



# SENGUNTHAR ENGINEERING COLLEGE (AUTONOMOUS)

(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)  
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956  
NAAC Accredited with 'A' Grade

**TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU**



## ODD SEMESTER

### Department of Civil Engineering

**REGULATION: R2019**

**YEAR / SEMESTER: I / I**

**SUBJECT CODE: 19HST101**

**SUBJECT NAME: COMMUNICATIVE TECHNO ENGLISH - I**

#### **COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Learn to acquire usage of English.
- Use a wide range of vocabulary in oral and written communication.
- Give short informal presentations and participate in classroom discussions.
- Write informal letters and other communications.
- Frame grammatically correct sentences

**SUBJECT CODE: 19MAT101**

**SUBJECT NAME: ENGINEERING MATHEMATICS - I**

#### **COURSE OUTCOMES:**

After successfully completing the course, the student will have a good understanding of the following topics and their applications.

- Understanding of the ideas of matrix and its nature.
- Apply differentiation to solve maxima and minima problems.
- Understanding the concept of partial differentiation and total derivative.
- Evaluate integrals using techniques of integration such as substitution, partial fractions and integration by parts.
- Apply integration to compute multiple integrals, area, volume, integrals in polar co-ordinates, in addition to change of order and change of variables.

**SUBJECT CODE: 19CYE101**

**SUBJECT NAME: ENGINEERING CHEMISTRY**

#### **COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Identify the method of removal of impurities from water for domestic and industrial purpose.
- Identify the different types of polymers, polymerisation processes and some special properties and applications of polymers.
- Analyze the causes of corrosion and discuss the control measures and discuss the functions of batteries
- Apply of phase rule to alloy making for various engineering applications.
- Discuss the fundamentals of the nano materials and nano products of today.
- Outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters

**SUBJECT CODE: 19PHE101**

**SUBJECT NAME: ENGINEERING PHYSICS**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Apply these basic principles of structures of Engineering materials.
- Make use of materials properties using the knowledge of elasticity.
- Acquire the concepts of light propagation and its applications in lasers and fibre optics.
- Realize advanced physics concepts of quantum theory and its applications.
- Incorporate the acoustics and ultrasound applications.
- Apply principles of elasticity, optics and acoustic properties in Engineering applications.

**SUBJECT CODE: 19GET101**

**SUBJECT NAME: ENGINEERING GRAPHICS**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Construct multiple views of engineering components.
- Prepare the pictorial drawings as per the standards.
- Develop the projection of solids.
- Draw the section of solids drawings and development of surfaces of given objects.
- Apply free hand sketching and concept of isometric in engineering practice.

**SUBJECT CODE: 19GEE101**

**SUBJECT NAME: COMPUTER FUNDAMENTALS AND PYTHON PROGRAMMING**

**COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Know the Computer basics, Components and Softwares
- Develop algorithmic solutions to simple computational problems and Read, write, execute by hand simple Python programs.
- Structure simple Python programs for solving problems.
- Decompose a Python program into functions.
- Represent compound data using Python lists, tuples, and dictionaries.

**SUBJECT CODE: 19EEC101**

**SUBJECT NAME: LIFE SKILLS FOR ENGINEERS**

**COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Communicate effectively and make effective presentations.
- Write different types of reports.
- Face interview & group discussion.
- Critically think on a particular problem.
- Get success in all aspects and develop public skills.

**REGULATION: R2019**

**YEAR / SEMESTER: II / III**

**SUBJECT CODE: 19MAT301**

**SUBJECT NAME: TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS**

**COURSE OUTCOMES:**

After successfully completing the course, the student will be able to:

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

**SUBJECT CODE: 19CET302**

**SUBJECT NAME: APPLIED GEOLOGY**

**COURSE OUTCOMES:**

After completing this course students are able to:

- Understand the importance of geological knowledge earthquake, volcanism and the action of various geological agencies.
- Get basics knowledge on properties of minerals.
- Gain knowledge about types of rocks, their distribution and uses.
- Understand the methods of study on geological structure.
- Understand the application of geological investigation in projects tunnels, bridges, roads, airport and harbor.

**SUBJECT CODE: 19CET303**

**SUBJECT NAME: CONSTRUCTION MATERIALS**

**COURSE OUTCOMES:**

On Completion of this course, the student will be able to:

- Understand the Identify suitable construction materials for building construction.
- Provide knowledge on lime, cement, aggregates and mortar.
- Gain knowledge on basic properties of concrete.
- Understand Familiar with timber and other materials used in construction.
- Select and justify appropriate advanced and modern building materials for various construction applications.

**SUBJECT CODE: 19CET304**

**SUBJECT NAME: SOLID MECHANICS**

**COURSE OUTCOMES:**

On Completion of this course, the student will be able to:

- Understand the Identify suitable construction materials for building construction.
- Get knowledge on lime, cement, aggregates and mortar.
- Gain knowledge on properties of concrete and its properties.
- Familiar with timber and other materials used in construction.
- Accustom on advanced and modern building materials for various construction applications.

**SUBJECT CODE: 19CEE301**

**SUBJECT NAME: ENGINEERING SURVEY**

**COURSE OUTCOMES:**

On completion of the course, the students will be able to:

- Conduct linear and angular measurement survey with the help of chain, tape and compass.
- Determine the horizontal and vertical distance by traversing using the odolite and measure difference in elevation and produce reduced level of the given points.
- Describe the methods of setting out curves in the field and to determine the area and volume of structures.
- Handle total station instrument for making the horizontal and vertical measurements and Conduct the global positioning system for determining geographical location of the site.
- Use conventional surveying tools such as chain/tape, compass, dumpy level, the odolite in the field of civil engineering applications such as structural plotting and highway profiling.

**SUBJECT CODE: 19CEE302**

**SUBJECT NAME: FLUID MECHANICS AND FLOW MEASUREMENTS**

**COURSE OUTCOMES:**

At the end of the course students will be able to :

- Understand the various parameters equipped with Fluid.
- Get a basic knowledge of fluids in static, kinematic and dynamic equilibrium.
- Learn types of flow and losses of flow in pipes.
- Understand and solve the boundary layer problems.
- Gain knowledge about dimensional and model analysis.

**SUBJECT CODE: 19EEC302**

**SUBJECT NAME: ENTREPRENEURSHIP DEVELOPMENT ACTIVITY**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Identify personal strengths and value systems.
- Recall important tenets of digital literacy.
- Discuss the essentials of matters pertaining to money.
- Prepare for employment and self-employment.
- Illustrate the basics of entrepreneurship and identify new business opportunities.

**SUBJECT CODE: 19MDC301**

**SUBJECT NAME: LEADERSHIP ENHANCEMENT PROGRAMME**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Develop the capabilities needed to increase team's work productivity.
- Help to decrease employee turnover and increase engagement, creating a strong and united team.
- Develop communication skills, mastering the art of negotiation, influence and conflict management.
- More confident as a leader and find new ways of influencing the teams they lead.
- Effectively connect to people, developing the ability to give constructive feedback, and critically seek the feedback of the team.

**REGULATION: R2019**

**YEAR / SEMESTER: III / V**

**SUBJECT CODE: 19CET501**

**SUBJECT NAME: STRUCTURAL ANALYSIS I**

**COURSE OUTCOMES:**

Upon the completion of the course, the students will be able to:

- Determine the static and kinematic indeterminacy of beam, truss and frame.
- Draw about influence line diagrams for determinate and indeterminate beams.
- Understand the concepts of slope deflection method for beams and portal frame.
- Analyze continuous beams and portal frame using moment distribution method.
- Analyze arches and statically indeterminate beams.

**SUBJECT CODE: 19CET502**

**SUBJECT NAME: DESIGN OF REINFORCED CONCRETE ELEMENTS**

**COURSE OUTCOMES:**

Upon the completion of the course, the student will be able to:

- Understand the various design methodologies for the design of RCC elements.
- Evaluate the shear, bond and torsion effects in beams.
- Design the various types of slabs, flanged beams and staircase by limit state method.
- Design columns for axial, uniaxial and biaxial eccentric loadings.
- Learn about the design of footing by limit state method.

**SUBJECT CODE: 19CET503**

**SUBJECT NAME: FOUNDATIONENGINEERING**

**COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Understand the importance of soil investigation in various civil Engineering projects.
- Estimate bearing capacity incorporating IS codal provisions.
- Do proper foundation proportioning for any kind of shallow foundation system and get exposure in foundation analysis.
- Estimate the pile group capacity and group efficiency for various types of soils.
- Analyze earth retaining structures for various soil conditions.

**SUBJECT CODE: 19CEE501**

**SUBJECT NAME: WATER SUPPLY ENGINEERING**

**COURSE OUTCOMES:**

Upon the completion of the course, the students will be able to:

- Aware about the water supply system, water sources and water quality characteristics and standards.
- Apply the concepts of water conveyance systems.
- Understand the various treatments for water supply.
- Learn about the advanced treatment for water supply.
- Analyze the water distribution and supply network for buildings.
- Perform water quality testing for various standards.

**SUBJECT CODE: 19CEE502**

**SUBJECT NAME: CONCRETE TECHNOLOGY AND TESTING OF CONCRETE**

**COURSE OUTCOMES:**

Upon the completion of the course, the students will be able to:

- Determine the properties of cement.
- Find out the properties of aggregates and admixtures.
- Understand the IS mix design and quality control of concrete.
- Determine the properties of fresh and hardened concrete.
- Apply the suitable special concretes.
- Ensure the strength characteristics of the given concrete materials.

**SUBJECT CODE: 19EEC501**

**SUBJECT NAME: QUANTITATIVE APTITUDE LEARNING**

**COURSE OUTCOMES:**

Upon the completion of the course, the students will be able to:

- Use the basic concepts and techniques of the numbers, Highest common factor and Least common multiple.
- Apply the concept of decimal fraction and problems on ages.
- Apply the concept of time, work, distance, calendar and clock.
- Acquire skills in simple interest, compound interest and elementary algebra.
- Exposed to concepts and properties of polynomial and quadratic equations.

**SUBJECT CODE: 19CEPX02**

**SUBJECT NAME: CONSTRUCTION PLANNING AND SCHEDULING (PROFESSIONAL ELECTIVE I)**

**COURSE OUTCOMES:**

Upon the completion of the course, the students will be able to:

- Understand basic concepts of construction planning.
- Schedule the construction activities.
- Forecast and control the cost in a construction.
- Understand about quality control and its safety during construction.
- Organize information in Centralized database Management systems.

**SUBJECT CODE: 19MDC501**

**SUBJECT NAME: VALUE ADDED COURSE – II**

**COURSE OUTCOMES:**

Upon the completion of the course, the students will be able to:

- Create the models for different kinds of structures.
- Understand the concepts of loading in the structures.
- Learn the various loading patterns on the structures.
- Analyze the frame and truss type structures.
- Design the different types of structures.

**SUBJECT CODE: 19MDC502**

**SUBJECT NAME: SURVEY CAMP**

**COURSE OUTCOMES:**

Upon the completion of the course, the students will be able to:

- Calculate the area of various construction project sites.
- Estimate the volume of earthwork required and planned the layout of engineering projects.
- Prepare detailed topographical map of the area.
- Prepare the layout by using total station.
- Setting out curves by using total station.

**REGULATION: R2017**

**YEAR / SEMESTER: IV / VII**

**SUBJECT CODE: CE8701**

**SUBJECT NAME: ESTIMATION, COSTING AND VALUATION ENGINEERING**

**COURSE OUTCOMES:**

The student will be able to

- Estimate the quantities for buildings,
- Rate Analysis for all Building works, canals, and Roads and Cost Estimate.
- Understand types of specifications, principles for report preparation, tender notices types.
- Gain knowledge on types of contracts
- Evaluate valuation for building and land.

**SUBJECT CODE: CE8702**

**SUBJECT NAME: RAILWAYS, AIRPORTS, DOCKS AND HARBOUR ENGINEERING**

**COURSE OUTCOMES:**

Students who successfully complete this course will be able to:

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

**SUBJECT CODE: CE8703**

**SUBJECT NAME: STRUCTURAL DESIGN AND DRAWING**

**COURSE OUTCOMES:**

At the end of the course the student will be able to

- Design and draw reinforced concrete Cantilever and Counter fort Retaining Walls
- Design and draw flat slab as per code provisions
- Design and draw reinforced concrete and steel bridges
- Design and draw reinforced concrete and steel water tanks
- Design and detail the various steel trusses and cantry girders

**SUBJECT CODE: CE8011**

**SUBJECT NAME: DESIGN OF PRESTRESSED CONCRETE STRUCTURES**

**COURSE OUTCOMES:**

On successful completion of this course, students will be able to:

- Understand the behaviour of prestressed concrete members and able to analyze the prestressed concrete beams.
- Design the prestressed concrete members for flexure and shear as per the relevant design code (IS 1343).
- Analyze for deflection of prestressed concrete members and design the anchorage zone.
- Analyze and design of composite beams and continuous beams.
- Design of prestressed concrete structures - sleepers, Tanks, pipes and poles.

**SUBJECT CODE: OML751**

**SUBJECT NAME: TESTING OF MATERIALS**

**COURSE OUTCOMES:**

- Identify suitable testing technique to inspect industrial component.
- Ability to use the different technique and know its applications and limitation.

**SUBJECT CODE: CE8712**

**SUBJECT NAME: INDUSTRIAL TRAINING**

**COURSE OUTCOMES:**

At the end of the course the student will be able to understand

- The intricacies of implementation textbook knowledge into practice.
- The concepts of developments and implementation of new techniques.





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## EVEN SEMESTER

**REGULATION: R2019**

**YEAR / SEMESTER: I / II**

**SUBJECT CODE: 19HST201**

**SUBJECT NAME: COMMUNICATIVE TECHNO ENGLISH - II**

**COURSE OUTCOME:**

Upon completion of the course, the students will be able to:

- Acquire advanced level grammatical knowledge.
- Improve their language usage in LSRW skills.
- Speak fluently using a wide range of vocabulary.
- Acquire the ability to understand different written texts.
- Enhance the writing skills to express the ideas in the business contexts.

**SUBJECT CODE: 19CYT201**

**SUBJECT NAME: ENVIRONMENTAL SCIENCE AND ENGINEERING**

**COURSE OUTCOME:**

Upon completion of the course, the students will be able to:

- Find scientific, technological, economic and political solutions to environmental problems.
- Invent innovative solutions for pollutions to improve the quality of environment.
- Participate the conservation of natural resources to save earth.
- Promote sustainable development and understand the concept of green chemistry.
- Analyse the effects of human population and issues related to the environment and human health.

**SUBJECT CODE: 19MAT201**

**SUBJECT NAME: ENGINEERING MATHEMATICS - II**

**COURSE OUTCOME:**

After successfully completing the course, the student will have a good understanding of the following topics and their applications

- Higher order linear differential equations with constant coefficients and variable coefficient.
- Green's, Gauss divergence and Stoke's theorems – Verification and application.
- Analytic functions, conformal mapping and Bilinear transformation.
- Application of residue theorem for evaluation of real integrals on contour integral.
- Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

**SUBJECT CODE: 19PHT201**

**SUBJECT NAME: PHYSICS OF MATERIALS**

**COURSE OUTCOME:**

Upon completion of this course, the students will be able to:

- Knowledge on the thermal conductivity and their applications.
- Acquire knowledge on phase diagram, various microstructures and alloys.
- Get knowledge on materials characterization techniques.
- Have the potential applications of superconductors.
- Understand the basics of ceramics, composites and nanomaterials.

**SUBJECT CODE: 19GEE202**

**SUBJECT NAME: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**

**COURSE OUTCOME:**

Upon completion of the course, the students will be able to:

- Understand electric circuits and choose appropriate instruments for electrical measurement for a specific application.
- Understand the concept of different types of DC and AC machines.
- Identify the diode's usage as a rectifier, and Zener diode's usage as a voltage regulator and discuss the basic characteristics of BJT.
- Employ Boolean algebra to implement the combinational logic circuits.
- Discuss about Microprocessors, Microcontrollers and recognize their needs.
- Carry out basic home electrical works and appliances and measure the electrical quantities and soldering practice.

**SUBJECT CODE: 19MET201**

**SUBJECT NAME: ENGINEERING MECHANICS**

**COURSE OUTCOME:**

On successful completion of this course, The Students can able to:

- Understand the forces and its related laws of mechanics in static and dynamic conditions.
- Solve problems in engineering systems using the concept of static equilibrium.
- Solve problems involving frictional phenomena in machines.
- Solve the moment of inertia of any sections and masses for the structural members.
- Apply the different principles to study the motion of a body and analyze their constitutive equations.

**SUBJECT CODE: 19EEC201**

**SUBJECT NAME: TECHNICAL SKILL (AUTOCAD)**

**COURSE OUTCOME:**

On successful completion of this course, The Students can able to:

- Understand develop skill to use software to create 2D and 3D models.

**REGULATION: R2019**

**YEAR / SEMESTER: II / IV**

**SUBJECT CODE: 19MAT403**

**SUBJECT NAME: NUMERICAL METHODS**

**COURSE OUTCOMES:**

After successfully completing the course, the student will have a good understanding of the following topics and their applications:

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

**SUBJECT CODE: 19CET402**

**SUBJECT NAME: CONSTRUCTION TECHNIQUES, EQUIPMENTS AND PRACTICES**

**COURSE OUTCOMES:**

Students completing this course will be able to:

- Understand the concrete technology.
- Maintain and operate hand and power tools and equipment used in the building construction sites.
- Plan the requirements for substructure construction.
- Make the usage of superstructure construction.
- Know the different construction techniques and structural systems.

**SUBJECT CODE: 19CET403**

**SUBJECT NAME: APPLIED HYDRAULICS ENGINEERING**

**COURSE OUTCOMES:**

On completion of this course the students will be able to:

- Apply their knowledge of fluid mechanics in addressing problems in open channels.
- Identify a effective section for flow in different cross sections.
- Solve problems in uniform, gradually and rapidly varied flows in steady state conditions.
- Understand the principles, working and application of turbines.
- Realize the principles, working and application of pumps.

**SUBJECT CODE: 19CET404**

**SUBJECT NAME: HIGHWAY ENGINEERING**

**COURSE OUTCOMES:**

On Completion of this course, the student will be able to:

- Acquire skills in selecting the best highway alignment and develop the highway proposal.
- Learn Design various highway cross sectional elements.
- Understand Design flexible and rigid pavements as per IRC codes.
- Gain knowledge on highway materials and construction practice.
- Extend knowledge on highway maintenance.

**SUBJECT CODE: 19CEE401**

**SUBJECT NAME: STRENGTH OF MATERIALS**

**COURSE OUTCOMES:**

On completion of the course, the students will be able to:

- Determine the physical properties of given cement, fine aggregates coarse aggregates and wooden sample.
- Evaluate Young Modulus, torsional strength, hardness and tensile strength of given specimens.
- Apply the technical concepts and ways to solve engineering problems through conducting experiments.
- Compute the deflection of beams by different methods and selection of method for determining slope or deflection.
- Describe the failure modes for various types of columns.

**SUBJECT CODE: 19CEE402**

**SUBJECT NAME: SOIL MECHANICS**

**COURSE OUTCOMES:**

On Completion of this course, the student will be able to:

- Describe the origin, phase relation physical properties and classification of soil and to Introduce the concept of soil pressure distribution and flow of water in soil.
- Outline the concepts of stress distribution in soil and Terzaghi's one dimensional consolidation theory.
- Analysis of shear strength behaviour of soil by direct shear, triaxial, UCC and Vane shear test and to analyse the concept of slope stability and slope failures of cohesive and  $C-\phi$  soil.
- Absorb knowledge about grain size distribution using sieve analysis and by hydrometer analysis.
- Identify and classify soils with reference to their characteristics, calculate different soil properties and to explain the strength of the soil and be able to calculate shear strength of the soils.

**SUBJECT CODE: 19EEC301**

**SUBJECT NAME: COMMUNICATION SKILLS**

**COURSE OUTCOMES:**

At the end of this course, learners will be able to:

- Improve vocabulary and express the same contextually.
- Communicate to his peer group properly and make presentations.
- Comprehend the general and technical text.
- Write simple paragraph and essay in any topic.
- Participate in group discussions expressing ideas relevantly, coherently and cogently.

