

**2.6.1 Teachers and students are aware of the stated Programme and course outcomes of the Programmes offered by the institution.**

Thamirabharani Engineering College has well-defined learning outcomes based on the course outcomes provided by the affiliating body Anna University, Chennai. Our college has contributed in exposing students to emerging technologies to explore new subjects and deepen their understanding of difficult concepts and instilling entrepreneurial attitude in them. Our institute dedicates itself to empowering students through outcome based teaching and learning processes. The Program Outcomes(POs), Program Specific Outcomes(PSOs) and Course Outcomes(COs) are disseminated to teachers and students through following modes

Sl. No.	Course Outcomes	Page No.
1	Regulation 2021	1
2	Regulation 2017	47



Principal  
THAMIRABHARANI ENGG COLLEGE  
Tirunelveli, Tamilnadu-627 358

**THAMIRABHARANI ENGINEERING COLLEGE**

**TIRUNELVELI – 627358**

**DEPARTMENT OF CIVIL ENGINEERING**

**Course outcomes for all programs offered by the institution are to be stated and displayed on website**

<b>SEMESTER-I</b>	
<b>HS3151 Professional English - I</b>	
CO101.1	To use appropriate words in a professional context
CO101.2	To gain understanding of basic grammatic structures and use them in right context.
CO101.3	To read and infer the denotative and connotative meanings of technical texts
CO101.4	To write definitions, descriptions, narrations and essays on various topics
<b>MA3151 Matrices and Calculus</b>	
CO102.1	Use the matrix algebra methods for solving practical problems
CO102.2	Apply differential calculus tools in solving various application problems.
CO102.3	Able to use differential calculus ideas on several variable functions.
CO102.4	Apply different methods of integration in solving practical problems.
CO102.5	Apply multiple integral ideas in solving areas, volumes and other practical problems
<b>PH3151 Engineering Physics</b>	
CO103.1	Understand the importance of mechanics.
CO103.2	Express their knowledge in electromagnetic waves.
CO103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
CO103.4	Understand the importance of quantum physics.
CO103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.
<b>CY3151 Engineering Chemistry</b>	
CO104.1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.
CO104.2	To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.
CO104.3	To apply the knowledge of phase rules and composites for material selection requirements.
CO104.4	To recommend suitable fuels for engineering processes and applications.
CO104.5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.
<b>GE3151 Problem Solving and Python Programming</b>	
CO105.1	Develop algorithmic solutions to simple computational problems.
CO105.2	Develop and execute simple Python programs.
CO105.3	Write simple Python programs using conditionals and looping for solving problems.
CO105.4	Decompose a Python program into functions.

  
Principal  
THAMIRABHARANI ENGG. COLLEGE.  
Tirunelveli, Tamilnadu-627 358



CO105.5	Represent compound data using Python lists, tuples, dictionaries etc.
CO105.6	Read and write data from/to files in Python programs.
<b>GE3171 Problem Solving and Python Programming Laboratory</b>	
CO106.1	Develop algorithmic solutions to simple computational problems
CO106.2	Develop and execute simple Python programs.
CO106.3	Implement programs in Python using conditionals and loops for solving problems.
CO106.4	Deploy functions to decompose a Python program.
CO106.5	Process compound data using Python data structures.
CO106.6	Utilize Python packages in developing software applications.
<b>BS3171 Physics and Chemistry Laboratory</b>	
CO107.1	Understand the functioning of various physics laboratory equipment.
CO107.2	Use graphical models to analyze laboratory data.
CO107.3	Use mathematical models as a medium for quantitative reasoning and describing physical reality.
CO107.4	Access, process and analyze scientific information.
CO107.5	Solve problems individually and collaboratively.
<b>GE3172 English Laboratory</b>	
CO108.1	To listen and comprehend complex academic texts
CO108.2	To speak fluently and accurately in formal and informal communicative contexts
CO108.3	To express their opinions effectively in both oral and written medium of communication

*C. S. S. S.*

Principal  
THAMIRABHARANI ENGG. COLLEGE,  
Tirunelveli, Tamilnadu-627 358

**THAMIRABHARANI ENGINEERING COLLEGE**  
**TIRUNELVELI – 627358**  
**DEPARTMENT OF CIVIL ENGINEERING**

**Course outcomes for all programs offered by the institution are to be stated and displayed on website**

<b>SEMESTER-II</b>	
<b>HS3251 Professional English II</b>	
CO201.1	To compare and contrast products and ideas in technical texts.
CO201.2	To identify cause and effects in events, industrial processes through technical texts
CO201.3	To analyse problems in order to arrive at feasible solutions and communicate them orally and in the written format.
CO201.4	To report events and the processes of technical and industrial nature.
CO201.5	To present their opinions in a planned and logical manner, and draft effective resumes in context of job search.
<b>MA3251 Statistics and Numerical Methods</b>	
CO202.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.
CO202.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.
CO202.3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
CO202.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
CO202.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
<b>PH3201 Physics for Civil Engineering</b>	
CO203.1	Acquire knowledge about heat transfer through different materials, thermal performance of building and thermal insulation.
CO203.2	gain knowledge on the ventilation and air conditioning of buildings
CO203.3	understand the concepts of sound absorption, noise insulation and lighting designs
CO203.4	know about the processing and applications of composites, metallic glasses, shape memory alloys and ceramics
CO203.5	get awareness on natural disasters such as earth quake, cyclone, fire and safety measures
<b>BE3252 Basic Electrical, Electronics, and Instrumentation Engineering</b>	
CO204.1	Compute the electric circuit parameters for simple problems
CO204.2	Explain the concepts of domestics wiring and protective devices
CO204.3	Explain the working principle and applications of electrical machines
CO204.4	Analyze the characteristics of analog electronic devices
CO204.5	Explain the types and operating principles of sensors and transducers



Principal  
**THAMIRABHARANI ENGG. COLLEGE,**  
 Tirunelveli, Tamilnadu-627 358



<b>GE3251 Engineering Graphics</b>	
CO205.1	Use BIS conventions and specifications for engineering drawing.
CO205.2	Construct the conic curves, involutes and cycloid.
CO205.3	Solve practical problems involving projection of lines.
CO205.4	Draw the orthographic, isometric and perspective projections of simple solids.
CO205.5	Draw the development of simple solids.
<b>GE3271 Engineering Practices Laboratory</b>	
CO206.1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.
CO206.2	Wire various electrical joints in common household electrical wire work.
CO206.3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.
CO206.4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.
<b>BE3272 Basic Electrical, Electronics, and Instrumentation Engineering Laboratory</b>	
CO207.1	Use experimental methods to verify Ohm's law and Kirchhoff's Law and to measure three phase power
CO207.2	Analyze experimentally the load characteristics of electrical machines
CO207.3	Analyze the characteristics of basic electronic devices
CO207.4	Use LVDT to measure displacement
<b>GE3272 Communication Laboratory</b>	
CO208.1	Speak effectively in group discussions held in a formal/semi formal contexts.
CO208.2	Write emails and effective job applications.



Principal  
**THAMIRABHARANI ENGG. COLLEGE,**  
 Tirunelveli, Tamilnadu-627 360



**THAMIRABHARANI ENGINEERING COLLEGE**

**TIRUNELVELI – 627358**

**DEPARTMENT OF CIVIL ENGINEERING**

**Course outcomes for all programs offered by the institution are to be stated and displayed on website**

<b>SEMESTER-III</b>	
<b>MA3351 Transforms and Partial Differential Equations</b>	
CO301.1	Understand how to solve the given standard partial differential equations.
CO301.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
CO301.3	Appreciate the physical significance of Fourier series techniques in solving one- and two-dimensional heat flow problems and one-dimensional wave equations.
CO301.4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
CO301.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.
<b>ME3351 Engineering Mechanics</b>	
CO302.1	Illustrate the vectorial and scalar representation of forces and moments
CO302.2	Analyse the rigid body in equilibrium
CO302.3	Evaluate the properties of distributed forces
CO302.4	Determine the friction and the effects by the laws of friction
CO302.5	Calculate dynamic forces exerted in rigid body
<b>CE3301 Fluid Mechanics</b>	
CO303.1	Demonstrate the difference between solid and fluid, its properties and behaviour in static conditions.
CO303.2	Apply the conservation laws applicable to fluids and its application through fluid kinematics and dynamics.
CO303.3	Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performance of prototypes by model studies.
CO303.4	Estimate the losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel.
CO303.5	Explain the concept of boundary layer and its application to find the drag force exerted by the fluid on the flat solid surface.
<b>CE3302 Construction Materials and Technology</b>	
CO304.1	Identify the good quality brick, stone and blocks for construction.
CO304.2	Recognize the market forms of timber, steel, aluminium and applications of various composite materials.
CO304.3	Identify the best construction and service practices such as thermal insulations and air conditioning of the building

Principal  
THAMIRABHARANI ENGG. COLLEGE.  
Tirunelveli, Tamilnadu-627 358



CO304.4	Select various equipment for construction works conditioning of building
CO304.5	Understand the construction planning and scheduling techniques
<b>CE3303 Water Supply and Wastewater Engineering</b>	
CO305.1	Understand the various components of water supply scheme and design of intake structure and conveyance system for water transmission
CO305.2	Understand on the characteristics and composition of sewage, ability to estimate sewage generation and design sewer system including sewage pumping stations
CO305.3	Understand the process of conventional treatment and design of water and wastewater treatment system and gain knowledge of selection of treatment process and biological treatment process
CO305.4	Ability to design and evaluate water distribution system and water supply in buildings and understand the self-purification of streams and sludge and septage disposal methods.
CO305.5	Able to understand and design the various advanced treatment system and knowledge about the recent advances in water and wastewater treatment process and reuse of sewage
<b>CE3351 Surveying and Levelling</b>	
CO306.1	Introduce the rudiments of various surveying and its principles.
CO306.2	Imparts knowledge in computation of levels of terrain and ground features
CO306.3	Imparts concepts of Theodolite Surveying for complex surveying operations
CO306.4	Understand the procedure for establishing horizontal and vertical control
CO306.5	Imparts the knowledge on modern surveying instruments
<b>CE3361 Surveying and Levelling Laboratory</b>	
CO307.1	Impart knowledge on the usage of basic surveying instruments like chain/tape, compass and levelling instruments
CO307.2	Able to use levelling instrument for surveying operations
CO307.3	Able to use theodolite for various surveying operations
CO307.4	Able to carry out necessary surveys for social infrastructures
CO307.5	Able to prepare planimetric maps
<b>CE3311 Water and Wastewater Analysis Laboratory</b>	
CO308.1	Calibrate and standardize the equipment
CO308.2	Collect proper sample for analysis
CO308.3	To know the sample preservation methods
CO308.4	To perform field-oriented testing of water, wastewater
CO308.5	To perform coliform analysis
<b>GE3361 Professional Development</b>	
CO309.1	Use MS Word to create quality documents
CO309.2	Structuring and organizing content for their day-to-day technical and academic requirements
CO309.3	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding



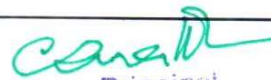
Principal  
**THAMIRABHARANI ENGG. COLLEGE**  
 Tirunelveli, Tamilnadu-627 358

**THAMIRABHARANI ENGINEERING COLLEGE**  
**TIRUNELVELI – 627358**

**DEPARTMENT OF CIVIL ENGINEERING**

**Course outcomes for all programs offered by the institution are to be stated and displayed on website**

<b>SEMESTER-IV</b>	
<b>CE3401 Applied Hydraulics Engineering</b>	
CO401.1	Describe the basics of open channel flow, its classification and analysis of uniform flow in steady state conditions with specific energy concept and its application
CO401.2	Analyse steady gradually varied flow, water surface profiles and its length calculation using direct and standard step methods with change in water surface profiles due to change in grades.
CO401.3	Derive the relationship among the sequent depths of steady rapidly varied flow and estimating energy loss in hydraulic jump with exposure to positive and negative surges.
CO401.4	Design turbines and explain the working principle
CO401.5	Differentiate pumps and explain the working principle with characteristic curves and design centrifugal and reciprocating pumps
<b>CE3402 Strength of Materials</b>	
CO402.1	Understand the concepts of stress and strain, principal stresses and principal planes.
CO402.2	Determine Shear force and bending moment in beams and understand concept of theory of simple bending.
CO402.3	Calculate the deflection of beams by different methods and selection of method for determining slope or deflection.
CO402.4	Analyse propped cantilever, fixed beams and continuous beams for external loadings and support settlements.
CO402.5	Determine the stresses due to Unsymmetrical bending of beams, locate the shear centre, and study the various theories of failure
<b>CE3403 Concrete Technology</b>	
CO403.1	Understand the requirements of cement, aggregates and water for concrete
CO403.2	Select suitable admixtures for enhancing the properties of concrete
CO403.3	Design concrete mixes as per IS method of mix design
CO403.4	Determine the properties of concrete at fresh and hardened state.
CO403.5	Know the importance of special concretes for specific requirements.
<b>CE3404 Soil Mechanics</b>	
CO404.1	Demonstrate an ability to identify various types of soils and its properties, formulate and solve engineering Problems
CO404.2	Show a basic understanding of flow through soil medium and its impact of engineering solution.



