process.
5	Acquire information regarding new engineering materials and mechanical properties.



  
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<b>Course Code/ Course Name:</b>	<b>17CYB03 - ENVIRONMENTAL SCIENCE</b>
<b>Course Outcomes:</b> The students will be able to	
1	Design a system, component, or process to meet desired needs.
2	Identify, formulate, and solve environmental engineering problems.
3	Understand the professional and ethical responsibility as related to the practice of environmental engineering and the impact of engineering solutions in a global context.
4	Use the techniques, skills, and modern engineering tools necessary for environmental engineering practice.
5	Acquire the knowledge of information technology in environmental science.

<b>Course Code/ Course Name:</b>	<b>17EEC01- BASIC ELECTRICAL AND ELECTRONICS ENGINEERING</b>
<b>Course Outcomes:</b> The students will be able to	
1	Apply the basic laws and investigates the behavior of electric circuits by analytical instruments.
2	Identify the electrical components and explore the characteristics of electrical machines.
3	Analyze the various characteristics of semiconductor devices and applications.
4	Expose the concept of digital electronics
5	Understand the fundamental of communication systems.

<b>Course Code/ Course Name:</b>	<b>17CSC01 - PROBLEM SOLVING AND PYTHON PROGRAMMING</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the working of computers
2	The Students will be able to identify the electrical components and explore the characteristics of electrical machines
3	The Students will be able to identify the various electronic devices and understand the principles of working of the semiconductor devices.
4	The Students will be able to explain the working of Rectifiers, Filters and Amplifiers.
5	The Students will be able to choose appropriate instruments for electrical measurement for a specific application.



  
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<b>Course Code/ Course Name:</b>	<b>17CSP01 - PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY</b>
<b>Course Outcomes:</b>	
1	The student will be able to use MS Word and MS Excel for document preparation.
2	The students will be able to understand the basics of Python Programming constructs
3	The students will be able to realize the need of string manipulation, list, and tuples
4	The students will be able to design programs involving dictionaries, function and modules.
5	The students will be able to develop simple programs with exception handling

<b>Course Code/ Course Name:</b>	<b>17CEP01 -BUILDING DRAWING - I</b>
<b>Course Outcomes:</b> The students will be able to	
1	Capability to draw the simple figures and its types
2	Knowledge to create the simple solids like prism pyramids etc.
3	Ability to draw the plan of the different buildings
4	Expert in isometric, 2D and 3D views of simple objects like cone, prism
5	To identify the symbols and sign conventions in construction.

<b>Course Code/ Course Name:</b>	<b>17GEP02- INTER PERSONAL VALUES</b>
<b>Course Outcomes:</b> The students will be able to	
1	Develop a healthy relationship& harmony with others
2	Practice respecting every human being
3	Practice to eradicate negative temperaments
4	Acquire Respect, Honesty, Empathy, Forgiveness and Equality
5	Practice Exercises and Meditation to lead a healthy life and Manage the cognitive abilities of an Individual



  
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## SEMESTER III

<b>Course Code/ Course Name:</b>	<b>17MYB03 - FOURIER SERIES AND PARTIAL DIFFERENTIAL EQUATIONS</b>
<b>Course Outcomes:</b> The students will be able to	
1	Ability to have fundamental understanding of Fourier series and give Fourier expansions of a given function.
2	Apply transform techniques to solve engineering problems.
3	Analyze and simulate the first and second order linear partial differential equations.
4	Demonstrate a firm understanding of the solution techniques for homogeneous linear PDE's.
5	Ability to apply partial differential techniques to solve the physical engineering problems.

<b>Course Code/ Course Name:</b>	<b>17CEC02 - ENGINEERING GEOLOGY</b>
<b>Course Outcomes:</b> The students will be able to	
1	Identify the available minerals by their properties and behaviour
2	Acquire the knowledge of the topographical formation, interior earth and also the theory of plate tectonics.
3	Identify various geological agents and processes involved.
4	Study the characteristics of ground water
5	Do geological investigations and mapping for construction projects

<b>Course Code/ Course Name:</b>	<b>17CEC03 - MECHANICS OF SOLIDS – I</b>
<b>Course Outcomes:</b> The students will be able to	
1	Study the concepts of stress ,strain and deformation of solids
2	Analyze the plane truss members using various methods
3	Able to draw the bending moment and shear force diagram
4	Analyze the slope and deflection of beams by various methods
5	Understand the concept of stresses in shafts and springs



  
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<b>Course Code/ Course Name:</b>	<b>17CEC04 - MECHANICS OF FLUIDS</b>
<b>Course Outcomes:</b> The students will be able to	
1	Understand the basic properties of fluids and their applications
2	Understand the concepts of static, kinematic and dynamics of fluid flow.
3	Learn types of flow and losses of flow in pipes.
4	Get idea about dimensional and model analysis
5	Understand and solve the boundary layer problems

<b>Course Code/ Course Name:</b>	<b>17CEC05 – BUILDING MATERIALS</b>
<b>Course Outcomes:</b> The students will be able to	
1	Compare the properties of most common and advanced building materials.
2	Understand the applications of glass, timbers and other materials
3	Know the types and application of joineries and plumbing materials
4	Get idea on roofing and flooring materials
5	Understand the importance of modern material for construction.

<b>Course Code/ Course Name:</b>	<b>17CEC06 – SURVEYING</b>
<b>Course Outcomes:</b> The students will be able to	
1	Remember the basics of surveying and different methods of surveying.
2	Understand the contouring and leveling concepts
3	Understanding the fundamental function, use of Theodolite and tacheometry in practical applications.
4	Get idea about route surveying
5	Get exposure on advance surveying such as total Station.



  
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ERODE – 638 052 TAMILNADU

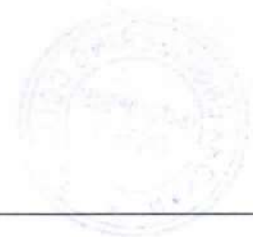
Email: [principal@nandhaengg.org](mailto:principal@nandhaengg.org) Mobile : 73737 12234

<b>Course Code/ Course Name:</b>	<b>17CEP02 – SURVEYING LABORATORY</b>
<b>Course Outcomes:</b> The students will be able to	
1	Compare to practical study on old and advanced methods
2	Get knowledge on Compass Surveying methods.
3	Understand the leveling concept
4	Train to well versed in using theodolite
5	Get exposure to advance surveying such as Total Station.



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அண்ணா பல்கலைக்கழகம்  
அனுமதிக்கப்பட்டது  
2017-18





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## SEMESTER IV

<b>Course Code/ Course Name:</b>	<b>17MYB07 – NUMERICAL METHODS</b>
<b>Course Outcomes:</b> The students will be able to	
1	Solve an algebraic or transcendental equation using an appropriate numerical method
2	Numerically approximate functions with Lagrange polynomials
3	Understand and apply appropriate techniques for numerical differentiation and integration.
4	Make use of numerical methods in the solution of ordinary differential equations which are useful in solving engineering problems
5	Solve initial value problem ordinary differential equations with explicit or implicit methods as appropriate.

<b>Course Code/ Course Name:</b>	<b>17CEC07 - MECHANICS OF SOLIDS - II</b>
<b>Course Outcomes:</b> The students will be able to	
1	Determine the strain energy and compute the deflection of determinate beams, frames and trusses using energy principles.
2	Analyze propped cantilever, fixed beams and continuous beams using theorem of three moment equation.
3	Find the load carrying capacity of columns and stresses induced in columns and cylinders.
4	Determine principal stresses and planes for an element in three dimensional state of stress and study various theories of failure
5	Determine the stresses due to unsymmetrical bending of beams, locate the shear center, and find the stresses in curved beams.

<b>Course Code/ Course Name:</b>	<b>17CEC08 - SOIL MECHANICS</b>
<b>Course Outcomes:</b> The students will be able to	
1	Classify the soil and assess the engineering properties, based on index properties.
2	Estimate soil stresses and prepare flow net diagram.
3	Do proper stress estimation for various types of foundation loads.
4	Understand and identify the settlement in soils.
5	Analyze shear properties of cohesive and cohesionless soils



  
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<b>Course Code/ Course Name:</b>	<b>17CEC09 - HIGHWAY ENGINEERING</b>
<b>Course Outcomes:</b> The students will be able to	
1	Carry out surveys involved in planning and highway alignment.
2	Design various geometric elements of highways.
3	Analyse the various characteristics of highway materials and test this quality
4	Design of flexible and rigid pavement as per IRC codes.
5	Analyse the concepts of pavement failures and apply it in maintenance methods

<b>Course Code/ Course Name:</b>	<b>17CEC10 - APPLIED HYDRAULICS ENGINEERING</b>
<b>Course Outcomes:</b> The students will be able to	
1	Apply their knowledge of fluid mechanics in addressing problems in open channels.
2	Able to identify a effective section for flow in different cross sections
3	Solve problems in uniform, gradually and rapidly varied flows in steady state conditions.
4	Understand the principles, working and application of turbines
5	Understand the principles, working and application of pumps.

<b>Course Code/ Course Name:</b>	<b>17CEC11 - CONCRETE TECHNOLOGY</b>
<b>Course Outcomes:</b> The students will be able to	
1	Determine the properties of cement.
2	Find out the properties of aggregates and admixtures
3	Understand the IS mix design and quality control of concrete
4	Determine the properties of fresh and hardened concrete.
5	Acquire knowledge about the application of special concretes



  
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<b>Course Code/ Course Name:</b>	<b>17CEP03 - BUILDING DRAWING – II</b>
<b>Course Outcomes:</b> The students will be able to	
1	Familiarize with the standard symbols and sign conventions suitably
2	Know about the different type of structures
3	Draw the elevation and sectional views of the buildings using computer software.
4	Implement the regulations for layout planning and preparation of drawings
5	Understand the different views of the components of a building.

<b>Course Code/ Course Name:</b>	<b>17CEP04 - HYDRAULICS ENGINEERING LABORATORY</b>
<b>Course Outcomes:</b> The students will be able to	
1	Measure flow in pipes and determine frictional losses
2	Demonstrate characteristics curves of pumps and turbines.
3	Estimate the Co-efficient of discharge for orifice and notches
4	Measure discharge in pipes.
5	Determine the energy loss in pipe flow.



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## SEMESTER V

<b>Course Code/ Course Name:</b>	<b>17CEC12 - STRUCTURAL ANALYSIS – I</b>
<b>Course Outcomes:</b> The students will be able to	
1	Analyze continuous beams, pin- jointed indeterminate plane frames and rigid plane frames
2	Analyse the continuous beams and portal frames by slope deflection method.
3	Understand the concept of moment distribution method.
4	Analyse the beams and support by kani's method.
5	Draw the influence lines for statically determinate and indeterminate structures

<b>Course Code/ Course Name:</b>	<b>17CEC13 - DESIGN OF REINFORCED CONCRETE ELEMENTS</b>
<b>Course Outcomes:</b> The students will be able to	
1	Identify the basic concepts and methods in the design of reinforced concrete elements.
2	Design the beam using IS code of practice.
3	Apply the concepts in design of slab and staircase.
4	Design of RC columns of any cross section with different end conditions.
5	Select and design of RC footing of different cross section under various site conditions.

<b>Course Code/ Course Name:</b>	<b>17CEC14 - FOUNDATION ENGINEERING</b>
<b>Course Outcomes:</b> The students will be able to	
1	Understand the importance of soil investigation in various civil Engineering projects
2	Estimate bearing capacity incorporating IS codal provisions.
3	Do proper foundation proportioning for any kind of shallow foundation system and get exposure in foundation analysis.
4	Estimate pile and pile group capacity, group efficiency for various types of soils
5	Analysis earth retaining structures for various soil conditions



  
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<b>Course Code/ Course Name:</b>	<b>17CEC15 - WATER RESOURCES AND IRRIGATION ENGINEERING</b>
<b>Course Outcomes:</b> The students will be able to	
1	Get exposure about the developments of water resources.
2	Assess the irrigation needs of crops
3	Study about different types of structures for irrigation
4	Implement various types of irrigation methods
5	Plan for water management and minimize irrigation water losses

<b>Course Code/ Course Name:</b>	<b>17CEP05 - CONCRETE AND HIGHWAY ENGINEERING LABORATORY</b>
<b>Course Outcomes:</b> The students will be able to	
1	Evaluate the various properties of cement and concrete.
2	Diagnose the properties of aggregates with different testing methods
3	Ensure the strength characteristics of the given concrete
4	Prepare different concrete mixes and check the workability properties
5	Gain sufficient idea on practice and procedure of using bitumen in road works



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## SEMESTER VI

<b>Course Code/ Course Name:</b>	<b>17CEC16 - STRUCTURAL ANALYSIS – II</b>
<b>Course Outcomes:</b> The students will be able to	
1	Analyze of three hinged, two hinged and fixed arches
2	Analysis simple determinate and indeterminate beams, frames and trusses using flexibility matrix method
3	Analysis simple determinate and indeterminate beams, frames and trusses using stiffness matrix method.
4	Determine the member forces in suspension bridges and space truss
5	Explain the basic concepts in finite element method

<b>Course Code/ Course Name:</b>	<b>17CEC17 - DESIGN OF STEEL STRUCTURES</b>
<b>Course Outcomes:</b> The students will be able to	
1	Analyse the behaviour of bolted and welded connecting and design them,
2	Know the concept of design of tension members
3	Design compression members using simple and built-up sections.
4	Design various types of flexural members.
5	Design Industrial structures and their components.

<b>Course Code/ Course Name:</b>	<b>17CEC18 - DESIGN OF REINFORCED CONCRETE STRUCTURES</b>
<b>Course Outcomes:</b> The students will be able to	
1	Design counterfort and cantilever retaining walls.
2	Design underground and overhead R.C water tanks for the given capacity
3	Design flat slabs as per IS standards
4	Analyze and design various types of slabs using yield line theory.
5	Design columns for axial, uniaxial and biaxial bending and industrial structures



  
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<b>Course Code/ Course Name:</b>	<b>17CEC19 – ENVIRONMENTAL ENGINEERING</b>
<b>Course Outcomes:</b> The students will be able to	
1	Recognize the water supply system, water sources and water quality characteristics and standards
2	Design various water treatment units.
3	Design the various primary treatment units for wastewater
4	Design and choose the various secondary treatment units for wastewater
5	Select suitable treatment units for disposal of sewage and sludge.

<b>Course Code/ Course Name:</b>	<b>17CEP07 - DESIGN AND DRAWING LABORATORY</b>
<b>Course Outcomes:</b> The students will be able to	
1	Design R.C retaining walls using software
2	Prepare structural drawings for various concrete structures using software
3	Design and draw the detailing of slab bridge
4	Design and draw the detailing of various types of water tanks
5	Design steel structures of roof truss using software

<b>Course Code/ Course Name:</b>	<b>17CEP08 – SURVEY CAMP</b>
<b>Course Outcomes:</b> The students will be able to	
1	Conduct various types of surveys in the field as per the requirements
2	Conduct survey using Advanced Instruments
3	Prepare contour map for the given area.
4	Apply the procedures involved in field work and to work as a surveying team.
5	Calculate the distances and angles of an object using advanced Instruments



  
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## SEMESTER VII

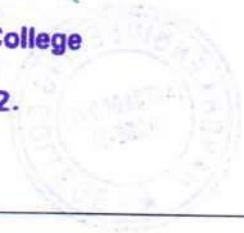
<b>Course Code/ Course Name:</b>	<b>17CEC20 – ESTIMATING, COSTING AND VALUATION</b>
<b>Course Outcomes:</b> The students will be able to	
1	Prepare the estimate corresponding to the required specification
2	Arrive rates of various work items of civil Engineering works and familiarized with tendering
3	Prepare bills of quantities in construction works
4	Predict the value of properties considering various influencing factors.
5	Get familiarized with report process.