**SUBJECT CODE: 19MDC401**

**SUBJECT NAME: VALUE ADDED COURSE – I (SKETCHUP SOFTWARE)**

**COURSE OUTCOMES:**

At the end of the course, students can:

- Apply basic 3D modeling and apply basic concepts to create simple building models.
- Create everyday shapes, from 2D plans, elevations; create rectangles, circles, polygons and arcs.
- Move, scale and rotate objects with processes of applying, creating and editing materials.
- Export in 2D and 3D and Map textures on straight and curved objects.

**REGULATION: R2019**

**YEAR / SEMESTER: III / VI**

**SUBJECT CODE: 19CET601**

**SUBJECT NAME: DESIGN OF STEEL STRUCTURES**

**COURSE OUTCOMES:**

Upon the completion of the course, the students will be able to:

- Determine the behaviour of bolted and welded connections.
- Apply the concept of shear lag in design of tension members.
- Design compression members using simple and built-up sections.
- Analyze the beams subjected to uniaxial and biaxial bending
- Understand the Industrial structures and their components.

**SUBJECT CODE: 19CET602**

**SUBJECT NAME: STRUCTURAL ANALYSIS II**

**COURSE OUTCOMES:**

Upon the completion of the course, the students will be able to:

- Analyze the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method.
- Understand the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames.
- Analyze the indeterminate beams and frames using plastic analysis.
- Determine the member forces in suspension bridges and space truss.
- Explain the basic concepts in finite element method.

**SUBJECT CODE: 19CET603**

**SUBJECT NAME: DESIGN OF REINFORCED CONCRETE AND MASONRY STRUCTURES**

**COURSE OUTCOMES:**

Upon the completion of the course, the students will be able to:

- Determine the reinforced concrete Cantilever and Counterfort Retaining Walls.
- Explain and draw reinforced concrete steel water tanks.
- Analyze the flat slab as per code provisions.
- Understand the yield line theory.
- Design of axially and eccentrically loaded brick walls.

**SUBJECT CODE: 19CEE601**

**SUBJECT NAME: WASTE WATER ENGINEERING**

**COURSE OUTCOMES:**

Upon the completion of the course, the students will be able to:

- Learn the basic characteristics and sources of wastewater.
- Design the primary treatment units of wastewater.
- Design secondary treatment units of wastewater.
- Identify the suitable sewage disposal methods.
- Design the treatment units for sludge disposal.
- Check the quality and characteristics of wastewater as per IS standards.

**SUBJECT CODE: 19CEPX10**

**SUBJECT NAME: RAILWAYS, AIRPORTS AND HARBOUR ENGINEERING (Professional Elective II)**

**COURSE OUTCOMES:**

Upon the completion of the course, the students will be able to:

- Understand the methods of route alignment and design elements in railway planning.
- Understand the construction techniques and maintenance of track laying and railway stations.
- Gain an insight on the planning and site selection of airport planning.
- Analyze and design the elements for orientation of runways and passenger facility systems.
- Describe the various features of harbours, ports and coastal protection works.

**SUBJECT CODE: 19MEOX04**

**SUBJECT NAME: PRINCIPLES OF MANAGEMENT (Open Elective I)**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to

- Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, and have some basic knowledge on international aspect of management.
- Understand the planning process in the organization.
- Comprehend the concept of organization.
- Demonstrate the ability to directing, leadership and communicate effectively.
- Analysis isolate issues and formulate best control methods.

**SUBJECT CODE: 19CEJ601**

**SUBJECT NAME: DESIGN PROJECT**

**COURSE OUTCOMES:**

At the end of the course the students will have a clear idea of his/her area of work.

**SUBJECT CODE: 19MDC601**

**SUBJECT NAME: CONSTITUTION OF INDIA**

**COURSE OUTCOMES:**

At the end of the course the student will be able to

- Understand the Salient features and characteristics of the Constitution of India.
- Analyze the scheme of the Fundamental rights and Duties.
- Evaluate in detail the powers between the Union and the States.
- Know the concept of Constitutional Powers.
- Recognize other constitutional functionaries.

**REGULATION: R2017**

**YEAR / SEMESTER: IV / VIII**

**SUBJECT CODE: CE8091**

**SUBJECT NAME: HYDROLOGY AND WATER RESOURCES ENGINEERING**

**COURSE OUTCOMES:**

The students completing the course will have

- an understanding of the key drivers on water resources, hydrological processes and their integrated behaviour in catchments,
- ability to construct and apply a range of hydrological models to surface water and groundwater problems including Hydrograph, Flood/Drought management, artificial recharge
- ability to conduct Spatial analysis of rainfall data and design water storage reservoirs
- Understand the concept and methods of ground water management.

**SUBJECT CODE: CE8022**

**SUBJECT NAME: PREFABRICATED STRUCTURES**

**COURSE OUTCOMES:**

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

**SUBJECT CODE: CE8811**

**SUBJECT NAME: PROJECT WORK**

**COURSE OUTCOMES:**

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



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## ODD SEMESTER

**Department of Computer Science and Engineering**

**REGULATION: R2019**

**YEAR / SEMESTER: I / I**

**SUBJECT CODE: 19HST101**

**SUBJECT NAME: COMMUNICATIVE TECHNO ENGLISH - I**

**COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Learn to acquire usage of English.
- Use a wide range of vocabulary in oral and written communication.
- Give short informal presentations and participate in classroom discussions.
- Write informal letters and other communications.
- Frame grammatically correct sentences

**SUBJECT CODE: 19MAT101**

**SUBJECT NAME: ENGINEERING MATHEMATICS - I**

**COURSE OUTCOMES:**

After successfully completing the course, the student will have a good understanding of the following topics and their applications.

- Understanding of the ideas of matrix and its nature.
- Apply differentiation to solve maxima and minima problems.
- Understanding the concept of partial differentiation and total derivative.
- Evaluate integrals using techniques of integration such as substitution, partial fractions and integration by parts.
- Apply integration to compute multiple integrals, area, volume, integrals in polar co-ordinates, in addition to change of order and change of variables.

**SUBJECT CODE: 19CYE101**

**SUBJECT NAME: ENGINEERING CHEMISTRY**

**COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Identify the method of removal of impurities from water for domestic and industrial purpose.
- Identify the different types of polymers, polymerisation processes and some special properties and applications of polymers.
- Analyze the causes of corrosion and discuss the control measures and discuss the functions of batteries
- Apply of phase rule to alloy making for various engineering applications.
- Discuss the fundamentals of the nano materials and nano products of today.
- Outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters



**SUBJECT CODE: 19PHE101**

**SUBJECT NAME: ENGINEERING PHYSICS**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Apply these basic principles of structures of Engineering materials.
- Make use of materials properties using the knowledge of elasticity.
- Acquire the concepts of light propagation and its applications in lasers and fibre optics.
- Realize advanced physics concepts of quantum theory and its applications.
- Incorporate the acoustics and ultrasound applications.
- Apply principles of elasticity, optics and acoustic properties in Engineering applications.

**SUBJECT CODE: 19GET101**

**SUBJECT NAME: ENGINEERING GRAPHICS**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Construct multiple views of engineering components.
- Prepare the pictorial drawings as per the standards.
- Develop the projection of solids.
- Draw the section of solids drawings and development of surfaces of given objects.
- Apply free hand sketching and concept of isometric in engineering practice.

**SUBJECT CODE: 19GEE101**

**SUBJECT NAME: COMPUTER FUNDAMENTALS AND PYTHON PROGRAMMING**

**COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Know the Computer basics, Components and Softwares
- Develop algorithmic solutions to simple computational problems and Read, write, execute by hand simple Python programs.
- Structure simple Python programs for solving problems.
- Decompose a Python program into functions.
- Represent compound data using Python lists, tuples, and dictionaries.

**SUBJECT CODE: 19EEC101**

**SUBJECT NAME: LIFE SKILLS FOR ENGINEERS**

**COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Communicate effectively and make effective presentations.
- Write different types of reports.
- Face interview & group discussion.
- Critically think on a particular problem.
- Get success in all aspects and develop public skills.

**REGULATION: R2019**

**YEAR / SEMESTER: II / III**

**SUBJECT CODE: 19MAT301**

**SUBJECT NAME: TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS**

**COURSE OUTCOME:**

After successfully completing the course, the student will be able to,

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

**SUBJECT CODE: 19CST301**

**SUBJECT NAME: DATA STRUCTURES**

**COURSE OUTCOME:**

At the end of the course, the student should be able to,

- Implement abstract data types for linear data structures.
- Apply the different linear and non-linear data structures to problem solutions.
- Critically analyze the various sorting algorithms.
- Apply the hashing techniques to organize memory
- Analyze the various searching algorithms.

**SUBJECT CODE: 19CST302**

**SUBJECT NAME: COMPUTER ORGANIZATION AND ARCHITECTURE**

**COURSE OUTCOME:**

On Completion of the course, the students should be able to,

- Understand the basics structure of computers, operations and instructions.
- Understand pipelined execution and design control unit.
- Understand parallel processing architectures.
- Apply the DMA Concepts in I/O Communications.
- Learn the Nano Programming Techniques.

**SUBJECT CODE: 19ECT302**

**SUBJECT NAME: ANALOG AND DIGITAL COMMUNICATION**

**COURSE OUTCOME:**

Upon Completion of the course, the students will be able to,

- Comprehend and appreciate the significance and role of this course in the present contemporary world.
- Apply analog and digital communication techniques.
- Use data and pulse communication techniques.
- Analyze Source and Error control coding.
- Know about information coding techniques.

**SUBJECT CODE: 19CSE301**

**SUBJECT NAME: OBJECT ORIENTED PROGRAMMING**

**COURSE OUTCOME:**

Upon completion of course, students will be able to,

- Gain the basic knowledge on Object Oriented concepts.
- Develop the applications using Java.
- Implement Multithreading concepts in real time environment.
- Apply Generic Programming.
- Understand the concepts of exception handling.
- Apply the concepts to produce solutions for various problems.

**SUBJECT CODE: 19ECE301**

**SUBJECT NAME: DIGITAL ELECTRONICS**

**COURSE OUTCOME:**

Upon completion of the course, Students will be able to,

- Analyze different methods used for simplification of Boolean expressions.
- Design and implement Combinational circuits.
- Design and implement synchronous and asynchronous sequential circuits.
- Write simple HDL codes for the circuits.
  - Understand the concepts of memory.
- Design combinational circuits and simple digital system using basic gates.

**SUBJECT CODE: 19EEEC301**

**SUBJECT NAME: COMMUNICATION SKILLS**

**COURSE OUTCOME**

At the end of this course, learners will be able to

- Improve vocabulary and express the same contextually
- Communicate to his peer group properly and make presentations
- Comprehend the general and technical text
- Write simple paragraph and essay in any topic
- Participate in group discussions expressing ideas relevantly, coherently and cogently

**SUBJECT CODE: 19MDC301**

**SUBJECT NAME: LEADERSHIP ENHANCEMENT PROGRAMME**

**COURSE OUTCOME**

At the end of the course, the students will be able to,

- Develop the capabilities needed to increase team's work productivity.
- Help to decrease employee turnover and increase engagement, creating a strong and united team.
- Develop communication skills, mastering the art of negotiation, influence and conflict management.
- More confident as a leader and find new ways of influencing the teams they lead.
- Effectively connect to people, developing the ability to give constructive feedback, and critically seek the feedback of the team.

**REGULATION: 2019**

**YEAR / SEMESTER: III / V**

**SUBJECT CODE: 19CST501**

**SUBJECT NAME: ARTIFICIAL INTELLIGENCE**

**COURSE OUTCOMES:**

Students will be able to

- Study the software architecture and its quality attributes.
- Use appropriate search algorithm for any AI problems.
- Represent a problem using Propositional and First Order Logic.
- Design software agents to solve a problem.
- Design various applications that use Artificial Intelligence.

**SUBJECT CODE: 19CST502**

**SUBJECT NAME: THEORY OF COMPUTATION**

**COURSE OUTCOMES:**

Students will be able to

- Construct automata, regular expression for any pattern.
- Write Context free grammar for any construct.
- Design Pushdown automata for any language.
- Propose computation solutions using Turing machines.
- Derive whether a problem is decidable or not.

**SUBJECT CODE: 19CST503**

**SUBJECT NAME: RESOURCE MANAGEMENT TECHNIQUES**

**COURSE OUTCOMES:**

The students completing the course will have

- Solve optimization problems using graphic solution..
- Develop optimization problems using simplex methods.
- Apply integer programming and linear programming to solve real-life applications
- Use jacobian methods solve Simple problems.
- Compare PERT and CPM for problems in project management.

**SUBJECT CODE: 19CSE501**

**SUBJECT NAME: COMPUTER NETWORKS**

**COURSE OUTCOMES:**

Students will be able to

- Understand the basic layers and its functions in computer networks.
- Know the various data link protocols and media access.
- Analyze and design routing algorithms.
- Study the transport protocols and congestion control in transport layer.
- Understand the working of various application layer protocols.
- Apply the concepts and algorithms in networking applications.

**SUBJECT CODE: 19CSE502**

**SUBJECT NAME: OBJECT ORIENTED ANALYSIS AND DESIGN**

**COURSE OUTCOMES:**

This course equips the student to

- Design and Implement applications using OO concepts.
- Use the static UML diagrams for various applications.
- Use the dynamic UML diagrams for various applications.
- Apply the appropriate design patterns.
- Understand the various testing methodologies for OO software.
- Perform OO analysis and design for a given problem specification.

**SUBJECT CODE: 19MGT501**

**SUBJECT NAME: ENGINEERING ECONOMICS AND MANAGEMENT**

**COURSE OUTCOMES:**

- Apply the basics of economics and cost analysis to engineering applications.
- Summarize the steps involved in decision making with economic feasibility.
- Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management.
- Understand the planning process in the organization.
- Understand the concept of organization, directing and controlling.

**SUBJECT CODE: 19EEC501**

**SUBJECT NAME: QUANTITATIVE APTITUDE LEARNING**

**COURSE OUTCOMES:**

- Use the basic concepts and techniques of the numbers, Highest common factor and Least common multiple.
- Apply the concept of decimal fraction and problems on ages.
- Apply the concept of time, work, distance, calender and clock.
- Acquire skills in simple interest, compound interest and elementary algebra.
- Be exposed to concepts and properties of polynomial and quadratic equations.

**SUBJECT CODE: 19MDC501**

**SUBJECT NAME: VALUE ADDED COURSE – II (WEB TECHNOLOGIES)**

**COURSE OUTCOMES:**

On the completion of the course, the students will be able to:

- Design Website using HTML5, CSS3 and JS.
- Design Responsive Sites.
- Manage, Maintain and Support Web Apps.
- Design Simple Applications using the web technologies.
- Maintain Database Connectivity.

**REGULATION: R2017**

**YEAR / SEMESTER: IV / VII**

**SUBJECT CODE: MG8591**

**SUBJECT NAME: PRINCIPLES OF MANAGEMENT**

**COURSE OUTCOME:**

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

**SUBJECT CODE: CS8792**

**SUBJECT NAME: CRYPTOGRAPHY AND NETWORK SECURITY**

**COURSE OUTCOME:**

At the end of the course, the student should be able to:

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

**SUBJECT CODE: CS8791**

**SUBJECT NAME: CLOUD COMPUTING**

**COURSE OUTCOME:**

On Completion of the course, the students should be able to:

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

**SUBJECT CODE: OME752**

**SUBJECT NAME: SUPPLY CHAIN MANAGEMENT**

**COURSE OUTCOME:**

• The student would understand the framework and scope of supply chain networks and functions.

**SUBJECT CODE: CS8091**

**SUBJECT NAME: BIG DATA ANALYTICS**

**COURSE OUTCOME:**

Upon successful completion of the course, students should be able to:

- Work with big data tools and its analysis techniques
- Analyze data by utilizing clustering and classification algorithms
- Learn and apply different mining algorithms and recommendation systems for large volumes of data
- Perform analytics on data streams
- Learn No SQL data bases and management.

**SUBJECT CODE: CS8088**

**SUBJECT NAME: WIRELESS ADHOC AND SENSOR NETWORKS**

**COURSE OUTCOME:**

Upon completion of the course, the students will be able to:

- Identify different issues in wireless adhoc and sensor networks.
- To analyze protocols developed for adhoc and sensor networks.
- To identify and understand security issues in adhoc and sensor networks.

**SUBJECT CODE: CS8711**

**SUBJECT NAME: CLOUD COMPUTING LABORATORY**

**COURSE OUTCOME:**

On completion of this course, the students will be able to:

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

**SUBJECT CODE: IT8761**

**SUBJECT NAME: SECURITY LABORATORY**

**COURSE OUTCOME:**

Upon successful completion of the course, students should be able to:

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



# **SENGUNTHAR ENGINEERING COLLEGE (AUTONOMOUS)**

(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)  
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956  
NAAC Accredited with 'A' Grade

**TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU**

**EVEN SEMESTER**

**Department of Computer Science and Engineering**



**REGULATION: R2019**

**YEAR / SEMESTER: I / II**

**SUBJECT CODE: 19HST201**

**SUBJECT NAME: COMMUNICATIVE TECHNO ENGLISH - II**

**COURSE OUTCOMES:**

- Acquire advanced level grammatical knowledge.
- Improve their language usage in LSRW skills.
- Enhance the writing skills to express the ideas in the business context
- Acquire the ability to understand different written texts.
- Categorize a wide range of vocabulary and English usage.

**SUBJECT CODE: 19MAT201**

**SUBJECT NAME: ENGINEERING MATHEMATICS – II**

**COURSE OUTCOMES:**

- Apply various techniques in solving differential equations which arises in Engineering problems.
- Solve engineering problems using the concept of vector calculus.
- Develop the concept of analytic functions, conformal mapping and Bilinear transformations.
- Evaluate integrals using Cauchy's integral formula and residue theorem.
- Build the Laplace transforms techniques in solving differential equations.

**SUBJECT CODE: 19CYT201**

**SUBJECT NAME: ENVIRONMENTAL SCIENCE AND ENGINEERING**

**COURSE OUTCOMES:**

- Discuss about the features of various ecosystems and need of conservation of biodiversity.
- Apply the appropriate methodologies to control the various environmental pollution.
- Get the knowledge about the different types of resources like land, water, mineral and energy and also about the effects of environment by the usage of these resources.
- Assess the social issues to improve the quality of environment and participating actively in solving current environmental problem.
- Find solution for the effects of the population explosion as well as environmental and human health issues.



**SUBJECT CODE: 19PHT202**

**SUBJECT NAME: SOLID STATE PHYSICS AND NANOELECTRONIC DEVICES**

**COURSE OUTCOMES:**

- Explain the nature of conducting materials and to calculate the parameters involved.
- Enhance basic concept of semiconductor, Hall effect, the principles of LED and photodiodes.
- Create, apply and disseminate knowledge leading to innovation Superconducting and Dielectric Materials.
- Acquire knowledge about optical Materials for advancement of applications.
- Grasp the basis of nanomaterials and their innovative uses to the human kind.

**SUBJECT CODE: 19GET203**

**SUBJECT NAME: BASIC CIVIL AND MECHANICAL ENGINEERING**

**COURSE OUTCOMES:**

- Know the various functions of Civil Engineer and to identify the suitable construction materials.
- Demonstrate the various elements of sub-structure and super-structure.
- understand the basic concepts in thermal engineering and fluid mechanics.
- Display the IC engine working principles of various energy sources.
- Exhibit an understanding of principles and applications of mechanical power transmission components and basic manufacturing process.

**SUBJECT CODE: 19CSE201**

**SUBJECT NAME: C PROGRAMMING**

**COURSE OUTCOMES:**

- Develop C programs for simple applications making use of basic constructs,
- Implement C programs for simple applications making use of basic arrays and strings.
- Construct C programs involving functions, recursion and pointers
- Write C programs using structures.
- Design applications using sequential and random access file processing.
- Do problem solving by applying various programming methodologies.

**SUBJECT CODE: 19EEC201**

**SUBJECT NAME: TECHNICAL SKILL (MULTIMEDIA)**

**COURSE OUTCOMES:**

Upon completion of the course, the students will be able to,

- Apply the tools on Photoshop.
- Create an application using Photoshop.
- Process the element using flash.
- Create animations.
- Understand the process of image processing.