Principal  
**THAMIRABHARANI ENGG. COLLEGE,**  
 Tirunelveli, Tamilnadu-627 358



CO404.3	Understand the basic concept of stress distribution in loaded soil medium and soil settlement due to consolidation
CO404.4	Show an understanding of shear strength of soils and its impact of engineering solutions to the loaded soil medium and also will be aware of contemporary issues on shear strength of soils.
CO404.5	Demonstrate an ability to design both finite and infinite slopes, components, and process as per needs and specifications.
<b>CE3405 Highway and Railway Engineering</b>	
CO405.1	Plan a highway according to the principles and standards adopted in various institutions in India.
CO405.2	Design the geometric features of road network and components of pavement.
CO405.3	Test the highway materials and construction practice methods and know its properties and able to perform pavement evaluation and management.
CO405.4	Understand the methods of route alignment and design elements in railway planning and constructions.
CO405.5	Understand the construction techniques and maintenance of track laying and railway stations
<b>GE3451 Environmental Sciences and Sustainability</b>	
CO406.1	Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect that serves environmental Protection. One will obtain knowledge on the following after completing the course.
CO406.2	Public awareness of environmental is at infant stage.
CO406.3	Ignorance and incomplete knowledge have to lead to misconceptions
CO406.4	Development and improvement in std. of living have led to serious environmental disasters
<b>CE3411 Hydraulic Engineering Laboratory</b>	
CO407.1	Apply Bernoulli equation for calibration of flow measuring devices.
CO407.2	Measure friction factor in pipes and compare with Moody diagram
CO407.3	Determine the performance characteristics of rotodynamic pumps.
CO407.4	Determine the performance characteristics of positive displacement pumps.
CO407.5	Determine the performance characteristics of turbines.
<b>CE3412 Materials Testing Laboratory</b>	
CO408.1	Determine the mechanical properties of steel.
CO408.2	Determine the physical properties of cement
CO408.3	Determine the physical properties of fine and coarse aggregate.
CO408.4	Determine the workability and compressive strength of concrete.
CO408.5	Determine the strength of brick and wood.
<b>CE3413 Soil Mechanics Laboratory</b>	
CO409.1	Conduct tests to determine the index properties of soils

  
 Principal  
**THAMIRABHARANI ENGG. COLLEGE,**  
 Tirunelveli, Tamilnadu-627 358

CO409.2	Determine the in-situ density and compaction characteristics.
CO409.3	Conduct tests to determine the compressibility, permeability and shear strength of soils.
CO409.4	Understand the various tests on Geosynthetics.



Principal  
THAMIRABHARANI ENGG. COLLEGE  
Tirunelveli Tamilnadu-627 358

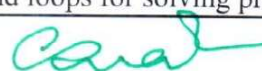


**THAMIRABHARANI ENGINEERING COLLEGE**  
**TIRUNELVELI – 62358**

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**Course outcomes for all programs offered by the institution are to be stated and displayed on website**

<b>SEMESTER-I</b>	
<b>HS3151 Professional English - I</b>	
CO101.1	To use appropriate words in a professional context
CO101.2	To gain understanding of basic grammatic structures and use them in right context.
CO101.3	To read and infer the denotative and connotative meanings of technical texts
CO101.4	To write definitions, descriptions, narrations and essays on various topics
<b>MA 3151 MATRICES AND CALCULUS</b>	
CO102.1	Use the matrix algebra methods for solving practical problems.
CO102.2	Apply differential calculus tools in solving various application problems.
CO102.3	Able to use differential calculus ideas on several variable functions.
CO102.4	Apply different methods of integration in solving practical problems.
CO102.5	Apply multiple integral ideas in solving areas, volumes and other practical problems.
<b>PH3151 Engineering Physics</b>	
CO103.1	Understand the importance of mechanics.
CO103.2	Express their knowledge in electromagnetic waves.
CO103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
CO103.4	Understand the importance of quantum physics.
CO103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.
<b>CY3151 Engineering Chemistry</b>	
CO104.1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.
CO104.2	To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.
CO104.3	To apply the knowledge of phase rules and composites for material selection requirements.
CO104.4	To recommend suitable fuels for engineering processes and applications.
CO104.5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.
<b>GE3151 &amp; PROBLEM SOLVING AND PYTHON PROGRAMMING</b>	
CO105.1	Develop algorithmic solutions to simple computational problems.
CO105.2	Develop and execute simple Python programs.
CO105.3	Write simple Python programs using conditionals and loops for solving problems.



Principal  
**THAMIRABHARANI ENGG. COLLEGE,**  
Tirunelveli, Tamilnadu-627 358



CO105.4	Decompose a Python program into functions.
CO105.5	Represent compound data using Python lists, tuples, dictionaries etc.
CO105.6	Read and write data from/to files in Python programs.
<b>GE3171 &amp; ROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY</b>	
CO106.1	Develop algorithmic solutions to simple computational problems
CO106.2	Develop and execute simple Python programs.
CO106.3	Implement programs in Python using conditionals and loops for solving problems..
CO106.4	Deploy functions to decompose a Python program.
CO106.5	Process compound data using Python data structures.
CO106.6	Utilize Python packages in developing software applications.
<b>BS3171 Physics and Chemistry Laboratory</b>	
CO107.1	Understand the functioning of various physics laboratory equipment.
CO107.2	Use graphical models to analyze laboratory data.
CO107.3	Use mathematical models as a medium for quantitative reasoning and describing physical reality.
CO107.4	Access, process and analyze scientific information.
CO107.5	Solve problems individually and collaboratively.
<b>GE3172 English Laboratory</b>	
CO108.1	To listen and comprehend complex academic texts
CO108.2	To speak fluently and accurately in formal and informal communicative contexts
CO108.3	To express their opinions effectively in both oral and written medium of communication



Principal  
**THAMIRABHARANI ENGG. COLLEGE,**  
Tirunelveli, Tamilnadu-627 358


**THAMIRABHARANI ENGINEERING COLLEGE**

**TIRUNELVELI – 62358**

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**Course outcomes for all programs offered by the institution are to be stated and displayed on website**

<b>SEMESTER-II</b>	
<b>HS3252 &amp; PROFESSIONAL ENGLISH -II</b>	
CO201.1	To compare and contrast products and ideas in technical texts.
CO201.2	To identify and report cause and effects in events, industrial processes through technical texts
CO201.3	To analyse problems in order to arrive at feasible solutions and communicate them in the written format.
CO201.4	To present their ideas and opinions in a planned and logical manner
CO201.5	To draft effective resumes in the context of job search.
<b>MA 3251 STATISTICS AND NUMERICAL METHODS</b>	
CO202.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.
CO202.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.
CO202.3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems
CO202.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
CO202.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
<b>PH3256 PHYSICS FOR INFORMATION SCIENCE</b>	
CO203.1	gain knowledge on classical and quantum electron theories, and energy band structures
CO203.2	acquire knowledge on basics of semiconductor physics and its applications in various devices
CO203.3	get knowledge on magnetic properties of materials and their applications in data storage,
CO203.4	have the necessary understanding on the functioning of optical materials for optoelectronics
CO203.5	understand the basics of quantum structures and their applications and basics of quantum computing
<b>BE3251 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING</b>	
CO204.1	Compute the electric circuit parameters for simple problems
CO204.2	Explain the working principle and applications of electrical machines

  
Principal  
THAMIRABHARANI ENGG. COLLEGE,  
Tirunelveli, Tamilnadu-627 358



CO204.3	Analyze the characteristics of analog electronic devices
CO204.4	Explain the basic concepts of digital electronics
CO204.5	Explain the operating principles of measuring instruments
<b>GE3251 ENGINEERING GRAPHICS</b>	
CO205.1	Use BIS conventions and specifications for engineering drawing.
CO205.2	Construct the conic curves, involutes and cycloid
CO205.3	Solve practical problems involving projection of lines.
CO205.4	Draw the orthographic, isometric and perspective projections of simple solids.
CO205.5	Draw the development of simple solids.
<b>CS3251 PROGRAMMING IN C</b>	
CO206.1	Demonstrate knowledge on C Programming constructs
CO206.2	Develop simple applications in C using basic constructs
CO206.3	Design and implement applications using arrays and strings
CO206.4	Develop and implement modular applications in C using functions.
CO206.5	Develop applications in C using structures and pointers
CO206.6	Design applications using sequential and random access file processing.
<b>GE3271 &amp; ENGINEERING PRACTICES LABORATORY</b>	
CO207.1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.
CO207.2	Wire various electrical joints in common household electrical wire work.
CO207.3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.
CO207.4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB
<b>GE3272 Communication Laboratory</b>	
CO208.1	Speak effectively in group discussions held in a formal/semi formal contexts.
CO208.2	Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions
CO208.3	Write emails, letters and effective job applications.
CO208.4	Write critical reports to convey data and information with clarity and precision
CO208.5	Give appropriate instructions and recommendations for safe execution of tasks
<b>CS3271 PROGRAMMING IN C LABORATORY</b>	
CO209.1	Demonstrate knowledge on C programming constructs.
CO209.2	Develop programs in C using basic constructs.
CO209.3	Develop programs in C using arrays.
CO209.4	Develop applications in C using strings, pointers, functions
CO209.5	Develop applications in C using structures.
CO209.6	Develop applications in C using file processing.

Principal  
**THAMIRABHARANI ENGG. COLLEGE,**  
 Tirunelveli, Tamilnadu-627 358



**THAMIRABHARANI ENGINEERING COLLEGE**

**TIRUNELVELI – 62358**

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**Course outcomes for all programs offered by the institution are to be stated and displayed on website**

<b>SEMESTER-III</b>	
<b>MA 3354 DISCRETE MATHEMATICS</b>	
CO301.1	Have knowledge of the concepts needed to test the logic of a program.
CO301.2	Have an understanding in identifying structures on many levels.
CO301.3	Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.
CO301.4	Be aware of the counting principles.
CO301.5	Be exposed to concepts and properties of algebraic structures such as groups, rings and fields
<b>CS3351 Digital Principles and Computer Organization</b>	
CO302.1	Have knowledge of the concepts needed to test the logic of a program.
CO302.2	Have an understanding in identifying structures on many levels.
CO302.3	Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.
CO302.4	Be aware of the counting principles.
CO302.5	Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.
<b>CS3301- DATA STRUCTURES</b>	
CO303.1	Define linear and non-linear data structures.
CO303.2	Implement linear and non-linear data structure operations.
CO303.3	Use appropriate linear/non-linear data structure operations for solving a given problem.
CO303.4	Apply appropriate graph algorithms for graph applications.
CO303.5	Analyze the various searching and sorting algorithms.
<b>CS3391 OBJECT ORIENTED PROGRAMMING</b>	
CO304.1	Apply the concepts of classes and objects to solve simple problems
CO304.2	Develop programs using inheritance, packages and interfaces
CO304.3	Make use of exception handling mechanisms and multithreaded model to solve real world problems
CO304.4	Build Java applications with I/O packages, string classes, Collections and generics concepts
CO304.5	Integrate the concepts of event handling and JavaFX components and controls for developing GUI based applications
<b>CS3352 FOUNDATIONS OF DATA SCIENCE</b>	
CO305.1	Define the data science process

  
Principal  
THAMIRABHARANI ENGG COLLEGE,  
Tirunelveli, Tamilnadu-627 358

CO305.2	Understand different types of data description for data science process
CO305.3	Gain knowledge on relationships between data
CO305.4	Use the Python Libraries for Data Wrangling
CO305.5	Apply visualization Libraries in Python to interpret and explore data
<b>CS3361 DATA SCIENCE LABORATORY</b>	
CO306.1	Make use of the python libraries for data science
CO306.2	Make use of the basic Statistical and Probability measures for data science.
CO306.3	Perform descriptive analytics on the benchmark data sets.
CO306.4	Perform correlation and regression analytics on standard data sets
CO306.5	Present and interpret data using visualization packages in Python.
<b>CS3381 OBJECT ORIENTED PROGRAMMING LABORATORY</b>	
CO307.1	Design and develop java programs using object oriented programming concepts
CO307.2	Develop simple applications using object oriented concepts such as package, exceptions 74
CO307.3	Implement multithreading, and generics concepts
CO307.4	Create GUIs and event driven programming applications for real world problems
CO307.5	Implement and deploy web applications using Java
<b>CS3311 DATA STRUCTURES LABORATORY</b>	
CO308.1	Implement Linear data structure algorithms
CO308.2	Implement applications using Stacks and Linked lists
CO308.3	Implement Binary Search tree and AVL tree operations.
CO308.4	Implement graph algorithms.
CO308.5	Analyze the various searching and sorting algorithms.