<b>Course Code/ Course Name:</b>	<b>17CEC21 - CONSTRUCTION TECHNIQUES, EQUIPMENT AND PRACTICE</b>
<b>Course Outcomes:</b> The students will be able to	
1	Know the different construction techniques and structural systems
2	Apply the various construction practices in the field.
3	Predict the equipment for different types of work
4	Plan the requirements for substructure construction.
5	Know the methods and techniques involved in the construction of various types of super structures

<b>Course Code/ Course Name:</b>	<b>17CED01 - DESIGN PROJECT</b>
<b>Course Outcomes:</b> The students will be able to	
1	Formulate a problem definition in the field of Civil Engineering through literature survey.
2	Develop methodology using appropriate tools for the problem
3	Identify the objectives of the project by thorough understanding of the problem
4	Gain sufficient idea on practice of various fields in civil Engineering.
5	Design the structures, draw the reinforcement detailing and find the Estimation of Buildings



  
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## SEMESTER VIII

Course Code/ Course Name:	17CED02 - PROJECT WORK
<b>Course Outcomes:</b> The students will be able to	
1	Identify the objectives of the project by thorough understanding of the problem.
2	Develop methodology using appropriate tools for the problem
3	Take up any challenging practical problems and find solution based on literature.
4	Analyze the problem based on the methodology and tabulate the results
5	Conclude the results and submit the project report



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## PROGRAM SEPECIFIC ELECTIVE

<b>Course Code/ Course Name:</b>	<b>17CEX01 – ARCHITECTURE AND TOWN PLANNING</b>
<b>Course Outcomes:</b> The students will be able to	
1	Understand the various elements of architecture and principles of orientation.
2	Choose the various building materials as per the interior design aspects.
3	Make plan for the buildings by considering our Indian climatic conditions
4	Solve the problem that is coming in Town Planning level
5	Know various rules and regulation of town planning and development authorities.

<b>Course Code/ Course Name:</b>	<b>17CEX02 – REMOTE SENSING AND GIS TECHNIQUES</b>
<b>Course Outcomes:</b> The students will be able to	
1	Analyze Electromagnetic radiations and their interactions with atmosphere.
2	Classify and apply passive and active sensors.
3	Interpret and analyze the images
4	Have basic idea about the fundamentals of GIS.
5	Analyze data models for different studies

<b>Course Code/ Course Name:</b>	<b>17CEX03 – CONSTRUCTION PLANNING AND SCHEDULING</b>
<b>Course Outcomes:</b> The students will be able to	
1	Understand basic concepts of construction planning.
2	Schedule the construction activities.
3	Forecast and control the cost in a construction.
4	Understand about quality control and its safety during construction
5	Organize information in Centralized database Management systems



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<b>Course Code/ Course Name:</b>	<b>17CEX04 – TRAFFIC ENGINEERING AND MANAGEMENT</b>
<b>Course Outcomes:</b> The students will be able to	
1	Analyse traffic problems and plan for traffic systems various uses
2	Plan and design the traffic signal duration
3	Practice the traffic engineering and practice the control measures
4	Analyse the causes and report the accident.
5	Manage the traffic congestion using the available management measures

<b>Course Code/ Course Name:</b>	<b>17CEX05 – GROUND IMPROVEMENT TECHNIQUES</b>
<b>Course Outcomes:</b> The students will be able to	
1	Find out the methods and selection of ground improvement techniques based on soil condition
2	Understand dewatering techniques and design for simple cases.
3	Get knowledge on insitu treatment of cohesionless and cohesive soils.
4	Understand the concept of earth reinforcement and design of reinforced earth.
5	Get knowledge on types of grouts and grouting technique.

<b>Course Code/ Course Name:</b>	<b>17CEX06 – HOUSING PLANNING AND MANAGEMENT</b>
<b>Course Outcomes:</b> The students will be able to	
1	Plan and design the housing projects as per regulations.
2	Design the various housing programme with sustainability concepts
3	Formulate and design the housing layouts by conducting site analysis
4	Evaluate the suitability of various cost effective construction materials.
5	Perform the economic analysis based project appraisal of housing projects.



  
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<b>Course Code/ Course Name:</b>	<b>17CEX07 – RAILWAYS, AIRPORTS AND HARBOUR ENGINEERING</b>
<b>Course Outcomes:</b> The students will be able to	
1	Understand the methods of route alignment and design elements in Railway Planning and Constructions
2	Understand the Construction techniques and Maintenance of Track laying and Railway stations.
3	Gain an insight on the planning and site selection of Airport Planning and design.
4	Analyze and design the elements for orientation of runways and passenger facility systems.
5	Understand the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted.

<b>Course Code/ Course Name:</b>	<b>17CEX08 – GREEN BUILDINGS</b>
<b>Course Outcomes:</b> The students will be able to	
1	Get exposure about green building requirements
2	Identify the materials and design strategies
3	Study about implementation of green building systems
4	Learn the concept and assessment of standards.
5	Apply to environmental benefits

<b>Course Code/ Course Name:</b>	<b>17CEX09 – SMART MATERIALS AND STRUCTURES</b>
<b>Course Outcomes:</b> The students will be able to	
1	Understand the fundamentals of Smart materials.
2	Understand the concepts of strain measuring techniques
3	Suggest suitable sensors for various applications.
4	Adapt the different actuator material in structural components
5	Apply signal processing and control system in smart structures.



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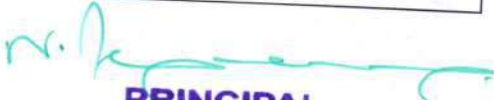
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<b>Course Code/ Course Name:</b>	<b>17CEX10 – INDUSTRIAL WASTE TREATMENT AND DISPOSAL</b>
<b>Course Outcomes:</b> The students will be able to	
1	Implement sophisticated wastewater treatment technology.
2	Conduct waste audit in an industry and implement waste minimization techniques
3	Learn new techniques for collection, recycling and disposal of waste and sludge
4	Prevent and control industrial effluents and hazardous wastes implementing environmental legislations.
5	Identify the common effluent treatment plant for the industries

<b>Course Code/ Course Name:</b>	<b>17CEX11 – GROUND WATER ENGINEERING</b>
<b>Course Outcomes:</b> The students will be able to	
1	Estimate the various aquifer parameters
2	Analyze the steady and unsteady state of flow into a well.
3	Apply mathematical models for ground water management
4	Implement various saline water prevention techniques
5	Adopt appropriate rainwater harvesting techniques

<b>Course Code/ Course Name:</b>	<b>17CEX12 – SOLID WASTE MANAGEMENT</b>
<b>Course Outcomes:</b> The students will be able to	
1	Classify solid wastes explain the functional elements of SWM and determine the effects of poor waste management on public health and the environment.
2	Evaluate how a collection system is planned, implemented and maintain the required data for record keeping and inventory control.
3	Discuss the various components of a waste collection system and to explain the characteristics of waste containers relative to their use.
4	Identify the purpose of waste processing and explain the processing techniques for reducing the volume and size of wastes.
5	Evaluate the various options for disposal of wastes and their selection criteria.



  
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<b>Course Code/ Course Name:</b>	<b>17CEX13 – REPAIR AND REHABILITATION OF STRUCTURES</b>
<b>Course Outcomes:</b> The students will be able to	
1	Identify the maintenance and assessment method of distressed structures
2	Understand the strength and durability properties, their effects due to climate and temperature.
3	Know about recent development in concrete
4	Learn the techniques for repair and protection methods
5	Study about repair, rehabilitation and retrofitting of structures and demolition methods.

<b>Course Code/ Course Name:</b>	<b>17CEX14 – DISASTER MANAGEMENT AND MITIGATION</b>
<b>Course Outcomes:</b> The students will be able to	
1	Identify the principles and components of disaster management
2	Acquire the knowledge man-made disasters and their issues
3	Highlight the remote sensing technologies related to disaster management.
4	Learn the concepts of risk assessment and mitigation
5	Analyse the risk and vulnerability in disaster management

<b>Course Code/ Course Name:</b>	<b>17CEX15 – ENVIRONMENTAL IMPACT ASSESSMENT</b>
<b>Course Outcomes:</b> The students will be able to	
1	Carry out scoping and screening of developmental projects for environmental and social assessments by EIA
2	Explain different methodologies which are used at different stages in EIA process
3	Evaluate environmental prediction and assessment reports
4	Develop on Environmental Management Systems.
5	Study on EIA for infrastructure projects



  
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<b>Course Code/ Course Name:</b>	<b>17CEX16 – CORROSION AND ITS CONTROL</b>
<b>Course Outcomes:</b> The students will be able to	
1	Know the classification of corrosion and its effects
2	Study the forms of corrosion
3	Identify the measuring and exposure techniques
4	Carry out the protection methods
5	Identify the structural corrosion

<b>Course Code/ Course Name:</b>	<b>17CEX17 – ADVANCED SURVEYING TECHNIQUES</b>
<b>Course Outcomes:</b> The students will be able to	
1	Apply the right method in locating and plotting of soundings.
2	Locate a celestial body using different co-ordinate systems in astronomical surveying.
3	Interpret and scale aerial photographs
4	Apply total station and EDM in distance measurement and traversing.
5	Adopt advanced surveying techniques over conventional methods in the field of civil engineering

<b>Course Code/ Course Name:</b>	<b>17CEX18 – DIGITAL CADASTRE</b>
<b>Course Outcomes:</b> The students will be able to	
1	Gain knowledge about cadastral survey.
2	Understand the methods of cadastral survey.
3	Get the knowledge about photogrammetric methods.
4	Understand Land Record System and computational procedure for modernization of the same.
5	Understand the Government procedure in Land Record Management



  
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<b>Course Code/ Course Name:</b>	<b>17CEX19 – GEOINFORMATICS APPLICATIONS FOR CIVIL ENGINEERS</b>
<b>Course Outcomes:</b> The students will be able to	
1	Get knowledge about the land resource management
2	Study structural deformation and movement
3	Model soil characteristics, soil degradation assessment and management.
4	Monitor urban growth and management of transport infrastructure
5	Model catchments and management of water resources

<b>Course Code/ Course Name:</b>	<b>17CEX20 – PAVEMENT ENGINEERING</b>
<b>Course Outcomes:</b> The students will be able to	
1	Get knowledge about types of rigid and flexible pavements.
2	Able to design of flexible pavements.
3	Able to design of rigid pavements.
4	Determine the causes of distress in rigid and flexible pavements
5	Understand stabilisation of pavements, testing and field control

<b>Course Code/ Course Name:</b>	<b>17CEX21 – PRESTRESSED CONCRETE STRUCTURES</b>
<b>Course Outcomes:</b> The students will be able to	
1	Selection of various methods of prestressing.
2	Apply the design codes relevant to the design of prestressed concrete structures.
3	Design for deflection and crack control of prestressed concrete structures.
4	Analysis and design of composite beam construction
5	Design of various prestressed concrete members



  
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<b>Course Code/ Course Name:</b>	<b>17CEX22 – COMPUTER AIDED DESIGN OF STRUCTURES</b>
<b>Course Outcomes:</b> The students will be able to	
1	Understand the concepts of Computer- Aided Design, Software requirements and Hardware components in CAD system.
2	Acquire the knowledge in Computer Graphics and Graphics standard.
3	Understand the fundamentals of finite element analysis and be able use software for modeling, analysis and design of structures.
4	Understand the concepts of Optimization techniques and its practical applications to Civil Engineering.
5	Acquire the knowledge in Artificial Intelligence and Knowledge based expert systems.

<b>Course Code/ Course Name:</b>	<b>17CEX23 – PREFABRICATED STRUCTURES</b>
<b>Course Outcomes:</b> The students will be able to	
1	Apply the principles and systems of prefabrication in the field.
2	Identify suitable prefabricated components for specific use.
3	Understand the design principles of fabrication
4	Classify the structural connections
5	Utilize the various code provisions regarding progressive collapse.

<b>Course Code/ Course Name:</b>	<b>17CEX24 – BASICS OF DYNAMICS AND ASEISMIC DESIGN</b>
<b>Course Outcomes:</b> The students will be able to	
1	Assess the influence of vibrations and selection of remediation methods based on the nature of vibration
2	Understand the dynamic concepts of MDOF systems
3	Realize the origin, various terminologies and behavior of earthquakes
4	Analyse and design the structures for earthquake forces as per IS 1893 and IS 13920.
5	Know the control measures as well as the Aseismic design methodology



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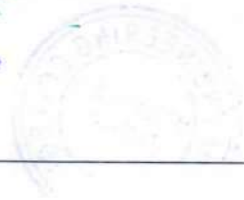
<b>Course Code/ Course Name:</b>	<b>17CEX25 – PRINCIPLES OF COMPUTATIONAL FLUID DYNAMICS</b>
<b>Course Outcomes:</b> The students will be able to	
1	Develop knowledge on non linear problems
2	Improve knowledge on finite element, difference and volume methods.
3	Provide solution methodologies for real time problems.
4	Analyse the fluid flow using coupling equations.
5	Develop hydrological and hydrodynamic models.

<b>Course Code/ Course Name:</b>	<b>17CEX26 - CONSTRUCTION SAFETY</b>
<b>Course Outcomes:</b> The students will be able to	
1	Identify the correct and proper method of managing accidents by analyzing the situation
2	Get trained to choose the appropriate safety programmes at the site
3	Get acquainted to adopt the contractual obligations which are essential in the site
4	Know the hazard assessment procedures and their control
5	Implement plan for safety technology for the safety of workers

<b>Course Code/ Course Name:</b>	<b>17GEA02 – PRINCIPLES OF MANAGEMENT</b>
<b>Course Outcomes:</b> The students will be able to	
1	Acquire comprehensive knowledge on management concepts.
2	Understand and apply planning concepts at different conditions and situations.
3	Accomplish organizational structures and understand the staffing process.
4	Motivate employees and Project managements in working environments.
5	Do the budgetary and non-budgetary control of projects.



  
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<b>Course Code/ Course Name:</b>	<b>17GEA03 - TOTAL QUALITY MANAGEMENT</b>
<b>Course Outcomes:</b> The students will be able to	
1	Acquire various concepts of quality management.
2	Implement various principles of quality management.
3	Impart quality using statistical process.
4	Learn to use the various tools to maintain quality.
5	Implement the quality system for ISO certification.

<b>Course Code/ Course Name:</b>	<b>17GEA04 - PROFESSIONAL ETHICS AND HUMAN VALUES</b>
<b>Course Outcomes:</b> The students will be able to	
1	Know the concepts of ethics and values.
2	Acquire the knowledge of interpersonal and organizational issues in ethics
3	Able to Highlight the ethical issues related to engineering.
4	Learn the concepts of engineer's responsibilities and their rights.
5	Understand the role of global issues and professional bodies.