**REGULATION: R2019**

**YEAR / SEMESTER: II / IV**

**SUBJECT CODE: 19MAT401**

**SUBJECT NAME: PROBABILITY AND QUEUEING THEORY**

**COURSE OUTCOME:**

After successfully completing the course, the student will be able to,

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

**SUBJECT CODE: 19CST401**

**SUBJECT NAME: DESIGN AND ANALYSIS OF ALGORITHMS**

**COURSE OUTCOME:**

Upon completion of the course, Students will be able to,

- Design algorithms for various computing problems.
- Analyze the time and space complexity of algorithms.
- Critically analyze the different algorithm design techniques for a given problem.
- Modify existing algorithms to improve efficiency.
- Solve P and NP Complete Problems.

**SUBJECT CODE: 19CST402**

**SUBJECT NAME: OPERATING SYSTEMS**

**COURSE OUTCOME:**

Upon completion of the course, Students will be able to,

- Analyze various scheduling algorithms.
- Understand deadlock prevention and avoidance algorithms.
- Compare and contrast various memory management schemes.
- Understand the functionality of file systems.
- Understand the advanced operating systems.

**SUBJECT CODE: 19CST403**

**SUBJECT NAME: SOFTWARE ENGINEERING**

**COURSE OUTCOME:**

Upon completion of the course, Students will be able to,

- Explore the strength and weakness of various life cycle models.
- Identify the functional and non-functional requirements for the project.
- Develop the project using lifecycle models.
- Verify and validate the software using different types of testing.
- Understand the concepts of Agile.

**SUBJECT CODE: 19CSE401**

**SUBJECT NAME: DATABASE MANAGEMENT SYSTEMS**

**COURSE OUTCOME:**

Upon completion of the course, the students will be able to,

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

**SUBJECT CODE: 19ECE503**

**SUBJECT NAME: MICROPROCESSORS AND MICROCONTROLLERS**

**COURSE OUTCOME:**

At the end of the course, the students should be able to,

- Know the architecture of 8086 microprocessor.
- Design Memory Interfacing circuits.
- Design and interface I/O circuits.
- Design and implement 8051 microcontroller based systems.
- Develop counters and Time delay circuits.
- Understand and execute programs based on 8086 microprocessor.

**SUBJECT CODE: 19EEC302**

**SUBJECT NAME: ENTREPRENEURSHIP DEVELOPMENT ACTIVITY**

**COURSE OUTCOME:**

At the end of the course, students can

- Identify personal strengths and value systems.
- Recall important tenets of digital literacy.
- Discuss the essentials of matters pertaining to money.
- Prepare for employment and self-employment.
- Illustrate the basics of entrepreneurship and identify new business opportunities.

**SUBJECT CODE: 19MDC401**

**SUBJECT NAME: PC HARDWARE AND TROUBLESHOOTING**

**COURSE OUTCOME:**

Upon completion of the course, students will be able to,

- Explore the various hardware components on a computer.
- Know the graphics card usage and types of CPU.
- Enhance the knowledge in system diagnostics.
- Exploit the problem solving techniques.
- Learn the ways of assembling the PC.

**REGULATION: R2019**

**YEAR / SEMESTER: III / VI**

**SUBJECT CODE: 19CST601**

**SUBJECT NAME MACHINE LEARNING TECHNIQUES**

**COURSE OUTCOMES:**

Students will be able to

- Study the software architecture and its quality attributes.
- Discuss and apply back propagation algorithm for machine learning applications.
- Discuss the genetic algorithms for various problems.
- Suggest set of rules for machine learning.
- Design systems that uses appropriate graph models of machine learning.

**SUBJECT CODE: 19CST602**

**SUBJECT NAME: COMPILER DESIGN**

**COURSE OUTCOMES:**

Students will be able to

- Understand the different phases of compiler.
- Design a lexical analyzer for a sample language.
- Apply different parsing algorithms to develop the parsers for a given grammar.
- Understand syntax-directed translation and run-time environment.
- Learn to implement code optimization techniques and a simple code generator.

**SUBJECT CODE: 19CSE601**

**SUBJECT NAME: MOBILE COMPUTING**

**COURSE OUTCOMES:**

Students will be able to

- Understand the basics of mobile telecommunication systems.
- Illustrate the generations of telecommunication systems in wireless networks.
- Determine the functionality of MAC, network layer and Identify a routing protocol for a given Ad hoc network.
- Understand the functionality of Transport and Application layers.
- Learn the need for mobile operating systems.
- Develop a mobile application using android/blackberry/ios/Windows SDK.

**SUBJECT CODE: 19CSE602**

**SUBJECT NAME: INTERNET PROGRAMMING**

**COURSE OUTCOMES:**

Students will be able to

- Construct a basic website using HTML and Cascading Style Sheets.
- Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms.
- Develop server side programs using Servlets and JSP.
- Construct simple web pages in PHP and to represent data in XML format.
- Use AJAX and web services to develop interactive web applications.
- Learnt to apply the concepts to design web applications.

**SUBJECT CODE: 19CSPX01**

**SUBJECT NAME: DATA WAREHOUSING AND MINING**

**COURSE OUTCOMES:**

Upon completion of the course, the students will be able to,

- Acquire the knowledge of data mining, data preprocessing and visualization.
- Model and design data warehouse architecture and perform analysis with tools.
- Apply frequent pattern and association rules mining techniques for data analysis.
- Understand Proper Classification techniques for data analysis.
- Apply suitable Clustering methods for data analysis.

**SUBJECT CODE: 19CEOX05**

**SUBJECT NAME: AIR AND NOISE POLLUTION CONTROL**

**COURSE OUTCOMES:**

Upon the completion of the course, the students will be able to:

- Understand about nature and characteristics of air pollutants.
- Identify the basic elements of atmosphere and its stability.
- Design stacks and particulate air pollution control devices to meet applicable standards.
- Understand the basic concepts of air quality management.
- Identify, formulate and solve air and noise pollution problems.

**SUBJECT CODE: 19CSJ601**

**SUBJECT NAME: MINI PROJECT**

**COURSE OUTCOMES:**

The students completing the course will have

- Identify a specific problem for the current need of the society and collecting information related to the same through detailed review of articles.
- Develop the skills to formulate a technical project.
- Test and validate the results obtained through conformance.
- Prepare project reports and to face reviews and viva voce examination.
- Take up any challenging practical problems and find the solution by formulating proper methodology.

**SUBJECT CODE: 19MDC601**

**SUBJECT NAME: CONSTITUTION OF INDIA**

**COURSE OUTCOMES:**

At the end of the course the student will be able to

- Understand the Salient features and characteristics of the Constitution of India.
- Analyze the scheme of the Fundamental rights and Duties.
- Evaluate in detail the powers between the Union and the States.
- Know the concept of Constitutional Powers.
- Recognize other constitutional functionaries.

**REGULATION: R2017**

**YEAR / SEMESTER: IV / VIII**

**SUBJECT CODE: IT8073**

**SUBJECT NAME: INFORMATION SECURITY**

**COURSE OUTCOME:**

At the end of the course, the students should be able to:

- Discuss the basics of information security
- Illustrate the legal, ethical and professional issues in information security
- Demonstrate the aspects of risk management.
- Become aware of various standards in the Information Security System
- Design and implementation of Security Techniques.

**SUBJECT CODE: CS8080**

**SUBJECT NAME: INFORMATION RETRIEVAL TECHNIQUES**

**COURSE OUTCOME:**

Upon completion of the course, the students will be able to:

- Use an open source search engine frame work and explore its capabilities
- Apply appropriate method of classification or clustering.
- Design and implement innovative features in a search engine.
- Design and implement are commander system.

**SUBJECT CODE: CS8811**

**SUBJECT NAME: PROJECT WORK**

**COURSE OUTCOMES:**

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



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## ODD SEMESTER

### Department of Electronics and Communication Engineering

**REGULATION: R2019**

**YEAR / SEMESTER: I / I**

**SUBJECT CODE: 19HST101**

**SUBJECT NAME: COMMUNICATIVE TECHNO ENGLISH - I**

#### **COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Learn to acquire usage of English.
- Use a wide range of vocabulary in oral and written communication.
- Give short informal presentations and participate in classroom discussions.
- Write informal letters and other communications.
- Frame grammatically correct sentences

**SUBJECT CODE: 19MAT101**

**SUBJECT NAME: ENGINEERING MATHEMATICS - I**

#### **COURSE OUTCOMES:**

After successfully completing the course, the student will have a good understanding of the following topics and their applications.

- Understanding of the ideas of matrix and its nature.
- Apply differentiation to solve maxima and minima problems.
- Understanding the concept of partial differentiation and total derivative.
- Evaluate integrals using techniques of integration such as substitution, partial fractions and integration by parts.
- Apply integration to compute multiple integrals, area, volume, integrals in polar co-ordinates, in addition to change of order and change of variables.

**SUBJECT CODE: 19CYE101**

**SUBJECT NAME: ENGINEERING CHEMISTRY**

#### **COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Identify the method of removal of impurities from water for domestic and industrial purpose.
- Identify the different types of polymers, polymerisation processes and some special properties and applications of polymers.
- Analyze the causes of corrosion and discuss the control measures and discuss the functions of batteries
- Apply of phase rule to alloy making for various engineering applications.
- Discuss the fundamentals of the nano materials and nano products of today.
- Outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters

**SUBJECT CODE: 19PHE101**

**SUBJECT NAME: ENGINEERING PHYSICS**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Apply these basic principles of structures of Engineering materials.
- Make use of materials properties using the knowledge of elasticity.
- Acquire the concepts of light propagation and its applications in lasers and fibre optics.
- Realize advanced physics concepts of quantum theory and its applications.
- Incorporate the acoustics and ultrasound applications.
- Apply principles of elasticity, optics and acoustic properties in Engineering applications.

**SUBJECT CODE: 19GET101**

**SUBJECT NAME: ENGINEERING GRAPHICS**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Construct multiple views of engineering components.
- Prepare the pictorial drawings as per the standards.
- Develop the projection of solids.
- Draw the section of solids drawings and development of surfaces of given objects.
- Apply free hand sketching and concept of isometric in engineering practice.

**SUBJECT CODE: 19GEE101**

**SUBJECT NAME: COMPUTER FUNDAMENTALS AND PYTHON PROGRAMMING**

**COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Know the Computer basics, Components and Softwares
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- Structure simple Python programs for solving problems.
- Decompose a Python program into functions.
- Represent compound data using Python lists, tuples, and dictionaries.

**SUBJECT CODE: 19EEC101**

**SUBJECT NAME: LIFE SKILLS FOR ENGINEERS**

**COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Communicate effectively and make effective presentations.
- Write different types of reports.
- Face interview & group discussion.
- Critically think on a particular problem.
- Get success in all aspects and develop public skills.



**REGULATION: R2019**

**YEAR / SEMESTER: II / III**

**SUBJECT CODE: 19MAT301**

**SUBJECT NAME: TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

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

**SUBJECT CODE: 19ECT301**

**SUBJECT NAME: SIGNALS AND SYSTEMS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Determine if a given system is linear/causal/stable
- Capable of determining the frequency components present in a deterministic signal.
- Capable of characterizing LTI systems in the time domain and frequency domain.
- Compute the output of an LTI system in the time and frequency domains.

**SUBJECT CODE: 19EET304**

**SUBJECT NAME: CIRCUIT THEORY**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Understand and evaluate DC and AC electrical circuits
- Develop the capacity to apply the circuit theorems in real time
- Acquire the knowledge about resonance and coupled circuits
- Analyze the concepts in transients and two port networks
- Design the network topologies

**SUBJECT CODE: 19ECE301**

**SUBJECT NAME: DIGITAL ELECTRONICS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Analyze different methods used for simplification of Boolean expressions.
- Design and implement Combinational circuits.
- Design and implement synchronous and asynchronous sequential circuits.
- Write simple HDL codes for the circuits.
- Use the semiconductor memories and related technology.

**SUBJECT CODE: 19ECE302**

**SUBJECT NAME: ELECTRONIC CIRCUITS**

**COURSE OUTCOME:**

Upon completion of the course, the students will be able to :

- Apply the knowledge of BJT to design practical amplifier circuits.
- Analyse discrete analog circuits based on BJTs, MOSFETS and Op-amps.
- Frequency response characteristics of BJT and FET amplifiers.
- Analyze different types of amplifier, and oscillator circuits.
- Design BJT amplifier and oscillator circuits.

**SUBJECT CODE: 19CSE303**

**SUBJECT NAME: DATA STRUCTURES USING C**

**COURSE OUTCOME:**

Upon completion of the course, students will be able to:

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

**SUBJECT CODE: 19EEEC301**

**SUBJECT NAME: COMMUNICATION SKILLS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Improve vocabulary and express the same contextually
- Communicate to his peer group properly and make presentations
- Comprehend the general and technical text
- Write simple paragraph and essay in any topic
- Participate in group discussions expressing ideas relevantly, coherently and cogently

**SUBJECT CODE: 19MDC301**

**SUBJECT NAME: LEADERSHIP ENHANCEMENT PROGRAMME**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Develop the capabilities needed to increase team's work productivity.
- Help to decrease employee turnover and increase engagement, creating a strong and united team.
- Develop communication skills, mastering the art of negotiation, influence and conflict Management.
- More confident as a leader and find new ways of influencing the teams they lead.
- Effectively connect to people, developing the ability to give constructive feedback, and critically seek the feedback of the team.

**REGULATION: R2019**

**YEAR / SEMESTER: III / V**

**SUBJECT CODE: 19ECT501**

**SUBJECT NAME: TRANSMISSION LINES AND WAVEGUIDE**

**COURSE OUTCOME:**

- Explain the characteristics of transmission lines and its losses
- Write about the standing wave ratio and impedance matching in high frequency transmission lines.
- Analyze impedance matching by stubs using smith chart.
- Design the passive filters for transmission lines.
- Analyze the characteristics of TE and TM waves.

**SUBJECT CODE: 19ECT502**

**SUBJECT NAME: SOFT COMPUTING**

**COURSE OUTCOME:**

Upon completion of this course, the students should be able to:

- Apply suitable soft computing techniques for various applications.
- Artificial neural networks and its applications.
- Understanding Fuzzy logic and its applications.
- Solving multi-objective optimization problems using Evolutionary algorithms.
- Integrate various soft computing techniques for complex problems

**SUBJECT CODE: 19ECE502**

**SUBJECT NAME: DIGITAL SIGNAL PROCESSING**

**COURSE OUTCOME:**

Upon completion of this course, the students should be able to:

- Apply DFT for the analysis of digital signals and systems.
- Design and Realize IIR Filters.
- Design and Realize FIR filters using windows.
- Characterize the effects of finite precision representation on digital filters.
- Summarize architecture and instruction sets of TMS320C5X Processor.
- Demonstrate their abilities towards MATLAB based implementation of various DSP systems.

**SUBJECT CODE: 19ECE503**

**SUBJECT NAME: MICROPROCESSOR AND MICRO CONTROLLER**

**COURSE OUTCOME:**

At the end of the course, the students should be able to:

- Understand and execute programs based on 8086 microprocessor.
- Design Memory Interfacing circuits.
- Design and interface I/O circuits.
- Design and implement 8051 microcontroller based systems.
- Develop counters and Time delay circuits.
- Interface different I/O's with Processor and Controller.

**SUBJECT CODE: 19ECPX01**

**SUBJECT NAME: MEDCAL ELECTRONICS**

**COURSE OUTCOME:**

On successful completion of this course, the student should be able to:

- Know the human body electro- physiological parameters and recording of bio-potentials.
- Comprehend the non-electrical physiological parameters and their measurement –body temperature, blood pressure, pulse, blood cell count, blood flow meter etc.
- Interpret the various assist devices used in the hospitals viz. pacemakers, defibrillators, dialyzers and ventilators.
- Comprehend physical medicine methods eg. ultrasonic, shortwave, microwave surgicaldiathermies , and bio-telemetry principles and methods.
- Know about recent trends in medical instrumentation.

**SUBJECT CODE: 19MEOX04**

**SUBJECT NAME: PRINCIPLES OF MANAGEMENT**

**COURSE OUTCOME:**

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

- Understand the planning process in the organization.
- Comprehend the concept of organization.
- Demonstrate the ability to directing, leadership and communicate effectively.
- Analysis isolate issues and formulate best control methods.

**SUBJECT CODE: 19EEC501**

**SUBJECT NAME: QUANTITATIVE APTITUDE LEARNING**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Understand the basic concepts and techniques of the numbers, Highest common factor and Least common multiple.
- Apply the concept of decimal fraction and problems on ages.
- Understand and apply the concept of time, work, distance, calendar and clock.
- Acquire skills in simple interest, compound interest and elementary algebra.
- Be exposed to concepts and properties of polynomial and quadratic equations.

**SUBJECT CODE: 19MDC501**

**SUBJECT NAME: VALUE ADDED COURSE - II**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Provided with all data on internal architecture of these microcontrollers, operation of particular circuits, instruction set, name of registers, their accurate addresses, pin-puts etc.,
- Adapt Micropython form personal use, in education, and in commercial products

**REGULATION: R2017**

**YEAR / SEMESTER: IV/ VII**

**SUBJECT CODE: EC8701**

**SUBJECT NAME: ANTENNAS AND MICROWAVE ENGINEERING**

**COURSE OUTCOME:**

The student should be able to:

- Apply the basic principles and evaluate antenna parameters and link power budgets
- Design and assess the performance of various antennas
- Design a microwave system given the application specifications

**SUBJECT CODE: EC8751**

**SUBJECT NAME: OPTICAL COMMUNICATION**

**COURSE OUTCOME:**

At the end of the course, the student should be able to:

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

**SUBJECT CODE: EC8791**

**SUBJECT NAME: EMBEDDED AND REAL TIME SYSTEMS**

**COURSE OUTCOME:**

At the end of the course, the student should be able to:

- Describe the architecture and programming of ARM processor
- Outline the concepts of embedded systems
- Explain the basic concepts of real time operating system design
- Model real-time applications using embedded-system concepts

**SUBJECT CODE: EC8702**

**SUBJECT NAME: AD HOC AND WIRELESS SENSOR NETWORKS**

**COURSE OUTCOME:**

At the end of the course, the student would be able to:

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

**SUBJECT CODE: EC8092**

**SUBJECT NAME: ADVANCED WIRELESS COMMUNICATION**

**COURSE OUTCOME:**

- Comprehend and appreciate the significance and role of this course in the present contemporary world
- Apply the knowledge about the importance of MIMO in today's communication
- Appreciate the various methods for improving the data rate of wireless communication system

**SUBJECT CODE: OCH752**

**SUBJECT NAME: ENERGY TECHNOLOGY**

**COURSE OUTCOME:**

•Understand conventional Energy sources, Non- conventional Energy sources, biomass sources and develop design parameters for equipment to be used in Chemical process industries. Understand energy conservation in process industries

**SUBJECT CODE: EC8711**

**SUBJECT NAME: EMBEDDED LABORATORY**

**COURSE OUTCOME:**

At the end of the course, the student should be able to:

- Write programs in ARM for a specific Application
- Interface memory, A/D and D/A convertors with ARM system
- Analyze the performance of interrupt
- Write program for interfacing keyboard, display, motor and sensor.
- Formulate a mini project using embedded system

**SUBJECT CODE: EC8761**

**SUBJECT NAME: ADVANCED COMMUNICATION LABORATORY**

**COURSE OUTCOME:**

On completion of this lab course, the student would be able to

- Analyze the performance of simple optical link by measurement of losses and
- Analyzing the mode characteristics of fiber
- Analyze the Eye Pattern, Pulse broadening of optical fiber and the impact on BER
- Estimate the Wireless Channel Characteristics and Analyze the performance of Wireless Communication System
- Understand the intricacies in Microwave System design



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NAAC Accredited with 'A' Grade

**TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU**



## EVEN SEMESTER

### Department of Electronics and Communication Engineering

**REGULATION: R2019**

**YEAR / SEMESTER: I / II**

**SUBJECT CODE: 19HST201**

**SUBJECT NAME: COMMUNICATIVE TECHNO ENGLISH-II**

#### **COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Acquire advanced level grammatical knowledge.
- Improve their language usage in LSRW skills.
- Enhance the writing skills to express the ideas in the business context
- Acquire the ability to understand different written texts.
- Categorize a wide range of vocabulary and English usage.