Principal  
**THAMIRABHARANI ENGG. COLLEGE,**  
Tirunelveli Tamilnadu-627 358



**THAMIRABHARANI ENGINEERING COLLEGE**

**TIRUNELVELI – 62358**

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**Course outcomes for all programs offered by the institution are to be stated and displayed on website**

<b>SEMESTER-IV</b>	
<b>SUB.CODE&amp; NAME: CS3491 ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING</b>	
CO401.1	CO1: Use appropriate search algorithms for problem solving
CO401.2	CO2: Apply reasoning under uncertainty
CO401.3	CO3: Build supervised learning models
CO401.4	CO4: Build ensembling and unsupervised models
CO401.5	CO5: Build deep learning neural network models
<b>CS3401 ALGORITHMS</b>	
CO402.1	CO1: Analyze the efficiency of algorithms using various frameworks
CO402.2	CO2: Apply graph algorithms to solve problems and analyze their efficiency.
CO402.3	CO3: Make use of algorithm design techniques like divide and conquer, dynamic programming and greedy techniques to solve problems
CO402.4	CO4: Use the state space tree method for solving problems.
CO402.5	CO5: Solve problems using approximation algorithms and randomized algorithms
<b>CS3451 INTRODUCTION TO OPERATING SYSTEMS</b>	
CO403.1	Analyze various scheduling algorithms and process synchronization.
CO403.2	Explain deadlock prevention and avoidance algorithms.
CO403.3	Compare and contrast various memory management schemes.
CO403.4	Explain the functionality of file systems, I/O systems, and Virtualization
CO403.5	Compare iOS and Android Operating Systems.
<b>CS3461 OPERATING SYSTEMS LABORATORY</b>	
CO404.1	CO1 : Define and implement UNIX Commands.
CO404.2	CO2 : Compare the performance of various CPU Scheduling Algorithms
CO404.3	CO3 : Compare and contrast various Memory Allocation Methods.
CO404.4	CO4 :Define File Organization and File Allocation Strategies.
CO404.5	CO5 : Implement various Disk Scheduling Algorithms.
<b>CS3452 Theory of Computation</b>	
CO405.1	CO1: Construct automata theory using Finite Automata
CO405.2	CO2: Write regular expressions for any pattern
CO405.3	CO3: Design context free grammar and Pushdown Automata
CO405.4	CO4: Design Turing machine for computational functions
CO405.5	CO5: Differentiate between decidable
<b>CS3492 Database Management Systems</b>	
CO406.1	To learn the fundamentals of data models, relational algebra and SQL



Principal

THAMIRABHARANI ENGG. COLLEGE,  
Tirunelveli, Tamilnadu-627 358

CO406.2	To represent a database system using ER diagrams and to learn normalization techniques
CO406.3	To understand the fundamental concepts of transaction, concurrency and recovery
CO406.4	To understand the internal storage structures using different file and indexing techniques
CO406.5	To have an introductory knowledge about the Distributed databases, NOSQL and database security
<b>GE3451 Environmental Sciences and Sustainability</b>	
CO407.1	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.
CO407.2	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.
CO407.3	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.
CO407.4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.
CO407.5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.
<b>CS3481 Database Management Systems Laboratory</b>	
CO408.1	To learn and implement important commands in SQL.
CO408.2	To learn the usage of nested and joint queries.
CO408.3	To understand functions, procedures and procedural extensions of databases.
CO408.4	To understand design and implementation of typical database applications.
CO408.5	To be familiar with the use of a front end tool for GUI based application development.




Principal  
THAMIRABHARANI ENGG. COLLEGE  
Tirunelveli, Tamilnadu-627 358



**THAMIRABHARANI ENGINEERING COLLEGE****TIRUNELVELI – 62358****DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**Course outcomes for all programs offered by the institution are to be stated and displayed on website**

<b>SEMESTER-I</b>	
<b>HS3151 Professional English - I</b>	
CO101.1	To use appropriate words in a professional context
CO101.2	To gain understanding of basic grammatic structures and use them in right context.
CO101.3	To read and infer the denotative and connotative meanings of technical texts
CO101.4	To write definitions, descriptions, narrations and essays on various topics
<b>MA 3151 MATRICES AND CALCULUS</b>	
CO102.1	Use the matrix algebra methods for solving practical problems.
CO102.2	Apply differential calculus tools in solving various application problems.
CO102.3	Able to use differential calculus ideas on several variable functions.
CO102.4	Apply different methods of integration in solving practical problems.
CO102.5	Apply multiple integral ideas in solving areas, volumes and other practical problems.
<b>PH3151 Engineering Physics</b>	
CO103.1	Understand the importance of mechanics.
CO103.2	Express their knowledge in electromagnetic waves.
CO103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
CO103.4	Understand the importance of quantum physics.
CO103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.
<b>CY3151 Engineering Chemistry</b>	
CO104.1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.
CO104.2	To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.
CO104.3	To apply the knowledge of phase rules and composites for material selection requirements.
CO104.4	To recommend suitable fuels for engineering processes and applications.
CO104.5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.
<b>GE3151 Problem Solving and Python Programming</b>	
CO105.1	Develop algorithmic solutions to simple computational problems.
CO105.2	Write simple Python programs using conditionals and loops for solving problems.



Principal  
THAMIRABHARANI ENGG. COLLEGE,  
Tirunelveli, Tamilnadu-627 358

CO105.3	Decompose a Python program into functions.
CO105.4	Represent compound data using Python lists, tuples, dictionaries etc.
CO105.5	Read and write data from/to files in Python programs.
<b>BS3171 Physics and Chemistry Laboratory</b>	
CO106.1	Understand the functioning of various physics laboratory equipment.
CO106.2	Use graphical models to analyze laboratory data.
CO106.3	Use mathematical models as a medium for quantitative reasoning and describing physical reality.
CO106.4	Access, process and analyze scientific information.
CO106.5	Solve problems individually and collaboratively.
<b>GE3172 English Laboratory</b>	
CO107.1	To listen and comprehend complex academic texts
CO107.2	To speak fluently and accurately in formal and informal communicative contexts
CO107.3	To express their opinions effectively in both oral and written medium of communication
<b>GE3171 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY</b>	
CO108.1	Develop algorithmic solutions to simple computational problems
CO108.2	Develop and execute simple Python programs.
CO108.3	Implement programs in Python using conditionals and loops for solving problems..
CO108.4	Deploy functions to decompose a Python program.
CO108.5	Process compound data using Python data structures.
CO108.6	Utilize Python packages in developing software applications.

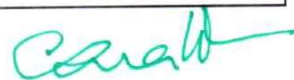


Principal  
**THAMIRABHARANI ENGG COLLEGE**  
 Tirunelveli, Tamilnadu-627 358



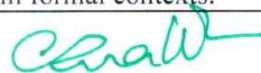
**THAMIRABHARANI ENGINEERING COLLEGE**  
**TIRUNELVELI – 62358**  
**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**  
Course outcomes for all programs offered by the institution are to be stated and displayed on website

<b>SEMESTER-II</b>	
<b>HS3252 Professional English - II</b>	
CO201.1	To compare and contrast products and ideas in technical texts.
CO201.2	To identify and report cause and effects in events, industrial processes through technical texts
CO201.3	To analyse problems in order to arrive at feasible solutions and communicate them in the written format.
CO201.4	To present their ideas and opinions in a planned and logical manner
CO201.5	To draft effective resumes in the context of job search.
<b>MA 3251 STATISTICS AND NUMERICAL METHODS</b>	
CO202.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.
CO202.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.
CO202.3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems
CO202.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
CO202.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
<b>PH3202 Physics for Electrical Engineering</b>	
CO203.1	know basics of dielectric materials and insulation.
CO203.2	gain knowledge on the electrical and magnetic properties of materials and their applications
CO203.3	understand clearly of semiconductor physics and functioning of semiconductor devices
CO203.4	understand the optical properties of materials and working principles of various optical devices
CO203.5	appreciate the importance of nanotechnology and nanodevices
<b>BE3255 Basic Civil and Mechanical Engineering</b>	
CO204.1	Understanding profession of Civil and Mechanical engineering.
CO204.2	Summarise the planning of building, infrastructure and working of Machineries.
CO204.3	Apply the knowledge gained in respective discipline



Principal  
**THAMIRABHARANI ENGG. COLLEGE,**  
Tirunelveli, Tamilnadu-627 358

CO204.4	Illustrate the ideas of Civil and Mechanical Engineering applications.
CO204.5	Appraise the material, Structures, machines and energy.
<b>GE3251 Engineering Graphics</b>	
CO205.1	Use BIS conventions and specifications for engineering drawing.
CO205.2	Construct the conic curves, involutes and cycloid
CO205.3	Solve practical problems involving projection of lines.
CO205.4	Draw the orthographic, isometric and perspective projections of simple solids.
CO205.5	Draw the development of simple solids.
<b>EE3251 Electric Circuit Analysis</b>	
CO206.1	Explain circuit's behavior using circuit laws and apply mesh and nodal analysis to determine the behavior of DC and AC systems
CO206.2	Apply mesh analysis/nodal analysis/network theorems to determine behavior of the given DC and AC circuit
CO206.3	Compute the transient response of first order and second order systems to step and sinusoidal input
CO206.4	Compute power, line/phase voltage and currents of the given three phase circuit and Explain the frequency response of series and parallel RLC circuits
CO206.5	Compute power, line/phase voltage and currents of the given three phase circuit
<b>GE3271 Engineering Practices Laboratory</b>	
CO207.1	Wire various electrical joints in common household electrical wire work.
CO207.2	carry out basic home electrical works and appliances
CO207.3	Measure the electrical quantities
<b>EE3271 Electric Circuits Laboratory</b>	
CO208.1	Use simulation and experimental methods to verify the fundamental electrical laws for the given DC/AC circuit
CO208.2	Use simulation and experimental methods to verify the various electrical theorems (Superposition, Thevenin, Norton and maximum power transfer) for the given DC/AC circuit
CO208.3	Analyze transient behavior of the given RL/RC/RLC circuit using simulation and experimental methods
CO208.4	Analyze frequency response of the given series and parallel RLC circuit using simulation and experimentation methods
CO208.5	Analyze the performance of the given three-phase circuit using simulation and experimental methods
<b>GE3272 Communication Laboratory/ Foreign Language</b>	
CO209.1	Speak effectively in group discussions held in formal/semi formal contexts.



Principal  
THAMIRABHARANI ENGG. COLLEGE,  
Tirunelveli, Tamilnadu-627 358



CO209.2	Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions
CO209.3	Write emails, letters and effective job applications.
CO209.4	Write critical reports to convey data and information with clarity and precision
CO209.5	Give appropriate instructions and recommendations for safe execution of tasks



Principal  
**THAMIRABHARANI ENGG. COLLEGE,**  
 Tirunelveli, Tamilnadu-627 358

**THAMIRABHARANI ENGINEERING COLLEGE**

**TIRUNELVELI – 62358**

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**Course outcomes for all programs offered by the institution are to be stated and displayed on website**

<b>SEMESTER-III</b>	
<b>MA 3303 PROBABILITY AND COMPLEX FUNCTIONS</b>	
CO301.1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
CO301.2	Understand the basic concepts of one and two dimensional random variables and apply in engineering applications
CO301.3	To develop an understanding of the standard techniques of complex variable theory in particular analytic function and its mapping property.
CO301.4	To familiarize the students with complex integration techniques and contour integration techniques which can be used in real integrals.
CO301.5	To acquaint the students with Differential Equations which are significantly used in engineering problems.
<b>EE3301 Electromagnetic Fields</b>	
CO302.1	Visualize and explain Gradient, Divergence, and Curl operations on electromagnetic vector fields and identify the electromagnetic sources and their effects.
CO302.2	Compute and analyse electrostatic fields, electric potential, energy density along with their applications.
CO302.3	Compute and analyse magneto static fields, magnetic flux density, vector potential along with their applications
CO302.4	Explain different methods of emf generation and Maxwell's equations
CO302.5	Explain the concept of electromagnetic waves and characterizing parameters
<b>EE3302 Digital Logic Circuits</b>	
CO303.1	Explain various number systems and characteristics of digital logic families
CO303.2	Apply K-maps and Quine McCluskey methods to simplify the given Boolean expressions
CO303.3	Explain the implementation of combinational circuit such as multiplexers and de multiplexers - code converters, adders, subtractors, Encoders and Decoders
CO303.4	Design various synchronous and asynchronous circuits using Flip Flops
CO303.5	Explain asynchronous sequential circuits and programmable logic devices
CO303.6	Use VHDL for simulating and testing RTL, combinatorial and sequential circuits
<b>EC3301 Electron Devices and Circuits</b>	

Principal  
THAMIRABHARANI ENGG. COLLEGE,  
Tirunelveli, Tamilnadu-627 358



CO304.1	Explain the structure and operation of PN junction devices (diode, Zener diode, LED and Laser diode)
CO304.2	Design clipper, clamper, half wave and full wave rectifier, regulator circuits using PN junction diodes
CO304.3	Analyze the structure and characteristics BJT, FET, MOSFET, UJT, Thyristor and IGBT
CO304.4	Analyze the performance of various configurations of BJT and MOSFET based amplifier
CO304.5	Explain the characteristics of MOS based cascade and differential amplifier
CO304.6	Explain the operation of various feedback amplifiers and oscillators
<b>EE3303 Electrical Machines - I</b>	
CO305.1	Apply the laws governing the electromechanical energy conversion for singly and multiple excited systems.
CO305.2	Explain the construction and working principle of DC machines and Interpret various characteristics of DC machines.
CO305.3	Compute various performance parameters of the machine, by conducting suitable tests.
CO305.4	Draw the equivalent circuit of transformer and predetermine the efficiency and regulation.
CO305.5	Describe the working principle of auto transformer, three phase transformer with different types of connection
<b>CS3353 C Programming and DataStructures</b>	
CO306.1	Develop C programs for any real world/technical application.
CO306.2	Apply advanced features of C in solving problems.
CO306.3	Write functions to implement linear and non-linear data structure operations
CO306.4	Suggest and use appropriate linear/non-linear data structure operations for solving a given problem
CO306.5	Appropriately use sort and search algorithms for a given application.
<b>EC3311 Electronic Devices andCircuits Laboratory</b>	
CO307.1	Analyze the characteristics of PN, Zener diode and BJT in CE,CC,CB configurations experimentally
CO307.2	Analyze the characteristics of JFET and UJT experimentally
CO307.3	Analyze frequency response characteristics of a Common Emitter amplifier experimentally
CO307.4	Analyze the characteristics of RC phase shift and LC oscillators experiment
CO307.5	Analyze the characteristics of half-wave and full-wave rectifier with and without filters experimentally



Principal  
THAMIRABHARANI ENGG. COLLEGE,  
Tirunelveli, Tamilnadu-627 368

CO307.6	Analyze the characteristics of FET based differential amplifier experimentally
CO307.7	Calculate the frequency and phase angle using CRO experimentally
CO307.8	Analyze the frequency response characteristics of passive filters experimentally

#### **EE3311 Electrical Machines Laboratory – I**

CO308.1	Construct the circuit with appropriate connections for the given DC machine/transformer.
CO308.2	Experimentally determine the characteristics of different types of DC machines.
CO308.3	Demonstrate the speed control techniques for a DC motor for industrial applications.
CO308.4	Identify suitable methods for testing of transformer and DC machines.
CO308.5	Predetermine the performance parameters of transformers and DC motor.
CO308.6	Understand DC motor starters and 3-phase transformer connections.