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## COMPUTER SCIENCE AND ENGINEERING



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<b>Regulation :</b>	<b>R17</b>
<b>Program Code :</b>	<b>CS</b>
<b>Program Name :</b>	<b>Computer Science and Engineering</b>

## VISION OF THE DEPARTMENT

To achieve excellence in Computer Science and Engineering education to meet the ever growing needs of the society.

## MISSION OF THE DEPARTMENT

Computer Science and Engineering department is committed to

- To ensure quality in major areas of Computer Science and Engineering keeping pace with the latest developments.
- To create the ability in the students to design, develop and test world class software systems.
- To promote lifelong learning in core and emerging areas.
- To inculcate strong ethical values and leadership abilities in the minds of students so as to work towards the advancement of the society.

## PROGRAM EDUCATIONAL OBJECTIVES (PEOS):

### List of PEOs

<b>PEO1</b>	<b>Core Competency</b>	To transform the graduates as experts in computing profession to satisfy the needs of the core computing technology industry.
<b>PEO2</b>	<b>Higher Education</b>	To enable them to pursue higher studies and explore new paths in teaching and research.
<b>PEO3</b>	<b>Innovative Skill</b>	To empower the graduates to be able to offer innovative solutions to real life problems.
<b>PEO4</b>	<b>Continuous Learning</b>	To help the graduates to keep abreast of the latest trends in computing technology and ready for lifelong learning process.
<b>PEO5</b>	<b>Interdisciplinary Skill</b>	To ensure that the graduates practice professional ethics in the software industry and possess the necessary soft skills for working in diverse cultural and interdisciplinary teams.



  
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## PROGRAM OUTCOMES:

ATTRIBUTE	GA'S
<b>Engineering Knowledge</b>	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>Problem Analysis</b>	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>Design and Development of Solutions</b>	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
<b>Investigation of Complex Problems</b>	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
<b>Modern Tool Usage</b>	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
<b>The Engineer and Society</b>	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
<b>Environment and Sustainability</b>	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>Ethics</b>	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>Individual and Team Work.</b>	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>Communication</b>	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
<b>Project Management and Finance</b>	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
<b>Lifelong Learning</b>	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



  
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## PROGRAM SPECIFIC OUTCOMES (PSOs) OF THE DEPARTMENT:

Graduates should be able to

<b>PSO1:</b>	Ability to understand the principles and working of hardware and software aspects in a computer system
<b>PSO2:</b>	Ability to demonstrate knowledge in mathematical models, algorithms and software development methodologies
<b>PSO3:</b>	Ability to develop practical competency in programming languages and open source platforms
<b>PSO4:</b>	Ability to provide a foundation for higher studies, research and entrepreneurship



  
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## SEMESTER 1:

<b>Course Code/ Course Name:</b>	<b>17EYA01/ PROFESSIONAL ENGLISH – I</b>
<b>Course Outcomes:</b>	
1	The students will be able to construct clear, grammatically correct sentences using a variety of sentence structures and appropriate vocabulary.
2	The students will be able to utilize listening skills to articulate one's own point of view in different circumstances.
3	The students will be able to apply appropriate communication skills across settings, purposes, and audiences.
4	The students will be able to distinguish main ideas and supporting details and employ active reading strategies to understand texts at the maximum level.
5	The students will be able to equip themselves with writing skills needed for academic as well as workplace contexts.

<b>Course Code/ Course Name:</b>	<b>17MYB01/ CALCULUS AND SOLID GEOMETRY</b>
<b>Course Outcomes:</b>	
1	Apply the concept of orthogonal reduction to diagonalise the given matrix.
2	Have knowledge about the geometrical aspects of sphere.
3	Find the radius of curvature, circle of curvature and centre of curvature for a given curve.
4	Classify the maxima and minima for a given function with several variables, through by finding stationary points.
5	Demonstrate the use of double and triple integrals to compute area and volume.

<b>Course Code/ Course Name:</b>	<b>17PYB02 - PHYSICS FOR COMPUTER ENGINEERS</b>
<b>Course Outcomes:</b>	
1	The students will be able to acquire knowledge regarding Acoustics and ultrasonic
2	The students will be able to applying knowledge in the fields of optics & laser technology
3	The students will be able to design the sensors using the knowledge of fiber optics
4	The students will be able to gain the knowledge of wave, particle nature and matter waves
5	The students will be able to analyze the different kind of crystal structures and crystal growth



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<b>Course Code/ Course Name:</b>	<b>17CYB03 - ENVIRONMENTAL SCIENCE</b>
<b>Course Outcomes:</b>	
1	The students will be able to design a system, component, or process to meet desired needs.
2	The students will be able to identify, formulate, and solve environmental engineering problems
3	The students will be able to understand the professional and ethical responsibility as related to the practice of environmental engineering and the impact of engineering solutions in a global context.
4	The students will be able to use the techniques, skills, and modern engineering tools necessary for environmental engineering practice.
5	The students will be able to acquire the knowledge of information technology in environmental science.

<b>Course Code/ Course Name:</b>	<b>17CSC02 - PYTHON PROGRAMMING</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the working of computers.
2	The students will be able to understand the basics of Python Programming constructs
3	The students will be able to realize the need of strings, list, and tuples
4	The students will be able to design programs involving dictionaries and function.
5	The students will be able to develop simple programs using file concept and Modules

<b>Course Code/ Course Name:</b>	<b>17MEP01 - ENGINEERING GRAPHICS LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will be able to construct conic sections and special curves of required specifications
2	The students will be able to apply the concept of first angle projection to create project of straight lines, planes, solids and section of solids
3	The students will be able to develop a surface drawing of a solid model with given dimensions
4	The students will be able to build orthographic, isometric projections of a three dimensional object
5	The students will be able to make use of the knowledge of engineering drawing to create physical models



  
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<b>Course Code/ Course Name:</b>	<b>17CSP02 -PYTHON PROGRAMMING LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the basics of Python Programming constructs
2	The students will be able to understand the various operators of Python Programming.
3	The students will be able to realize the need of string manipulation, list, and tuples
4	The students will be able to design programs involving dictionaries, function and modules
5	The students will be able to develop simple programs with exception handling

## SEMESTER 2:

<b>Course Code/ Course Name:</b>	<b>17EYA02 PROFESSIONAL ENGLISH – II</b>
<b>Course Outcomes:</b>	
1	The students will be able to communicate using a variety of sentence structures and appropriate vocabulary.
2	The students will be able to comprehend conversations and short talks delivered in English and respond accordingly.
3	The students will be able to speak appropriately and effectively in various situations.
4	The students will be able to employ active reading strategies to understand texts at the maximum level.
5	The students will be able to equip themselves with writing formal letters and winning Job Application.

<b>Course Code/ Course Name:</b>	<b>17MYB02 COMPLEX ANALYSIS AND LAPLACE TRANSFORMS</b>
<b>Course Outcomes:</b>	
1	The students will be able to predict the suitable method to solve second and higher order differential equations
2	The students will be able to apply the concepts of Differentiation and Integration to Vectors.
3	The students will be able to compute an analytic function, when its real or imaginary part is known.
4	The students will be able to identify the Singularities and its corresponding Residues for the given function.
5	The students will be able to predict a suitable method to evaluate the Contour integration.



  
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<b>Course Code/ Course Name:</b>	<b>17PYB04 APPLIED PHYSICS</b>
<b>Course Outcomes:</b>	
1	The students will be able to acquire knowledge about electron theory of metals and conductivity
2	The students will be able to distinguish between conductors, semiconductors and super conductors
3	The students will be able to understand the magnetism and its applications
4	The students will be able to design various optoelectronic devices
5	The students will be able to aware of recent trends in nanotechnology

<b>Course Code/ Course Name:</b>	<b>17CYB04 – CHEMISTRY FOR COMPUTER ENGINEERS</b>
<b>Course Outcomes:</b>	
1	The students will be able to apply knowledge of fundamental principles of chemistry
2	The students will be able to define and solve engineering problems, including the utilization of creative and innovative skills
3	The students will be able to gain practical experience with chemical process equipment as well as to analyze and interpret data
4	The students will be able to understand the impact of engineering solutions in a global, economic, environmental and societal content
5	The students will be able to understand the management of electronic waste

<b>Course Code/ Course Name:</b>	<b>17CSC03 STRUCTURED PROGRAMMING</b>
<b>Course Outcomes:</b>	
1	The student will be able to understand the basic terminology used in computer programming.
2	The student can use different data types and operators in a computer program.
3	The student will be able to design programs involving decision structures and loops.
4	The student will be able to write programs using arrays and strings.
5	The student will be able to develop programs using functions by different parameter passing techniques.



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<b>Course Code/ Course Name:</b>	<b>17ECC04 - BASICS OF ELECTRONICS ENGINEERING</b>
<b>Course Outcomes:</b>	
1	The Students can apply the Ohm's law and Kirchhoff's law and investigates the behavior of electric circuits by analytical techniques.
2	The Students will be able to analyze and forecast the Network theorems in DC and AC circuits.
3	The Students will be able to understand the characteristics of semiconductor devices
4	The students will be able to understand the concept of rectifiers, filters and amplifiers
5	The students will be able to design transducers, measuring instruments and logic circuits.

<b>Course Code/ Course Name:</b>	<b>17CSP03 STRUCTURED PROGRAMMING LABORATORY</b>
<b>Course Outcomes:</b>	
1	The student will be able to implement programs using decision making statements and looping
2	The student will be able to write simple programs on arrays of different dimensions.
3	The student will be able to develop function programs using recursion and pointers.
4	The student will be able to design structure and union programs
5	The student will be able to handle memory locations manually using dynamic memory allocation functions

<b>Course Code/ Course Name:</b>	<b>17ECP02 – ELECTRONICS LABORATORY</b>
<b>Course Outcomes:</b>	
1	The Students can be able to analyze the characteristics of diodes and transistors.
2	The Students will be able to evaluate the characteristics of electronic devices such as BJT,FET and UJT
3	The Students will be able to verify the Half wave and Full wave Rectifier.
4	The students will be able to verify the theorems such as Thevenin's theorem, Norton theorems, KVL and KCL
5	The Students will be able to verify the Logic Gates.



  
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## SEMESTER 3:

<b>Course Code/ Course Name:</b>	<b>17MYB04 PROBABILITY AND STATISTICS</b>
<b>Course Outcomes:</b>	
1	The students will be able to infer expectation, variance, standard deviation moments and moment generating function for discrete and continuous random variables.
2	The students will be able to apply the concept of expectation and moment generating functions to discrete and Continuous distributions and find the probability values for the defined distributions.
3	The students will be able to Acquire skills in handling situations involving more than one random variable and functions of random variables
4	The students will be able to select a hypothesis testing method for the given numerical set of data to analyze the significance
5	The students will be able to apply analysis of Variance for the data set of selected number factors for analyzing the significance.

<b>Course Code/ Course Name:</b>	<b>17CSC04 DATA STRUCTURES USING PYTHON</b>
<b>Course Outcomes:</b>	
1	The students will be able to recall and familiarize python programming and implement Stack ADT.
2	The students will be able to compare the performance of our linked list implementation with Python's list implementation.
3	The students will be able to implement the ADTs queue, and deque using Python lists.
4	The students will be able to implement trees using classes and references.
5	The students will be able to design graph abstract data type using multiple internal representations.

<b>Course Code/ Course Name:</b>	<b>17ITC01 - OOPS USING JAVA</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the basics of object oriented concepts in java.
2	The students will be able to develop applications using inheritance, packages and interfaces.
3	The students will be able to construct applications with exception handling.
4	The students will be able to build applications using threads and collection framework
5	The students will be able to build simple java application with neat GUI and database connectivity



  
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<b>Course Code/ Course Name:</b>	<b>17CSC05 OPERATING SYSTEMS</b>
<b>Course Outcomes:</b>	
1	The students will be able to identify the systematic approach of the system.
2	The students will be able to develop real-time operating systems for task scheduling.
3	The students will be able to analyze the working of memory related hardware
4	The students will be able to work on design and development of disk and file related hardware.
5	The students will be able to know the real time meaning of security and production in the field of operating system.

<b>Course Code/ Course Name:</b>	<b>17ECC09 DIGITAL PRINCIPLES AND SYSTEM DESIGN</b>
<b>Course Outcomes:</b>	
1	The Students will be able to design digital circuits, by simplifying the Boolean functions.
2	The Students will be able to get idea about Combinational Circuit and HDL basics
3	The Students will be able to design synchronous clocked circuits
4	The students will be able to design asynchronous sequential circuits.
5	The Students can formulate Programmable Logical Device Models.

<b>Course Code/ Course Name:</b>	<b>17CSC06 MICROPROCESSOR AND COMPUTER ARCHITECTURE</b>
<b>Course Outcomes:</b>	
1	The students will be able to explain the basic architecture of 8086.
2	The students will be able to employ the peripheral interfacing.
3	The students will be able to solve basic binary math operation.
4	The students will be able to understand the variety of memory technologies.
5	The students will be able to describe the instruction execution and pipelining concepts.

<b>Course Code/ Course Name:</b>	<b>17ITP01 - OOPS USING JAVA LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will be able to create simple java programs using basic programming elements in java.
2	The students will be able to develop applications using inheritance, packages and interfaces.
3	The students will be able to construct applications with exception handling.
4	The students will be able to build applications using threads and collection framework
5	The students will be able to build simple java application with neat GUI and database connectivity



  
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<b>Course Code/ Course Name:</b>	<b>17CSP04 OPERATING SYSTEMS LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will be able to display basic commands and CPU utilization.
2	The students will be able to explore the knowledge to solve basic scheduling problems.
3	The students will be able to simulate the operating system processing.
4	The students will be able to identify components and peripherals of operating systems including input-output devices.
5	The students will be able to able to create new process for operating systems

## SEMESTER 4:

<b>Course Code/ Course Name:</b>	<b>17MYB08 DISCRETE MATHEMATICS</b>
<b>Course Outcomes:</b>	
1	The students will be able to rephrase real world statements as logical propositions and demonstrate whether the proposition is satisfy, tautology or a contradiction.
2	The students will be able to infer whether a logical argument is valid from the given set of premises by applying the inference rules of predicate calculus.
3	The students will be able to show mathematical reasoning and arrive at conclusions about sets and relations.
4	The students will be able to construct the number of arrangements and selections using the principles of counting.
5	The students will be able to avail the concept of Lattices and its properties.

<b>Course Code/ Course Name:</b>	<b>17ITC04 DESIGN AND ANALYSIS OF ALGORITHMS</b>
<b>Course Outcomes:</b>	
1	The students will be able to analyze worst, best and average case running times of algorithms using asymptotic notations.
2	The students will be able to use different sorting techniques such as heap sort, merge sort, and quick sort.
3	The students will be able to design dynamic-programming algorithms and apply them to test for optimality.
4	The students will be able to analyze the complexity of searching and hashing.
5	The students will be able analyze the complexities of various problems in different domain.



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<b>Course Code/ Course Name:</b>	<b>17CSC07 DATABASE MANAGEMENT SYSTEM</b>
<b>Course Outcomes:</b>	
1	The students will be able to identify suitable data models for real time application and conceptualize a database system using ER Diagram
2	The students will be able to write queries in relational algebra and SQL.
3	The students will be able to normalize the database design.
4	The students will be able to choose storage structure and process/optimize Queries.
5	The students will be able to apply concepts of query processing, transaction processing, and concurrency control.