**SUBJECT CODE: 19CYT201**

**SUBJECT NAME: ENVIRONMENTAL SCIENCE AND ENGINEERING**

#### **COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Discuss about the features of various ecosystems and need of conservation of biodiversity.
- Apply the appropriate methodologies to control the various environmental pollution.
- Get the knowledge about the different types of resources like land, water, mineral and energy and also about the effects of environment by the usage of these resources.
- Assess the social issues to improve the quality of environment and participating actively in solving current environmental problem.
- Find solution for the effects of the population explosion as well as environmental and human health issues.

**SUBJECT CODE: 19MAT201**

**SUBJECT NAME: ENGINEERING MATHEMATICS-II**

#### **COURSE OUTCOMES:**

After successfully completing the course, the student will have a good understanding of the following topics and their applications

- Apply various techniques in solving differential equations which arises in engineering problems.
- Solve engineering problems using the concept of vector calculus.
- Develop the concept of analytic functions, conformal mapping and Bilinear transformation..
- Evaluate integrals using Cauchy's integral formula and residual theorem.
- Build the Laplace transforms techniques in solving differential equation.

**SUBJECT CODE: 19PHT202**

**SUBJECT NAME: SOLID STATE PHYSICS AND NANOELECTRONIC DEVICES**

**COURSE OUTCOMES:**

Upon completion of this course, the students will be able to:

- Explain the nature of conducting materials and to calculate the parameters involved.
- Enhance basic concept of semiconductor, Hall effect, the principles of LED and photodiodes.
- Create, apply and disseminate knowledge leading to innovation Superconducting and Dielectric Materials.
- Acquire knowledge about optical Materials for advancement of applications.
- Grasp the basis of nano materials and their innovative uses to the human kind.

**SUBJECT CODE: 19GET203**

**SUBJECT NAME: BASIC CIVIL AND MECHANICAL ENGINEERING**

**COURSE OUTCOMES:**

Upon completion of this course, the students can able to:

- Know the various functions of Civil Engineer and to identify the suitable construction materials.
- Demonstrate the various elements of sub-structure and super-structure.
- Understand the basic concepts in thermal engineering and fluid mechanics.
- Display the IC engine working principles of various energy sources.
- Exhibit an understanding of principles and applications of mechanical power transmission components and basic manufacturing process.

**SUBJECT CODE: 19ECE201**

**SUBJECT NAME: ELECTRONIC DEVICES**

**COURSE OUTCOMES:**

At the end of the course the students will be able to:

- Explain the operation and V-I characteristic of diode, and its different parameters.
- Develop the operation and biasing of BJT in different configuration.
- Analyze the characteristics of FET and MOSFET.
- Describe the operation of special devices like Zener, LASER diodes and power devices.
- Interpret the operation of power and display devices.
- Have the exposure on the various experiments and characteristics using Electronic devices and electric circuits.

**SUBJECT CODE: 19EEEC203**

**SUBJECT NAME: TECHNICALSKILL (HANDS ON TRAINING IN ELECTRICAL & ELECTRONICS)**

**COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Repair and service the electrical appliances.



**REGULATION: R2019**

**YEAR / SEMESTER: II / IV**

**SUBJECT CODE: 19MAT402**

**SUBJECT NAME: PROBABILITY AND RANDOM PROCESSES**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
- Understand the basic concepts of one and two dimensional random variables and applying engineering applications.
- Apply the concept random processes in engineering disciplines.
- Understand and apply the concept of correlation and spectral densities.
- The students will have an exposure of various distribution functions and help in acquiring skills in handling situations involving more than one variable. Able to analyze the response of random inputs to linear time invariant systems.

**SUBJECT CODE: 19ECT401**

**SUBJECT NAME: ELECTROMAGNETIC FIELDS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Display an understanding of fundamental electromagnetic laws and concepts.
- Write Maxwell's equations in integral, differential and phasor forms and explain their physical meaning.
- Explain electromagnetic wave propagation in lossy and in lossless media.
- Solve simple problems requiring estimation of electric and magnetic field quantities based on these concepts and laws.

**SUBJECT CODE: 19ECT402**

**SUBJECT NAME: MEASUREMENTS AND INSTRUMENTATION**

**COURSE OUTCOME:**

The students can:

- Analyze the performance characteristics of an instrument, standards and calibration.
- Understand DC and AC measuring instruments.
- Discriminate the functions of various storage and display devices.
- Measuring the R, L, and C using bridges.
- Measure electrical and non electrical quantities by transducers .

**SUBJECT CODE: 19EET403**

**SUBJECT NAME: CONTROL SYSTEMS ENGINEERING**

**COURSE OUTCOME:**

Upon Completion of the course, the students will be able to:

- Apply transfer function models to analyze physical systems.
- Determine the transient and steady state behavior of systems subjected to standard test signals.
- Analyze the stability of the linear system in frequency domain and design compensators.
- Analyze the linear systems for absolute and relative stability in time and frequency domain.
- Familiarize with state space analysis and system properties like Controllability and Observability.

**SUBJECT CODE: 19ECE401**

**SUBJECT NAME: COMMUNICATION THEORY**

**COURSE OUTCOME:**

At the end of the course, the students will be able to

- Design AM communication systems
- Design Angle modulated communication systems.
- Apply the concepts of Random Process to the design of Communication systems.
- Analyze the noise performance of AM and FM systems.
- Gain knowledge in sampling and quantization.

**SUBJECT CODE: 19ECE402**

**SUBJECT NAME: LINEAR INTEGRATED CIRCUITS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Design linear and non linear applications of OP - AMPS.
- Incorporate applications using analog multiplier and PLL.
- Construct ADC and DAC using OP - AMPS.
- Generate waveforms using OP - AMP Circuits.

**SUBJECT CODE: 19EEC402**

**SUBJECT NAME: ENTREPRENEURSHIP DEVELOPMENT ACTIVITY**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Identify personal strengths and value systems
- Recall important tenets of digital literacy
- Discuss the essentials of matters pertaining to money
- Prepare for employment and self-employment
- Illustrate the basics of entrepreneurship and identify new business opportunities

**SUBJECT CODE: 19MDC401**

**SUBJECT NAME: VALUE ADDED COURSE - I**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Write simple programs in MATLAB to solve scientific and mathematical problems.
- Students are capable to produce PCB of their own circuit
- Repair and Diagnose the Problem of all kinds of faults in Mobile Phone handsets in Hardware as well Software and rectify the faults using tools and equipment and various software.
- Analyze simple analog and digital circuits using PSpice software

**REGULATION: R2019**

**YEAR / SEMESTER: III / VI**

**SUBJECT CODE: 19ECT601**

**SUBJECT NAME: ANTENNAS AND WAVE PROPAGATION**

**COURSE OUTCOME:**

Upon completion of the course, the students will be able to:

- Apply the basic principles and evaluate antenna parameters.
- Analyze aperture antennas and frequency independent antennas.
- Design and analyze antenna arrays.
- Design and assess the performance of various antennas.
- Identify the characteristics of radio-wave propagation.

**SUBJECT CODE: 19ECT602**

**SUBJECT NAME: WIRELESS COMMUNICATION**

**COURSE OUTCOME:**

Upon completion of the course, the students will be able to:

- Characterize a wireless channel and evolve the system design specifications.
- Analyze cellular system based on resource availability and traffic demands.
- Design and implement various signaling schemes for fading channels.
- Identify suitable signaling and multipath mitigation techniques for the wireless channel and system under consideration.
- Implement the systems with transmit/receive diversity of MIMO and analyze their performance.

**SUBJECT CODE: 19ECT603**

**SUBJECT NAME: COMMUNICATION NETWORKS**

**COURSE OUTCOME:**

At the end of the course, the student should be able to:

- Identify the components required to build different types of networks.
- Choose the required functionality at each layer for given application.
- Identify solution for routing and its algorithm.
- Trace the flow of information from one node to another node in the network.
- Understand the solution for each functionality at Application layer.

**SUBJECT CODE: 19ECE601**

**SUBJECT NAME: VLSI DESIGN**

**COURSE OUTCOME:**

At the end of the course, the student should be able to:

- Realize the concepts of digital building blocks using MOS transistor.
- Design combinational MOS circuits and power strategies.
- Design and construct Sequential Circuits and Timing systems.
- Design arithmetic building blocks and memory subsystems.
- Apply and implement FPGA design flow and testing.
- Write HDL code for basic as well as advanced digital integrated circuits and to design, Simulate and extract the layouts of Digital & Analog IC Blocks using EDA tools

**SUBJECT CODE: 19ECE602**

**SUBJECT NAME: DIGITAL COMMUNICATION**

**COURSE OUTCOME:**

Upon completion of the course, the students will be able to:

- Design Channel coding schemes.
- Evaluate the different waveform codings and its representations.
- Develop base band signaling scheme analyze their performance.
- Simulate and validate the various functional modules of a communication system.
- Analyze the different error control codings.
- Simulate end-to-end communication Link.

**SUBJECT CODE: 19ECPX07**

**SUBJECT NAME: COMPUTER ARCHITECTURE**

**COURSE OUTCOME:**

Upon completion of the course, the students will be able to:

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

**SUBJECT CODE: 19ECJ601**

**SUBJECT NAME: MINI PROJECT**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Design and fabricate the machine element or the mechanical product.
- Demonstrate the working model of the machine element or the mechanical product.

**SUBJECT CODE: 19MDC601**

**SUBJECT NAME: CONSTITUTION OF INDIA**

**COURSE OUTCOMES:**

At the end of the course the student will be able to

- Understand the Salient features and characteristics of the Constitution of India.
- Analyze the scheme of the Fundamental rights and Duties.
- Evaluate in detail the powers between the Union and the States.
- Know the concept of Constitutional Powers.
- Recognize other constitutional functionaries.

**REGULATION: R2017**

**YEAR / SEMESTER: IV / VIII**

**SUBJECT CODE: EC8094**

**SUBJECT NAME: SATELLITE COMMUNICATION**

**COURSE OUTCOME:**

- Analyze the satellite orbits.
- Analyze the earth segment and space segment.
- Analyze the satellite Link design.
- Design various satellite applications.

**SUBJECT CODE: GE8076**

**SUBJECT NAME: PROFESSIONAL ETHICS IN ENGINEERING**

**COURSE OUTCOME:**

- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.

**SUBJECT CODE: EC8811**

**SUBJECT NAME: PROJECT WORK**

**COURSE OUTCOME:**

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



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## ODD SEMESTER

### Department of Electrical and Electronics Engineering

**REGULATION: R2019**

**YEAR / SEMESTER: I / I**

**SUBJECT CODE: 19HST101**

**SUBJECT NAME: COMMUNICATIVE TECHNO ENGLISH - I**

#### **COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Learn to acquire usage of English.
- Use a wide range of vocabulary in oral and written communication.
- Give short informal presentations and participate in classroom discussions.
- Write informal letters and other communications.
- Frame grammatically correct sentences

**SUBJECT CODE: 19MAT101**

**SUBJECT NAME: ENGINEERING MATHEMATICS - I**

#### **COURSE OUTCOMES:**

After successfully completing the course, the student will have a good understanding of the following topics and their applications.

- Understanding of the ideas of matrix and its nature.
- Apply differentiation to solve maxima and minima problems.
- Understanding the concept of partial differentiation and total derivative.
- Evaluate integrals using techniques of integration such as substitution, partial fractions and integration by parts.
- Apply integration to compute multiple integrals, area, volume, integrals in polar co-ordinates, in addition to change of order and change of variables.

**SUBJECT CODE: 19CYE101**

**SUBJECT NAME: ENGINEERING CHEMISTRY**

#### **COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Identify the method of removal of impurities from water for domestic and industrial purpose.
- Identify the different types of polymers, polymerisation processes and some special properties and applications of polymers.
- Analyze the causes of corrosion and discuss the control measures and discuss the functions of batteries
- Apply of phase rule to alloy making for various engineering applications.
- Discuss the fundamentals of the nano materials and nano products of today.
- Outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters

**SUBJECT CODE: 19PHE101**

**SUBJECT NAME: ENGINEERING PHYSICS**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Apply these basic principles of structures of Engineering materials.
- Make use of materials properties using the knowledge of elasticity.
- Acquire the concepts of light propagation and its applications in lasers and fibre optics.
- Realize advanced physics concepts of quantum theory and its applications.
- Incorporate the acoustics and ultrasound applications.
- Apply principles of elasticity, optics and acoustic properties in Engineering applications.

**SUBJECT CODE: 19GET101**

**SUBJECT NAME: ENGINEERING GRAPHICS**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Construct multiple views of engineering components.
- Prepare the pictorial drawings as per the standards.
- Develop the projection of solids.
- Draw the section of solids drawings and development of surfaces of given objects.
- Apply free hand sketching and concept of isometric in engineering practice.

**SUBJECT CODE: 19GEE101**

**SUBJECT NAME: COMPUTER FUNDAMENTALS AND PYTHON PROGRAMMING**

**COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Know the Computer basics, Components and Softwares
- Develop algorithmic solutions to simple computational problems and Read, write, execute by hand simple Python programs.
- Structure simple Python programs for solving problems.
- Decompose a Python program into functions.
- Represent compound data using Python lists, tuples, and dictionaries.

**SUBJECT CODE: 19EEC101**

**SUBJECT NAME: LIFE SKILLS FOR ENGINEERS**

**COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Communicate effectively and make effective presentations.
- Write different types of reports.
- Face interview & group discussion.
- Critically think on a particular problem.
- Get success in all aspects and develop public skills.

**REGULATION: R2019**

**YEAR / SEMESTER: II / III**

**SUBJECT CODE: 19MAT301**

**SUBJECT NAME: TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

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

**SUBJECT CODE: 19EET301**

**SUBJECT NAME: ELECTROMAGNETIC THEORY**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Describe the basic mathematical concepts related to electromagnetic vector fields.
- Explain the electric and magnetic fields for simple configurations under static conditions.
- Analysis time varying electric and magnetic fields.
- Apply the Maxwell's equations in different forms and different media.
- Outline the knowledge in Electromagnetic waves.

**SUBJECT CODE: 19EET302**

**SUBJECT NAME: LINEAR INTEGRATED CIRCUITS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Understand the knowledge in IC fabrication procedure.
- Describe the DC and AC characteristics of op-amp and its effect on output.
- Elucidate and design filters and generate waveforms using op-amp circuits.
- Analyze the applications of special ICs like Timers, PLL circuits.
- Understand the knowledge on the Applications of Op-amp.

**SUBJECT CODE: 19EEE301**

**SUBJECT NAME: ANALOG ELECTRONICS AND CIRCUITS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Explain the structure and working operation of basic electronic devices.
- Able to identify and differentiate both active and passive elements.
- Analyze the characteristics of different electronic devices such as diodes and transistors.
- Choose and adapt the required components to construct an amplifier circuit and analyze the various switching circuits with its waveforms.
- Employ the acquired knowledge in design and analysis of oscillators.



**SUBJECT CODE: 19ECE301**

**SUBJECT NAME: DIGITAL ELECTRONICS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Analyze different methods used for simplification of Boolean expressions.
- Design and implement Combinational circuits.
- Design and implement synchronous and asynchronous sequential circuits.
- Write simple HDL codes for the circuits.
- Use the semiconductor memories and related technology.

**SUBJECT CODE: 19CSE302**

**SUBJECT NAME: PROGRAMMING IN C AND C++**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Develop simple applications in C using basic constructs
- Design and implement applications using arrays and strings
- Develop and implement applications in C using functions and pointers.
- Design and implement C++ programs for any given problem.
- Understand an existing program and modify it as per the requirements. Identify the errors in a C++ program.
- Develop C and C++ programs for simple applications making use of basic constructs, arrays and strings.
- Develop C and C++ programs involving functions, recursion and pointers.

**SUBJECT CODE: 19EEEC301**

**SUBJECT NAME: COMMUNICATION SKILLS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Improve vocabulary and express the same contextually
- Communicate to his peer group properly and make presentations
- Comprehend the general and technical text
- Write simple paragraph and essay in any topic
- Participate in group discussions expressing ideas relevantly, coherently and cogently

**SUBJECT CODE: 19MDC301**

**SUBJECT NAME: LEADERSHIP ENHANCEMENT PROGRAMME**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Develop the capabilities needed to increase team's work productivity.
- Help to decrease employee turnover and increase engagement, creating a strong and united team.
- Develop communication skills, mastering the art of negotiation, influence and conflict Management.
- More confident as a leader and find new ways of influencing the teams they lead.
- Effectively connect to people, developing the ability to give constructive feedback, and critically seek the feedback of the team.

**REGULATION: 2019**

**YEAR / SEMESTER: III / V**

**SUBJECT CODE: 19EET501**

**SUBJECT NAME: MICROPROCESSORS AND MICROCONTROLLERS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Understand the internal operations of 8085 processor.
- Develop skills in writing assembly language program.
- Recognize the knowledge on interfacing the external devices to the processor according to the user requirements.
- Design the internal structure and instruction set of 8051 controller.
- Develop PWM outputs using PIC microcontroller.

**SUBJECT CODE: 19EET502**

**SUBJECT NAME: POWER SYSTEM ANALYSIS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Understand the per unit system.
- Identify and apply iterative techniques for power flow analysis.
- Model and carry out short circuit studies on power system.
- Acquire knowledge on Fault analysis.
- Model and analyze stability problems in power system.

**SUBJECT CODE: 19EEE501**

**SUBJECT NAME: POWER ELECTRONICS AND APPLICATIONS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Apply the knowledge of power electronic devices and converters.
- Demonstrate the performance of converters and power semiconductor devices.
- Analyze the performance of DC-DC converters.
- Understand the operation of inverter circuits.
- Enrich the knowledge of cyclo converter.
- Use power electronic simulation package for analyzing and designing power control applications.

**SUBJECT CODE: 19EEE502**

**SUBJECT NAME: INDUCTION AND SYNCHRONOUS MACHINES**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Identify the construction and working principle of synchronous generator.
- Understand mmf curves and armature windings.
- Acquire knowledge on synchronous motor.
- Construction and working principle of three phase induction motor.
- Recognize the construction and working principle of special machines.
- Predetermine the performance and operating characteristics of synchronous and induction machines.

**SUBJECT CODE: 19EEPX02**

**SUBJECT NAME: DESIGN OF ELECTRICAL APPARATUS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Approximate the design values for machine dimensions for the required power.
- Relate the output power of a DC machine with its main dimensions and design the armature of a DC Machine.
- Correlate the output power of a transformer with its core dimensions and design the transformer.
- Show the power of an induction motor with its main dimensions and design squirrel cage and slip ring induction motors.
- Illustrate the power of a synchronous machine with its main dimensions and design salient pole and cylindrical pole type synchronous machines.

**SUBJECT CODE: 19ECOX01**

**SUBJECT NAME: INTERNET OF THINGS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Articulate the main concepts, key technologies, strength and limitations of IoT.
- Identify the architecture, infrastructure models of IoT.
- Analyze the networking and how the sensors are communicated in IoT.
- Identify and design the new models for market strategic interaction.
- Analyze various M2M and IoT architectures (Analyze)

**SUBJECT CODE: 19EEC501**

**SUBJECT NAME: QUANTITATIVE APTITUDE LEARNING**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Understand the basic concepts and techniques of the numbers, Highest common factor and Least common multiple.
- Apply the concept of decimal fraction and problems on ages.
- Understand and apply the concept of time, work, distance, calendar and clock.
- Acquire skills in simple interest, compound interest and elementary algebra.
- Be exposed to concepts and properties of polynomial and quadratic equations.

**SUBJECT CODE: 19MDC501**

**SUBJECT NAME: VALUE ADDED COURSE - II**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Will understand that the computer is not only a visualization tool but also for design.
- PLC outcome category because they were designed to measure multiple outcomes.
- ETAP is a powerful, user friendly and easy to use tool with trusted output data and calculations.