#### **CS3362 C Programming and Data Structures Laboratory**

CO309.1	Use different constructs of C and develop applications
CO309.2	Write functions to implement linear and non-linear data structure operations
CO309.3	Suggest and use the appropriate linear / non-linear data structure operations for a given problem
CO309.4	Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval
CO309.5	Implement Sorting and searching algorithms for a given application

#### **GE3361 Professional Development**

CO3010.1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements
CO3010.2	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding
CO3010.3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.



Principal  
**THAMIRABHARANI ENGG. COLLEGE.**  
 Tirunelveli, Tamilnadu-627 358



**THAMIRABHARANI ENGINEERING COLLEGE  
TIRUNELVELI – 62358**

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**Course outcomes for all programs offered by the institution are to be stated and displayed on website**

<b>SEMESTER-IV</b>	
<b>GE3451 &amp; ENVIRONMENTAL SCIENCES AND SUSTAINABILITY</b>	
CO401.1	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.
CO401.2	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.
CO401.3	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.
CO401.4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.
CO401.5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.
<b>EE3401 Transmission and Distribution</b>	
CO402.1	Understand the structure of power system, computation of transmission line parameters for different configurations.
CO402.2	Model the transmission lines to determine the line performance and to understand the impact of Ferranti effect and corona on line performance.
CO402.3	Do Mechanical design of transmission lines, grounding and to understand about the insulators in transmission system
CO402.4	Design the underground cables and understand the performance analysis of underground cable.
CO402.5	Understand the modelling, performance analysis and modern trends in distribution system.
<b>EE3402 Linear Integrated Circuits</b>	
CO403.1	Explain monolithic IC fabrication process and explain the fabrication of diodes, capacitance, resistance, FETs and PV Cell
CO403.2	Analyze the characteristics and basic applications (inverting/non-inverting amplifier, summer, differentiator, integrator, V/I and I/V converter) of Op-Amp



Principal  
THAMIRABHARANI ENGG. COLLEGE,  
Tirunelveli, Tamilnadu-627 358

CO403.3	Explain circuit and applications of op-amp based instrumentation amplifier, log/antilog amplifier, analog multiplier /divider, active filters, comparators, waveform generators, A/D and D/A converters
CO403.4	Explain Functional blocks, characteristics and applications of Timer, PLL, analog multiplier ICs.
CO403.5	Explain the applications of ICs in Instrumentation amplifier, fixed and variable voltage regulator, SMPS and function generator
<b>EE3403 Measurements and Instrumentation</b>	
CO404.1	Understand about different functional elements of instrumentation.
CO404.2	Analyze to choose an instrument for measuring different electrical and magnetic parameters
CO404.3	Design a suitable Bridge circuit to determine the values of various resistor, inductor and capacitor.
CO404.4	Explain the construction and working of various types of transducers
CO404.5	Explain the construction and working principle of various types of ADC and DAC.
<b>EE3404 Microprocessor and Microcontroller</b>	
CO405.1	Ability to write assembly language program for Microprocessor and Microcontroller
CO405.2	Ability to design and implement interfacing of peripheral with microprocessor and microcontroller
CO405.3	Ability to analyze, comprehend, design and simulate microprocessor based system user for control and monitoring.
CO405.4	Ability to analyze, comprehend, design and simulate Microcontroller based systems used for control and monitoring.
CO405.5	Ability to understand and appreciate advanced architecture evolving microprocessor field
<b>EE3405 Electrical Machines - II</b>	
CO406.1	Ability to understand the construction and working principle of Synchronous generator
CO406.2	Ability to understand the construction and working principle of Synchronous Motor
CO406.3	Ability to understand the construction and working principle of Three Phase Induction Motor
CO406.4	Acquire knowledge about the starting and speed control of induction motors
CO406.5	To gain knowledge about the basic principles and working of Single phase induction motors and Special Electrical Machines.
<b>EE3411 Electrical Machines Laboratory - II</b>	
CO407.1	Ability to understand and analyze EMF and MMF methods
CO407.2	Ability to analyze the characteristics of V and Inverted V curves



Principal  
**THAMIRABHARANI ENGG. COLLEGE,**  
Tirunelveli, Tamilnadu-627 358



CO407.3	Acquire hands on experience of conducting various tests on alternators and obtaining their performance indices using standard analytical as well as graphical methods. to understand the importance of Synchronous machines
CO407.4	Acquire hands on experience of conducting various tests on induction motors and obtaining their performance indices using standard analytical as well as graphical methods. to understand the importance of single and three phase Induction motors
CO407.5	Ability to acquire knowledge on separation of losses
<b>EE3412 Linear and Digital Circuits Laboratory</b>	
CO408.1	Ability to understand and implement Boolean Functions.
CO408.2	Ability to understand the importance of code conversion
CO408.3	Ability to Design and implement circuits with digital ICs like decoders, multiplexers, register.
CO408.4	Ability to acquire knowledge on Application of Op-Amp
CO408.5	Ability to Design and implement counters using analog ICs like timers, VCOs and digital ICs like Flip-flops and counters.
<b>EE3413 Microprocessor and Microcontroller laboratory</b>	
CO409.1	Ability to write assembly language program for microprocessor.
CO409.2	Ability to write assembly language program for microcontroller
CO409.3	Ability to design and implement interfacing of peripheral with microprocessor and microcontroller
CO409.4	Ability to analyze, comprehend, design and simulate microprocessor based systems used for control and monitoring..
CO409.5	Ability to analyze, comprehend, design and simulate microcontroller based systems used for control and monitoring.



Principal

THAMIRABHARANI ENGG. COLLEGE,  
Tirunelveli, Tamilnadu-627 358

**THAMIRABHARANI ENGINEERING COLLEGE  
TIRUNELVELI – 62358**

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

Course outcomes for all programs offered by the institution are to be stated and displayed on website

<b>SEMESTER-I</b>	
<b>HS3151 Professional English - I</b>	
CO101.1	To use appropriate words in a professional context
CO101.2	To gain understanding of basic grammatic structures and use them in right context.
CO101.3	To read and infer the denotative and connotative meanings of technical texts
CO101.4	To write definitions, descriptions, narrations and essays on various topics
<b>MA 3151 MATRICES AND CALCULUS</b>	
CO102.1	Use the matrix algebra methods for solving practical problems.
CO102.2	Apply differential calculus tools in solving various application problems.
CO102.3	Able to use differential calculus ideas on several variable functions.
CO102.4	Apply different methods of integration in solving practical problems.
CO102.5	Apply multiple integral ideas in solving areas, volumes and other practical problems.
<b>PH3151 Engineering Physics</b>	
CO103.1	Understand the importance of mechanics.
CO103.2	Express their knowledge in electromagnetic waves.
CO103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
CO103.4	Understand the importance of quantum physics.
CO103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.
<b>CY3151 Engineering Chemistry</b>	
CO104.1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.
CO104.2	To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.
CO104.3	To apply the knowledge of phase rules and composites for material selection requirements.
CO104.4	To recommend suitable fuels for engineering processes and applications.
CO104.5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.
<b>GE3151 &amp; PROBLEM SOLVING AND PYTHON PROGRAMMING</b>	
CO105.1	Develop algorithmic solutions to simple computational problems.
CO105.2	Develop and execute simple Python programs.



Principal  
THAMIRABHARANI ENCO. COLLEGE,  
Tirunelveli, Tamilnadu-627 358



CO105.3	Write simple Python programs using conditionals and loops for solving problems.
CO105.4	Decompose a Python program into functions.
CO105.5	Represent compound data using Python lists, tuples, dictionaries etc.
CO105.6	Read and write data from/to files in Python programs.
<b>GE3171 &amp; ROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY</b>	
CO106.1	Develop algorithmic solutions to simple computational problems
CO106.2	Develop and execute simple Python programs.
CO106.3	Implement programs in Python using conditionals and loops for solving problems..
CO106.4	Deploy functions to decompose a Python program.
CO106.5	Process compound data using Python data structures.
CO106.6	Utilize Python packages in developing software applications.
<b>BS3171 Physics and Chemistry Laboratory</b>	
CO107.1	Understand the functioning of various physics laboratory equipment.
CO107.2	Use graphical models to analyze laboratory data.
CO107.3	Use mathematical models as a medium for quantitative reasoning and describing physical reality.
CO107.4	Access, process and analyze scientific information.
CO107.5	Solve problems individually and collaboratively.
<b>GE3172 English Laboratory</b>	
CO108.1	To listen and comprehend complex academic texts
CO108.2	To speak fluently and accurately in formal and informal communicative contexts
CO108.3	To express their opinions effectively in both oral and written medium of communication



Principal  
**THAMIRABHARANI ENGG. COLLEGE.**  
Tirunelveli, Tamilnadu-627 358

**THAMIRABHARANI ENGINEERING COLLEGE**

**TIRUNELVELI – 62358**

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**Course outcomes for all programs offered by the institution are to be stated and displayed on website**

<b>SEMESTER-II</b>	
<b>BE3254 &amp; Electrical and Instrumentation Engineering</b>	
CO201.1	Explain the working principle of electrical machines
CO201.2	Analyze the output characterizes of electrical machines
CO201.3	Choose the appropriate electrical machines for various applications
CO201.4	Explain the types and operating principles of measuring instruments
CO201.5	Explain the basic power system structure and protection schemes
<b>MA 3251 STATISTICS AND NUMERICAL METHODS</b>	
CO202.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.
CO202.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.
CO202.3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems
CO202.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
CO202.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
<b>GE3271 &amp; ENGINEERING PRACTICES LABORATORY</b>	
CO203.1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.
CO203.2	Wire various electrical joints in common household electrical wire work.
CO203.3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.
CO203.4	equipments; Make a tray out of metal sheet using sheet metal work.
<b>EC3251 &amp; CIRCUIT ANALYSIS</b>	



Principal  
THAMIRABHARANI ENGG. COLLEGE,  
Tirunelveli, Tamilnadu-627 358



CO204.1	Apply the basic concepts of circuit analysis such as Kirchoff's laws, mesh current and node voltage method for analysis of DC and AC circuits.
CO204.2	Apply suitable network theorems and analyze AC and DC circuits
CO204.3	Analyze steady state response of any R, L and C circuits
CO204.4	Analyze the transient response for any RC, RL and RLC circuits and frequency response of parallel and series resonance circuits.
CO204.5	Analyze the coupled circuits and network topologies
<b>EC3271 &amp; CIRCUIT ANALYSIS LABORATORY</b>	
CO205.1	Design RL and RC circuits.
CO205.2	Verify Thevinin & Norton theorem KVL & KCL, and Super Position Theorems.
<b>HS3252 &amp; PROFESSIONAL ENGLISH -II</b>	
CO206.1	To compare and contrast products and ideas in technical texts.
CO206.2	To identify and report cause and effects in events, industrial processes through technical texts
CO206.3	To analyse problems in order to arrive at feasible solutions and communicate them in the written format.
CO206.4	To present their ideas and opinions in a planned and logical manner
CO206.5	To draft effective resumes in the context of job search.
<b>PH3254 &amp; PHYSICS FOR ELECTRONICS ENGINEERING</b>	
CO207.1	know basics of crystallography and its importance for varied materials properties
CO207.2	gain knowledge on the electrical and magnetic properties of materials and their applications
CO207.3	understand clearly of semiconductor physics and functioning of semiconductor devices
CO207.4	understand the optical properties of materials and working principles of various optical devices
CO207.5	appreciate the importance of nanotechnology and nanodevices
<b>GE3251 &amp; ENGINEERING GRAPHICS</b>	
CO208.1	Use BIS conventions and specifications for engineering drawing
CO208.2	Construct the conic curves, involutes and cycloid.
CO208.3	Solve practical problems involving projection of lines.
CO208.4	Draw the orthographic, isometric and perspective projections of simple solids.
CO208.5	Draw the development of simple solids.
<b>GE3272 &amp; COMMUNICATION LABORATORY</b>	
CO209.1	Speak effectively in group discussions held in formal/semi formal contexts.