<b>Course Code/ Course Name:</b>	<b>17CSC08 COMPUTER NETWORKS</b>
<b>Course Outcomes:</b>	
1	The students will be able to familiarize with the Data Communication Concepts
2	The students will be able to implement the Data Link Layer Concepts
3	The students will be able to realize the need of Addressing and Routing
4	The students will be able to build a clear concern on Transport Layer Services
5	The students will be able to work with Application layer protocols

<b>Course Code/ Course Name:</b>	<b>17CSC09 ARTIFICIAL INTELLIGENCE</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the fundamentals of knowledge representation of agents.
2	The students will be able to an ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
3	The students will be able to understand the representation of states, algorithm for planning and real world problems.
4	The students will be able to analysis and compare the different learning process and apply to the probability theory.
5	The students will be able to understand the different limitations of current Artificial Intelligence techniques.



  
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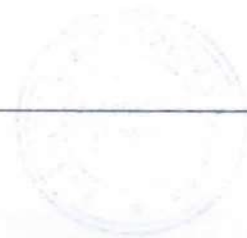
<b>Course Code/ Course Name:</b>	<b>17GEA01 ENGINEERING ECONOMICS AND FINANCIAL ACCOUNTING</b>
<b>Course Outcomes:</b>	
1	The students will be able to know the importance of Engineering Economics and Principles of Micro and Macro Economics.
2	The students will be able to estimate the market position with the knowledge in demand forecasting and supply.
3	The students will be able to develop and estimate cost for any project.
4	The students will be able to fix the price of the product with the knowledge in different market structure and taxation design.
5	The students will be able to analyze the financial statement to determine the optimal managerial decisions.

<b>Course Code/ Course Name:</b>	<b>17CSP05 DATABASE MANAGEMENT SYSTEM LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will be able to define database with various integrity constraints.
2	The students will be able to working with various DDL, DML queries.
3	The students will be able to create various views and make use of various types of joins and procedures and functions
4	The students will be able to do conceptual design using E-R model and normalize the design.
5	The students will be able to work with real time data base connectivity

<b>Course Code/ Course Name:</b>	<b>17CSP06 COMPUTER NETWORKS LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will be able to implement services provided by Data Link Layer
2	The students will be able to realize addressing protocols
3	The students will be able to implement various routing algorithms
4	The students will be able to program using Sockets
5	The students will be able to use Analyzer tools



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## SEMESTER 5:

<b>Course Code/ Course Name:</b>	<b>17CSC10 THEORY OF COMPUTATION</b>
<b>Course Outcomes:</b>	
1	The students will be able to explain the key properties of formal languages and finite automata
2	The students will be able to design and describe the strings recognized by regular languages.
3	The students will be able to construct the context-free grammars and explain the languages accepted by CFG
4	The students will be able to design a turing machine and push down automata that accomplish a specific task.
5	The students will be able to explain the undecidable and intractable classes of problems

<b>Course Code/ Course Name:</b>	<b>17ITC09 INTERNET AND WEB PROGRAMMING</b>
<b>Course Outcomes:</b>	
1	The students will be able to design a web page using HTML 5 and CSS
2	The students will be able to make use of JavaScript client side coding
3	The students will be able to apply servlets for their web development
4	The students will be able to make use of JSP
5	The students will be able to make use of XML and Web Services

<b>Course Code/ Course Name:</b>	<b>17CSC11 OBJECT ORIENTED SOFTWARE ENGINEERING</b>
<b>Course Outcomes:</b>	
1	The student will be able to explain software development activities.
2	The student will be able to gather and analyze user's requirements for the given product.
3	The students will be able to identify and apply appropriate system design.
4	The students will be able to apply Design Patterns and Interfaces.
5	The students will be able to formulate and employ different testing strategies.

<b>Course Code/ Course Name:</b>	<b>17CSC12 GRAPHICS AND MULTIMEDIA</b>
<b>Course Outcomes:</b>	
1	The students will be able to explain the fundamentals of Graphics
2	The students will be able to design two dimensional and three dimensional graphic transformations.
3	The students will be able to detect the hidden surfaces and relate color models with graphics.
4	The students will be able to explain the techniques of image editing.
5	The students will be able to manipulate an image.



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<b>Course Code/ Course Name:</b>	<b>17CSP07 CASE TOOLS LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will be able to outline the project scope and objectives.
2	The students will be able to write the software requirement analysis.
3	The students will be able to create Data Modeling.
4	The students will be able to develop and debug the projects.
5	The students will be able to generate test cases using testing strategies.

<b>Course Code/ Course Name:</b>	<b>17CSP08 GRAPHICS AND MULTIMEDIA LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will be able to draw basic shapes such as lines, circle and ellipse.
2	The students will be able to execute processing of basic shapes by various algorithms and techniques.
3	The students will be able to apply the transformations to the basic shapes and various clipping algorithms.
4	The students will be able to design animation sequences using Open source animation Softwares.
5	The students will be able to create videos using video editing Softwares.

## SEMESTER 6:

<b>Course Code/ Course Name:</b>	<b>17CSC14 CLOUD COMPUTING</b>
<b>Course Outcomes:</b>	
1	The students will be able to recall and describe cloud Platform and Technology.
2	The students will be able to describe and Implement Virtualization Technologies.
3	The students will be able to develop and manage cloud applications using Aneka.
4	The students will be able to create a Hadoop Environment and Generate a Map- Reduce Programming.
5	The students will be able to design Web Based Applications for various Corporate.

<b>Course Code/ Course Name:</b>	<b>17CSC15 SECURITY IN COMPUTING</b>
<b>Course Outcomes:</b>	
1	The students will be able to summarize various cryptographic algorithms
2	The students will be able to secure the programs from unauthorized access
3	The students will be able to employ security mechanism in networks
4	The students will be able to apply security mechanisms to Secure databases
5	The students will be able to differentiate various security models and standards



  
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<b>Course Code/ Course Name:</b>	<b>17CSC16 PRINCIPLES OF COMPILER DESIGN</b>
<b>Course Outcomes:</b>	
1	The students will be able to describe different phases of a Compiler and its applications
2	The students will be able to build parsers for syntax analysis using context free grammars.
3	The students will be able to create intermediate code for programming constructs.
4	The students will be able to develop the code.
5	The students will be able to analyze and optimize the code to design a compiler.

<b>Course Code/ Course Name:</b>	<b>17CSP09 INTERNET OF THINGS LABORATORY</b>
<b>Course Outcomes:</b>	
1	Students will be able to acquire knowledge about Arduino, LED and control intensity of light.
2	Students will be able to implement buzzer and LCD in applications.
3	Students will be able to implement LM35sensor, LDR in applications.
4	Students will be able to implement the way to blink LED through key input and working with servo motor.
5	Students will be able to implement applications with NODEMCU with Blynk app and upload sensor value in Cloud.

## SEMESTER 7:

<b>Course Code/ Course Name:</b>	<b>17CSC17 MOBILE COMPUTING</b>
<b>Course Outcomes:</b>	
1	The students will be able to explain the basics of mobile telecommunication system
2	The students will be able to choose the required functionality at each layer for given application
3	The students will be able to identify different standards of mobile communication systems
4	The students will be able to use simulation tools and design Ad hoc networks
5	The students will be able to develop a mobile application.



  
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<b>Course Code/ Course Name:</b>	<b>17ITC15 MACHINE LEARNING TECHNIQUES</b>
<b>Course Outcomes:</b>	
1	The students will be able to explain the concepts of supervised, unsupervised and semi-supervised learning
2	The students will be able to apply the appropriate machine learning strategy for any given problem
3	The students will be able to suggest supervised, unsupervised or semi-supervised learning algorithms for any given problem
4	The students will be able to design systems that uses the appropriate graph models of machine learning
5	The students will be able to modify existing machine learning algorithms to improve classification efficiency

<b>Course Code/ Course Name:</b>	<b>17CSC18 FULL STACK DEVELOPMENT</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand and develop web page using HTML and CSS
2	The students will be able to design and develop front end application using JavaScript
3	The students will be able to design and develop front end application using Bootstrap.
4	The students will be able to implement MVC and responsive design to scale well across PC, tablet and Mobile Phone using jQuery.
5	The students will be able to implement MVC and responsive design to scale well across PC, tablet and Mobile Phone using jQuery Mobile.

<b>Course Code/ Course Name:</b>	<b>17CSP10 MOBILE COMPUTING LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the fundamentals and various computational processing of mobile applications
2	The students will be able to apply specifications and functionalities of various protocols/ standards of mobile applications.
3	The students will be able to implement the design using Android SDK and using Objective C and iOS.
4	The students will be able to design and Implement various mobile applications using emulators.
5	The students will be able to deploy applications to hand-held devices.



  
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<b>Course Code/ Course Name:</b>	<b>17CSD01 PROJECT WORK - I</b>
<b>Course Outcomes:</b>	
1	The students will be able to demonstrate a sound technical knowledge of their selected project topic.
2	The students will be able to undertake problem formulation and solution legally for the sustainable development.
3	The students will be able to develop an attitude of team work and independent working on real time problems.
4	The students will be able to design engineering solutions to complex problems based on engineering and management principles.
5	The students will be able to communicate with engineers and the community at large in written and oral forms.

## SEMESTER 8:

<b>Course Code/ Course Name:</b>	<b>17CSD02 PROJECT WORK II</b>
<b>Course Outcomes:</b>	
1	The students will be able to demonstrate a sound technical knowledge of their selected project topic.
2	The students will be able to undertake problem formulation and solution legally for the sustainable development.
3	The students will be able to develop an attitude of team work and independent working on real time problems.
4	The students will be able to design engineering solutions to complex problems based on engineering and management principles.
5	The students will be able to communicate with engineers and the community at large in written and oral forms.

## LIST OF PROGRAMME SPECIFIC ELECTIVES

<b>Course Code/ Course Name:</b>	<b>17CSX01 DATA SCIENCE</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the basics of data science and big data field.
2	The students will be able to design efficient techniques for mining large volumes of data in engineering applications.
3	The students will be able to deploy the technique of classification and prediction in data science
4	The students will be able to understand about the clusters and analyze the big data for useful business applications.
5	The students will be able to apply tools like Hadoop, Giraph and storm to implement real time applications.



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<b>Course Code/ Course Name:</b>	<b>17CSX02 DATA WAREHOUSING AND DATA MINING</b>
<b>Course Outcomes:</b>	
1	The students will be able to identify and use of various data warehousing components functionalities
2	The students will be able to analyze the techniques of data mining and data warehousing models and do preprocessing techniques.
3	The students will be able to design, implement and evaluate a system using association mining.
4	The students will be able to apply and work with classification algorithms
5	The students will be able to apply and work with clustering algorithms and recent trends

<b>Course Code/ Course Name:</b>	<b>17CSX03 DATA ANALYTICS</b>
<b>Course Outcomes:</b>	
1	The students will be able to apply the statistical analysis methods.
2	The students will be able to compare and contrast various soft computing frameworks.
3	The students will be able to design distributed file systems.
4	The students will be able to apply Stream data model.
5	The students will be able to use frameworks and Visualization techniques.

<b>Course Code/ Course Name:</b>	<b>17CSX04 TCP/IP DESIGN AND IMPLEMENTATION</b>
<b>Course Outcomes:</b>	
1	The students will be able to gain knowledge in communication protocols.
2	The students will be able to establish TCP connection.
3	The students will be able to acquire knowledge in fundamentals of IP addresses and IP routing
4	The students will be able to analyze and implement TCP in real time environment.
5	The students will be able to outline an insight of congestion avoidance and control.

<b>Course Code/ Course Name:</b>	<b>17CSX05 NETWORK ANALYSIS AND MANAGEMENT</b>
<b>Course Outcomes:</b>	
1	The students will be able to explain basics of network design and requirement analysis.
2	The students will be able to apply a range of techniques for characterizing network structure.
3	The students will be able to explain the methodologies for developing logical design of networks.
4	The students will be able to explore the network management and security concepts.
5	The students will be able to apply network physical design and routing for building networking applications.



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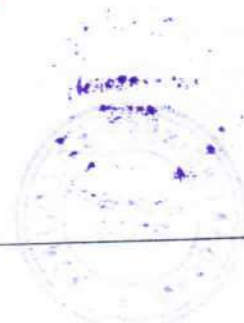
<b>Course Code/ Course Name:</b>	<b>17CSX06 WIRELESS COMMUNICATION AND NETWORKS</b>
<b>Course Outcomes:</b>	
1	The students will be able to explain the fundamentals of wireless communication.
2	The students will be able to recognize the model about mobile radio propagation.
3	The students will be able to design the modulation and diversity schemes.
4	The students will be able to apply real time uses of multiple access systems.
5	The students will be able to implement the wireless networking requirement.

<b>Course Code/ Course Name:</b>	<b>17CSX07 EMBEDDED SYSTEMS</b>
<b>Course Outcomes:</b>	
1	The students will be able to write the programming of ARM processor.
2	The students will be able to optimize the embedded platform.
3	The students will be able to choose the appropriate Operating system design and distributed embedded systems for designing.
4	The students will be able to develop Arduino programs.
5	The students will be able to model real-time applications using embedded-system concepts.

<b>Course Code/ Course Name:</b>	<b>17CSX08 GRAPH THEORY</b>
<b>Course Outcomes:</b>	
1	The students will be able to write precise and accurate mathematical definitions of objects in graph theory.
2	The students will be able to use mathematical definitions to identify and construct examples.
3	The students will be able to validate and critically assess a mathematical proof.
4	The students will be able to use a combination of theoretical knowledge and independent mathematical thinking in creative investigation of questions in graph theory.
5	The students will be able to reason from definitions to construct mathematical proofs.



  
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<b>Course Code/ Course Name:</b>	<b>17CSX09 INFORMATION RETRIEVAL TECHNIQUES</b>
<b>Course Outcomes:</b>	
1	The students will be able build an information retrieval system using the available tools.
2	The students will be to identify and design the various components of an Information Retrieval system.
3	The students will be able to apply machine learning techniques to text classification and clustering which is used for efficient information retrieval.
4	The students will be able to analyze the web content structure.
5	The students will be able to design an efficient search engine.

<b>Course Code/ Course Name:</b>	<b>17CSX10 MOBILE APPLICATION DEVELOPMENT</b>
<b>Course Outcomes:</b>	
1	The students will be able to describe the requirements for mobile applications.
2	The students will be able to explain the challenges in mobile application design and development.
3	The students will be able to develop mobile applications for specific requirements.
4	The students will be able to implement the design using Android SDK and using Objective C and iOS.
5	The students will be able to deploy mobile applications in Android and iPhone

<b>Course Code/ Course Name:</b>	<b>17CSX11 HUMAN COMPUTER INTERACTION</b>
<b>Course Outcomes:</b>	
1	The students will be able to explain the capabilities of both humans and computers from the viewpoint of human information processing
2	The students will be able to describe the typical human-computer interaction (HCI) models, styles, and various historic HCI paradigms
3	The students will be able to apply an interactive design process, standards, guidelines and universal design principles to designing HCI systems.
4	The students will be able to analyze and identify user models, user support, socio-organizational issues, and stakeholder requirements of HCI systems.
5	The students will be able to analyze and discuss HCI issues in groupware, ubiquitous computing, virtual reality, multimedia, and Word Wide Web-related environments.