**REGULATION: R2017**

**YEAR / SEMESTER: IV/ VII**

**SUBJECT CODE: EE8701**

**SUBJECT NAME: HIGH VOLTAGE ENGINEERING**

**COURSE OUTCOME:**

- Ability to understand Transients in power system
- Ability to understand Generation and measurement of high voltage
- Ability to understand High voltage testing
- Ability to understand various types of over voltages in power system
- Ability to measure over voltages
- Ability to test power apparatus and insulation coordination

**SUBJECT CODE: EE8702**

**SUBJECT NAME: POWER SYSTEM OPERATION AND CONTROL**

**COURSE OUTCOME:**

- Ability to understand the day-to-day operation of electric power system
- Ability to analyze the control actions to be implemented on the system to meet the minute-to-minute variation of system demand
- Ability to understand the significance of power system operation and control
- Ability to acquire knowledge on real power-frequency interaction
- Ability to understand the reactive power-voltage interaction
- Ability to design SCADA and its application for real time operation

**SUBJECT CODE: EE8703**

**SUBJECT NAME: RENEWABLE ENERGY SYSTEMS**

**COURSE OUTCOME:**

- Ability to create awareness about renewable Energy Sources and technologies
- Ability to get adequate inputs on a variety of issues in harnessing renewable Energy
- Ability to recognize current and possible future role of renewable energy sources
- Ability to explain the various renewable energy resources and technologies and their applications
- Ability to understand basics about biomass energy
- Ability to acquire knowledge about solar energy

**SUBJECT CODE: EI8075**

**SUBJECT NAME: FIBRE OPTICS AND LASER INSTRUMENTS**

**COURSE OUTCOME:**

1. Understand the principle, transmission, dispersion and attenuation characteristics of optical fibers
2. Apply the gained knowledge on optical fibers for its use as communication medium and as sensor as well which have important applications in production, manufacturing industrial and biomedical applications.
3. Understand laser theory and laser generation system.
4. Students will gain ability to apply laser theory for the selection of lasers for a specific Industrial and medical application.

**SUBJECT CODE: GE8077**

**SUBJECT NAME: TOTAL QUALITY MANAGEMENT**

**COURSE OUTCOME:**

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

**SUBJECT CODE: EE8711**

**SUBJECT NAME: POWER SYSTEM SIMULATION LABORATORY**

**COURSE OUTCOME:**

Ability to

- Ability to understand power system planning and operational studies
- Ability to acquire knowledge on Formation of Bus Admittance and Impedance Matrices and Solution of Networks
- Ability to analyze the power flow using GS and NR method
- Ability to find Symmetric and Unsymmetrical fault
- Ability to understand the economic dispatch
- Ability to analyze the electromagnetic transients

**SUBJECT CODE: EE8712**

**SUBJECT NAME: RENEWABLE ENERGY SYSTEMS LABORATORY**

**COURSE OUTCOME:**

- Ability to understand and analyze Renewable energy systems
- Ability to train the students in Renewable Energy Sources and technologies
- Ability to provide adequate inputs on a variety of issues in harnessing Renewable Energy
- Ability to simulate the various Renewable energy sources
- Ability to recognize current and possible future role of Renewable energy sources
- Ability to understand basics of Intelligent Controllers



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**TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU**



## EVEN SEMESTER

**Department of Electrical and Electronics Engineering**

**REGULATION: R2019**

**YEAR / SEMESTER: I / II**

**SUBJECT CODE: 19HST201**

**SUBJECT NAME: COMMUNICATIVE TECHNO ENGLISH - II**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Acquire advanced level grammatical knowledge.
- Improve their language usage in LSRW skills.
- Speak fluently using a wide range of vocabulary.
- Acquire the ability to understand different written texts.
- Enhance the writing skills to express the ideas in the business contexts.

**SUBJECT CODE: 19CYT201**

**SUBJECT NAME: ENVIRONMENTAL SCIENCE AND ENGINEERING**

**COURSE OUTCOME:**

At the end of the course, the students will be able to

- Find scientific, technological, economic and political solutions to environmental problems.
- Invent innovative solutions for pollutions to improve the quality of environment.
- Participate the conservation of natural resources to save earth.
- Promote sustainable development and understand the concept of green chemistry.
- Analyse the effects of human population and issues related to the environment and human health.

**SUBJECT CODE: 19MAT201**

**SUBJECT NAME: ENGINEERING MATHEMATICS - II**

**COURSE OUTCOME:**

At the end of the course, the students will be able to

- Higher order linear differential equations with constant coefficients and variable coefficient.
- Green's, Gauss divergence and Stoke's theorems – Verification and application.
- Analytic functions, conformal mapping and Bilinear transformation.
- Application of residue theorem for evaluation of real integrals on contour integral.
- Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

**SUBJECT CODE: 19PHT202**

**SUBJECT NAME: SOLID STATE PHYSICS AND NANOELECTRONIC DEVICES**

**COURSE OUTCOME:**

At the end of the course, the students will be able to

- Gain knowledge on classical and quantum electron theories, and energy band structures.
- Acquire knowledge on basics of semiconductor physics and its applications in various devices.
- Get knowledge on superconducting and dielectric properties of materials.
- Understand the function of optical materials for optoelectronics.
- Expand the knowledge on quantum structures and their applications in spintronics and Nano electronics.

**SUBJECT CODE: 19GET203**

**SUBJECT NAME: BASIC CIVIL AND MECHANICAL ENGINEERING**

**COURSE OUTCOME:**

At the end of the course, the students will be able to

- Know the various functions of Civil Engineer and to identify the suitable construction materials.
- Demonstrate the various elements of sub-structure and super-structure.
- Understand the basic concepts in thermal engineering and fluid mechanics.
- Display the IC engine working principles of various energy sources.
- Exhibit an understanding of principles and applications of mechanical power transmission components and basic manufacturing process.

**SUBJECT CODE: 19EEE201**

**SUBJECT NAME: CIRCUIT THEORY**

**COURSE OUTCOME:**

At the end of the course, the students will be able to

- Learn the basic concepts of DC and AC electrical circuits.
- Understand and apply the knowledge of circuit theorems.
- Acquire knowledge about resonance and coupled circuits.
- Apply the concepts in transients.
- Analyze the three phase circuits.
- Understand and apply circuit theorems and concepts in engineering applications.

**SUBJECT CODE: 19EEEC203**

**SUBJECT NAME: HANDS ON TRAINING IN ELECTRICAL AND ELECTRONICS ENGINEERING**

**COURSE OUTCOME:**

At the end of the course, the students will be able to

- Repair and service the electrical appliances.

**REGULATION: R2019**

**YEAR / SEMESTER: II / IV**

**SUBJECT CODE: 19MAT403**

**SUBJECT NAME: NUMERICAL METHODS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

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

**SUBJECT CODE: 19EET401**

**SUBJECT NAME: ELECTRICAL AND ELECTRONIC MEASUREMENTS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Acquire knowledge on Basic functional elements of instrumentation.
- Understand the concepts of Fundamentals of electrical and electronic instrument.
- Compare between various measurements techniques.
- Acquire knowledge on various storage and display devices.
- Understand the concepts various transducers and the data acquisition systems.
- Model and analyze electrical and electronic Instruments and understand the Operational features of display Devices and Data Acquisition System.

**SUBJECT CODE: 19EET402**

**SUBJECT NAME: GENERATION, TRANSMISSION AND DISTRIBUTION**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Explain the structure and working operation of different types of power generation.
- Analyses the importance and the functioning of transmission line parameters.
- Understand the concepts of Lines and Insulators.
- Acquire knowledge on the performance of Transmission lines.
- Describe the importance of distribution of the electric power in power system
- Supervise the laying of Underground Cables
- Become familiar with the function of different components used in Transmission and Distribution levels of power system and modelling of these components

**SUBJECT CODE: 19ECT404**

**SUBJECT NAME: DISCRETE TIME SYSTEM AND SIGNAL PROCESSING**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Understand the importance of Fourier transforms digital filters and DS Processors.
- Acquire knowledge on Signals and systems & their mathematical representation.
- Understand and analyze the discrete time systems.
- Analyze the transformation techniques & their computation.
- Acquire knowledge on programmability digital signal processor & quantization effects.



**SUBJECT CODE: 19EEE401**

**SUBJECT NAME: DC MACHINES AND TRANSFORMERS**

**COURSE OUTCOME:**

- At the end of the course, the students will be able to:
- Gain knowledge on magnetic circuit and laws, properties of magnetic materials, core loss.
- Acquire knowledge on construction, working principles, testing and efficiency of Transformer.
- Get knowledge on the basic concepts of electro mechanical energy conversion and concepts in rotating machines.
- Understand construction, principle of operation, methods of excitation and characteristics of DC generators.
- Expand the knowledge on working principle, characteristic, starting and testing of DC motor.
- Ability to understand and analyze DC Machines and transformer.

**SUBJECT CODE: 19EEE402**

**SUBJECT NAME: CONTROL SYSTEMS ENGINEERING**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Develop various representations of system based on the knowledge of Mathematics, Science and Engineering fundamentals.
- Do time domain and frequency domain analysis of various models of linear system.
- Analyse the various frequency response plots and its system.
- Apply the concepts of various system stability criterions.
- Understand use of PID controller in closed loop system.

**SUBJECT CODE: 19EEC402**

**SUBJECT NAME: ENTREPRENEURSHIP DEVELOPMENT ACTIVITY**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Identify personal strengths and value systems
- Recall important tenets of digital literacy
- Discuss the essentials of matters pertaining to money
- Prepare for employment and self-employment
- Illustrate the basics of entrepreneurship and identify new business opportunities

**SUBJECT CODE: 19MDC401**

**SUBJECT NAME: VALUE ADDED COURSE - I**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Able to generate plots and export this for use in reports and presentations.
- Able to program scripts and functions using the Mat lab development environment.
- Students will be able to state basic PLC terminology and their meanings.
- Students will be able to explain and apply the concept of electrical ladder logic, its history, and its relationship to programmed PLC instruction.
- System design and program an embedded system at the basic level develop hardware-software complex with the use of the National Instruments products

**REGULATION: R2019**

**YEAR / SEMESTER: III / VI**

**SUBJECT CODE: 19EET601**

**SUBJECT NAME: PROTECTION AND SWITCHGEAR**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Differentiate different types of faults and earthing in the power system.
- Understand and analyze the various types relays.
- Select different types of protective schemes for generator, transformer, busbars and feeders.
- Study about the importance of static relays.
- Acquire knowledge of different circuit breakers and suggest suitable circuit breaker for particular operation.

**SUBJECT CODE: 19EET602**

**SUBJECT NAME: ELECTRICAL DRIVES**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Understand steady state operation and transient dynamics of a motor load system.
- Identify the operation of the converter, chopper fed dc drive and solve simple problems.
- Study and analyze the speed control of induction motor drive.
- Use recent microcontroller for motor control and PLC based control of drives.
- Analyze and design of various controllers for solid state drives.

**SUBJECT CODE: 19EEE601**

**SUBJECT NAME: EMBEDDED CONTROLLERS AND REAL TIME OPERATING SYSTEMS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Understand the concept of composition, design and implementation of embedded systems.
- Learn the interfacing techniques between processors and peripheral devices related to embedded system.
- Know the concept of communication protocols and apply advanced technical knowledge in multiple contexts.
- Realize the management tasks needed for developing embedded system.
- Use various testing tools for hardware- software debugging and learn its applications.
- Understand ARM processor and building blocks of embedded systems.

**SUBJECT CODE: 19EEE602**

**SUBJECT NAME: POWER SYSTEM OPERATION AND CONTROL**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Understand power system planning and operational studies.
- Design of power-frequency controller.
- Maintaining the voltage profile against varying system load. .
- Appreciate the economic operation of power system.
- Know the need of computer control of power systems.
- Simulate of load - frequency dynamics of single- area and two-area power systems.

**SUBJECT CODE: 19EEXP09**

**SUBJECT NAME: SPECIAL ELECTRICAL MACHINES**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Select suitably configured modern electric motors for constrained applications with the knowledge of fundamental principles, constructions and classifications.
- Examine the special machines used in different applications.
- Analyze the performance characteristics of special electrical machines with suitable equations and phasor diagram techniques.
- Understand the different control techniques of special electrical machines to satisfy the various requirements based on the applications.
- Outline the characteristics of synchronous reluctance motor.

**SUBJECT CODE: 19EEXP14**

**SUBJECT NAME: FIBRE OPTICS AND LASER INSTRUMENTS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Understand the principle, transmission, dispersion and attenuation characteristics of optical fibers.
- Apply the gained knowledge on optical fibers for its use as communication medium.
- Realize laser theory and laser generation system.
- Pertain laser theory for the selection of lasers for a specific Industrial and medical application.
- Know the basic principle and methods of Holographic interferometer and application of laser instruments in medical surgeries.

**SUBJECT CODE: 19EEXP22**

**SUBJECT NAME: MICRONCONTROLLER BASED SYSTEM DESIGN**

**COURSE OUTCOME:**

- Describe the architectures of processors.
- Acquire knowledge on Interrupts and timers.
- Use the importance of Peripheral devices for data communication.
- Design and develop the basics to ARM Processor.
- Obtain knowledge in Architecture of ARM processors.

**SUBJECT CODE: 19EEEC604**

**SUBJECT NAME: MINI PROJECT**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Design and fabricate the machine element or the mechanical product.
- Demonstrate the working model of the machine element or the mechanical product.

**SUBJECT CODE: 19MDC601**

**SUBJECT NAME: CONSTITUTION OF INDIA**

**COURSE OUTCOMES:**

At the end of the course the student will be able to

- Understand the Salient features and characteristics of the Constitution of India.
- Analyze the scheme of the Fundamental rights and Duties.
- Evaluate in detail the powers between the Union and the States.
- Know the concept of Constitutional Powers.
- Recognize other constitutional functionaries.

**REGULATION: R2017**

**YEAR / SEMESTER: IV / VIII**

**SUBJECT CODE: EE8015**

**SUBJECT NAME: ELECTRIC ENERGY GENERATION, UTILIZATION AND CONSERVATION**

**COURSE OUTCOME:**

- To understand the main aspects of generation, utilization and conservation.
- To identify an appropriate method of heating for any particular industrial application.
- To evaluate domestic wiring connection and debug any faults occurred.
- To construct an electric connection for any domestic appliance like refrigerator as well as to design a battery charging circuit for a specific household application.
- To realize the appropriate type of electric supply system as well as to evaluate the performance of a traction unit.
- To understand the main aspects of Traction.

**SUBJECT CODE: EE8018**

**SUBJECT NAME: MICROCONTROLLER BASED SYSTEM DESIGN**

**COURSE OUTCOME:**

- Ability to understand and apply computing platform and software for engineering problems.
- Ability to understand the concepts of Architecture of PIC microcontroller
- Ability to acquire knowledge on Interrupts and timers.
- Ability to understand the importance of Peripheral devices for data communication.
- Ability to understand the basics of sensor interfacing
- Ability to acquire knowledge in Architecture of ARM processors

**SUBJECT CODE: EE8811**

**SUBJECT NAME: PROJECT WORK**

**COURSE OUTCOME:**

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



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## ODD SEMESTER

Department of Mechanical engineering

**REGULATION: R2019**

**YEAR / SEMESTER: I / I**

**SUBJECT CODE: 19HST101**

**SUBJECT NAME: COMMUNICATIVE TECHNO ENGLISH - I**

**COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Learn to acquire usage of English.
- Use a wide range of vocabulary in oral and written communication.
- Give short informal presentations and participate in classroom discussions.
- Write informal letters and other communications.
- Frame grammatically correct sentences

**SUBJECT CODE: 19MAT101**

**SUBJECT NAME: ENGINEERING MATHEMATICS - I**

**COURSE OUTCOMES:**

After successfully completing the course, the student will have a good understanding of the following topics and their applications.

- Understanding of the ideas of matrix and its nature.
- Apply differentiation to solve maxima and minima problems.
- Understanding the concept of partial differentiation and total derivative.
- Evaluate integrals using techniques of integration such as substitution, partial fractions and integration by parts.
- Apply integration to compute multiple integrals, area, volume, integrals in polar co-ordinates, in addition to change of order and change of variables.

**SUBJECT CODE: 19CYE101**

**SUBJECT NAME: ENGINEERING CHEMISTRY**

**COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Identify the method of removal of impurities from water for domestic and industrial purpose.
- Identify the different types of polymers, polymerisation processes and some special properties and applications of polymers.
- Analyze the causes of corrosion and discuss the control measures and discuss the functions of batteries
- Apply of phase rule to alloy making for various engineering applications.
- Discuss the fundamentals of the nano materials and nano products of today.
- Outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters

**SUBJECT CODE: 19PHE101**

**SUBJECT NAME: ENGINEERING PHYSICS**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Apply these basic principles of structures of Engineering materials.
- Make use of materials properties using the knowledge of elasticity.
- Acquire the concepts of light propagation and its applications in lasers and fibre optics.
- Realize advanced physics concepts of quantum theory and its applications.
- Incorporate the acoustics and ultrasound applications.
- Apply principles of elasticity, optics and acoustic properties in Engineering applications.

**SUBJECT CODE: 19GET101**

**SUBJECT NAME: ENGINEERING GRAPHICS**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Construct multiple views of engineering components.
- Prepare the pictorial drawings as per the standards.
- Develop the projection of solids.
- Draw the section of solids drawings and development of surfaces of given objects.
- Apply free hand sketching and concept of isometric in engineering practice.

**SUBJECT CODE: 19GEE101**

**SUBJECT NAME: COMPUTER FUNDAMENTALS AND PYTHON PROGRAMMING**

**COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Know the Computer basics, Components and Softwares
- Develop algorithmic solutions to simple computational problems and Read, write, execute by hand simple Python programs.
- Structure simple Python programs for solving problems.
- Decompose a Python program into functions.
- Represent compound data using Python lists, tuples, and dictionaries.

**SUBJECT CODE:19EEC101**

**SUBJECT NAME:LIFE SKILLS FOR ENGINEERS**

**COURSE OUTCOMES:**

Upon completion of the course, the students will be able to:

- Communicate effectively and make effective presentations.
- Write different types of reports.
- Face interview & group discussion.
- Critically think on a particular problem.
- Get success in all aspects and develop public skills.

**REGULATION: R2019**

**YEAR / SEMESTER: II / III**

**SUBJECT CODE: 19MAT301**

**SUBJECT NAME: TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS**

**COURSE OUTCOMES:**

After successfully completing the course, the student will be able to:

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

**SUBJECT CODE : 19MET301**

**SUBJECT NAME: ENGINEERING THERMODYNAMICS**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Understand the fundamental concepts and definitions, thermodynamic principles to Engineering problems.
- Understand the second law of thermodynamics and availability analysis.
- Identify the properties of pure substance and explain the working of steam power cycle.
- Discuss the thermodynamic relation, ideal and real gas behavior.
- Understand the fundamental properties and types of psychrometric process

**SUBJECT CODE 19MET302**

**SUBJECT NAME: KINEMATICS OF MACHINERY**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Build up critical thinking and problem solving capacity of various mechanical engineering problems related to kinematics of machines.
- Perform the velocity and acceleration analysis on various links which constitute a mechanism.
- Understand the working principles of gears, gear trains and cams.
- Develop the ability to use mathematics as a tool whereby the solution to problem may be carried out in the most direct and effective manner..
- Recognize the effect of friction in different friction drives.

**SUBJECT CODE 19EET303**

**SUBJECT NAME: ELECTRICAL DRIVES AND CONTROL**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to

- Identify and explain the types and selection of rating of electrical drives.
- Analyze the speed-torque characteristics and braking characteristics of electrical drives for DC shunt, series and induction motors.
- Illustrate the types and characteristics of DC and AC motor starters.
- Compare and contrast the conventional and solid-state speed control of DC and AC drives.
- Test the speed control of DC and AC motors and the performance analysis of DC and AC motor drives.

**SUBJECT CODE 19MEE301**

**SUBJECT NAME: MANUFACTURING TECHNOLOGY - I**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Understand the usage of pattern and casting production by using different methods.
- Understand the basic concepts of metal joining and their application.
- Summarize various hot working and cold working methods of metals.
- Analyse the various sheet metal making processes.
- Distinguish various methods of manufacturing plastic components
- Ability to make moulding, use different machine tools to machining, welding and sheet metal operations.

**SUBJECT CODE 19MEE302**

**SUBJECT NAME: FLUID MECHANICS AND MACHINERY**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Analyze the dynamics of fluid flow and summarize the flow characteristics.
- Identify the flow characteristics and calculate major and minor losses associated with pipe flow in piping networks.
- Invent the principles of dimensional analysis and model analysis to fluid flow problems.
- Evaluate the performance of pumps.
- Conduct the performance study on different turbines.
- Apply the Bernoulli's principle to find the coefficient of discharge, determine the friction factor for set of pipes, and analyze the performance characteristics of turbine and pumps.