Professor  
**THAMIRABHARANI ENGG. COLLEGE,**  
Tirunelveli, Tamilnadu-627 358

CO209.2	Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions
CO209.3	Write emails, letters and effective job applications.
CO209.4	:Write critical reports to convey data and information with clarity and precision
CO209.5	:Write critical reports to convey data and information with clarity and precision



Principal

THAMIRABHARANI ENGG. COLLEGE.

Tirunelveli, Tamilnadu-627 358



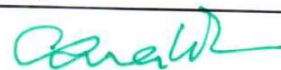
**THAMIRABHARANI ENGINEERING COLLEGE**

**TIRUNELVELI – 62358**

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**Course outcomes for all programs offered by the institution are to be stated and displayed on website**

<b>SEMESTER-III</b>	
<b>CS3353 &amp; C PROGRAMMING AND DATA STRUCTURES</b>	
CO301.1	Develop C programs for any real world/technical application.
CO301.2	Apply advanced features of C in solving problems
CO301.3	Write functions to implement linear and non-linear data structure operations.
CO301.4	Suggest and use appropriate linear/non-linear data structure operations for solving a given problem.
CO301.5	Appropriately use sort and search algorithms for a given application.
CO301.6	Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval.
<b>MA 3355 RANDOM PROCESSES AND LINEAR ALGEBRA</b>	
CO302.1	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.
CO302.2	Demonstrate accurate and efficient use of advanced algebraic techniques
CO302.3	Apply the concept of random processes in engineering disciplines.
CO302.4	Understand the fundamental concepts of probability with a thorough knowledge of standard distributions that can describe certain real-life phenomenon.
CO302.5	Understand the basic concepts of one and two dimensional random variables and apply them to model engineering problems.
<b>EC3351 &amp; CONTROL SYSTEMS</b>	
CO303.1	Compute the transfer function of different physical systems.
CO303.2	Analyse the time domain specification and calculate the steady state error.
CO303.3	Illustrate the frequency response characteristics of open loop and closed loop system response.
CO303.4	Analyse the stability using Routh and root locus techniques.
CO303.5	Illustrate the state space model of a physical system and discuss the concepts of sampled data control system.
<b>EC3352 &amp; DIGITAL SYSTEMS DESIGN</b>	
CO304.1	Use Boolean algebra and simplification procedures relevant to digital logic.
CO304.2	Design various combinational digital circuits using logic gates.
CO304.3	Analyse and design synchronous sequential circuits.
CO304.4	Analyse and design asynchronous sequential circuits. .
CO304.5	Build logic gates and use programmable devices
<b>EC3353 &amp; ELECTRONIC DEVICES AND CIRCUITS</b>	



Principal

THAMIRABHARANI ENGG. COLLEGE,  
Tirunelveli Tamilnadu-627 358

CO305.1	Explain the structure and working operation of basic electronic devices.
CO305.2	Design and analyze amplifiers.
CO305.3	Analyze frequency response of BJT and MOSFET amplifiers
CO305.4	Design and analyze feedback amplifiers and oscillator principles.
CO305.5	Design and analyze power amplifiers and supply circuits
<b>EC3354 &amp; SIGNALS AND SYSTEMS</b>	
CO306.1	Determine if a given system is linear/causal/stable
CO306.2	Determine the frequency components present in a deterministic signal
CO306.3	Characterize continuous LTI systems in the time domain and frequency domain
CO306.4	Characterize discrete LTI systems in the time domain and frequency domain
CO306.5	Compute the output of an LTI system in the time and frequency domains
<b>CS3362 &amp; C PROGRAMMING AND DATA STRUCTURES LABORATORY</b>	
CO307.1	Use different constructs of C and develop applications
CO307.2	Write functions to implement linear and non-linear data structure operations
CO307.3	Suggest and use the appropriate linear / non-linear data structure operations for a given problem
CO307.4	Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval
CO307.5	Implement Sorting and searching algorithms for a given application
<b>EC3361 &amp; ELECTRONIC DEVICES AND CIRCUITS LABORATORY</b>	
CO308.1	Characteristics of PN Junction Diode and Zener diode.
CO308.2	Design and Testing of BJT and MOSFET amplifiers.
CO308.3	Operation of power amplifiers.
<b>GE3361 &amp; PROFESSIONAL DEVELOPMENT</b>	
CO309.1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements
CO309.2	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding
CO309.3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.



Principal  
**THAMIRABHARANI ENGG. COLLEGE,**  
Tirunelveli, Tamilnadu-627 358



**THAMIRABHARANI ENGINEERING COLLEGE  
TIRUNELVELI – 62358**

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

Course outcomes for all programs offered by the institution are to be stated and displayed on website

<b>SEMESTER-IV</b>	
<b>EC3452 &amp; ELECTROMAGNETIC FIELDS</b>	
CO401.1	Relate the fundamentals of vector, coordinate system to electromagnetic concepts
CO401.2	Analyze the characteristics of Electrostatic field
CO401.3	Interpret the concepts of Electric field in material space and solve the boundary conditions
CO401.4	Explain the concepts and characteristics of Magneto Static field in material space and solve boundary conditions.
CO401.5	
<b>EC3401 &amp; NETWORKS AND SECURITY</b>	
CO402.1	Explain the Network Models, layers and functions.
CO402.2	Categorize and classify the routing protocols.
CO402.3	List the functions of the transport and application layer.
CO402.4	Evaluate and choose the network security mechanisms.
CO402.5	Discuss the hardware security attacks and countermeasures.
<b>EC3492 &amp; DIGITAL SIGNAL PROCESSING</b>	
CO403.1	Apply DFT for the analysis of digital signals and systems
CO403.2	Design IIR and FIR filters
CO403.3	Characterize the effects of finite precision representation on digital filters
CO403.4	Design multirate filters
CO403.5	Apply adaptive filters appropriately in communication systems
<b>EC3491 &amp; COMMUNICATION SYSTEMS</b>	
CO404.1	Gain knowledge in amplitude modulation techniques
CO404.2	Understand the concepts of Random Process to the design of communication systems
CO404.3	Gain knowledge in digital techniques
CO404.4	Gain knowledge in sampling and quantization
CO404.5	Understand the importance of demodulation techniques
<b>EC3451 &amp; LINEAR INTEGRATED CIRCUITS</b>	
CO405.1	Design linear and nonlinear applications of OP – AMPS
CO405.2	Design applications using analog multiplier and PLL
CO405.3	Design ADC and DAC using OP – AMPS
CO405.4	Generate waveforms using OP – AMP Circuits
CO405.5	Analyze special function ICs
<b>GE3451 &amp; ENVIRONMENTAL SCIENCES AND SUSTAINABILITY</b>	



Principal  
THAMIRABHARANI ENGG. COLLEGE,  
Tirunelveli, Tamilnadu-627 358

CO406.1	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.
CO406.2	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.
CO406.3	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.
CO406.4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.
CO406.5	
<b>EC3461 &amp; COMMUNICATION SYSTEMS LABORATORY</b>	
CO407.1	Design AM, FM & Digital Modulators for specific applications.
CO407.2	Compute the sampling frequency for digital modulation.
CO407.3	Simulate & validate the various functional modules of Communication system.
CO407.4	Demonstrate their knowledge in base band signaling schemes through implementation of digital modulation schemes.
CO407.5	Apply various channel coding schemes & demonstrate their capabilities towards
<b>EC3462 &amp; LINEAR INTEGRATED CIRCUITS LABORATORY</b>	
CO408.1	Analyze various types of feedback amplifiers
CO408.2	Design oscillators, tuned amplifiers, wave-shaping circuits and multivibrators
CO408.3	Design and simulate feedback amplifiers, oscillators, tuned amplifiers, wave-shaping circuits and multivibrators, filters using SPICE Tool.
CO408.4	Design amplifiers, oscillators, D-A converters using operational amplifiers.
CO408.5	



Principal  
THAMIRABHARANI ENGG. COLLEGE.  
Tirunelveli, Tamilnadu-627 358



**THAMIRABHARANI ENGINEERING COLLEGE**  
**TIRUNELVELI – 62358**  
**DEPARTMENT OF MECHANICAL ENGINEERING**

Course outcomes for all programs offered by the institution are to be stated and displayed on website

<b>SEMESTER-I</b>	
<b>HS3151 Professional English - I</b>	
CO101.1	To use appropriate words in a professional context
CO101.2	To gain understanding of basic grammatic structures and use them in right context.
CO101.3	To read and infer the denotative and connotative meanings of technical texts
CO101.4	To write definitions, descriptions, narrations and essays on various topics
<b>MA 3151 MATRICES AND CALCULUS</b>	
CO102.1	Use the matrix algebra methods for solving practical problems.
CO102.2	Apply differential calculus tools in solving various application problems.
CO102.3	Able to use differential calculus ideas on several variable functions.
CO102.4	Apply different methods of integration in solving practical problems.
CO102.5	Apply multiple integral ideas in solving areas, volumes and other practical problems.
<b>PH3151 ENGINEERING PHYSICS</b>	
CO103.1	Understand the importance of mechanics.
CO103.2	Express their knowledge in electromagnetic waves
CO103.3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
CO103.4	Understand the importance of quantum physics
CO103.5	Comprehend and apply quantum mechanical principles towards the formation of energy bands
<b>CY3151 Engineering Chemistry</b>	
CO104.1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.
CO104.2	To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.
CO104.3	To apply the knowledge of phase rules and composites for material selection requirements.
CO104.4	To recommend suitable fuels for engineering processes and applications.
CO104.5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.
<b>GE3151 PROBLEM SOLVING AND PYTHON PROGRAMMING</b>	

Principal  
**THAMIRABHARANI ENGG. COLLEGE.**  
 Tirunelveli, Tamilnadu-627 358

CO105.1	Develop algorithmic solutions to simple computational problems.
CO105.2	Develop and execute simple Python programs.
CO105.3	Write simple Python programs using conditionals and looping for solving problems.
CO105.4	Decompose a Python program into functions.
CO105.5	Represent compound data using Python lists, tuples, dictionaries etc.
CO105.6	Read and write data from/to files in Python programs
<b>BS3171 Physics and Chemistry Laboratory</b>	
CO106.1	Understand the functioning of various physics laboratory equipment.
CO106.2	Use graphical models to analyze laboratory data.
CO106.3	Use mathematical models as a medium for quantitative reasoning and describing physical reality.
CO106.4	Access, process and analyze scientific information.
CO106.5	Solve problems individually and collaboratively.
<b>GE3172 English Laboratory</b>	
CO107.1	To listen and comprehend complex academic texts
CO107.2	To speak fluently and accurately in formal and informal communicative contexts
CO107.3	To express their opinions effectively in both oral and written medium of communication
<b>GE3171 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY</b>	
CO108.1	Develop algorithmic solutions to simple computational problems
CO108.2	Develop and execute simple Python programs
CO108.3	Implement programs in Python using conditionals and loops for solving problems
CO108.4	Deploy functions to decompose a Python program.
CO108.5	Process compound data using Python data structures
CO108.6	Utilize Python packages in developing software applications.