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<b>Course Code/ Course Name:</b>	<b>17CSX12 GREEN COMPUTING</b>
<b>Course Outcomes:</b>	
1	The students will be able to explain green computing technology to reduce paper wastage and carbon footprint.
2	The students will be able to describe behavior and capabilities of green assets and processes.
3	The students will be able to conserve natural resources.
4	The students will be able to utilize the resources in a socio economic manner.
5	The students will be able to Implement the environmental impacts of green activities.

<b>Course Code/ Course Name:</b>	<b>17CSX13 NANO COMPUTING</b>
<b>Course Outcomes:</b>	
1	The students will be able to explain nano computing challenges.
2	The students will be able to handle the imperfections.
3	The students will be able to apply reliability evolution strategies.
4	The students will be able to use nano scale quantum computing.
5	The students will be able to utilize molecular computing and optimal computing.

<b>Course Code/ Course Name:</b>	<b>17CSX14 DEEP LEARNING</b>
<b>Course Outcomes:</b>	
1	The students will be able to use the concepts of machine learning in real world.
2	The students will be able develop the basic deep networks constructs
3	The students will be able to analyze the need of optimization in training networks.
4	The students will be able to design programs involving convolution networks problems.
5	The students will be able to extend simple applications for vision and processing.

<b>Course Code/ Course Name:</b>	<b>17CSX15 KNOWLEDGE MANAGEMENT</b>
<b>Course Outcomes:</b>	
1	The students will be able to explain the technical components and use of decision support systems.
2	The students will be able to link the KM frameworks to key KM concepts and the major phases of the KM cycle.
3	The students will be able to apply general approaches to classify knowledge.
4	The students will be able to apply tools, techniques, processes used for knowledge codification.
5	The students will be able to analyze the knowledge transfer process.



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<b>Course Code/ Course Name:</b>	<b>17CSX16 IMAGE PROCESSING TECHNIQUES</b>
<b>Course Outcomes:</b>	
1	The students will be aware of the concepts of digital image fundamentals.
2	The students will be able to apply image enhancement techniques.
3	The students will be able to use image restoration and segmentation techniques.
4	The students will be able to use image compression technique.
5	The students will be able to represent features of images.

<b>Course Code/ Course Name:</b>	<b>17ITX05 PHP PROGRAMMING</b>
<b>Course Outcomes:</b>	
1	The students will be able to creating programs that include if, else, switch, for, while, and do loops to process statements repeatedly.
2	The students will be able to write simple PHP code to perform some functionality for a web application
3	The students will be able to design and implement a typical static web pages and interactive, dynamic web applications
4	The students will be able to know the Object oriented programming techniques in PHP
5	The students will be able to build, populate, and access a database through server side programming to provide data access for a web application.

<b>Course Code/ Course Name:</b>	<b>17ITX06 PROGRAMMING WITH JAVA2 ENTERPRISE EDITION</b>
<b>Course Outcomes:</b>	
1	The students will be able to design GUI components with Java FX.
2	The students will be able to develop database applications using JDBC.
3	The students will be able to implement Java networking APIs.
4	The students will be able to develop JSP and Servlet application.
5	The students will be able to learn Java Reflection API and XML.

<b>Course Code/ Course Name:</b>	<b>17ITX07 ADVANCED WEB PROGRAMMING</b>
<b>Course Outcomes:</b>	
1	The students will be able to design a web page using Bootstrap
2	The students will be able to make use of Bootstrap grids.
3	The students will be able to demonstrate use Node JS outside of web browser
4	The students will be able to make use of Angular JS for web page designing.
5	The students will be able to make use of AJAX in web page development.



  
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<b>Course Code/ Course Name:</b>	<b>17ITX08 C# AND .NET</b>
<b>Course Outcomes:</b>	
1	The students will be able to explain the .NET framework.
2	The students will be able to explain how c# fits into the .NET Platform.
3	The students will be able to analyze the basic structure of a C# application and to develop real time application
4	The students will be able to debug, compile, and run a simple web based application on .NET.
5	The students will be able to develop programs using C# on.NET.

<b>Course Code/ Course Name:</b>	<b>17ITX09 RUBY PROGRAMMING</b>
<b>Course Outcomes:</b>	
1	The students will be able to recall and describe basic of ruby programming.
2	The students will be able to know the concepts of operators, statements and control structures.
3	The students will be able to develop a program based on classes and modules
4	The students will be able to generate a Metaprogramming.
5	The students will be able to design a Ruby environment

<b>Course Code/ Course Name:</b>	<b>17CSX17 SOFTWARE DESIGN AND ARCHITECTURE</b>
<b>Course Outcomes:</b>	
1	The students will be able to explain influence of key architectural structures on business and technical activities.
2	The students will be able to define software architecture process.
3	The students will be able to design software architecture model for large scale software systems.
4	The students will be able to design and understand various software quality models.
5	The students will be able to recognize major software architectural styles, design patterns, and frameworks.

<b>Course Code/ Course Name:</b>	<b>17CSX18 SOFTWARE TESTING METHODOLOGIES</b>
<b>Course Outcomes:</b>	
1	The students will be able to summarize software testing principles and defects.
2	The students will be able to differentiate various test case design strategies.
3	The students will be able to outline different levels of testing
4	The students will be able to develop a software test plan.
5	The students will be able to determine suitable testing tool for a particular application.



  
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<b>Course Code/ Course Name:</b>	<b>17CSX19 SOFTWARE AGENTS</b>
<b>Course Outcomes:</b>	
1	The students will be able to define the characteristics of an intelligent agent.
2	The students will be able to identify agents for learning and assistance.
3	The students will be able to describe the communication and collaboration among agents.
4	The students will be able to grasp Agent architectures.
5	The students will be able to use agent development environment to develop the project.

<b>Course Code/ Course Name:</b>	<b>17CSX20 SOFTWARE QUALITY ASSURANCE</b>
<b>Course Outcomes:</b>	
1	The students will be able to explain the quality and configuration management processes.
2	The students will be able to describe the various activities of quality planning and quality control.
3	The students will be able to analyze the software metrics and apply the quality tools in software development.
4	The students will be able to analyze the software configuration standards and activities
5	The students will be able to measure the quality of the software based on different standards

<b>Course Code/ Course Name:</b>	<b>17CSX21 SOFTWARE PROJECT MANAGEMENT</b>
<b>Course Outcomes:</b>	
1	The students will be able to evaluate and select the most desirable projects & Identify desirable characteristics of effective project managers.
2	The students will be able to apply appropriate approaches to plan a new project.
3	The students will be able to apply appropriate methodologies to develop a project schedule.
4	The students will be able to develop a suitable budget for a new project.
5	The students will be able to practice project management principles while developing software.

<b>Course Code/ Course Name:</b>	<b>17CSX22 NATURAL LANGUAGE PROCESSING</b>
<b>Course Outcomes:</b>	
1	The students will be able to tag text with basic Language processing features
2	The students will be able to design an innovative application using NLP components.
3	The students will be able to implement a rule based system to tackle morphology/syntax of a Language.
4	The students will be able to design a tag set to be used for statistical processing keeping an application in mind.
5	The students will be able to design a Statistical technique for a new application.



  
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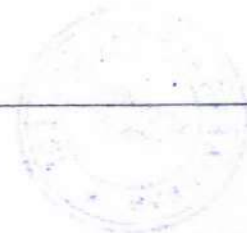
<b>Course Code/ Course Name:</b>	<b>17CSX23 TEXT MINING</b>
<b>Course Outcomes:</b>	
1	The students will be able to identify the different features that can be mined from text and web documents.
2	The students will be able to use available open source classification and clustering tools on some standard text data sets.
3	The students will be able to modify existing classification/clustering algorithms in terms of functionality or features used.
4	The students will be able to design a system that uses text mining to improve the functions of an existing open source search engine.
5	The students will be able to implement a text mining system that can be used for an application of your choice.

<b>Course Code/ Course Name:</b>	<b>17CSX24 DISTRIBUTED SYSTEMS</b>
<b>Course Outcomes:</b>	
1	The students will be able to explain the differences among: concurrent, networked, distributed, and mobile systems.
2	The students will be able to use communication between distributed objects by Remote procedure calls in real time applications.
3	The students will be able to design distributed systems based on security, file systems architecture in distributed operating system.
4	The students will be able to implement and analyze the event synchronization and distributed mutual exclusion problems.
5	The students will be able to apply transactions and deadlock handling techniques in distributed systems in engineering applications.

<b>Course Code/ Course Name:</b>	<b>17CSX25 GAME PROGRAMMING</b>
<b>Course Outcomes:</b>	
1	The students will be able to discuss the concepts of Game design and development.
2	The students will be able to design the processes, and use mechanics for game development.
3	The students will be able to explain the Core architectures of Game Programming.
4	The students will be able to use Game programming platforms, frame works and engines.
5	The students will be able to create interactive Games.



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<b>Course Code/ Course Name:</b>	<b>17CSX26 BLOCKCHAIN TECHNOLOGIES</b>
<b>Course Outcomes:</b>	
1	The students will be able to describe blockchain technology and its key concepts.
2	The students will be able to design and implement cryptocurrency and e-payment systems/applications.
3	The students will be able explain bitcoin transaction process.
4	The students will be able to deploy a private Ethereum block chain.
5	The students will be able to develop applications using Corda.

<b>Course Code/ Course Name:</b>	<b>17CSX27 QUANTUM COMPUTING</b>
<b>Course Outcomes:</b>	
1	The students will be able to explain the fundamentals of quantum computing.
2	The students will be able to design quantum system with quantum gates.
3	The students will be able to design the quantum system with the quantum algorithm
4	The students will be able to converse the physical realization of quantum computers
5	The students will be able to propose quantum tools using quantum computing software

<b>Course Code/ Course Name:</b>	<b>17CSX28 CONTAINER ORCHESTRATION USING KUBERNETES</b>
<b>Course Outcomes:</b>	
1	The students will be able to manage container orchestration in disturbed environments.
2	The students will be able to create clusters.
3	The students will be able to manage process like monitoring, logging and troubleshooting in clusters.
4	The students will be able to utilize kubernetes resource
5	The students will be able to create applications in cloud.

<b>Course Code/ Course Name:</b>	<b>17CSX29 INTERNET OF THINGS</b>
<b>Course Outcomes:</b>	
1	The students will be able to explain the internal architecture of microcontroller and the concepts and the cause of technology.
2	The students will be able to classify the sensors and controller as part of IoT.
3	The students will be able to plan a communication framework with fog computing.
4	The students will be able to plan the data analytical and data visualization platforms
5	The students will be able to discover knowledge on security in IoT.



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<b>Course Code/ Course Name:</b>	<b>17CSX30 AGILE METHODOLOGIES</b>
<b>Course Outcomes:</b>	
1	The student will be able to interact with business stakeholders in determining the requirements for a software system.
2	The student will be able to perform iterative software development processes: how to plan them, how to execute them.
3	The student will be able to point out the impact of social aspects on software development success.
4	The student will be able to develop techniques and tools for improving team collaboration and software quality.
5	The student will be able to perform Software process improvement as an ongoing task for development teams.

<b>Course Code/ Course Name:</b>	<b>17CSX32 SOCIAL NETWORK ANALYSIS</b>
<b>Course Outcomes:</b>	
1	The students will be able to explain the concept of semantic web and related applications
2	The students will be able to represent knowledge using ontology
3	The students will be able to develop semantic web related applications.
4	The students will be able to predict human behaviour in social web and related communities.
5	The students will be able to visualize social networks

<b>Course Code/ Course Name:</b>	<b>17MYB12 BASIC STATISTICS AND NUMERICAL ANALYSIS</b>
<b>Course Outcomes:</b>	
1	The students will be able to use statistical tools to solve problems from different fields.
2	The students will be able to acquaint the basic concepts in numerical methods and their uses.
3	The students will be able to represent the data and find the intermediate values, when huge amounts of experimental data are involved, the methods discussed on interpolation will be useful in constructing approximate polynomial.
4	The students will be able to explain the consequences of finite precision and the inherent limits of the numerical methods considered and by using differentiation and integration.
5	The students will be able to understand the solution of ordinary differential equations will be useful in attempting any engineering problem.



  
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<b>Course Code/ Course Name:</b>	<b>17CSX31- PROBLEM SOLVING AND PROGRAMMING</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the basics of Python Programming constructs.
2	The students will be able to design programs involving selection structure
3	The students will be able to design programs involving function, modules and loops.
4	The students will be able to realize the need of strings.
5	The students will be able to realize the need of list, tuples and dictionary.

<b>Course Code/ Course Name:</b>	<b>17ITX26 - PROBLEM SOLVING AND ALGORITHMIC SKILLS</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the basics of object oriented concepts in python.
2	The students will be able to develop applications using inheritance and polymorphism
3	The students will be able to implement the ADTs and trees
4	The students will be able to design graph abstract data type and heap
5	The students will be able to implement the sorting techniques and shortest path algorithms.

<b>Course Code/ Course Name:</b>	<b>17ECX16 INTERNET OF THINGS AND ITS APPLICATIONS</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand basics of Electrical circuits and Electronic devices
2	The students will be able to understand IOT characteristics and its essential components.
3	The students will be able to describe Arduino processor and working of Analog and Digital I/O pins
4	The students will be able to understand Raspberry pi and its interface with other devices
5	The students will be able to implement a IoT system using Arduino/Raspberry Pi.

<b>Course Code/ Course Name:</b>	<b>17CSX33 GOOGLE CLOUD PLATFORM</b>
<b>Course Outcomes:</b>	
1	The students will be able to recall and describe Google Cloud Platform products and services.
2	The students will be able to describe about container basics, containerize an existing application and Kubernetes concepts and principles.
3	The students will be able to Configure VPC networks, virtual machines and cloud IAM.
4	The students will be able to Manage and examine billing of GCP resources and Monitor resources using Stack driver services.
5	The students will be able to deploy the load balancers and auto scaling for VM instances



  
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<b>Course Code/ Course Name:</b>	<b>17CSX34 TABLEAU</b>
<b>Course Outcomes:</b>	
1	The students will be able to recall various Tableau products.
2	The students will be able to create discrete dates, continuous dates, multiple measures, measure on opposite axis, maps and show number in viz using text tables.
3	The students will be able to develop calculated field using existing fields, quick table calculation, reference line and reference band, dashboard and using dashboard actions.
4	The Students will be able to implement Join the data from same database ,different database, dynamic grouping called Subsets ,Level of details Calculation and advanced table calculation
5	The student will be able to design parameters from dynamic selection of a value, extract and comparing measure using bar in bar chart, bullet chart, back ground maps and Device specific dashboards like Desktop, Laptop, Mobile and story-telling.

<b>Course Code/ Course Name:</b>	<b>17CSX35 NODE JS</b>
<b>Course Outcomes:</b>	
1	The student will able to gain knowledge on Node JS environment setup
2	The student will able to create a web server
3	The student will able to work with file system concepts
4	The student will able to know about Events and Express JS
5	The student will be able to develop project using Node JS

<b>Course Code/ Course Name:</b>	<b>17CSX36 REACTJS</b>
<b>Course Outcomes:</b>	
1	The student will able to gain knowledge on React JS
2	The student will able to know about components in React JS
3	The student will able to the forms and events in React JS
4	The student will able to know usage of Router and Flux
5	The student will be able to develop an animation project.