**SUBJECT CODE 19EEC302**

**SUBJECT NAME: ENTREPRENEURSHIP DEVELOPMENT ACTIVITY**

**COURSE OUTCOMES:**

At the end of this course, students can:

- Identify personal strengths and values systems.
- Recall important tenets of digital literacy.
- Discuss the essentials of matters pertaining to money.
- Prepare for employment and self-employment.
- Illustrate the basics of entrepreneurship and identify new business opportunities.



**REGULATION: R2019**

**YEAR / SEMESTER: III / V**

**SUBJECT CODE 19MET501**

**SUBJECT NAME: AUTOMOBILE ENGINEERING**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Recognize the various parts of the automobile and their functions and materials.
- Discuss the engine auxiliary systems and engine emission control.
- Distinguish the working of different types of transmission systems.
- Identify the types of steering, brakes and suspension systems.
- Predict possible alternate sources of energy for IC Engines.

**SUBJECT CODE: 19MET502**

**SUBJECT NAME: DESIGN OF MACHINE ELEMENTS**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Relate the concepts of principal stresses, stress concentration in machine members and fatigue loading
- Identify the various stresses induced in shafts and couplings for design process.
- Solve the various stresses induced in design of bolted, welded and riveted joints.
- Choose the different types of springs and their design procedure.
- Apply the design procedure and calculate the life and thermal properties for bearings

**SUBJECT CODE 19MET503**

**SUBJECT NAME: POWER PLANT ENGINEERING**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Describe the layout, construction and working of the components inside a thermal power plant.
- Demonstrate the layout, construction and working of the components inside a Diesel, Combined cycle power plants.
- Summarize the working of the components inside nuclear power plants.
- Classify the type of energy sources and explain the layout, construction and working of the components inside Renewable energy power plants.
- Identify the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production

**SUBJECT CODE: 19MEPX05**

**SUBJECT NAME: NON DESTRUCTIVE TEST AND EVALUATION OF MATERIALS**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Differentiate various defect types and select the appropriate NDT methods for better evaluation.
- Complete theoretical understanding of the penetrants, penetrant testing and safety precautions.
- Implement various eddy current inspection methods to find material imperfections.
- Evaluate the concept of ultrasonic testing and acoustic emission.
- Apply radiation property for inspecting material

**SUBJECT CODE: 19MEE501**

**SUBJECT NAME: HEAT AND MASS TRANSFER**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Solve heat conduction equations to different surface configurations under steady state heat conduction
- Analyze free and forced convective heat transfer correlations to internal and external flow
- Classify the various types of condensation processes in the heat exchangers.
- Illustrate about thermal radiation exchange between black and gray surfaces.
- Apply diffusive and convective mass transfer equations and correlations to solve problems for different applications
- Conduct tests on heat conduction, convective heat transfer and radiative heat transfer apparatus and evaluate thermal conductivity, heat transfer coefficient and emissivity of materials

**SUBJECT CODE: 19MEE502**

**SUBJECT NAME: METROLOGY AND MEASUREMENTS**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Describe the concepts of measurements to apply in various metrological instruments.
- Illustrate the methods for linear, angle and flatness measurements and select a suitable method and its relevant instrument for a given application.
- Understand the procedure for conducting computer aided inspection.
- Measure the threads, gear tooth profiles, surface roughness and flatness using appropriate instruments and analyze the data.
- Identify the construction, working principles and select appropriate measuring instruments for force, torque, power, flow and temperature for a given application.
- Examine various measuring techniques of mechanical properties in industrial applications.

**SUBJECT CODE: 19EEEC501**

**SUBJECT NAME: QUANTITATIVE APTITUDE LEARNING**

**COURSE OUTCOMES:**

After successfully completing the course, the student will have a good understanding of the following topics and their applications.

- Understand the basic concepts and techniques of the numbers, Highest common factor and Least common multiple.
- Apply the concept of decimal fraction and problems on ages.
- Understand and apply the concept of time, work, distance, calendar and clock.
- Acquire skills in simple interest, compound interest and elementary algebra.
- Be exposed to concepts and properties of polynomial and quadratic equations.

**SUBJECT CODE: 19MDC501**

**SUBJECT NAME: VALUE ADDED COURSE – II (ANSYS)**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Solve structural analysis problems using one dimensional and two dimensional elements.
- Determine numerical solution of problem using axi-symmetric condition.
- Evaluate various model of failure of a machine component using Modal analysis.
- Apply harmonic analysis to find the response of a structural system using simulation.
- Analyze engineering heat transfer problem under given boundary conditions.

**REGULATION: R2017**

**YEAR / SEMESTER: IV/ VII**

**SUBJECT CODE: ME8792**

**SUBJECT NAME: POWER PLANT ENGINEERING**

**COURSE OUTCOME:**

Upon the completion of this course the students will be able to

- Explain the layout, construction and working of the components inside a thermal power plant
- Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants
- Explain the layout, construction and working of the components inside nuclear power plants.
- Explain the layout, construction and working of the components inside Renewable energy power plants.
- Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.

**SUBJECT CODE: ME8793**

**SUBJECT NAME: PROCESS PLANNING AND COST ESTIMATION**

**COURSE OUTCOME:**

Upon the completion of this course the students will be able to

- Select the process, equipment and tools for various industrial products.
- Prepare process planning activity chart.
- Explain the concept of cost estimation.
- Compute the job order cost for different type of shop floor.
- Calculate the machining time for various machining operations.

**SUBJECT CODE: ME8791**

**SUBJECT NAME: MECHATRONICS**

**COURSE OUTCOME:**

Upon the completion of this course the students will be able to

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

**SUBJECT CODE: OIE751**

**SUBJECT NAME: ROBOTICS**

**COURSE OUTCOME:**

Upon the completion of this course the students will be able to

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

**SUBJECT CODE: GE8077**

**SUBJECT NAME: TOTAL QUALITY MANAGEMENT**

**COURSE OUTCOME:**

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

**SUBJECT CODE: ME8097**

**SUBJECT NAME: NON DESTRUCTIVE TESTING AND EVALUATION**

**COURSE OUTCOME:**

Upon the completion of this course the students will be able to

- Explain the fundamental concepts of NDT
- Discuss the different methods of NDE
- Explain the concept of Thermography and Eddy current testing
- Explain the concept of Ultrasonic Testing and Acoustic Emission
- Explain the concept of Radiography

**SUBJECT CODE: ME8711**

**SUBJECT NAME: SIMULATION AND ANALYSIS LABORATORY**

**COURSE OUTCOME:**

Upon the completion of this course the students will be able to

- Simulate the working principle of air conditioning system, hydraulic and pneumatic cylinder and cam follower mechanisms using MATLAB.
- Analyze the stresses and strains induced in plates, brackets and beams and heat transfer problems.
- Calculate the natural frequency and mode shape analysis of 2D components and beams

**SUBJECT CODE: ME8781**

**SUBJECT NAME: MECHATRONICS LABORATORY**

**COURSE OUTCOME:**

Upon the completion of this course the students will be able to

- Demonstrate the functioning of mechatronics system with various pneumatic, hydraulic and electrical systems.
- Demonstrate the functioning of control systems with the help of PLC and microcontrollers.



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## EVEN SEMESTER

### Department of Mechanical engineering

**REGULATION: R2019**

**YEAR / SEMESTER: I / II**

**SUBJECT CODE: 19HST201**

**SUBJECT NAME: COMMUNICATIVE TECHNO ENGLISH - II**

**COURSE OUTCOME:**

Upon completion of the course, the students will be able to:

- Acquire advanced level grammatical knowledge.
- Improve their language usage in LSRW skills.
- Speak fluently using a wide range of vocabulary.
- Acquire the ability to understand different written texts.
- Enhance the writing skills to express the ideas in the business contexts.

**SUBJECT CODE: 19CYT201**

**SUBJECT NAME: ENVIRONMENTAL SCIENCE AND ENGINEERING**

**COURSE OUTCOME:**

Upon completion of the course, the students will be able to:

- Find scientific, technological, economic and political solutions to environmental problems.
- Invent innovative solutions for pollutions to improve the quality of environment.
- Participate the conservation of natural resources to save earth.
- Promote sustainable development and understand the concept of green chemistry.
- Analyse the effects of human population and issues related to the environment and human health.

**SUBJECT CODE: 19MAT201**

**SUBJECT NAME: ENGINEERING MATHEMATICS - II**

**COURSE OUTCOME:**

After successfully completing the course, the student will have a good understanding of the following topics and their applications

- Higher order linear differential equations with constant coefficients and variable coefficient.
- Green's, Gauss divergence and Stoke's theorems – Verification and application.
- Analytic functions, conformal mapping and Bilinear transformation.
- Application of residue theorem for evaluation of real integrals on contour integral.
- Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

**SUBJECT CODE: 19PHT201**

**SUBJECT NAME: PHYSICS OF MATERIALS**

**COURSE OUTCOME:**

Upon completion of this course, the students will be able to:

- Knowledge on the thermal conductivity and their applications.
- Acquire knowledge on phase diagram, various microstructures and alloys.
- Get knowledge on materials characterization techniques.
- Have the potential applications of superconductors.
- Understand the basics of ceramics, composites and nanomaterials.

**SUBJECT CODE: 19GEE202**

**SUBJECT NAME: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**

**COURSE OUTCOME:**

Upon completion of the course, the students will be able to:

- Understand electric circuits and choose appropriate instruments for electrical measurement for a specific application.
- Understand the concept of different types of DC and AC machines.
- Identify the diode's usage as a rectifier, and Zener diode's usage as a voltage regulator and discuss the basic characteristics of BJT.
- Employ Boolean algebra to implement the combinational logic circuits.
- Discuss about Microprocessors, Microcontrollers and recognize their needs.
- Carry out basic home electrical works and appliances and measure the electrical quantities and soldering practice.

**SUBJECT CODE: 19MET201**

**SUBJECT NAME: ENGINEERING MECHANICS**

**COURSE OUTCOME:**

On successful completion of this course, The Students can able to:

- Understand the forces and its related laws of mechanics in static and dynamic conditions.
- Solve problems in engineering systems using the concept of static equilibrium.
- Solve problems involving frictional phenomena in machines.
- Solve the moment of inertia of any sections and masses for the structural members.
- Apply the different principles to study the motion of a body and analyze their constitutive equations.

**SUBJECT CODE: 19EEC201**

**SUBJECT NAME: TECHNICAL SKILL (AUTOCAD)**

**COURSE OUTCOME:**

On successful completion of this course, The Students can able to:

- Understand develop skill to use software to create 2D and 3D models.

**REGULATION: R2019**

**YEAR / SEMESTER: II / IV**

**SUBJECT CODE: 19MAT404**

**SUBJECT NAME: STATISTICS AND NUMERICAL METHODS**

**COURSE OUTCOME:**

After successfully completing the course, the students can:

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

**SUBJECT CODE: 19MET402**

**SUBJECT NAME: ENGINEERING METALLURGY**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Describe the phase diagram, microstructure and composition of the Iron-Iron carbon diagram.
- Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes.
- Identify the effect of alloying elements on ferrous and non-ferrous metals
- Summarize the properties and applications of non metallic materials.
- Explain the testing procedure to evaluate mechanical properties.

**SUBJECT CODE: 19MEE401**

**SUBJECT NAME: THERMAL ENGINEERING**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Identify the various components of IC engine and their process.
- Analyze the different properties of gas power cycles and apply in different Thermal engineering applications.
- Explain the formation of steam, steam nozzles and turbines.
- Find out the various flow parameters of air compressors.
- Describe the concepts of Refrigeration cycles and Air Conditioning systems.
- Conclude the value timing, port timing diagram of IC engine, Performance test on Petrol Engine, Diesel Engine and compressor and characteristics of fuels/Lubricates.

**SUBJECT CODE: 19MEE402**

**SUBJECT NAME: STRENGTH OF MATERIALS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Calculate the stress and strains in regular and composite structures subjected to axial loads.
- Analyze the importance of two dimensional stress systems and stresses in thin and thick cylinders.
- Draw the shear force diagram, bending moment diagram for beams subjected to different loading conditions. Evaluate the bending stress and shear stress distribution.

- Estimate the slope and deflection of beams and buckling loads of columns under different boundary conditions.
- Apply torsion equation in design of circular shafts and helical springs.
- Perform tension test, torsion test, impact test, hardness test, deflection test and spring test on given specimen.

**SUBJECT CODE: 19MEE403**

**SUBJECT NAME: COMPOSITE MATERIALS AND MECHANICS**

**COURSE OUTCOME:**

Upon the completion of this course the students will be able to:

- Apply knowledge of composite mechanical performance and manufacturing methods to a composites design project.
- Describe and evaluate the properties of fibre reinforcements, polymer matrix materials and commercial composites.
- Acquire the knowledge in metal matrix composites and its processing methods.
- Acquire the knowledge in ceramics matrix composites and its processing methods.
- Adequate Knowledge about the composite materials in industry.
- Perform tension test, compression test, impact test, hardness test and micro structure analysis on given specimen.

**SUBJECT CODE: 19MEE404**

**SUBJECT NAME: MANUFACTURING TECHNOLOGY-II**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Describe the fundamentals of metal cutting in machining operations.
- Identify the components of lathe and milling machine.
- Execute various machining processes such as shaping, milling and gear cutting.
- Select the process parameters in grinding operations, finishing operations and gear generations for the given material.
- Summarize numerical control of machine tools operations and write a part program.
- Perform gear cutting operations using milling machine, keyway cutting operation using shaping, Surface finishing operations using grinding machine, Gear hopping operations using hopping machine and CNC part programming.

**SUBJECT CODE: 19EEEC301**

**SUBJECT NAME: COMMUNICATIONSKILLS**

**COURSE OUTCOME:**

At the end of this course, learners will be able to:

- Improve vocabulary and express the same contextually.
- Communicate to his peer group properly and make presentations.
- Comprehend the general and technical text.
- Write simple paragraph and essay in any topic.
- Participate in group discussions expressing ideas relevantly, coherently and cogently.



**REGULATION: R2019**

**YEAR / SEMESTER: III / VI**

**SUBJECT CODE: 19MET601**

**SUBJECT NAME: FINITE ELEMENT ANALYSIS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Understand the use of the FEM to solve problems in Engineering.
- Solve one dimensional structural problems.
- Inspect two dimensional scalar variable structural and heat transfer problems.
- Discover the two dimensional axisymmetric problems.
- Analyze the problems involving isoparametric, numerical integration approach.

**SUBJECT CODE: 19MET602**

**SUBJECT NAME: DESIGN OF TRANSMISSION SYSTEMS**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Design of belt and rope drives.
- Recognize the design of spur and helical gear drives.
- Elaborate the design of bevel and worm gear drives.
- Draw the kinematic and ray diagrams for multi stage gear boxes.
- Apply the concepts of design to cams, brakes and clutches.

**SUBJECT CODE: 19MEE601**

**SUBJECT NAME: CAD/CAM**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Inspect the 2D and 3D transformations, clipping algorithm, Manufacturing models and metrics.
- Examine various CAD models, stages in geometric modeling.
- Summarize the different types of standard systems used in CAD.
- Distinguish the NC, CNC and DNC systems and explain their working principles.
- Illustrate the different types of techniques used in cellular manufacturing and FMS.
- Demonstrate manual part programming with G and M codes using CAM.

**SUBJECT CODE: 19MEE602**

**SUBJECT NAME: DYNAMICS OF MACHINERY**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Compute static and dynamic forces of mechanisms.
- Analyze the balancing masses and their locations of reciprocating and rotating masses.
- Conclude the frequency of free vibration.
- Evaluate the frequency of forced vibration and damping coefficient.
- Calculate the speed and lift of the governor and estimate the gyroscopic effect on ships and airplanes.
- Determine mass moment of inertia of mechanical element, governor effort and range sensitivity, natural frequency and damping coefficient, critical speeds of shafts, balancing mass of rotating and reciprocating masses.

**SUBJECT CODE: 19MEPX10**

**SUBJECT NAME: PROFESSIONAL ETHICS IN ENGINEERING**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Understand human values.
- Realize professional, ethical values and the knowledge of contemporary issues.
- Excel in competitive and challenging environment and contribute to industry through professional careers.
- Update and maintain the technical skills and continuing their education throughout their professional careers.
- Apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.

**SUBJECT CODE: 19CEOX04**

**SUBJECT NAME: RENEWABLE ENERGY RESOURCES**

**COURSE OUTCOME:**

Upon the completion of this course the students will be able to

- Gain knowledge on solar equipment like dryer, furnace, water heater, pump using solar energy.
- Design wind power plants using vertical and horizontal axis turbine.
- Construct different biogas plant using biomass resources.
- Implement new ideas like fuel cell technology, OTEC, tidal and wave energy.
- Analyze the appropriate kinds of energy for future development

**SUBJECT CODE: 19MEJ601**

**SUBJECT NAME: MINI PROJECT**

**COURSE OUTCOME:**

At the end of the course, the students will be able to:

- Design and fabricate the machine element or the mechanical product.
- Demonstrate the working model of the machine element or the mechanical product

**SUBJECT CODE: 19MDC601**

**SUBJECT NAME: CONSTITUTION OF INDIA**

**COURSE OUTCOMES:**

At the end of the course the student will be able to

- Understand the Salient features and characteristics of the Constitution of India.
- Analyze the scheme of the Fundamental rights and Duties.
- Evaluate in detail the powers between the Union and the States.
- Know the concept of Constitutional Powers.
- Recognize other constitutional functionaries.

**REGULATION: R2017**

**YEAR / SEMESTER: IV/ VIII**

**SUBJECT CODE: MG8591**

**SUBJECT NAME: PRINCIPLES OF MANAGEMENT**

**COURSE OUTCOME:**

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

**SUBJECT CODE: ME8094**

**SUBJECT NAME: COMPUTER INTEGRATED MANUFACTURING SYSTEMS**

**COURSE OUTCOME:**

- CO1 Explain the basic concepts of CAD, CAM and computer integrated manufacturing systems
- CO2 Summarize the production planning and control and computerized process planning
- CO3 Differentiate the different coding systems used in group technology
- CO4 Explain the concepts of flexible manufacturing system (FMS) and automated guided vehicle (AGV) system
- CO5 Classification of robots used in industrial applications

**SUBJECT CODE: ME8811**

**SUBJECT NAME: PROJECT WORK**

**COURSE OUTCOME:**

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



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## ODD SEMESTER

**Department of Civil Engineering**

**Master of Structural Engineering**

**REGULATION: R2021**

**YEAR / SEMESTER: I / I**

**SUBJECT CODE: 21PSM101**

**SUBJECT NAME: ADVANCED MATHEMATICS FOR STRUCTURAL ENGINEERING**

### **COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Apply Laplace and Fourier transforms to initial value, initial–boundary value and boundary value problems in Partial Differential Equations.
- Differentiate maximize and minimize the functional that occur in various branches of engineering disciplines.
- Construct conformal mappings between various domains and use of conformal mapping in studying problems in physics and engineering particularly to fluid flow and heat flow problems.
- Classify tensor algebra and its applications in applied sciences and engineering and develops ability to solve mathematical problems involving tensors.
- Use Numerical integration and tensor analysis as a tool in the field of applied sciences and related fields.

**SUBJECT CODE: 21PGT101**

**SUBJECT NAME: RESEARCH METHODOLOGY AND IPR**

### **COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Formulate research problems.
- Carry out research analysis.
- Write technical papers/presentations.
- Understand that today's world is controlled by Computer, Information Technology, but tomorrow the world will be ruled by ideas, concepts, and creativity.
- Understand about IPR and filing patents in R & D.

**SUBJECT CODE: 21PST101**

**SUBJECT NAME: APPLIED ELASTICITY AND PLASTICITY**

### **COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Analyze the stresses and strains.
- Obtain solutions for elasticity problems in Cartesian coordinates.
- Interpret the induced stress in the two dimensional problems in polar coordinates.
- Analyze the beams and columns using energy methods.
- Obtain deformations by applying plasticity theory.

**SUBJECT CODE: 21PST102**

**SUBJECT NAME: FINITE ELEMENT ANALYSIS AND METHODS**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Understand the energy principles and finite element concepts.
- Apply the knowledge on element properties to solve various problems.
- Execute finite element analysis concept in one dimensional element problems.
- Apply the finite element analysis concept in two and three dimensional element problems.
- Analyze the framed structures.