Principal  
**THAMIRABHARANI ENGG. COLLEGE.**  
 Tirunelveli, Tamilnadu-627 358



**THAMIRABHARANI ENGINEERING COLLEGE**  
**TIRUNELVELI – 62358**

**DEPARTMENT OF MECHANICAL ENGINEERING**

Course outcomes for all programs offered by the institution are to be stated and displayed on website

<b>SEMESTER-II</b>	
<b>HS3252 Professional English - II</b>	
CO201.1	To compare and contrast products and ideas in technical texts.
CO201.2	To identify and report cause and effects in events, industrial processes through technical texts
CO201.3	To analyse problems in order to arrive at feasible solutions and communicate them in the written format.
CO201.4	To present their ideas and opinions in a planned and logical manner
CO201.5	To draft effective resumes in the context of job search.
<b>MA 3251 STATISTICS AND NUMERICAL METHODS</b>	
CO202.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.
CO202.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.
CO202.3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems
CO202.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
CO202.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
<b>BE3251- Basic Electrical and Electronics Engineering</b>	
CO203.1	Understand to compute the electric circuit parameters for simple problems
CO203.2	Understand about the working principle and applications of electrical machines
CO203.3	Analyze the characteristics of analog electronic devices
CO203.4	Understand about the basic concepts of digital electronics
CO203.5	Understand about the operating principles of measuring instruments
<b>PH3251 Materials Science</b>	
CO204.1	know basics of crystallography and its importance for varied materials properties
CO204.2	gain knowledge on the electrical and magnetic properties of materials and their applications
CO204.3	understand clearly of semiconductor physics and functioning of semiconductor devices
CO204.4	understand the optical properties of materials and working principles of various optical devices



Principal  
**THAMIRABHARANI ENGG. COLLEGE,**  
 Tirunelveli, Tamilnadu-627 358

CO204.5	appreciate the importance of functional nanoelectronic devices.
<b>GE3251 Engineering Graphics</b>	
CO205.1	Use BIS conventions and specifications for engineering drawing.
CO205.2	Construct the conic curves, involutes and cycloid.
CO205.3	Solve practical problems involving projection of lines.
CO205.4	Draw the orthographic, isometric and perspective projections of simple solids.
CO205.5	Draw the development of simple solids.
<b>GE3271 Engineering Practices Laboratory</b>	
CO206.1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.
CO206.2	Wire various electrical joints in common household electrical wire work.
CO206.3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.
CO206.4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB
<b>BE3271 Basic Electrical and Electronics Engineering Laboratory</b>	
CO207.1	Use experimental methods to verify the Ohm's and Kirchhoff's Laws.
CO207.2	Analyze experimentally the load characteristics of electrical machines
CO207.3	Analyze the characteristics of basic electronic devices
CO207.4	Use DSO to measure the various parameters
<b>GE3272 Communication Laboratory</b>	
CO208.1	Speak effectively in group discussions held in a formal/semi formal contexts.
CO208.2	Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions
CO208.3	Write emails, letters and effective job applications.
CO208.4	Write critical reports to convey data and information with clarity and precision
CO208.5	Give appropriate instructions and recommendations for safe execution of tasks

Principal  
**THAMIRABHARANI ENGG. COLLEGE**  
 Tirunelveli, Tamilnadu-627 356



**THAMIRABHARANI ENGINEERING COLLEGE  
TIRUNELVELI – 62358**

**DEPARTMENT OF MECHANICAL ENGINEERING**

**Course outcomes for all programs offered by the institution are to be stated and displayed on website**

<b>SEMESTER-III</b>	
<b>MA 3351 Transforms and Partial Differential Equations</b>	
CO301.1	Understand how to solve the given standard partial differential equations.
CO301.2	engineering applications
CO301.3	two dimensional heat flow problems and one dimensional wave equations.
CO301.4	equations would provide them the ability to formulate and solve some of the physical
CO301.5	by using Z transform techniques for discrete time systems
<b>MA 3351 Engineering Mechanics</b>	
CO302.1	Illustrate the vector and scalar representation of forces and moments
CO303.2	Analyse the rigid body in equilibrium
CO303.3	Evaluate the properties of distributed forces
CO303.4	Determine the friction and the effects by the laws of friction
CO303.5	Determine the friction and the effects by the laws of friction
<b>ME3391 Engineering Thermodynamics</b>	
CO303.1	and calculating
CO303.2	devices through
CO303.3	steam through
CO303.4	steam through
CO303.5	Apply the properties of gas mixtures in calculating the properties of gas mixtures and applying various thermodynamic relations to calculate property changes.
<b>CE3391 Fluid Mechanics and Machinery</b>	
CO304.1	Understand the properties and behaviour in static conditions. Also, to understand the conservation laws applicable to fluids and its application through fluid kinematics and dynamics
CO304.2	Understand the properties and behaviour in static conditions. Also, to understand the conservation laws applicable to fluids and its application through fluid kinematics and dynamics
CO304.3	Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performances of prototype by model studies
CO304.4	Explain the working principles of various turbines and design the various types of turbines.
CO304.5	Explain the working principles of centrifugal, reciprocating and rotary pumps and design the centrifugal and reciprocating pumps
<b>ME3392 Engineering Materials and Metallurgy</b>	



Principal  
THAMIRABHARANI ENGG. COLLEGE,  
Tirunelveli, Tamilnadu-627 358

CO305.1	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification.
CO305.2	Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes.
CO305.3	Clarify the effect of alloying elements on ferrous and non-ferrous metals.
CO305.4	Summarize the properties and applications of non-metallic materials.
CO305.5	Summarize the properties and applications of non-metallic materials.
<b>ME3393 Manufacturing Processes</b>	
CO306.1	Explain the principle of different metal casting processes.
CO306.2	Describe the various metal joining processes.
CO306.3	Illustrate the different bulk deformation processes.
CO306.4	Apply the various sheet metal forming process.
CO306.5	Apply suitable molding technique for manufacturing of plastics components.
<b>ME3381 Computer Aided Machine Drawing</b>	
CO307.1	Prepare standard drawing layout for modelled assemblies with BoM.
CO307.2	Model orthogonal views of machine components.
CO307.3	Prepare standard drawing layout for modelled parts
<b>ME3382 Manufacturing Technology Laboratory</b>	
CO308.1	Demonstrate the safety precautions exercised in the mechanical workshop and join two metals using GMAW
CO308.2	The students able to make the work piece as per given shape and size using machining process such as rolling, drawing, turning, shaping, drilling and milling.
CO308.3	The students become make the gears using gear making machines and analyze the defects in the cast and machined components
<b>GE3361 Professional Developments</b>	
CO309.1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements
CO309.2	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding
CO309.3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.

*Caral*

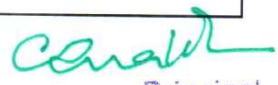
Principal  
THAMIRABHARANI ENGG. COLLEGE.  
Tirunelveli, Tamilnadu-627 358



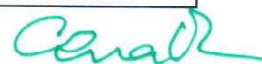
**THAMIRABHARANI ENGINEERING COLLEGE**  
**TIRUNELVELI – 62358**  
**DEPARTMENT OF MECHANICAL ENGINEERING**

Course outcomes for all programs offered by the institution are to be stated and displayed on website

<b>SEMESTER-IV</b>	
<b>ME3491 Theory of Machines</b>	
CO401.1	Discuss the basics of mechanism.
CO401.2	Solve problems on gears and gear trains.
CO401.3	Solve problems on gears and gear trains.
CO401.4	Calculate static and dynamic forces of mechanisms.
CO401.5	masses.
<b>ME3451 Thermal Engineering</b>	
CO402.1	Apply thermodynamic concepts to different air standard cycles and solve problems
CO402.2	To solve problems in steam nozzle and calculate critical pressure ratio
CO402.3	solve problems.
CO402.4	solve problems.
CO402.5	Calculate the various performance parameters of IC engines
<b>ME3492 Hydraulics and Pneumatics</b>	
CO403.1	Apply the working principles of fluid power systems and hydraulic pumps.
CO403.2	Apply the working principles of hydraulic actuators and control components.
CO403.3	Design and develop hydraulic circuits and systems.
CO403.4	components.
CO403.5	Identify various troubles shooting methods in fluid power systems.
<b>ME3493 Manufacturing Technology</b>	
CO404.1	Apply the mechanism of metal removal process and to identify the factors involved in improving machinability.
CO404.2	Describe the constructional and operational features of centre lathe and other special purpose lathes.
CO404.3	Describe the constructional and operational features of reciprocating machine tools.
CO404.4	Apply the constructional features and working principles of CNC machine tools.
CO404.5	Demonstrate the Program CNC machine tools through planning, writing codes and setting up CNC machine tools to manufacture a given component.
<b>CE3491 Strength of Materials</b>	
CO405.1	Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes.

  
Principal  
**THAMIRABHARANI ENGG. COLLEGE,**  
Tirunelveli, Tamilnadu-627 368

CO405.2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.
CO405.3	Apply basic equation of torsion in designing of shafts and helical springs
CO405.4	Calculate slope and deflection in beams using different methods.
CO405.5	Analyze thin and thick shells for applied pressures.
<b>GE3451 Environmental Sciences and Sustainability</b>	
CO406.1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.
CO406.2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.
CO406.3	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.
CO406.4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.
CO406.5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.
<b>CE3481 Strength of Materials and Fluid Machinery Laboratory</b>	
CO407.1	Determine the tensile, torsion and hardness properties of metals by testing
CO407.2	Determine the stiffness properties of helical and carriage spring
CO407.3	Apply the conservation laws to determine the coefficient of discharge of a venturimeter and finding the friction factor of given pipe
CO407.4	Apply the fluid static and momentum principles to determine the metacentric height and forces due to impact of jet
CO407.5	Determine the performance characteristics of turbine, rotodynamic pump and positive displacement pump.
<b>ME3461 Thermal Engineering Laboratory</b>	
CO408.1	Conduct tests to evaluate performance characteristics of IC engines
CO408.2	Conduct tests to evaluate the performance of refrigeration cycle
CO408.3	Conduct tests to evaluate Performance and Energy Balance on a Steam Generator.

  
THAMIRABHARANI ENGG. COLLEGE,  
Tirunelveli, Tamilnadu-627 358

Principal  
THAMIRABHARANI ENGG. COLLEGE,  
Tirunelveli, Tamilnadu-627 358



**R\_2017**



# THAMIRABHARANI ENGINEERING COLLEGE

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

## DEPARTMENT OF CIVIL ENGINEERING

### LIST OF COURSE OUTCOMES

SEMESTER I	
<b>HS8151 Communicative English</b>	
CO101.1	Read articles of a general kind in magazines and newspapers
CO101.2	Participate effectively in informal conversations; self-introduction and expression of opinions in English
CO101.3	Comprehend conversations and short talks delivered in English
CO101.4	Write short essays of a general kind and personal letters and emails in English
CO101.5	Develop vocabulary of a general kind by developing their reading skills
<b>MA8151 Engineering Mathematics - I</b>	
CO102.1	Apply differential calculus tools in solving various application problems
CO102.2	Apply differentiation to solve maxima and minima problems
CO102.3	Apply different methods of integration in solving practical problems
CO102.4	Apply integration to compute multiple integrals, area, volume, in polar coordinates, by changing order and variables
CO102.5	Apply various techniques in solving differential equations
<b>PH8151 Engineering Physics</b>	
CO103.1	Gain knowledge on the basics of properties of matter and its applications
CO103.2	Acquire knowledge on the concept of waves and optical devices and apply in fiber optics
CO103.3	Analyze the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers
CO103.4	Understand the advanced physics concepts of quantum theory and its applications in tunneling microscopes
CO103.5	Understand the basics of crystals, their structures and different crystal growth techniques

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE

Chathirampudukulam Village,  
Chidambaranagar - Vepemkulam Road,  
Thatchanallur, Tirunelveli - 627 358.



<b>CY8151 Engineering Chemistry</b>	
CO104.1	Understand the principles of water, characterization and treatment for potable and industrial purposes
CO104.2	Apply the knowledge of adsorption and catalysis in engineering technology
CO104.3	Understand the phase transition of one component and two component systems and the types of alloys and their applications
CO104.4	Understand the chemistry of various fuels and their combustion
CO104.5	Analyze the different forms of energy sources and compare the materials for constructing Battery and fuel cells.
<b>GE8151 Problem Solving and Python Programming</b>	
CO105.1	Develop algorithmic solutions to simple computational problems.
CO105.2	Read, write, execute by hand simple Python programs.
CO105.3	Structure simple Python programs for solving problems.
CO105.4	Represent compound data using Python lists, tuples, dictionaries
CO105.5	Read and write data from/to files in Python Programs.
<b>GE8152 Engineering Graphics</b>	
CO106.1	Familiarize with the fundamentals and standards of Engineering graphics
CO106.2	Perform freehand sketching of basic geometrical constructions and multiple views of objects
CO106.3	Project orthographic projections of lines and plane surfaces
CO106.4	Draw projections and solids and development of surfaces
CO106.5	Visualize and to project isometric and perspective sections of simple solids
<b>GE8161 Problem Solving and Python Programming Laboratory</b>	
CO107.1	Write, test, and debug simple Python programs
CO107.2	Implement Python programs with conditionals and loops
CO107.3	Develop Python programs step-wise by defining functions and calling them
CO107.4	Use Python lists, tuples, and dictionaries for representing compound data
CO107.5	Read and write data from/to files in Python

  
**PRINCIPAL**  
**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaranagar - Veerankulam Road  
 Thatchanallur, Tirunelveli - 627 953.