  
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## ELECTRONICS AND COMMUNICATION ENGINEERING



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<b>Program Code:</b>	<b>EC</b>
<b>Program Name:</b>	<b>Electronics and Communication Engineering</b>
<b>Regulation:</b>	<b>R17</b>

## VISION OF THE DEPARTMENT

To empower the Electronics and Communication Engineering students with academic excellence and societal commitment.

## MISSION OF THE DEPARTMENT


- To groom skilled and employable graduates to meet the growing challenges in the industry.
- To equip the students with an aptitude for continuous learning and to enrich their knowledge by organizing Seminars, Faculty Development Programs and Workshops.
- To nurture the students to understand the societal needs and equip them with technical expertise to provide appropriate solutions.

## PROGRAM EDUCATIONAL OBJECTIVES (PEOS):

### List of PEOs

<b>PEO 1:</b>	Basic Engineering Analysis	To provide students with sound foundation in Mathematical, Scientific and Engineering fundamentals necessary to formulate, analyze and solve engineering problems.
<b>PEO 2:</b>	Continuous Learning	To enable the students to adapt to the emerging technologies through continuous learning.
<b>PEO 3:</b>	Higher Education	To encourage the students to pursue post graduate programs in Engineering and interdisciplinary areas to emerge as educators and research experts.
<b>PEO 4:</b>	Leadership Qualities	To empower the students with the leadership qualities along with technical skills.
<b>PEO 5:</b>	Societal Benefits	To inculcate the ethical values for professional development of the students to solve complex problems and provide solutions leading to societal benefits.



  
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## PROGRAM OUTCOMES:

ATTRIBUTE	GA'S
Engineering Knowledge	An ability to apply knowledge of mathematics, sciences, semiconductor theory to solve problems in the area of Signal processing, Embedded systems, VLSI & Communication systems.
Problem Analysis	An ability to identify, formulate and analyze complex Electronics & Communication problems in the real world.
Design And Development of Solutions	An ability to design system components or process to meet desired needs within realistic constraints such as economic, environmental, social, ethical and sustainability.
Investigation of Complex Problems	An ability to conduct experiments, analyze and interpret experimental results to provide valid conclusion.
Modern Tool Usage	An ability to apply techniques, skills and modern engineering tools required for ECE applications.
The Engineer and Society	An ability to perform in multidisciplinary areas.
Environment & Sustainability	An ability to understand the impact of ECE solutions in a global, economic, environmental and societal context.
Ethics	An ability to apply professional and ethical principles with responsibility.
Individual And Team Work	An ability to function in multidisciplinary teams exhibiting innate abilities towards team building.
Communication	An ability to communicate effectively.
Project Management And Finance	An ability to apply, design and implement application oriented projects.
Lifelong Learning	An ability to engage in independent and lifelong learning in the broadest context of technological change.



  
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## PROGRAM SPECIFIC OUTCOMES (PSOs) OF THE DEPARTMENT:

Graduates should be able to

<b>PSO1:</b>	Apply a systematic approach to the solution of problems in the field of Electronics and Communication Engineering.
<b>PSO2:</b>	Engage in lifelong learning, commitment to quality and continuous improvement.
<b>PSO3:</b>	Ability to work in multidisciplinary groups.
<b>PSO4:</b>	Design applications related to Signal Processing, Computer Networks and Communication.



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## SEMESTER 1:

<b>Course Code/ Course Name:</b>	<b>17EYA01/ PROFESSIONAL ENGLISH – I</b>
<b>Course Outcomes:</b>	
1	The students will be able to construct clear, grammatically correct sentences using a variety of sentence structures and appropriate vocabulary.
2	The students will be able to utilize listening skills to articulate one's own point of view in different circumstances.
3	The students will be able to apply appropriate communication skills across settings, purposes, and audiences.
4	The students will be able to distinguish main ideas and supporting details and employ active reading strategies to understand texts at the maximum level.
5	The students will be able to equip themselves with writing skills needed for academic as well as workplace contexts.

<b>Course Code/ Course Name:</b>	<b>17MYB01/CALCULUS AND SOLID GEOMETRY</b>
<b>Course Outcomes:</b>	
1	Apply the concept of orthogonal reduction to diagonalise the given matrix.
2	Have knowledge about the geometrical aspects of sphere.
3	Find the radius of curvature, circle of curvature and centre of curvature for a given curve.
4	Classify the maxima and minima for a given function with several variables, through by finding stationary points.
5	Demonstrate the use of double and triple integrals to compute area and volume.

<b>Course Code/ Course Name:</b>	<b>17PYB01- PHYSICS FOR ENGINEERS</b>
<b>Course Outcomes:</b>	
1	Acquire knowledge regarding Acoustics and ultrasonic.
2	Applying knowledge in the fields of optics & laser technology.
3	Design the sensors using the knowledge of fiber optics.
4	Gain the knowledge of wave, particle nature and matter waves.
5	Analyze the different kind of crystal structures and crystal growth.



  
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<b>Course Code/ Course Name:</b>	<b>17CYB02 – APPLIED ELECTRO CHEMISTRY</b>
<b>Course Outcomes:</b>	
1	Apply knowledge of fundamental principles of chemistry.
2	Define and solve engineering problems, including the utilization of creative and innovative skills.
3	Gain practical experience with chemical process equipment as well as to analyze and interpret data.
4	Understand the impact of engineering solutions in a global, economic, environmental and societal content.
5	Understand the management of electronic waste.

<b>Course Code/ Course Name:</b>	<b>17CSC02 - PYTHON PROGRAMMING</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the working of computers.
2	The students will be able to understand the basics of Python Programming constructs.
3	The students will be able to realize the need of strings, list, and tuples.
4	The students will be able to design programs involving dictionaries and function.
5	The students will be able to develop simple programs using file concept and Modules.

<b>Course Code/ Course Name:</b>	<b>17ECC01– ELECTRONIC DEVICES</b>
<b>Course Outcomes:</b>	
1	The Students can be able to design components using basic devices.
2	The Students will be able to analyze characteristics of BJT for various operations.
3	The Students will be able to understand the characteristics of Field Effect Transistor.
4	The students will be able to analyze the operation of Special semiconductor diodes.
5	The Students can implement the project using Power devices and Display devices.



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<b>Course Code/ Course Name:</b>	<b>17CSP02 -PYTHON PROGRAMMING LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the basics of Python Programming constructs.
2	The students will be able to understand the various operators of Python Programming.
3	The students will be able to realize the need of string manipulation, list, and tuples.
4	The students will be able to design programs involving dictionaries, function and modules.
5	The students will be able to develop simple programs with exception handling.

<b>Course Code/ Course Name:</b>	<b>17GYP02- ENGINEERING PRACTICES LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand various civil engineering practices like plumbing, carpentry and relevant tools
2	The students will be able to understand various manufacturing processes like welding, machining and sheet metal work
3	The students will be able to do residential house wiring and Measure energy and resistance to earth of an electrical equipment
4	The students will be able to perform the assembling and testing of the PCB based electronic circuits.
5	The students will be able to make / operate / utilize the simple engineering components.

<b>Course Code/ Course Name:</b>	<b>17GEP01 - PERSONAL VALUES</b>
<b>Course Outcomes:</b>	
1	Become an individual in knowing the self.
2	Acquire and express Gratitude, Truthfulness, Punctuality, Cleanliness & fitness.
3	Practice simple physical exercise and breathing techniques.
4	Practice Yoga asana which will enhance the quality of life.
5	Practice Meditation and get benefited.



  
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## SEMESTER 2:

<b>Course Code/ Course Name:</b>	<b>17EYA02 – PROFESSIONAL ENGLISH – II</b>
<b>Course Outcomes:</b>	
1	The students will be able to communicate using a variety of sentence structures and appropriate vocabulary.
2	The students will be able to comprehend conversations and short talks delivered in English and respond accordingly.
3	The students will be able to speak appropriately and effectively in various situations.
4	The students will be able to employ active reading strategies to understand texts at the maximum level.
5	The students will be able to equip themselves with writing formal letters and winning Job Application.

<b>Course Code/ Course Name:</b>	<b>17MYB02 – COMPLEX ANALYSIS AND LAPLACE TRANSFORMS</b>
<b>Course Outcomes:</b>	
1	Predict the suitable method to solve second and higher order differential equations.
2	Apply the concepts of Differentiation and Integration to Vectors.
3	Compute an analytic function, when its real or imaginary part is known.
4	Identify the Singularities and its corresponding Residues for the given function.
5	Predict a suitable method to evaluate the Contour integration.

<b>Course Code/ Course Name:</b>	<b>17PYB05 – PHYSICS OF SOLIDS</b>
<b>Course Outcomes:</b>	
1	Acquire knowledge about conductors, semiconductors and super conductors.
2	Distinguish between conductors, semiconductors and super conductors.
3	Understand the dielectrics and its applications.
4	Get the knowledge about fabrication of integrated circuits.
5	Know of recent trends in nanotechnology.



  
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Course Code/ Course Name:

17CYB03 - ENVIRONMENTAL SCIENCE

Course Outcomes:

- 1 Design a system, component, or process to meet desired needs.
- 2 Identify, formulate, and solve environmental engineering problems
- 3 Understand the professional and ethical responsibility as related to the practice of environmental engineering and the impact of engineering solutions in a global context.
- 4 Use the techniques, skills, and modern engineering tools necessary for environmental engineering practice.
- 5 Acquire the knowledge of information technology in environmental science.

Course Code/ Course Name:

17MEC01 – ENGINEERING GRAPHICS

Course Outcomes:

- 1 The Students can be able to construct conic sections and special curves of required specifications.
- 2 The Students can be able to apply the concept of first angle projection to create project of straight lines, planes, solids and section of solids.
- 3 The Students can be able to develop a surface drawing of a solid model with given dimensions.
- 4 The Students can be able to build orthographic, isometric projections of a three dimensional object.
- 5 The Students can be able to make use of the knowledge of engineering drawing to create physical models.


Course Code/ Course Name:

17ECC03- CIRCUIT THEORY

Course Outcomes:

- 1 The Students can apply the Ohm's law and Kirchhoff's law and investigates the behavior of electric circuits by analytical techniques.
- 2 The Students will be able to Evaluate the voltage, current of electric circuit using Graph theory techniques
- 3 The Students will be able to Design simple network for the complex network by exploring circuit theorems.
- 4 The students will be able to Design and test the dc and ac transient circuits using test signals.
- 5 Design and test circuit for a desired cut off frequency using resonant and coupled circuits.



  
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<b>Course Code/ Course Name:</b>	<b>17GYP01 - PHYSICS AND CHEMISTRY LABORATORY</b>
<b>Course Outcomes:</b>	
1	Acquire the fundamental knowledge in optics such as interference, Diffraction and Understand about the spectral instruments etc
2	Gain the basic knowledge about handling the laser light and Identify the basic parameters of an optical fibre.
3	Analyze the properties of matter with sound waves.
4	Apply knowledge of measurement of hardness producing ions, chloride, alkalinity, DO, conductance, EMF and pH
5	Understand the impact of water quality and solve engineering problems.

<b>Course Code/ Course Name:</b>	<b>17ECP01 – CIRCUITS AND DEVICES LABORATORY</b>
<b>Course Outcomes:</b>	
1	The Students can be able to analyze the characteristics of diodes and transistors.
2	The Students will be able to evaluate the characteristics of electronic devices such as FET, UJT and SCR etc based on their operations.
3	The Students will be able to verify the characteristics of clipper and clamper.
4	The students will be able to verify the theorems such as Thevenin's theorem, Norton theorems etc.
5	The Students will be able to measure the voltage and frequency using resonance circuits.

<b>Course Code/ Course Name:</b>	<b>17GEP02- INTER PERSONAL VALUES</b>
<b>Course Outcomes:</b>	
1	Develop a healthy relationship & harmony with others.
2	Practice respecting every human being.
3	Practice to eradicate negative temperaments.
4	Acquire Respect, Honesty, Empathy, Forgiveness and Equality.
5	Practice Exercises and Meditation to lead a healthy life and Manage the cognitive abilities of an Individual.



  
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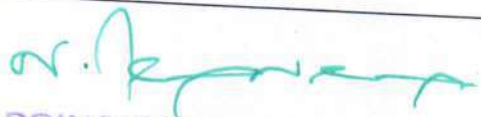
## SEMESTER 3:

<b>Course Code/ Course Name:</b>	<b>17MYB05-TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS</b>
<b>Course Outcomes:</b>	
1	The students will be able to analysis the Fourier series problem.
2	Know the formation of partial differential equations.
3	Apply the partial differential equations to solve the various electrical and electronics application.
4	Solve the problems using Fourier integral theorem and convolution theorem technique.
5	Formulate the difference equations and solve them using Z-transform techniques.

<b>Course Code/ Course Name:</b>	<b>17ITC03 - DATA STRUCTURES AND ALGORITHMS</b>
<b>Course Outcomes:</b>	
1	The students can Understand and apply the concept of abstract data type to represent and implement heterogeneous data structures.
2	The Students can Exemplify and implement how Stack ADT & Queue ADT can be implemented to manage the memory using static and dynamic allocations.
3	The students can Compare and contrast various techniques in Hashing and Trees.
4	The students can Understand the various types of shorting algorithms.
5	The students can Analyze and implement different types of sorting and searching algorithms.

<b>Course Code/ Course Name:</b>	<b>17ECC05 - ELECTRICAL MACHINES AND INSTRUMENTS</b>
<b>Course Outcomes:</b>	
1	The Students can Narrate Constructional details, principle of operation, performance and starters of D.C.Machines.
2	The Students can Explicate the Constructional details, principle of operation and testing of Transformer.
3	The Students can Describe the Constructional details, principle of operation, starting, speed control of induction and synchronous Motors.
4	The Students can Understand the principle of operation of basic measuring and electronics instruments
5	The Students can understand about operation of various types of transducers.



  
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<b>Course Code/ Course Name:</b>	<b>17ECC06 - DIGITAL LOGIC DESIGN</b>
<b>Course Outcomes:</b>	
1	The Students can apply the Boolean laws and theorems can able to minimize the Boolean expressions.
2	The Students will be able to construct Programmable arrays and memory logics.
3	The Students will be able to Design simple combinational logic circuits in hardware and simulation using Verilog.
4	The Students will be able to Design synchronous sequential logic circuits in hardware and simulation using Verilog.
5	The Students will be able to Design asynchronous sequential logic circuits.

<b>Course Code/ Course Name:</b>	<b>17ECC07 - SIGNALS AND SYSYTEMs</b>
<b>Course Outcomes:</b>	
1	The students will be able to Understand the operation of continuous time & Discrete time signals
2	The students will be able to Analyze the properties of signals & systems
3	The students will be able to Apply Laplace transform, Fourier transform, Z transform in signal analysis
4	The students will be able to Implementation of continuous time LTI systems using Fourier and Laplace Transforms.
5	The students will be able to Designing of discrete time LTI systems using Z transform

<b>Course Code/ Course Name:</b>	<b>17ECC08 - ANALOG ELECTRONICS</b>
<b>Course Outcomes:</b>	
1	The Students able to understand and design amplifier bias circuit.
2	The Students will be able to analysis the amplifier using h model.
3	The Students will be able to analyse the frequency response of amplifier and aware of power amplifier characteristics.
4	The students will be able to have idea about feedback amplifier and able to analyse the working of tuned amplifier.
5	The students will be able to design oscillator and multivibrators.