**SUBJECT CODE: 21PSE101**

**SUBJECT NAME: EXPERIMENTAL TECHNIQUES**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Perform force and strain measurement by selecting appropriate tools and technique.
- Use various vibration measuring instruments and analyze the structures using digital display unit.
- Apply model analysis as an effective experimental technique.
- Measure distress in the structures using various electronic equipments.
- Perform advanced NDT methods in accessing the load testing of structures.
- Perform NDT testing on concrete.

**SUBJECT CODE: 21PSP103**

**SUBJECT NAME: ADVANCES IN CONCRETE STRUCTURES (Professional Elective I)**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Explain the behaviour and design concept of reinforced concrete members.
- Design slender columns, R.C. walls and corbels.
- Design flat slab and flat plates according to ACI methods.
- Apply moment redistribution in continuous beams.
- Design and detail Fire Resistant buildings

**REGULATION: R2019**

**YEAR / SEMESTER: II / III**

**SUBJECT CODE: 19PST301**

**SUBJECT NAME: EARTHQUAKE ANALYSIS AND DESIGN OF STRUCTURES**

**COURSE OUTCOMES:**

- At the end of this course the students will be able to understand the causes and effect of earthquake.
- They will be able to design masonry and RC structures to the earthquake forces as per the recommendations of IS codes of practice.

**SUBJECT CODE: 19PSP302**

**SUBJECT NAME: DESIGN OF SUB STRUCTURES (Professional Elective IV)**

**COURSE OUTCOMES:**

- On completion of this course students will be able to select appropriate foundation type based on available soil conditions.
- They will be in a position to determine the load carrying capacity of each type of foundation.
- They will gain thorough knowledge about the design of reinforced concrete shallow foundations, pile foundations, well foundations, and machine foundations.

**SUBJECT CODE: 19PSP304**

**SUBJECT NAME: DESIGN OF STEEL CONCRETE COMPOSITE STRUCTURES**

**COURSE OUTCOMES:**

- At the end of this course students will be in a position to design composite beams, columns, trusses and box-girder bridges including the related connections.
- They will get exposure on case studies related to steel-concrete constructions of buildings.

**SUBJECT CODE: 19PSE301**

**SUBJECT NAME: PRACTICAL TRAINING - II (2 Weeks)**

**COURSE OUTCOMES:**

- They are trained in tackling a practical field/industry orientated problem related to Structural Engineering.

**SUBJECT CODE: 19PSE302**

**SUBJECT NAME: SEMINAR**

**COURSE OUTCOMES:**

- The students will be trained to face an audience and to tackle any problem during group discussion in the Interviews.

**SUBJECT CODE: 19PSJ301**

**SUBJECT NAME: PROJECT WORK (PHASE - I)**

**COURSE OUTCOMES:**

- At the end of the course the students will have a clear idea of his/her area of work and they are in a position to carry out the remaining phase II work in a systematic way.



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## EVEN SEMESTER

**Department of Civil Engineering**

**Master of Structural Engineering**

**REGULATION: R2021**

**YEAR / SEMESTER: I / II**

**SUBJECT CODE: 21PST201**

**SUBJECT NAME: ADVANCES IN STEEL STRUCTURES**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Understand various design philosophies as per various international codes.
- Design the steel members such as purlins, gable wind girders, base plates subjected to combined forces.
- Explain and design the different types of steel connections such as welded, bolted and moment resisting connections.
- Design high rise steel structures subjected to wind load.
- Design of steel structures for fire, fatigue and understand the principles of earthquake resistant design.

**SUBJECT CODE: 21PST202**

**SUBJECT NAME: STRUCTURAL DYNAMICS AND SEISMIC DESIGN**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Understand the elements of vibratory systems and its importance in analysis.
- Apply the equation of motion to two degree of freedom systems.
- Analyze dynamic response by direct integration method.
- Describe ground motion and its relationship to seismic design of structures.
- Apply the basic principles of conceptual design for earthquake resistant RC building.

**SUBJECT CODE: 21PSE201**

**SUBJECT NAME: ADVANCES IN CONCRETE TECHNOLOGY**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Find out the properties of fresh and hardened concrete.
- Design the concrete mix by various methods.
- Understand various testing of concrete and stress strain characteristics as per IS Code.
- Choose the correct concrete methods in the field depending upon the requirement and site conditions.
- Use suitable concrete for different structures considering the prevailing weathering conditions.
- Perform casting and testing in structural members.

**SUBJECT CODE: 21PSP205**

**SUBJECT NAME: PRE-STRESSED CONCRETE STRUCTURES (Professional Elective II)**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Analyze the pre-stressed concrete element using various methods.
- Design pre-stressed concrete flexural members.
- Design profiles for pre-stressed continuous beams.
- Design pre-stressed tension and compression members as per codal recommendations.
- Design pre-stressed concrete bridges as per IRC specifications

**SUBJECT CODE: 21PSP209**

**SUBJECT NAME: COMPUTER AIDED DESIGN OF STRUCTURES (Professional Elective III)**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Draft 2 D drawings using drafting software.
- Perform structural analysis using analysis package.
- Design the structures with computer methodologies.
- Optimize the structural design with various computer packages and graphics.
- Apply artificial intelligence to real life applications.

**SUBJECT CODE: 21PGO205**

**SUBJECT NAME: DIGITAL MARKETING**

**COURSE OUTCOME:**

Upon the completion of course, the students should be able to

- Acquaint the learners to create a structured digital marketing plan and budget.
- Identify the correct measure to set objectives and evaluate digital marketing,
- Review and prioritize the strategic options for boosting customer acquisition, conversion, and retention using digital marketing.
- Aware of Search engine optimizations.
- Understand the web analytics.

**SUBJECT CODE: 21PEE201**

**SUBJECT NAME: MINI PROJECT**

**COURSE OUTCOMES:**

At the end of the course project the students will have a clear idea of his/her area of work in Plan a layout of a structure, calculate loads using IS codes and various computational tools, Analyze the structure for various loads and load combination according to the relevant IS codes, design and detail structures using computer software/tools and check the correctness using manual approximate methods and prepare the complete structural drawings using computer software.



**REGULATION: R2019**

**YEAR / SEMESTER: II / IV**

**SUBJECT CODE: 19PSE401**

**SUBJECT NAME: PRACTICAL TRAINING – III (2 Weeks)**

**COURSE OUTCOMES:**

- They are trained in tackling a practical field/industry orientated problem related to Structural Engineering.

**SUBJECT CODE: 19PSJ401**

**SUBJECT NAME: PROJECT WORK (PHASE - II)**

**COURSE OUTCOMES:**

- On completion of the project work students will be in a position to take up any challenging practical problem and find better solutions.



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**TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU**



## Department of Computer Science and Engineering M.E CSE

**REGULATION: R2021**

**YEAR / SEMESTER: I / I**

**SUBJECT CODE: 21PCM101**

**SUBJECT NAME: APPLIED MATHEMATICS FOR COMPUTER SCIENCE**

### **COURSE OUTCOMES:**

After completing this course, students should be able to:

- Find the inference of the samples by using various methods in testing of hypothesis.
- Interpret variances by design of experiments to obtain inferences.
- Use the concept of Estimation theory.
- Apply logical thinking and its applications to computer science.
- Conceptualize sequential structures, tree structures, and graph structures and its applications.

**SUBJECT CODE: 21PGT101**

**SUBJECT NAME: RESEARCH METHODOLOGY AND IPR**

### **COURSE OUTCOMES**

After completing this course, students should be able to:

- Formulate research problem.
- Carry out research analysis.
- Follow research ethics.
- Understand that today's world is controlled by Computer, Information Technology, buttomorrow world will be ruled by ideas, concept, and creativity.
- Understand about IPR and filing patents in R & D.

**SUBJECT CODE: 21PCT101**

**SUBJECT NAME: MACHINE LEARNING TECHNIQUES**

### **COURSE OUTCOMES**

After completing this course, students should be able to:

- Study the software architecture and its quality attributes.
- Discuss and apply backpropogation algorithm for machine learning applications.
- Discuss the genetic algorithms for various problems.
- Suggest set of rules for machine learning.
- Design systems that uses appropriate graph models of machine learning.

**SUBJECT CODE: 21PCT102**

**SUBJECT NAME: WEB ENGINEERING**

**COURSE OUTCOMES:**

After completing this course, students should be able to:

- Explain the characteristics of web applications.
- Model web applications.
- Design web applications.
- Test web applications.
- Be aware of Systematic design methods.

**SUBJECT CODE: 21PCE101**

**SUBJECT NAME: ADVANCED DATA STRUCTURES AND ALGORITHMS**

**COURSE OUTCOMES:**

After completing this course, students should be able to:

- Design data structures and algorithms to solve computing problems.
- Design algorithms using graph structure and various string matching algorithms to solve real-life problems.
- Apply suitable design strategy for problem solving.
- Select and design data structures and algorithms that is appropriate for problems.
- Analyze the NP problems.
- Apply various algorithms in programming.

**SUBJECT CODE: 21PEE101**

**SUBJECT NAME: RESEARCH PAPER WRITING AND SEMINAR**

**COURSE OUTCOMES:**

**NIL**

**SUBJECT CODE: 21PCP101**

**SUBJECT NAME: ADVANCED DATABASES**

**COURSE OUTCOMES:**

After completing this course, students should be able to:

- The students will be able to Comprehend the various database revolution.
- Work with NoSQL databases to analyze the big data for useful business.
- Applications Analyze the different data models based on data representation methods and storage needs.
- Design and develop using application programming interface with SQL and NoSQL databases.
- Discover the survey on future generation databases.

**REGULATION: R2019**

**YEAR / SEMESTER: II / III**

**SUBJECT CODE: 19PCP315**

**SUBJECT NAME: INFORMATION STORAGE MANAGEMENT**

**COURSE OUTCOMES:**

Students will be able to

- Identify the need for performance evaluation and the metrics used for it.
- Distinguish between open and closed queuing networks.
- Use Little's law and other operational laws.
- Apply the operational laws to open and closed systems.
- Use discrete-time and continuous-time Markov chains to model real world systems.
- Develop analytical techniques for evaluating scheduling policies.

**SUBJECT CODE: 19PCP305**

**SUBJECT NAME: SOFTWARE QUALITY ASSURANCE AND TEST**

**COURSE OUTCOMES:**

This course equips the student to

- Perform functional and nonfunctional tests in the life cycle of the software product.
- Understand system testing and test execution process.
- Identify defect prevention techniques and software quality assurance metrics.
- Apply techniques of quality assurance for typical applications.

**SUBJECT CODE: 19PCP307**

**SUBJECT NAME: EMBEDDED SOFTWARE DEVELOPMENT**

**COURSE OUTCOMES:**

- Understand different architectures of embedded processor, microcontroller and peripheral devices. Interface memory and peripherals with embedded systems.
- Work with embedded network environment.
- Understand challenges in Real time operating systems.
- Design and analyze applications on embedded systems.

**SUBJECT CODE: 19PCJ301**

**SUBJECT NAME: Project Work Phase – I**

**COURSE OUTCOMES:**

- Identify a specific problem for the current need of the society and collecting information related to the same through detailed review of articles.
- Develop the skills to formulate a technical project.
- Test and validate the results obtained through conformance.
- Prepare project reports and to face reviews and viva voce examination.
- Take up any challenging practical problems and find the solution by formulating proper methodology.



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**TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU**

**EVEN SEMESTER**

**Department of Computer Science and Engineering**

**M.E CSE**



**REGULATION: R2019**

**YEAR / SEMESTER: I / II**

**SUBJECT CODE: 21PCT201**

**SUBJECT NAME: ADVANCED SOFT COMPUTING**

**COURSE OUTCOMES:**

After completing this course, students should be able to:

- Apply suitable soft computing techniques for various applications.
- Integrate various soft computing techniques for complex problems.
- Analyze and integrate various soft computing techniques.
- Solve problems effectively and efficiently.
- Parameterize various problems to be solved.

**SUBJECT CODE: 21PCT202**

**SUBJECT NAME: INDUSTRIAL IoT**

**COURSE OUTCOMES:**

After completing this course, students should be able to:

- Analyze various protocols for IoT.
- Develop web services to access/control IoT devices.
- Design a portable IoT using RaspberryPi.
- Deploy an IoT application and connect to the cloud.
- Analyze applications of IoT in real time scenario.

**SUBJECT CODE: 21PCE201**

**SUBJECT NAME: DATA SCIENCE AND ANALYTICS**

**COURSE OUTCOMES:**

After completing this course, students should be able to:

- Study the importance of Data Science.
- Use different tools and techniques for analysis.
- Study Classification and Clustering methods.
- Solve data analytical problems using Python.
- Solve exploratory data analytical problems using Python.
- Do sentiment analysis using python and R.

**SUBJECT CODE: 21PEE201**

**SUBJECT NAME: MINI PROJECT**

**COURSE OUTCOMES:**

After completing this course, students should be able to:

- Identify a specific problem for the current need of the society and collecting information related to the same through detailed review of articles.
- Develop the skills to formulate a technical project.
- Test and validate the results obtained through conformance.
- Prepare project reports and to face reviews and viva voce examination.
- Take up any challenging practical problems and find the solution by formulating proper methodology.

**SUBJECT CODE 21PCP205**

**SUBJECT NAME: SOFTWARE ARCHITECTURES AND DESIGN**

**COURSE OUTCOMES:**

After completing this course, students should be able to:

- Capable of understanding the architectural requirements.
- Ability to identify the structure of architecture.
- Develop a proper documentation regarding architecture .
- Pick out right architectural style for the given problem.
- Ability to generate multiple architectures for given problem

**SUBJECT CODE: 21PCP210**

**SUBJECT NAME: SOFTWARE QUALITY ASSURANCE AND TESTING**

**COURSE OUTCOMES:**

After completing this course, students should be able to:

- Perform functional and nonfunctional tests in the life cycle of the software product.
- Understanding the role of system Testing.
- Understand system testing and test execution process.
- Identify defect prevention techniques and software quality assurance metrics.
- Apply techniques of quality assurance for typical applications.

**REGULATION: R2019**

**YEAR / SEMESTER: II / IV**

**SUBJECT CODE: 19PCJ401**

**SUBJECT NAME: PROJECT WORK(PHASE – II)**

**COURSE OUTCOMES:**

The students completing the course will have

- Develop the ability to solve a specific problem till the successful solution of the same.
- Utilize new tools, algorithms and mechanisms that contribute to obtain the solution.
- Test and validate the results obtained through conformance.
- Prepare project report and to face reviews and viva voce examination.
- Take up any challenging practical problems and find the solution by formulating proper methodology.



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**TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU**



## ODD SEMESTER

## M.E VLSI DESIGN

### Department of Electronics and Communication Engineering

**REGULATION: R2021**

**YEAR / SEMESTER: I / I**

**SUBJECT CODE: 21PVM101**

**SUBJECT NAME: GRAPH THEORY AND OPTIMIZATION TECHNIQUES**

#### **COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- The basic concepts of graphs, different types of graphs and properties of Trees.
- The properties, theorems and be able to prove theorems.
- Apply suitable graph model and algorithm for solving applications.
- Solve optimization problems using Linear Programming methods.
- Apply integer programming and linear programming to solve real-life applications.

**SUBJECT CODE: 21PGT101**

**SUBJECT NAME: RESEARCH METHODOLOGY AND IPR**

#### **COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Formulate research problems.
- Carry out research analysis.
- Write technical papers/presentations.
- Understand that today's world is controlled by Computer, Information Technology, buttomorrow the world will be ruled by ideas, concepts, and creativity.
- Understand about IPR and filing patents in R & D.

**SUBJECT CODE: 21PVT101**

**SUBJECT NAME: DEVICE MODELING**

#### **COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Extend in depth knowledge in various characteristics of MOS Transistors..
- Analyze complex MOS device structures.
- Solve engineering problems with wide range of solutions in different MOSFET technologies.
- Identify the characteristics of MOSFET in dynamic operation.
- Apply appropriate techniques, resources and tools to engineering activities in modelling MOS structures.

**SUBJECT CODE: 21PVT102**

**SUBJECT NAME: SYSTEM DESIGN USING FPGA**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Design and manually optimize complex combinational and sequential digital circuits.
- Model combinational and sequential digital circuits by Verilog HDL.
- Design of FPGA based systems, digital networks, architectures and large systems.
- Demonstrate various aspects in Large Scale Digital Systems design.
- Impart knowledge of interfacing and display modules.

**SUBJECT CODE: 21PVE101**

**SUBJECT NAME: CMOS DIGITAL VLSI DESIGN**

**COURSE OUTCOMES:**

At the end of the course, the students will be able to:

- Use mathematical methods and circuit analysis models in analysis of CMOS digital circuits.
- Create models of moderately sized static CMOS combinational circuits that realize specified digital functions and to optimize combinational circuit delay using RC delay models and logic effort.
- Design sequential logic at the transistor level and compare the tradeoffs of sequencing elements including flip-flops, transparent latches.
- Understand design methodology of arithmetic building blocks.
- Apply the knowledge of CMOS in various clocking strategies processes.
- Map into the FGPA platform and carry out a serious of validation design

**SUBJECT CODE: 21PVPX01**

**SUBJECT NAME: LOW POWER VLSI DESIGN**

**COURSE OUTCOMES:**

At the end of this course, the students should be able to:

- Know the basics and advanced techniques in low power design.
- Design of low power VLSI optimized circuits.
- Implement suitable techniques of low power CMOS circuits.
- The reduction in power estimation by an IC earns a lot including reduction in size, costand etc.
- Understand synthesis and software design of low power.



**REGULATION: R2019**

**YEAR / SEMESTER: II / III**

**SUBJECT CODE: 19PVT301**

**SUBJECT NAME: ANALOG TO DIGITAL INTERFACES**

**COURSE OUTCOMES:**

- To be able to design Analog to Digital and Digital to Analog data converters based on data precision requirements

**SUBJECT CODE: 19PVPX13**

**SUBJECT NAME: SELECTED TOPICS IN ASIC DESIGN**

**COURSE OUTCOMES:**

After completing this course:

- The student would have gained knowledge in the circuit design aspects at the next transistor and block level abstractions of FPGA and ASIC design. In combination with the course on CAD for VLSI, the student would have gained sufficient theoretical knowledge for carrying out FPGA and ASIC designs.

**SUBJECT CODE: 19PVPX20**

**SUBJECT NAME: SELECTED TOPICS IN IC DESIGN**

**COURSE OUTCOMES:**

- This course provides the essential know how to a designer to construct Supply reference circuits and Clock Generation Circuits for given design specifications and aids the designer to understand the design specifications related to Supply and Clock Generation Circuits.

**SUBJECT CODE: 19PVJ301**

**SUBJECT NAME: PROJECT WORK PHASE - I**

**COURSE OUTCOMES:**

- At the end of the course the students will have a clear idea of his/her area of work and they are in a position to carry out the remaining phase II work in a systematic way.



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## EVEN SEMESTER

**REGULATION: R2021**

**YEAR / SEMESTER: I / II**

**SUBJECT CODE: 21PVT201**

**SUBJECT NAME: TESTING OF VLSI CIRCUITS**

**COURSE OUTCOME:**

At the end of this course, the students should be able to:

- Discuss test algorithms.
- Understand Verilog HDL coding.
- Prepare design for testability.
- Design test generation.
- Explain fault diagnosis.

**SUBJECT CODE: 21PVT202**

**SUBJECT NAME: CAD FOR VLSI CIRCUITS**

**COURSE OUTCOME:**

At the end of this course, the students should be able to:

- Understand VLSI design methodologies.
- Design layout, placement and partitioning.
- Outline floor planning and routing.
- Explain Simulation and Logic Synthesis.
- Discuss the hardware models for high level synthesis.

**SUBJECT CODE: 21PVE201**

**SUBJECT NAME: ANALOG IC DESIGN**

**COURSE OUTCOME:**

At the end of this course, the students should be able to:

- Study the performance characteristics of MOSFET Metrics.
- Understand single stage and Two stage Amplifiers.
- Analyze of single stage and multistage MOS amplifier frequency responses.
- Understand current mirrors and reference circuits.
- Design MOS single stage, multistage amplifiers and OPAMP for desired frequencies.
- Known the simulated concepts of small signal parameters.