<b>BS8161 Physics and Chemistry Laboratory</b>	
CO108.1	Apply the physics principles of Thermal physics and Properties of Matter to evaluate properties of materials
CO108.2	Understand measurement technique and usage of new instrument in Optics for real time application in Engineering
CO108.3	Apply the knowledge of semiconducting material, to evaluate the band gap of material useful for engineering solutions
CO108.4	Apply the knowledge of velocity of sound and compressibility of liquid – Ultrasonic interferometer
CO108.5	Understand measurements of air wedge method and evaluate the wavelength of spectrum
CO108.6	Obtain hands-on knowledge in the quantitative chemical analysis of water quality related parameters
CO108.7	Understand the experimental concepts in the mixture of acids and bases
CO108.8	Appreciate the need of Potentiometer, pH meter and Conductivity meter in the determination of concentration of ions
<b>SEMESTER II</b>	
<b>HS8251 Technical English</b>	
CO201.1	Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, and argue using appropriate communicative strategies
CO201.2	Write effectively and persuasively and produce different types of writings such as narration, description, exposition
CO201.3	Write the argument with creative, critical, analytical and evaluation writing
CO201.4	Read different genres of texts, infer implied meanings and critically analyze and evaluate them for ideas as well as for method of presentation
CO201.5	Listen / view and comprehend different spoken excerpts critically and infer unspoken and implied meanings
<b>MA8251 Engineering Mathematics - II</b>	
CO202.1	Compute Eigen values and Eigen vectors of a matrix, diagonalise symmetric matrices and similar matrices
CO202.2	Explain gradients, potential functions, and directional derivatives of functions of several variables. Compute line, surface and volume integral using Gauss divergence, Green's and Stoke's theorem
CO202.3	Discuss analytic functions in heat and fluid flow
CO202.4	Extend the concept of contour integrals in evaluating Real integrals
CO202.5	Discuss Laplace Transform methods to solve initial value problems for constant coefficient linear ODEs

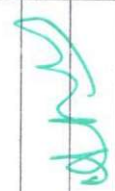
**PRINCIPAL**

**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaramagar - Vepankulam Road,  
 Thatchanallur, Tirunelveli - 627 353.



<b>PH8253 &amp; Physics for Civil Engineering</b>	
CO203.1	Gain knowledge on the thermal performance of buildings
CO203.2	Acquire knowledge on the acoustic properties of buildings
CO203.3	Acquire knowledge on various lighting designs for buildings.
CO203.4	Gain knowledge on the properties and performance of engineering materials
CO203.5	Understand the hazards of buildings and application of the concept of physics in rectifying the problems.
<b>BE8252 &amp; Basic Electronics and Electrical Engineering</b>	
CO204.1	Acquire knowledge theorems used in Electrical circuits and components and function of electrical machines
CO204.2	Understand the fundamentals of semiconductor and applications.
CO204.3	Understand the principles of digital electronics and communication.
CO204.4	Identify the electrical components and explain the characteristics of electrical machines
CO204.5	Identify electronics components and understand the characteristics
<b>GE8291 &amp; Environmental Science and Engineering</b>	
CO205.1	Acquire knowledge on Environmental Pollution or problems that cannot be solved by mere laws
CO205.2	Understand that Public participation is an important aspect which serves the environmental Protection
CO205.3	Apply scientific, technological, economic and political solutions to environmental problems
CO205.4	Assess the importance and impact of environment on human world
CO205.5	Analyze pollution control, waste management
<b>GE8292 &amp; Engineering Mechanics</b>	
CO206.1	Illustrate the vectorial and scalar representation of forces and moments.
CO206.2	Analyse the rigid body in equilibrium.
CO206.3	Evaluate the properties of surfaces and solids.
CO206.4	Calculate dynamic forces exerted in rigid body.
CO206.5	Determine the friction and the effects by the laws of friction.

  
**PRINCIPAL**  
**THAMIRADHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaramagar - Vepemkulam Road,  
 Thatchanallur, Tirunelveli - 627 353.

<b>GE8261 &amp; Engineering Practices Laboratory</b>	
CO207.1	Fabricate carpentry components and pipe connections including plumbing works
CO207.2	Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and soldering practices
CO207.3	Carry out basic home electrical works and appliances and measure the electrical quantities; make models using sheet metal
<b>CE8211 &amp; Computer Aided Building Drawing</b>	
CO208.1	Analyze the working components, gates, soldering practices.
CO208.2	Examine the quantities such as resistance capacitance, inductance etc.
<b>SEMSTER III</b>	
<b>MA8353 &amp; Transforms and Partial Differential Equations</b>	
CO301.1	Understand how to solve the given standard partial differential equations
CO301.2	Solve differential equations using Fourier series analysis which plays a vital role in Engineering applications
CO301.3	Apply Fourier series technique in one and two dimensional heat flow problems and one dimensional wave equations
CO301.4	Understand the mathematical principles to formulate and solve some of the physical problems of Engineering.
CO301.5	Apply effective mathematical tools for the solutions of partial differential equations for discrete time systems.
<b>CE8301 &amp; Strength of Materials I</b>	
CO302.1	Understand the concepts of stress and strain, principal stresses and principal planes
CO302.2	Determine Shear force and bending moment in beams and understand concept of theory of simple bending
CO302.3	Evaluate the deflection of beams by different methods and selection of method for determining slope or deflection
CO302.4	Apply basic equation of torsion in design of circular shafts and helical springs
CO302.5	Analyze the pin jointed plane and space trusses
<b>CE8302 &amp; Fluid Mechanics</b>	
CO303.1	knowledge of fluids in static, kinematic and dynamic equilibrium
CO303.2	Understand and solve the problems related to equation of motion
CO303.3	Knowledge about dimensional and model analysis.
CO303.4	Knowledge about types of flow and losses of flow in pipes.
<div style="text-align: right;">   <b>PRINCIPAL</b>  <b>THAMIRABHARANI ENGINEERING COLLEGE</b>            Chathirampudukulam Village,            Chidambaranagar - Vepankulam Road,            Thatchanallur, Tirunelveli - 627 353.         </div>	



CO303.5	Understand and solve the boundary layer problems.
<b>CE8351 &amp; Surveying</b>	
CO304.1	Understand the use of various surveying instruments and mapping.
CO304.2	Understand measuring horizontal angle and vertical angle using different instruments.
CO304.3	Understand methods of Levelling and setting Levels with different instruments
CO304.4	Understand concepts of astronomical surveying and methods to determine time, longitude, latitude and azimuth.
CO304.5	Understand concept and principle of modern surveying
<b>CE8391 &amp; Construction Materials</b>	
CO305.1	Knowledge about properties of most common and advanced building materials.
CO305.2	Understand the typical and potential applications of lime, cement and aggregates
CO305.3	Knowledge about the production of concrete and also the method of placing and making of concrete elements.
CO305.4	Understand the applications of timbers and other materials.
CO305.5	Understand the importance of modern material for construction
<b>CE8392 &amp; Engineering Geology</b>	
CO306.1	Understand the importance of knowledge about earth, earthquake, volcanism and the action of various geological agencies.
CO306.2	Knowledge on properties of minerals.
CO306.3	Knowledge about types of rocks, their distribution and uses.
CO306.4	Understand the methods of study on geological structure.
CO306.5	Understand the application of geological investigation in projects such as dams, tunnels, bridges, roads, airport and harbour
<b>CE8311 &amp; Construction Materials Laboratory</b>	
CO307.1	Understand the properties and behaviour of construction materials.
CO307.2	Knowledge in the area of testing of construction materials
CO307.3	Knowledge in components of construction elements experimentally
CO307.4	Analyse the choice of material for a particular work.



**PRINCIPAL**

**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaramagar - Veerankulam Road,  
 Thatchanallur, Tirunelveli - 627 353.

<b>CE8361 &amp; Surveying Laboratory</b>	
CO308.1	Knowledge on handling basic survey instruments including Theodolite, Tacheometer
CO308.2	Practical knowledge on handling survey instruments like Total Station and GPS
CO308.3	Knowledge to carryout Triangulation and Astronomical surveying including general field marking for various engineering
<b>HS8381 Interpersonal Skills/Listening&amp; Speaking</b>	
CO309.1	Listen sharply and reading keenly to understand and act aptly
CO309.2	Employ the soft skills to become a Successful leader
CO309.3	Make effective presentation and to excel in Group Discussions
CO309.4	Participate confidently and appropriately in conversations both formal and informal
<b>SEMSTER IV</b>	
<b>MA8491 &amp; Numerical Methods</b>	
CO401.1	Understand the basic concepts and techniques of solving algebraic and transcendental equations
CO401.2	Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life
CO401.3	Apply the numerical techniques of differentiation and integration for engineering problems
CO401.4	Knowledge of various techniques and methods for solving first and second order ordinary differential equations
CO401.5	Apply partial and ordinary differential equations with initial and boundary conditions to solve Engineering problems
<b>CE8401 &amp; Construction Techniques and Practices</b>	
CO402.1	Knowledge in different construction techniques and structural systems
CO402.2	Understand various techniques and practices on masonry construction, flooring, and roofing.
CO402.3	Knowledge in planning the requirements for substructure construction.
CO402.4	Knowledge in methods and techniques involved in the construction of various types of super structures.
CO402.5	Apply the principles learnt to select, maintain and operate hand and power tools and equipment used in construction sites
<b>CE8402 &amp; Strength of Materials II</b>	
CO403.1	Knowledge in strain energy and compute the deflection of determinate beams, frames and trusses using energy principles
CO403.2	Analyze propped cantilever, fixed beams and continuous beams using theorem of three moment equation



CO403.3	Evaluate the load carrying capacity of columns and stresses induced in columns and cylinders.
CO403.4	Evaluate principal stresses and planes for an element in three dimensional state of stress and study various theories of stress.
CO403.5	Evaluate the stresses due to Unsymmetrical bending of beams, locate the shear centre, and find the stresses in curved beams
<b>CE8403 &amp; Applied Hydraulic Engineering</b>	
CO404.1	Apply their knowledge of fluid mechanics in addressing problems in open channels.
CO404.2	Identify an effective section for flow in different cross sections.
CO404.3	Solve problems in uniform, gradually and rapidly varied flows in steady state conditions.
CO404.4	Understand the principles, working and application of turbines
CO404.5	Understand the principles, working and application of pumps.
<b>CE8404 &amp; Concrete Technology</b>	
CO405.1	Understand the various requirements of cement, aggregates and water for making concrete.
CO405.2	Understand the effect of admixtures on properties of concrete
CO405.3	Understand the concept and procedure of mix design as per IS method
CO405.4	Understand the properties of concrete at fresh and hardened state
CO405.5	Understand the importance and application of special concretes
<b>CE8491 &amp; Soil Mechanics</b>	
CO406.1	Knowledge on classification and the engineering properties of soil based on index properties
CO406.2	Understand the stress concepts in soils.
CO406.3	Understand and identify the settlement in soils
CO406.4	Determine the shear strength of soil.
CO406.5	Analyse both finite and infinite slopes.
<b>CE8481 &amp; Strength of Materials Laboratory</b>	

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE,  
Chathirampudukulam Village,  
Chidambaramagar - Vepankulam Road,  
Thatchanallur, Tirunelveli - 627 353.

CO407.1	To test different materials and components under the action of various forces
CO407.2	Determine their characteristics experimentally.
CO407.3	Apply the testing methods under various situations.
<b>CE8461 &amp; Hydraulic Engineering Laboratory</b>	
CO408.1	Measure flow in pipes, notches, orifice and venturimeter
CO408.2	Determine frictional losses during flow in pipes
CO408.3	Develop characteristics of pumps and turbines.
<b>HS8461 Advanced Reading and Writing</b>	
CO409.1	Apply the concept of critical reading and Analytical reading and comprehend the key ideas and gist of a passage.
CO409.2	Understand the importance of the presentation skills; analyze the given topic and the principles of grammar in written expressions.
CO409.3	Apply the concepts of grammar, various strategies and the usage of formal language in written expression.
CO409.4	Apply the concepts of accurate English while writing and become equally at ease in using good vocabulary and language skills.
<b>SEMESTER V</b>	
<b>CE8501 &amp; Design of Reinforced Cement Concrete Elements</b>	
CO501.1	Understand the various design methodologies for the design of RC elements
CO501.2	Design of flanged beams by limit state method and sign of beams for shear, bond and torsion
CO501.3	Design the various types of slabs and staircase by limit state method
CO501.4	Design columns for axial, uniaxial and biaxial eccentric loadings
CO501.5	Design of footing by limit state
<b>CE8502 &amp; Structural Analysis I</b>	
CO502.1	Analyze continuous beams, pin-jointed indeterminate plane frames and rigid plane frames by strain energy method
CO502.2	Analyze the continuous beams and rigid frames by slope deflection method.

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE  
 Chathirampudukulam Village,  
 Chidambaramnagar - Vepemkulam Road.  
 Thatchanallur, Tirunelveli - 627 353.



CO502.3	Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway.
CO502.4	Analyze the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method.
CO502.5	Understand the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames.
<b>EN8491 &amp; Water Supply Engineering</b>	
CO503.1	Understand the structure of drinking water supply systems, including water transport, treatment and distribution
CO503.2	Knowledge in various unit operations and processes in water treatment
CO503.3	Design the various functional units in water treatment.
CO503.4	Understanding of water quality criteria and standards, and their relation to public health.
CO503.5	Evaluate water supply project alternatives on basis of chosen criteria.
<b>CE8591 &amp; Foundation Engineering</b>	
CO504.1	Understand the site investigation, methods and sampling
CO504.2	Knowledge on bearing capacity and testing methods
CO504.3	Knowledge on design shallow footings
CO504.4	Determine the load carrying capacity, settlement of pile foundation
CO504.5	Determine the earth pressure on retaining walls and analysis for stability
<b>GE8074 &amp; Human Rights</b>	
CO505.1	Knowledge about basics of human rights.
CO505.2	Knowledge about development of human rights by UN
CO505.3	Know the parts in Indian constitution about human rights.
CO505.4	Knowledge about the socio-economically, culturally affected peoples' right.
CO505.5	Knowledge about human rights through education system
<b>OA1551 &amp; Environment and Agriculture</b>	



PRINCIPAL

**THAMIRASHARANI ENGINEERING COLLEGE**

Chathirampudukulam Village,  
Chidambaramagar - Vepemkulam Road  
Thatchanallur, Tirunelveli - 627 453.