  
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Course Code/ Course Name:

**17ECP03 - DIGITAL LOGIC DESIGN LABORATORY**

Course Outcomes:

- 1 The Students can be able to analyze the characteristics of diodes and transistors.
- 2 The Students will be able to design the combinational circuits like adder, subtractor, code convertors, encoder & decoders.
- 3 The Students will be able to design the sequential circuits like counters and shift registers.
- 4 The students will be able to Implement combinational and sequential circuits using Verilog codes.
- 5 The Students will be able to design own projects based on digital logic.

Course Code/ Course Name:

**17ECP04 - ANALOG ELECTRONICS LABORATORY**

Course Outcomes:

- 1 The Students can be able to design and analyze the amplifier biasing circuits.
- 2 The Students can be able to design and analyze the frequency response negative feedback amplifier.
- 3 The Students will be able to design different oscillator circuits and observe their output waveform
- 4 The students will be able to experiment power amplifiers.
- 5 The students will be able to experiment the multivibrator and wave shapers


Course Code/ Course Name:

**17GED02 – SOFT SKILLS – READING AND WRITING**

Course Outcomes:

- 1 The Students can be able to Apply the knowledge to identify the parts of speech and construct the sentences.
- 2 The Students can be able to Develop the reading skills through cloze texts, matching and multiple choice modes.
- 3 The Students can be able to Interpret effectively through writing for a variety of purposes.



  
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## SEMESTER 4:

<b>Course Code/ Course Name:</b>	<b>17MYB09 - PROBABILITY AND RANDOM PROCESSES</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the fundamental knowledge of the basic probability concepts.
2	Have a well-founded knowledge of standard distributions which can describe real life phenomena.
3	Acquire skills in handling situations involving more than one random variable and functions of random variables.
4	Understand and characterize phenomena which evolve with respect to time in probabilistic manner.
5	Apply concept and properties of spectral density function and cross correlation functions.

<b>Course Code/ Course Name:</b>	<b>17ITC08 - FUNDAMENTALS OF JAVA PROGRAMMING</b>
<b>Course Outcomes:</b>	
1	The students will be able to learn fundamental concepts of Java.
2	The students will be able to design concepts with inheritance.
3	The students will be able to implement exception handling and Files.
4	The students will be able to create threads and interfaces in Java classes.
5	The students will be able to implement GUI and generics concepts.

<b>Course Code/ Course Name:</b>	<b>17ECC10 - ELECTROMAGNETIC FIELDS</b>
<b>Course Outcomes:</b>	
1	The Students can apply vector calculus to static electric and magnetic fields in different engineering situations.
2	The Students will be able to analyze fields a potentials due to static changes.
3	The Students will be able to evaluate static magnetic fields.
4	The students can understand the relation between the fields under time varying situations.
5	The students can acquire knowledge about electromagnetic waves and its polarization.



  
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<b>Course Code/ Course Name:</b>	<b>17ECC11- ANALOG CIRCUIT DESIGN</b>
<b>Course Outcomes:</b>	
1	The Students can able to understand basic concepts of Linear IC's.
2	The Students will be able to design all Linear and Non linear op-amp configurations.
3	The Students will be able to Design simple analog multiplier circuits and PLL applications.
4	The Students will be able to Design A to D and D to A converters.
5	The Students will be able to Design simple analog circuits using op-amp.

<b>Course Code/ Course Name:</b>	<b>17ECC12 - DIGITAL SIGNAL PROCESSING</b>
<b>Course Outcomes:</b>	
1	The Students can apply DFT and FFT for the analysis of digital signals & systems.
2	The students will be able to design and implement digital FIR filters.
3	The students will be able to design and implement digital IIR filters.
4	The students will be able to characterize finite Word length effect on filters.
5	The Students can apply real time applications.

<b>Course Code/ Course Name:</b>	<b>17ECP06 - ANALOG CIRCUIT DESIGN LABORATORY</b>
<b>Course Outcomes:</b>	
1	The Students can be able to analyze the characteristics of Inverting and Non inverting amplifiers.
2	The Students will be able to design the Oscillator circuits and Integrator and Differentiators.
3	The Students will be able to design the astable and monostable multivibrator circuits using 555 timers.
4	The students will be able to Implement filter circuits using op-amp.
5	The Students will be able to design own projects using analog IC. .



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<b>Course Code/ Course Name:</b>	<b>17ECP07 - DIGITAL SIGNAL PROCESSING LABORATORY</b>
<b>Course Outcomes:</b>	
1	The Students will be able to Carry out simulation of DSP signals.
2	The Students will be able to Demonstrate the applications of FFT to DSP.
3	The Students will be able to Implement FIR and IIR filters for various applications of DSP.
4	The students will be able to Analyze Finite word length effect on DSP systems.
5	The Students will be able to Demonstrate their abilities towards DSP processor based implementation of DSP systems.

<b>Course Code/ Course Name:</b>	<b>17GED01 - SOFT SKILLS-LISTENING AND SPEAKING</b>
<b>Course Outcomes:</b>	
1	Apply the knowledge of basic grammar to classify the types of verbs and questions and to construct the sentences.
2	Develop the listening skills through note completion, matching and multiple choice modes.
3	Organize a presentation on the given topic.

## SEMESTER 5:

<b>Course Code/ Course Name:</b>	<b>17GEA02 – PRINCIPLES OF MANAGEMENT</b>
<b>Course Outcomes:</b>	
1	The Students will acquire comprehensive knowledge on management concepts.
2	The Students will be able to understand and apply planning concepts at different conditions and situations.
3	The Students will accomplish organizational structures and understand the staffing process.
4	The Students will be able to employee's motivation and project managements in working environments.
5	The Students will be able to do the budgetary and non-budgetary control of projects.



  
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<b>Course Code/ Course Name:</b>	<b>17ECC13 - MICROPROCESSOR AND MICROCONTROLLER INTERFACING</b>
<b>Course Outcomes:</b>	
1	The students will be able to apply the basic concepts of peripherals and develop the real time applications
2	The students will be able to program Microprocessor and Microcontroller for different applications using assembly language programming.
3	The students will be able to develop Microcontroller based system using higher level language
4	The students will be able to design and develop real time applications using Microcontrollers
5	The students will be able to acquire knowledge about peripherals and develop the real time applications

<b>Course Code/ Course Name:</b>	<b>17ECC14 - DATA COMMUNICATION AND NETWORKS</b>
<b>Course Outcomes:</b>	
1	The students will be able to Comprehend Processes To Communicate With Each Other Across A Computer Networks.
2	The students will be able to Analyze The Services, Roles And Features Of The Data Link Layers Of Data Networks.
3	The students will be able to Identify solution for each routing/switching functionality at network layer.
4	The students will be able to Trace the flow of information from one node to another node in the network.
5	The students will be able to Choose the required functionality at each layer for given application.



  
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<b>Course Code/ Course Name:</b>	<b>17ECC15 - TRANSMISSION LINES AND WAVEGUIDES</b>
<b>Course Outcomes:</b>	
1	The student will be able to Interpret the lumped circuit model of a transmission line with circuit theory and determine characteristic impedance, propagation constant and reflection coefficient.
2	The students will be able to realize E and H field distribution in Microstrip, Strip lines and Coplanar lines and Calculate losses and Q-factor of Microstrip line
3	The students will be able to Compute the SWR, reflection coefficient parameters using smith chart and design single stub matching and double stub matching
4	The students will be able to Deduce the field configuration of parallel plate waveguide.
5	The students will be able to Deduce the field configuration of rectangular waveguide and resonant cavities

<b>Course Code/ Course Name:</b>	<b>17ECP08 - MICROPROCESSOR AND MICROCONTROLLER INTERFACING LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will be able to develop applications using 8085 processor program.
2	The students will be able to evaluate various arithmetic & Logical operations using 8085 processor.
3	The students will be able to verify the various arithmetic & Logical operations using 8051 controller.
4	The Students will be able to verify the basic peripherals in 8051 using HLP.
5	The Students will be able to implement the interfacing concepts for various real world applications.

<b>Course Code/ Course Name:</b>	<b>17ECP09 - DATA COMMUNICATION AND NETWORKS LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will be able to Obtain the working knowledge of computer hardware & Operating Systems, software and networking skills.
2	The students will be able to Build some simple networking models using the Network simulator modeling tool and perform simulations that help them evaluate their design approaches and expected network performance.
3	The students will be able to Implement and compare the various routing algorithms for wire/wireless networks.
4	The students will be able to Master the concepts of protocols, network interfaces and design LAN, MAN and WAN.
5	The students will be able to Troubleshoot and repair network problems.



  
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<b>Course Code/ Course Name:</b>	<b>17GED08 - ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE</b>
<b>Course Outcomes:</b>	
1	The students will be able to Gain Knowledge about of Indian tradition and Indian traditional knowledge systems
2	The students will be able to Understand basics of technologies and its scientific perspectives.
3	The students will be able to study the basics of Indian traditional health care
4	The students will be able to know the basics of Indian artistic tradition
5	The students will be able To develop the basics of linguistic tradition

## SEMESTER 6:

<b>Course Code/ Course Name:</b>	<b>17ECC16 - ANALOG AND DIGITAL COMMUNICATION</b>
<b>Course Outcomes:</b>	
1	The students will be able to acquire the knowledge about Analog modulation and demodulation schemes
2	The students will be able to acquire the knowledge about Pulse modulation and demodulation schemes
3	The students will be able to calculate SNR of various communication systems and perform error control coding.
4	The students will be able to analyze the methods of baseband data transmission and reception.
5	The students will be able to analyze the performance of various Pass band data transmission and reception techniques.

<b>Course Code/ Course Name:</b>	<b>17ECC17 - VLSI DESIGN</b>
<b>Course Outcomes:</b>	
1	The students will be able to create models of moderately sized CMOS circuits that realize specified digital functions.
2	The students will be able to identify the interactions between process parameters, device structures, circuit performance, and system design
3	The students will be able to apply CMOS technology-specific layout rules in the placement and routing of transistors and Interconnect.
4	The students will be able to complete a significant VLSI design project having a set of objective criteria and design Constraints.
5	The students will be able to analyze the physical design process of ultra fast circuits and systems



  
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<b>Course Code/ Course Name:</b>	<b>17ECC18 - ANTENNA AND WAVE PROPAGATION</b>
<b>Course Outcomes:</b>	
1	The students will be able to know the basic radiation mechanism and antenna parameters.
2	The students will be able to design and characterize the various antenna arrays.
3	The students will be able to analyze the wire antennas and aperture antennas.
4	The students will be able to gain knowledge on the measurements of Antenna parameters.
5	The students will be able to compare the wave propagation and analyse the electromagnetic wave propagated in free space.

<b>Course Code/ Course Name:</b>	<b>17ECP10 - ANALOG AND DIGITAL COMMUNICATION LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will be able to transmit and receive the signal using Analog modulation and demodulation schemes.
2	The students will be able to analysis the response of pre - Emphasis and de-emphasis
3	The students will be able to transmit and receive the signal using digital modulation and demodulation schemes
4	The students will be able to transmit and receive the signal using Analog and digital pulse modulation and demodulation schemes
5	The students will be able to apply the Error control coding techniques using MATLAB in communication

<b>Course Code/ Course Name:</b>	<b>17ECP11 - VLSI DESIGN LABORATORY</b>
<b>Course Outcomes:</b>	
1	Design and simulation of Combination Logic Circuit using Verilog HDL.
2	Design and simulation of Sequential Logic Circuit using Verilog HDL.
3	Design, Simulate and Extract the layouts of Analog IC Blocks using Tanner spice.
4	Analyze transient characteristics.
5	Import the logic modules into FPGA boards.



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<b>Course Code/ Course Name:</b>	<b>17GED06 - COMPREHENSION</b>
<b>Course Outcomes:</b>	
1	The Student will be able to Understand and comprehend any given problem related to Electronics and communication Engineering field.

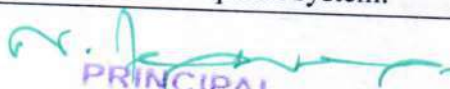
<b>Course Code/ Course Name:</b>	<b>17GED07- CONSTITUTION OF INDIA</b>
<b>Course Outcomes:</b>	
1	The students will be able to Gain Knowledge about the Constitutional Law of India
2	The students will be able to Understand the Fundamental Rights and Duties of a citizen
3	The students will be able to Apply the concept of Federal structure of Indian Government
4	The students will be able to Analyze the Amendments and Emergency provisions in the Constitution
5	The students will be able Develop a holistic approach in their life as a Citizen of India.

## SEMESTER 7:

<b>Course Code/ Course Name:</b>	<b>17ECC19 - MICROWAVE ENGINEERING</b>
<b>Course Outcomes:</b>	
1	The students will be able to calculate the power distribution in microwave components.
2	The students will be able to analyze the different types of microwave tubes
3	The students will be able to compute the impedance and loss measurements
4	The students will be able to identify the various microwave semiconductor devices and its characteristics
5	The students will be able to formulate the application of microwave systems.

<b>Course Code/ Course Name:</b>	<b>17ECC20 - OPTICAL COMMUNICATION</b>
<b>Course Outcomes:</b>	
1	The Students can understand the structure of optical fibers and wave propagation mechanisms.
2	The Students will be able to obtain the knowledge on the losses and dispersions occurred in the optical cable.
3	The Students will be able to characterize the Optical sources and detectors.
4	The students will be able to Calculate the link budget analysis of optical receiver section.
5	The Students can familiar with design considerations of fiber optical system.



  
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<b>Course Code/ Course Name:</b>	<b>17ECC21 - EMBEDDED AND REAL TIME SYSTEMS</b>
<b>Course Outcomes:</b>	
1	The students will be able to Describe the architecture of different ARM processor cores.
2	The students will be able to Understand the instruction set and Assembly Language Programming in ARM.
3	The students will be able to Categorize and understand the recent trends in Embedded Systems.
4	The students will be able to Outline the concepts of embedded systems and explain the basic concepts of real time Operating system design.
5	The students will be able to Develop real time solutions in different RTOS environment.

<b>Course Code/ Course Name:</b>	<b>17ECP12 - MICROWAVE AND OPTICAL LABORATORY</b>
<b>Course Outcomes:</b>	
1	The Students can apply knowledge of optical communication to various application areas.
2	The Student will be able to implement and maintain the various microwave components.
3	The Students will be able to solve problems in maintaining the optical and microwave components.
4	The students can obtain knowledge to calculate the numerical aperture of a fiber.
5	The Students can understand the characteristics of Gunn diode and Reflex Klystron.