**SUBJECT CODE: 21PVP201**

**SUBJECT NAME: VLSI SIGNAL PROCESSING**

**COURSE OUTCOME:**

At the end of this course, the students should be able to:

- Know the pipelining and parallel processing of digital filters.
- Apply the concept of pipelining, retiming and parallel processing in design of high-speed low power applications.

- Apply unfolding, folding and fast convolution in the design of VLSI architecture
- Built the bit-level arithmetic architectures..
- Employ the algorithmic strength reduction techniques to VLSI implementation of filters.

**SUBJECT CODE: 21PVP208**

**SUBJECT NAME: NETWORKS ON CHIP**

**COURSE OUTCOME:**

At the end of this course, the students should be able to:

- Know the NOC and switching techniques.
- Compare different architecture design.
- Discuss different routing algorithms.
- Recognize test and fault tolerance of NOC.
- Appraise three-dimensional integration of network-on-chip.

**SUBJECT CODE: 21PGO205**

**SUBJECT NAME: DIGITAL MARKETING**

**COURSE OUTCOME:**

Upon the completion of course, the students should be able to

- Acquaint the learners to create a structured digital marketing plan and budget.
- Identify the correct measure to set objectives and evaluate digital marketing,
- Review and prioritize the strategic options for boosting customer acquisition, conversion, and retention using digital marketing.
- Aware of Search engine optimizations.
- Understand the web analytics.

**SUBJECT CODE: 21PEE201**

**SUBJECT NAME: MINI PROJECT**

**COURSE OUTCOME:**

- At the end of the course project the students will understand the formulated industry / technical / societal problems. Analyze and / or develop models for providing solution to industry / technical / societal problems. Interpret and arrive at conclusions from the project carried out. Demonstrate effective communication skills through oral presentation. Engagein effective written communication through project report.

**REGULATION: R2019**

**YEAR / SEMESTER: II / IV**

**SUBJECT CODE: 19PVJ401**

**SUBJECT NAME: PROJECT WORK PHASE - II**

**COURSE OUTCOMES:**

- At the end of the course the students will have a clear idea of his/her area of work and they are in a position to carry out the remaining phase II work in a systematic way.



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**TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU**

**ODD SEMESTER**



**Department of Master of Business Administration**

**REGULATION: R2021**

**YEAR / SEMESTER: I / I**

**SUBJECT CODE: 21BAT101**

**SUBJECT NAME: ECONOMIC ANALYSIS FOR BUSINESS**

**COURSE OUTCOMES:**

On Completion of this course, the student will be able to:

- Students are expected to become familiar with both principles of micro and macro economics.
- Students become familiar with market equilibrium and elasticity of demand and supply.
- Discuss about different market structure and price determination
- Enabling the importance of Macroeconomic activities
- Understanding inflation and unemployment and its impact.

**SUBJECT CODE: 21BAT102**

**SUBJECT NAME: PRINCIPLES OF MANAGEMENT**

**COURSE OUTCOMES:**

**On Completion of this course, the student will be able to:**

- Describe and discuss the elements of effective management
- Discuss and apply the planning, decision making processes,
- Describe various activities related to organizing and recruitment processes.,
- Communicate effectively through both oral and written presentation.
- Familiarize with control mechanism of an organization.

**SUBJECT CODE: 21BAT103**

**SUBJECT NAME: ACCOUNTING FOR MANAGEMENT**

**COURSE OUTCOMES:**

**On Completion of this course, the student will be able to:**

- Possess a managerial outlook at accounts.
- Understanding kinds of accounts and its maintenance.
- Illustrating financial statements.
- Discuss about different kinds of cost.
- Familiarized with computerized accounting environment.

**SUBJECT CODE: 21BAT104**

**SUBJECT NAME: LEGAL ASPECTS OF BUSINESS**

**COURSE OUTCOMES:**

**On Completion of this course, the student will be able to:**

- Legal insight will be established in the business practices according to the situation of changing environment.
- Understanding the major principles of company law .
- Enabling the importance of Industrial law.
- Illustrating GST and its implications.
- Know the concept of Consumer protection and cyber law.

**SUBJECT CODE: 21BAT105**

**SUBJECT NAME: ORGANIZATIONAL BEHAVIOUR**

**COURSE OUTCOMES:**

On Completion of this course, the student will be able to:

- Better understanding of human behavior in organization.
- Know the framework for managing individual performance.
- Evaluate the importance and influence of groups in an organization
- Know the importance and types of leadership and impact of power and politics.
- Understanding the factors affecting organizational climate and importance of change in organization

**SUBJECT CODE: 21BAT106**

**SUBJECT NAME: STATISTICS FOR MANAGEMENT**

**COURSE OUTCOMES:**

**On Completion of this course, the student will be able to:.**

- Understanding the basic definition and rules for Probability
- Use the concept of Estimation theory.
- Interpret the difference between different parametric test
- Frame the hypothesis for non parametric test.
- Apply different kind of correlation and identify standard error of estimate.

**SUBJECT CODE: 21BAT107**

**SUBJECT NAME: TOTAL QUALITY MANAGEMENT**

**COURSE OUTCOMES:**

**On Completion of this course, the student will be able to:**

- Apply quality philosophies and tools to facilitate continuous improvement and ensure customer delight.
- Understanding different principles and philosophies of quality
- Construct and Apply statistical process control chart for variables and attributes.
- Discuss about tools and techniques for Quality management.
- Understanding different kind of quality systems for organizations

**SUBJECT CODE: 21BAE101**

**SUBJECT NAME: SPOKEN AND WRITTEN COMMUNICATION**

**COURSE OUTCOMES:**

**Learners should be able to:**

- Get into the habit of writing regularly.
- Speak confidently with any speakers of English, including native speakers
- Speak effortlessly in different contexts - informal and formal.
- Write articles, case studies and different kind stories.
- Express themselves in different genres of writing from creative to critical to factual writing.

**REGULATION: R2019**

**YEAR / SEMESTER: II / III**

**SUBJECT CODE: 19BAT301**

**SUBJECT NAME: INTERNATIONAL BUSINESS MANAGEMENT**

**COURSE OUTCOMES:**

- Students would be familiar with global business environment, global strategic management practices and get acquainted with functional domain practices.
- Students would be familiar with conflicts situations and ethical issues in global business.

**SUBJECT CODE: 19BAT302**

**SUBJECT NAME: STRATEGIC MANAGEMENT**

**COURSE OUTCOMES:**

- This Course will create knowledge and understanding of management concepts principles and skills from a people, finance, marketing and organisational perspectives the development of appropriate organisational policies and strategies within a changing context to meet stakeholder interests information systems to learn from failure key tools and techniques for the analysis and design of information systems, including their human and organisational as well as technical aspects.

**SUBJECT CODE: 19BATM04**

**SUBJECT NAME: INTEGRATED MARKETING COMMUNICATION**

**COURSE OUTCOMES:**

- Insight into the importance of advertising and sales promotion campaigns planning and objective setting in relation to consumer decision making processes.

**SUBJECT CODE: 19BATM05**

**SUBJECT NAME: RETAIL MARKETING**

**COURSE OUTCOMES:**

- To manage the retail chains and understand the retail customers behavior

**SUBJECT CODE: 19BATM06**

**SUBJECT NAME: SERVICES MARKETING**

**COURSE OUTCOMES:**

- Will be able to apply the concepts of services marketing in promoting services.

**SUBJECT CODE: 19BATF04**

**SUBJECT NAME: MERCHANT BANKING AND FINANCIAL SERVICES**

**COURSE OUTCOMES:**

- Good knowledge on merchant banking activities

**SUBJECT CODE: 19BATF05**

**SUBJECT NAME: SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT**

**COURSE OUTCOMES:**

- Become a good investment analyst

**SUBJECT CODE: 19BATF07**

**SUBJECT NAME: INTERNATIONAL TRADE FINANCE**

**COURSE OUTCOMES:**

- Possess good knowledge on international trade and the documentation involved in it.

**SUBJECT CODE: 19BATH01**

**SUBJECT NAME: ENTREPRENEURSHIP DEVELOPMENT**

**COURSE OUTCOMES:**

- Students will gain knowledge and skills needed to run a business.

**SUBJECT CODE: 19BATH02**

**SUBJECT NAME: INDUSTRIAL RELATIONS AND LABOUR WELFARE**

**COURSE OUTCOMES:**

- Students will know how to resolve industrial relations and human relations problems and promote welfare of industrial labour.

**SUBJECT CODE: 19BATH04**

**SUBJECT NAME: MANAGERIAL BEHAVIOUR AND EFFECTIVENES**

**COURSE OUTCOMES:**

- Students will gain knowledge about appropriate style of managerial behaviour.

**SUBJECT CODE: 19BATO04**

**SUBJECT NAME: PROJECT MANAGEMENT**

**COURSE OUTCOMES:**

- To apply project management principles in business situations to optimize resource utilization and time optimization.

**SUBJECT CODE: 19BATO05**

**SUBJECT NAME: SERVICES OPERATIONS MANAGEMENT**

**COURSE OUTCOMES:**

- To design and operate a service business using the concepts, tools and techniques of service operations management.

**SUBJECT CODE: 19BATO06**

**SUBJECT NAME: SUPPLY CHAIN MANAGEMENT**

**COURSE OUTCOMES:**

- Ability to build and manage a competitive supply chain using strategies, models, techniques and information technology.



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## EVEN SEMESTER

**REGULATION: R2021**

**YEAR / SEMESTER: I / II**

**SUBJECT CODE: 21BAT101**

**SUBJECT NAME: ECONOMIC ANALYSIS FOR BUSINESS**

**COURSE OUTCOMES:**

On Completion of this course, the student will be able to:

- Students are expected to become familiar with both principles of micro and macro economics.
- Students become familiar with market equilibrium and elasticity of demand and supply.
- Discuss about different market structure and price determination
- Enabling the importance of Macroeconomic activities
- Understanding inflation and unemployment and its impact.

**SUBJECT CODE: 21BAT102**

**SUBJECT NAME: PRINCIPLES OF MANAGEMENT**

**COURSE OUTCOMES:**

**On Completion of this course, the student will be able to:**

- Describe and discuss the elements of effective management
- Discuss and apply the planning, decision making processes,
- Describe various activities related to organizing and recruitment processes.,
- Communicate effectively through both oral and written presentation.
- Familiarize with control mechanism of an organization.

**SUBJECT CODE: 21BAT103**

**SUBJECT NAME: ACCOUNTING FOR MANAGEMENT**

**COURSE OUTCOMES:**

**On Completion of this course, the student will be able to:**

- Possess a managerial outlook at accounts.
- Understanding kinds of accounts and its maintenance.
- Illustrating financial statements.
- Discuss about different kinds of cost.
- Familiarized with computerized accounting environment.

**SUBJECT CODE: 21BAT104**

**SUBJECT NAME: LEGAL ASPECTS OF BUSINESS**

**COURSE OUTCOMES:**

**On Completion of this course, the student will be able to:**

- Legal insight will be established in the business practices according to the situation of changing environment.
- Understanding the major principles of company law .
- Enabling the importance of Industrial law.
- Illustrating GST and its implications.
- Know the concept of Consumer protection and cyber law.



**SUBJECT CODE: 21BAT105**

**SUBJECT NAME: ORGANIZATIONAL BEHAVIOUR**

**COURSE OUTCOMES:**

On Completion of this course, the student will be able to:

- Better understanding of human behavior in organization.
- Know the framework for managing individual performance.
- Evaluate the importance and influence of groups in an organization
- Know the importance and types of leadership and impact of power and politics.
- Understanding the factors affecting organizational climate and importance of change in organization

**SUBJECT CODE: 21BAT106**

**SUBJECT NAME: STATISTICS FOR MANAGEMENT**

**COURSE OUTCOMES:**

**On Completion of this course, the student will be able to:**

- Understanding the basic definition and rules for Probability
- Use the concept of Estimation theory.
- Interpret the difference between different parametric test
- Frame the hypothesis for non parametric test.
- Apply different kind of correlation and identify standard error of estimate.

**SUBJECT CODE: 21BAT107**

**SUBJECT NAME: TOTAL QUALITY MANAGEMENT**

**COURSE OUTCOMES:**

**On Completion of this course, the student will be able to:**

- Apply quality philosophies and tools to facilitate continuous improvement and ensure customer delight.
- Understanding different principles and philosophies of quality
- Construct and Apply statistical process control chart for variables and attributes.
- Discuss about tools and techniques for Quality management.
- Understanding different kind of quality systems for organizations

**SUBJECT CODE: 21BAE101**

**SUBJECT NAME: SPOKEN AND WRITTEN COMMUNICATION**

**COURSE OUTCOMES:**

**Learners should be able to:**

- Get into the habit of writing regularly.
- Speak confidently with any speakers of English, including native speakers
- Speak effortlessly in different contexts - informal and formal.
- Write articles, case studies and different kind stories.
- Express themselves in different genres of writing from creative to critical to factual writing.



# SENGUNTHAR ENGINEERING COLLEGE (AUTONOMOUS)

(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)  
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956  
NAAC Accredited with 'A' Grade

TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU



## Department of Civil Engineering

### B.E. Civil Engineering

#### Program Outcomes(PO)

##### Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **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.
3. **Design/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.
4. **Conduct investigations 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.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
6. **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.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **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.
11. **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.
12. **Life-long 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.

### **Program Specific Outcome (PSOs)**

1. Ability to understand the fundamental concepts, analyze, design, develop, implement using mathematical foundations and domain knowledge for providing solutions to complex civil engineering problems by applying the new ideas and innovations.
2. Ability to work and communicate effectively in a team environment and foster the professional skills towards industrial and societal needs.
3. Ability to grasp the advancements in IT tools and creating a career path to become an entrepreneur, lifelong learner with moral values and ethics.

## M.E- Structural Engineering

### Program Outcomes(PO)

#### Engineering Graduates will be able to:

- 1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. 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.
- 3. Design/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.
- 4. Conduct investigations 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.
- 5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- 6. 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.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

- 10. 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.
- 11. 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.
- 12. Life-long 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.

#### **Program Specific Outcome (PSOs)**

1. Ability to design, develop and implement high quality solutions by applying IT tools for complex structural engineering problems.
2. Ability to work and communicate effectively in a team environment and foster the professional skills towards industrial and societal needs.
3. Ability to grasp the advancements in technologies and creating a career path to become an entrepreneur, lifelong learner with moral values and ethics.

### **Department of Computer Science and Engineering**

#### **B.E- Computer Science and Engineering**

#### **Program Outcomes(PO)**

##### **Engineering Graduates will be able to:**

- 1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. 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.

- 3. Design/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.
- 4. Conduct investigations 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.
- 5. 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.
- 6. 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.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. 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.
- 11. 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.
- 12. Life-long 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.

## **Program Specific Outcome (PSOs)**

1. Ability to understand the fundamental concepts, analyze, design, develop, implement using mathematical foundations and domain knowledge for providing computational solutions to new ideas and innovations.
2. Ability to work and communicate effectively in a team environment and foster the professional skills towards industrial and societal needs.
3. Ability to grasp the advancements in computing and creating a career path to become an entrepreneur, lifelong learner with moral values and ethics.

## **M.E- Computer Science and Engineering**

### **Program Outcomes(PO)**

#### **Engineering Graduates will be able to:**

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **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.
3. **Design/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.
4. **Conduct investigations 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.

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
6. **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.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **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.
11. **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.
12. **Life-long 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.

### **Program Specific Outcomes (PSOs)**

1. Investigate the challenging problems and develop computing solutions by applying appropriate computational domains and techniques.
2. Ability to design, develop and implement high quality solutions and business applications by applying software engineering practices and emerging computing technologies.



3. Ability to identify the research gaps by providing solutions to new ideas and innovations and pursue lifelong professional development.

## **B.E- Electronics and Communication Engineering**

### **Program Outcomes(PO)**

#### **Engineering Graduates will be able to:**

- 1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. 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.
- 3. Design/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.
- 4. Conduct investigations 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.
- 5. 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.
- 6. 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.

- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. 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.
- 11. 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.
- 12. Life-long 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.

### **Program Specific Outcomes (PSOs)**

- 1.** Ability to understand the fundamental concepts, analyze, design, develop, implement using mathematical foundations and domain knowledge for providing solutions to complex electronics and communication engineering problems by applying new ideas and innovations.
- 2.** Ability to work and communicate effectively in a team environment and foster the professional skills towards industrial and societal needs.
- 3.** Ability to grasp the advancements in hardware / software tools and creating a career path to become an entrepreneur, lifelong learner with moral values and ethics.

## M.E- VLSI Design

### Program Outcomes(PO)

#### Engineering Graduates will be able to:

- 1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. 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.
- 3. Design/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.
- 4. Conduct investigations 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.
- 5. 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.
- 6. 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.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**10. 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.

**11. 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.

**12. Life-long 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.

### **Program Specific Outcomes (PSOs)**

1. Ability to understand mathematical concepts, analyze, design, develop, implement using domain knowledge for providing solutions to electronics system design by applying new ideas and innovations.
2. Ability to work and communicate effectively in a team environment and foster the professional skills towards industrial and societal needs.
3. Ability to grasp the advancements in hardware / software tools and creating a career path to become an entrepreneur, lifelong learner with moral values and ethics.

## **B.E- Electrical and Electronics Engineering**

### **Program Outcomes(PO)**

#### **Engineering Graduates will be able to:**

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

- 2. 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.
- 3. Design/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.
- 4. Conduct investigations 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.
- 5. 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.
- 6. 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.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. 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.
- 11. 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.

**12. Life-long 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.

### **Programme Specific Outcomes (PSO)**

1. Ability to understand the fundamental concepts, analyze, design, develop, implement using mathematical foundations and domain knowledge for providing solutions to new ideas and innovations in Electrical Systems.
2. Ability to work and communicate effectively in a team environment and foster the professional skills towards industrial and societal needs.
3. Ability to grasp the advancements in Electrical Systems and creating a career path to become an entrepreneur, lifelong learner with moral values and ethics.

## **B.E- Mechanical Engineering**

### **Program Outcomes(PO)**

#### **Engineering Graduates will be able to:**

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **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.
3. **Design/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.

- 4. Conduct investigations 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.
- 5. 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.
- 6. 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.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. 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.
- 11. 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.
- 12. Life-long 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.

### **Programme Specific Outcomes (PSO)**

1. Ability to understand the fundamental concepts, analyze, design, develop, implement using mathematical foundations and domain knowledge for providing

solutions to new ideas and innovations in mechanical systems and processes towards product development.

2. Ability to work and communicate effectively in a team environment and foster the professional skills towards industrial and societal needs.
3. Ability to grasp the advancements in mechanical systems, processes, software and creating a career path to become an entrepreneur, lifelong learner with moral values and ethics.

### **Department of Master of Business Administration**

#### **Programme Outcomes (POs)**

1. **Management Knowledge:** Acquire knowledge and skills in management and ability to apply its principles and practices to arrive at optimal solution for any corporate problems.
2. **Problem analysis:** Demonstrate critical thinking skills in understanding managerial issues and problems by collecting and analyzing data.
3. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of Research, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
4. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern IT tools including forecasting Business activities with an understanding of the limitations.
5. **Development of solutions:** Design solutions for management problems by applying the contemporary methods in management sciences to enhance organizational efficiency and to find innovative business solutions.
6. **Environment and sustainability:** Understand the impact of the Business decisions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
7. **Behavioral skills:** Improve the verbal and non-verbal communication skills and acquire leadership skill and team work capabilities through participation. Demonstrate hands-on experience in administration and research.



- 8. Ethics:** Apply ethical principles and understand the impact of the professional management solutions in societal and environmental contexts.
- 9. Entrepreneurial Perspective:** To identify business opportunities and acquire entrepreneurial traits to evaluate and manage their own business successfully.
- 10. Global Perspective:** Students should be able to demonstrate their ability to analyze and evaluate the political, economical, social, legal and technological global environment.
- 11. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 12. Life-long learning:** Ability to engage in independent and life-long learning in the context of managing unpredictable societal and global issues.

### **Program Specific Outcomes (PSOs)**

1. Ability to apply the fundamental knowledge of management concepts to optimally solve the complex business problems.
2. Ability to gain multidisciplinary skills through simulated problems, case analysis/studies, projects and industrial training to improve team effort.
3. Ability to grasp the advancements in IT tools and creating a career path to become an entrepreneur, lifelong learner with moral values and professional ethics for societal and environmental well-being.