<b>Course Code/ Course Name:</b>	<b>17ECP13 - EMBEDDED SYSTEMS LABORATORY</b>
<b>Course Outcomes:</b>	
1	The students will be able to develop applications using I/O ports in Microcontrollers
2	The students will be able to design embedded systems with wireless applications
3	The students will be able to design system for real world applications using peripherals.
4	The students will be able to design embedded systems using wired protocols.
5	The students will be able to made automation and provide solution to problems in design



  
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<b>Course Code/ Course Name:</b>	<b>17ECD01 – PROJECT WORK-I</b>
<b>Course Outcomes:</b>	
1	The students will be able to study problems in the field of Electronics and communication Engineering through literature survey and its reviews.
2	The students will be able Undertake problem identification, formulation and solution.
3	The students will be able to Design engineering solutions to complex problems utilising a systems approach and develop projects
4	The students will be able to Communicate effectively and to present ideas clearly
5	The students will be able to demonstrate the knowledge, skills and work as a team to achieve common goal

## SEMESTER 8:

<b>Course Code/ Course Name:</b>	<b>17ECD02 – PROJECT WORK-II</b>
<b>Course Outcomes:</b>	
1	The students will be able to study problems in the field of Electronics and communication Engineering through literature survey and its reviews.
2	The students will be able Undertake problem identification, formulation and solution.
3	The students will be able to Design engineering solutions to complex problems utilising a systems approach and develop projects.
4	The students will be able to Communicate effectively and to present ideas clearly.
5	The students will be able to demonstrate the knowledge, skills and work as a team to achieve common goal.



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## PROGRAM SPECIFIC ELECTIVES:

<b>Course Code/ Course Name:</b>	<b>17ECX01- MEDICAL ELECTRONICS</b>
<b>Course Outcomes:</b>	
1	The students will be able to gain knowledge about the Bio potential recording systems and its signal features.
2	The students will be able to learn various Non Electrical Parameters for advance analysis
3	The students will be able to identify various diagnostic equipments and its applications
4	The students will be able to analyze and evaluate the effect of different therapeutic methods, their risk potential, physical principles, opportunities and possibilities for different medical procedures
5	The students will be able to understand the elements of risk for different instrumentation methods and basic electrical safety

<b>Course Code/ Course Name:</b>	<b>17ECX02 - NANO ELECTRONICS</b>
<b>Course Outcomes:</b>	
1	The student will be able to Know the basics of nano electronics.
2	The student will be able demonstrate carbon nano tubes.
3	The student will be able to discuss the various applications of nanobiology
4	The student will be able to describe the properties of nanosensors.
5	The student will be to summarize how nanomedicines can impact the future

<b>Course Code/ Course Name:</b>	<b>17ECX03 - RADAR AND NAVIGATIONAL AIDS</b>
<b>Course Outcomes:</b>	
1	The students will be able to gain knowledge radar.
2	The students will be able to understand the pulse Doppler radar operations.
3	The students will be able to Understand the principles of navigation in addition to approach and landing aids.
4	The students will be able to learn about clutter.
5	The students will be able to apply the concept of radar in various fields.



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<b>Course Code/ Course Name:</b>	<b>17ECX04 - SENSORS AND ITS APPLICATIONS</b>
<b>Course Outcomes:</b>	
1	The Students will become expertise in the basic concepts of various sensors and transducers.
2	The Students will be able to identify a particular transducer for a specific application.
3	The Students will be able to analyze the performance of thermal, gas and acoustic sensors.
4	The Students will be able to analyze the performance of magnetic and inductance sensors.
5	The Students will be able to analyze the performance of automobile, home appliance and aerospace sensors.

<b>Course Code/ Course Name:</b>	<b>17ECX05 - MEMS AND ITS APPLICATION</b>
<b>Course Outcomes:</b>	
1	The student will be able to Know the fabrication methodology used in MEMS.
2	The student will be able Analyze about MEMS materials and its Fabrication techniques.
3	The student will be able to discuss recent advancements in the field of MEMS and its Switches
4	The student will be able to utilize the materials for common micro components and devices
5	The student will be to analyze the integration and packaging of RF MEMS devices

<b>Course Code/ Course Name:</b>	<b>17ECX06 - COMPUTER HARDWARE INTERFACING</b>
<b>Course Outcomes:</b>	
1	The students will be able to Design the BIOS.
2	The students will be able to Analyze the working of CPU.
3	The students will be able to Understand storage concepts.
4	The students will be able to Understanding the functioning of memory.
5	The students will be able to Learning various peripherals.



  
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<b>Course Code/ Course Name:</b>	<b>17ECX07 - CONTROL SYSTEMS ENGINEERING</b>
<b>Course Outcomes:</b>	
1	The students can Calculate the transfer function of a system.
2	The students will be able to determine the stability of linear systems
3	The students will be able to analyze the frequency response components.
4	The students will be able to analyze the stability and various frequency analysis techniques .
5	The Students can Formulate state-space models.

<b>Course Code/ Course Name:</b>	<b>17ECX08 - DIGITAL IMAGE PROCESSING</b>
<b>Course Outcomes:</b>	
1	The students will be able to know the image formation and the role human visual system plays in perception of Gray and color image data.
2	The students will be able to apply transform-domain representation of images.
3	The students will be able to perform image analysis by designing spatial and frequency domain filters.
4	The students will be able to describe how digital images are represented and stored efficiently depending on the desired quality.
5	The students will be able to detect/extract regions of interest from an image using various thresholding and Segmentation Techniques.

<b>Course Code/ Course Name:</b>	<b>17ECX09- WIRELESS COMMUNICATION</b>
<b>Course Outcomes:</b>	
1	The student will be able to Interpret the fundamental cellular radio concepts, Multipath propagation, Spectrum Limitations, Noise and Interference limited systems
2	The students will be able to understand radio propagation models and predict the large scale and small scale effects
3	The students will be able to Compute deduce Modulation and demodulation technique
4	The students will be able signal processing in wireless system.
5	The students will be able to figure out the different Spread Spectrum Systems



  
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Course Code/ Course Name:

**17ECX10 - HIGH SPEED NETWORKS**

Course Outcomes:

- 1 The Students will be able to distinguish the various latest networks.
- 2 The Students will be able to evaluate the different queuing model.
- 3 The Students will be having the capability to analyze various congestion control mechanisms.
- 4 The students will be able to analyze integrated and differentiated services.
- 5 The students will be able to identify the intricacies of RSVP, MPLS and RTP protocols.

Course Code/ Course Name:

**17ECX11 - MODERN MICROPROCESSORS AND MICROCONTROLLERS**

Course Outcomes:

- 1 The students will be able to acquire knowledge about memory hierarchy, Paging, Segmentation and Pipelining.
- 2 The students will be able to gain knowledge and design a system using Pentium Processor.
- 3 The students will be able to develop programming and system design using Pentium Processor.
- 4 The students will be able to build up programming and system design using Motorola Microcontroller.
- 5 The students will be able to gain programming and design knowledge in MSP 430 Microcontroller.

Course Code/ Course Name:

**17ECX12- PROTOCOLS AND ARCHITECTURES FOR WIRELESS SENSOR NETWORKS**

Course Outcomes:

- 1 The Students can apply their knowledge in the sensor network applications.
- 2 The Students will be able to analyse about the energy efficient network design.
- 3 The Students will be able to design sensor network
- 4 The students will be able to analyse the Time Synchronization, Localization and Positioning, Sensor Tasking and Control of sensors.
- 5 The students will be able to routing protocol secured network design



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<b>Course Code/ Course Name:</b>	<b>17ECX13 - TELECOMMUNICATION SWITCHING AND NETWORKS</b>
<b>Course Outcomes:</b>	
1	The Students can learn the different multiplexing methods and SONET optical standards.
2	The Students will be able to identify digital multiplexing and digital switching.
3	The Students will be able to recognize the need for network synchronization issues and management.
4	The students will be able to learn the local loop systems in digital environment.
5	The students can acquire the knowledge about telephone traffic and statistical modeling.

<b>Course Code/ Course Name:</b>	<b>17ECX14 - MULTIMEDIA COMPRESSION TECHNIQUES</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the concept of information theory, models and coding.
2	The students can acquire the knowledge of text compression coding techniques.
3	The students can able to study the audio compression coding and speech compression techniques.
4	The students will be able to know the image compression approaches, coding and JPEG standards.
5	The students will be Identify the wavelet based video compression.

<b>Course Code/ Course Name:</b>	<b>17ECX15 - SATELLITE COMMUNICATION</b>
<b>Course Outcomes:</b>	
1	The students will be able to learn the different satellite orbits and launching procedures
2	The students will be able to design & Analysis of various parameters in space segments
3	The students will be able to design & Analysis of various parameters in earth segments
4	The students will be able to know the satellite communication system and access
5	The students will be able to understand the satellite communication system and its applications



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<b>Course Code/ Course Name:</b>	<b>17ECX16 – INTERNET OF THINGS AND ITS APPLICATIONS</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand basics of Electrical circuits and Electronic devices
2	The students will be able to understand IOT characteristics and its essential components.
3	The students will be able to describe Arduino processor and working of Analog and Digital I/O pins
4	The students will be able to understand Raspberry pi and its interface with other devices
5	The students will be able to implement a IoT system using Arduino/Raspberry Pi.

<b>Course Code/ Course Name:</b>	<b>17ECX17 – SPEECH PROCESSING</b>
<b>Course Outcomes:</b>	
1	The students will be able to Model speech production system and describe the fundamentals of speech.
2	The students will be able to Extract and compare different speech parameters.
3	The students will be able to Choose an appropriate statistical speech model for a given application.
4	The students will be able to Design a speech recognition system.
5	The students will be able to Use different speech synthesis techniques.

<b>Course Code/ Course Name:</b>	<b>17ECX18 – OPTO ELECTRONIC DEVICES</b>
<b>Course Outcomes:</b>	
1	The students will be able to learned solid state physics.
2	The students will be able to design display devices
3	The students will be able to design optical detection devices.
4	The students will be able to design optoelectronic Modulator.
5	The students will be able to design optoelectronic integrated circuits.



  
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<b>Course Code/ Course Name:</b>	<b>17ECX19 – CRYPTOGRAPHY AND NETWORK SECURITY</b>
<b>Course Outcomes:</b>	
1	The students will be able to know about various security defense methods and standards.
2	The students will be able to learn about Symmetric Cryptography and its types
3	The students will be able to develop new Public Key Cryptography Algorithms.
4	The students will be able to apply Message Authentication algorithms like HASH function and HMAC.
5	The students will have knowledge about Network and System Security methods

<b>Course Code/ Course Name:</b>	<b>17ECX20 – STATISTICAL THEORY OF COMMUNICATION</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand various operations in Random Process.
2	The students will be able to understand different realizable linear systems and Matched filtering.
3	The students will be able to describe the Entropy function and Mutual information.
4	The students will be able to understand different encoding techniques and their implementation.
5	The students will be able to identify the required modulation according to the application.

<b>Course Code/ Course Name:</b>	<b>17ECX21 – COGNITIVE RADIO</b>
<b>Course Outcomes:</b>	
1	The students will be able to explain the principles of the software defined radio.
2	The students will be able to describe the architecture of software defined radio.
3	The students will be able design considerations of cognitive radio.
4	The students will be able to Illustrate cognitive radio architecture.
5	The students will be able to demonstrate knowledge of spectrum sensing and apply cross-layer design for cognitive radio.



  
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<b>Course Code/ Course Name:</b>	<b>17CSX01- DATA SCIENCE</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the basics of data science and big data field.
2	The students will be able to design efficient techniques for mining large volumes of data in engineering applications.
3	The students will be able to deploy the technique of classification and prediction in data science.
4	The students will be able to understand about the clusters and analyze the big data for useful business applications.
5	The students will be able to apply tools like Hadoop, Giraph and storm to implement real time applications.

<b>Course Code/ Course Name:</b>	<b>17CSX26 - HADOOP DISTRIBUTED ENVIRONMENT</b>
<b>Course Outcomes:</b>	
1	The students will be able to Identify the need for big data analytics for a domain.
2	The students will be able to understand the use cases in hadoop.
3	The students will be able to initialize Hadoop and HDFS.
4	The students will be able to Design applications using Map Reducing Concepts.
5	The students will be able to know the storage and deployment concepts.

<b>Course Code/ Course Name:</b>	<b>17CSX31- PROBLEM SOLVING AND PROGRAMMING</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the basics of Python Programming constructs.
2	The students will be able to design programs involving selection structure
3	The students will be able to design programs involving function, modules and loops.
4	The students will be able to realize the need of strings.
5	The students will be able to realize the need of list, tuples and dictionary.



  
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<b>Course Code/ Course Name:</b>	<b>17ITC12 - DATABASE SYSTEMS CONCEPTS</b>
<b>Course Outcomes:</b>	
1	The students will be able to describe the role of Database Management System in an Organization.
2	The students will be able to study basic database concepts including the structure and operations of the relational data model.
3	The students will be able to construct simple and Moderately advanced database queries using SQL.
4	The students will be able to apply logical database design principles includes E-R diagrams & Normalization.
5	The students will be able to explain various file organizing & Indexing structure.

<b>Course Code/ Course Name:</b>	<b>17ITX26- PROBLEM SOLVING AND ALGORITHMIC SKILLS</b>
<b>Course Outcomes:</b>	
1	The students will be able to understand the basics of object oriented concepts in python.
2	The students will be able to develop applications using inheritance and polymorphism
3	The students will be able to implement the ADTs and trees
4	The students will be able to design graph abstract data type and heap
5	The students will be able to implement the sorting techniques and shortest path algorithms.

<b>Course Code/ Course Name:</b>	<b>17GEA03 - TOTAL QUALITY MANAGEMENT</b>
<b>Course Outcomes:</b>	
1	Students can acquire various concepts of quality management.
2	Students can implement various principles of quality management.
3	Students will be able to impart quality using statistical process.
4	Students can learn to use the various tools to maintain quality.
5	Students can implement the quality system for ISO certification.



  
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<b>Course Code/ Course Name:</b>	<b>17EYA01/ PROFESSIONAL ENGLISH – I</b>
<b>Course Outcomes:</b>	
1	The students will be able to construct clear, grammatically correct sentences using a variety of sentence structures and appropriate vocabulary.
2	The students will be able to utilize listening skills to articulate one's own point of view in different circumstances.
3	The students will be able to apply appropriate communication skills across settings, purposes, and audiences.
4	The students will be able to distinguish main ideas and supporting details and employ active reading strategies to understand texts at the maximum level.
5	The students will be able to equip themselves with writing skills needed for academic as well as workplace contexts.

<b>Course Code/ Course Name:</b>	<b>17GEA04 - PROFESSIONAL ETHICS AND HUMAN VALUES</b>
<b>Course Outcomes:</b>	
1	Students know the concepts of ethics and values.
2	Students acquire the knowledge of interpersonal and organizational issues in ethics
3	Students will be able to Highlight the ethical issues related to engineering.
4	Students can learn the concepts of engineer's responsibilities and their rights.
5	Students will be able to understand the role of global issues and professional bodies.

<b>Course Code/ Course Name:</b>	<b>17MYB12 - BASIC STATISTICS AND NUMERICAL ANALYSIS</b>
<b>Course Outcomes:</b>	
1	Students will be able to use statistical tools to solve problems from different fields.
2	The students would be acquainted with the basic concepts in numerical methods and their uses.
3	Students will be able to huge amounts of experimental data are involved, the methods discussed on interpolation will be useful in constructing approximate polynomial to represent the data and to find the intermediate values.
4	Students will be able to explain the consequences of finite precision and the inherent limits of the numerical methods considered and by using differentiation and integration.
5	Students will be able to methods introduced in the solution of ordinary differential equations will be useful in attempting any engineering problem.



  
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