CO506.1	Understand the role of environment in the current practice of agriculture.
CO506.2	Understand various environmental impacts.
CO506.3	Understand various climate impacts and changes in environmental impacts due to climatic changes.
CO506.4	Understand various ecological diversities and environmental impacts on agriculture.
CO506.5	Understand various emerging environmental issues.
<b>CE8511 &amp; Soil Mechanics Laboratory</b>	
CO507.1	Knowledge to conduct tests to determine the index of soil and engineering properties of soil.
CO507.2	Knowledge to characterize the soil based on their properties.
CO507.3	Knowledge to select the soil under different situations
<b>CE8512 &amp; Water and Wastewater Analysis Laboratory</b>	
CO508.1	Analyse the physical, chemical and biological characteristics of water and wastewater.
CO508.2	Quantify the pollutant concentration in water and wastewater
CO508.3	Examine the conditions for the growth of micro-organisms.
<b>CE8513 &amp; Survey Camp</b>	
CO509.1	Practical training in the field work.
CO509.2	Knowledge about contouring and do calculations for surveying and leveling.
CO509.3	Knowledge about mapping and contouring the area.
<b>SEMESTER -- VI</b>	
<b>CE8601 &amp; Design of Steel Structural Elements</b>	
CO601.1	Understand the concepts of various design philosophies.
CO601.2	Design common bolted and welded connections for steel structures
CO601.3	Design tension members and understand the effect of shear lag
CO601.4	Understand the design concept of axially loaded columns and column base connections.
CO601.5	Understand specific problems related to the design of laterally restrained and unrestrained steel beams
<b>CE8602 &amp; Structural Analysis II</b>	



CO602.1	Knowledge on statically determinate structures and calculate critical stress resultants
CO602.2	Understand Muller Breslau principle and draw the influence lines for statically indeterminate beams.
CO602.3	Analyse of three hinged, two hinged and fixed arches.
CO602.4	Analyse the suspension bridges with stiffening girders.
CO602.5	Understand the concept of Plastic analysis and the method of analysing beams and rigid frames.
<b>CE8691 &amp; Irrigation Engineering</b>	
CO603.1	Knowledge and skills on crop water requirements.
CO603.2	Understand the methods and management of irrigation.
CO603.3	Knowledge on types of Impounding structures.
CO603.4	Understand methods of irrigation including canal irrigation
CO603.5	Knowledge on water management on optimization of water use.
<b>CE8604 &amp; Highway Engineering</b>	
CO604.1	Knowledge on planning and aligning of highway.
CO604.2	Design of highways.
CO604.3	Design flexible and rigid pavements.
CO604.4	Knowledge In Highway construction materials, properties, testing methods.
CO604.5	Understand the concept of pavement management system, evaluation of distress and maintenance of pavements.
<b>EN8492 &amp; Wastewater Engineering</b>	
CO605.1	Estimate sewage generation and design sewer system including sewage pumping stations.
CO605.2	Understanding on the characteristics and composition of sewage, self-purification of streams
CO605.3	Design of the unit operations and processes that are used in sewage treatment
CO605.4	Understand the standard methods for disposal of sewage.
CO605.5	Knowledge on sludge treatment and disposal
<b>CE8611 &amp; Highway Engineering Laboratory</b>	

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE  
 Chathirampekkulam Village,  
 Chidambaramagar - Veperur Road,  
 Thatchanallur, Tirunelveli - 627 358.

CO606.1	Knowledge in the principles of testing of highway materials
CO606.2	Knowledge about procedures for testing of aggregates, aggregates, bitumen and bituminous mixes
CO606.3	Knowledge about techniques to characterize various pavement materials through relevant tests
<b>CE8612 &amp; Irrigation and Environmental Engineering Drawing</b>	
CO607.1	Apply design concepts to design and draw the impounding structures.
CO607.2	Apply design concepts to design and draw the cross drainage works and canal works.
CO607.3	Apply design concepts to design and draw canal works
CO607.4	Apply design concepts to design and draw various units of Municipal water treatment plants
CO607.5	Apply design concepts to design and draw units of sewage treatment plants.
<b>HS8581 Professional Communication</b>	
CO610.1	Understand and apply knowledge of human communication and language processes as they occur across various contexts
CO610.2	Evaluate key theoretical approaches used in the interdisciplinary field of communication
CO610.3	Communicate effectively orally and in writing
CO610.4	Demonstrate his verbal and non-verbal communication ability through presentations
CO610.5	Participate effectively in group discussions
<b>SEMESTER – VII</b>	
<b>CE8701 &amp; Estimation, Costing and Valuation Engineering</b>	
CO701.1	Estimate the quantities for buildings.
CO701.2	Analysis the rates for all Building works, canals, and Roads and Cost Estimate
CO701.3	Understand types of specifications, principles for report preparation, tender notices types.
CO701.4	Knowledge on types of contracts.
CO701.5	Evaluate building and land valuation.
<b>CE8702 &amp; Railways, Airports, Docks and Harbour Engineering</b>	
CO702.1	Understand the methods of route alignment and design elements in Railway Planning and Constructions.

  
**PRINCIPAL**  
**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaram - Vepernkulam Road,  
 Thatchanallur, Tirunelveli - 627 358.



CO708.4	Develop skills in facing and solving the field problems.
CO708.5	Prepare plans, estimates and design and draw projects.
<b>SEMESTER – VIII</b>	
<b>CE8091 &amp; Hydrology and Water Resources Engineering</b>	
CO801.1	Understanding of the key drivers on water resources, hydrological processes and their integrated behaviour in catchments
CO801.2	Knowledge to construct and apply a range of hydrological models to surface water and groundwater problems.
CO801.3	Knowledge to conduct Spatial analysis of rainfall data.
CO801.4	Knowledge to design water storage reservoirs.
CO801.5	Understand the concept and methods of ground water management.
<b>CE8020 &amp; Maintenance, Repair and Rehabilitation of Structures</b>	
CO802.1	Understand the importance of maintenance and assessment method of distressed structures.
CO802.2	Understand the strength and durability properties, their effects due to climate and temperature.
CO802.3	Understand recent development in concrete.
CO802.4	Understand the techniques for repair and protection methods
CO802.5	Understand repair, rehabilitation and retrofitting of structures and demolition methods.
<b>CE8811 &amp; Project Work</b>	
CO803.1	Identify problems which need solution.
CO803.2	Formulate methodology through literature review.
CO803.3	Solution experimentally or using software for Engineering problems.
CO803.4	Solution to practical problems by formulating proper methodology

  
**PRINCIPAL**  
**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaramagar - Veperukulam Road,  
 Thatchanallur, Tirunelveli - 627 002.



## THAMIRABHARANI ENGINEERING COLLEGE

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

### DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

#### LIST OF COURSE OUTCOMES

SEMESTER I	
<b>HS8151 Communicative English</b>	
CO101.1	Read articles of a general kind in magazines and newspapers
CO101.2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English
CO101.3	Comprehend conversations and short talks delivered in English
CO101.4	Write short essays of a general kind and personal letters and emails in English
CO101.5	Develop vocabulary of a general kind by developing their reading skills
<b>MA8151 Engineering Mathematics – I</b>	
CO102.1	Apply differential calculus tools in solving various application problems
CO102.2	Apply differentiation to solve maxima and minima problems
CO102.3	Apply different methods of integration in solving practical problems
CO102.4	Apply multiple integral ideas in solving areas, volumes and other practical problems
CO102.5	Apply various techniques in solving differential equations
<b>PH8151 Engineering Physics</b>	
CO103.1	Gain knowledge on the basics of properties of matter and its applications
CO103.2	Analyze the concept of waves and optical devices and their applications in fiber optics
CO103.3	Analyze the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE

Chathirampudukulam Village,  
Chidambaranagar - Vepemkulam Road,  
Thatchanallur, Tirunelveli - 627 358



CO103.4	Understand the advanced physics concepts of quantum theory and its applications in tunneling microscopes
CO103.5	Understand the basics of crystals, their structures and different crystal growth techniques
<b>CY8151 Engineering Chemistry</b>	
CO104.1	Understand the principles of water, characterization and treatment for potable and industrial purposes
CO104.2	Apply the knowledge of adsorption and catalysis in engineering technology
CO104.3	Understand the phase transition of one component and two component systems and the types of alloys and their applications
CO104.4	Understand the chemistry of various fuels and their combustion
CO104.5	Analyze the different forms of energy sources and compare the materials for constructing Battery and fuel cells
<b>GE8151 Problem Solving and Python Programming</b>	
CO105.1	Develop algorithmic solutions to simple computational problems.
CO105.2	Read, write, execute by hand simple Python programs.
CO105.3	Structure simple Python programs for solving problems.
CO105.4	Represent compound data using Python lists, tuples, dictionaries.
CO105.5	Read and write data from/to files in Python Programs.
<b>GE8152 Engineering Graphics</b>	
CO106.1	Familiarize with the fundamentals and standards of Engineering graphics
CO106.2	Perform freehand sketching of basic geometrical constructions and multiple views of objects
CO106.3	Project orthographic projections of lines and plane surfaces
CO106.4	Draw projections and solids and development of surfaces
CO106.5	Visualize and to project isometric and perspective sections of simple solids
<b>GE8161 Problem Solving and Python Programming Laboratory</b>	
CO107.1	Write, test, and debug simple Python programs

PRINCIPAL

**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaranagar - Vepenkulam Road,  
 Thatchanallur, Tirunelveli - 627 358.

CO107.2	Implement Python programs with conditionals and loops
CO107.3	Develop Python programs step-wise by defining functions and calling them
CO107.4	Use Python lists, tuples, and dictionaries for representing compound data
CO107.5	Read and write data from/to files in Python
<b>BS8161 Physics and Chemistry Laboratory</b>	
CO108.1	Apply the physics principles of Thermal physics and Properties of Matter to evaluate properties of materials
CO108.2	Understand measurement technique and usage of new instrument in Optics for real time application in Engineering
CO108.3	Apply the knowledge of semiconducting material, to evaluate the band gap of material useful for engineering solutions
CO108.4	Apply the knowledge of velocity of sound and compressibility of liquid – Ultrasonic interferometer
CO108.5	Understand measurements of air wedge method and evaluate the wavelength of spectrum
CO108.6	Obtain hands-on knowledge in the quantitative chemical analysis of water quality related parameters
CO108.7	Understand the experimental concepts in the mixture of acids and bases
CO108.8	Appreciate the need of Potentiometer, pH meter and Conductivity meter in the determination of concentration of ions
<b>SEMESTER II</b>	
<b>HS8251 Technical English</b>	
CO201.1	Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, and argue using appropriate communicative strategies
CO201.2	Write effectively and persuasively and produce different types of writings such as narration, description, exposition
CO201.3	Write the argument with creative, critical, analytical and evaluation writing
CO201.4	Read different genres of texts, infer implied meanings and critically analyze and evaluate them for ideas as well as for method of presentation
CO201.5	Listen / view and comprehend different spoken excerpts critically and infer unspoken and implied meanings

**PRINCIPAL**

**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaramagar - Vepankulam Road,  
 Thatchanallur, Tirunelveli - 627 353.



<b>MA8251 Engineering Mathematics – II</b>	
CO202.1	Compute Eigen values and Eigen vectors of a matrix, diagonalise symmetric matrices and similar matrices
CO202.2	Explain gradients, potential functions, and directional derivatives of functions of several variables. Compute line, surface and volume integral using Gauss divergence, Green's and Stoke's theorem
CO202.3	Discuss analytic functions in heat and fluid flow
CO202.4	Extend the concept of contour integrals in evaluating Real integrals
CO202.5	Discuss Laplace Transform methods to solve initial value problems for constant coefficient linear ODEs
<b>PH8252 &amp; Physics for Information Science</b>	
CO203.1	Gain knowledge on classical and quantum electron theories, and energy band structures
CO203.2	Acquire knowledge on basics of semiconductor physics and its applications in various devices.
CO203.3	Get knowledge on magnetic and dielectric properties of materials.
CO203.4	Have the necessary understanding on the functioning of optical materials for optoelectronics.
CO203.5	Understand the basics of quantum structures and their applications in spintronics and carbon electronics
<b>BE8255 &amp; Basic Electrical, Electronics and Measurement</b>	
CO204.1	Acquire knowledge of analyzing three phase power circuits and measurement
CO204.2	Analyze the working principle of transformer and their applications
CO204.3	Understand the concepts of DC Machines
CO204.4	Describe the construction and working principle of AC Machines
CO204.5	Understand the need of measurement, their classification, advantages and disadvantages
<b>GE8291 &amp; Environmental Science and Engineering</b>	
CO205.1	Analyze electrical circuits using mesh, nodal analysis and network terminology
CO205.2	Apply network theorem concepts to solve AC and DC circuits
CO205.3	Explain the concepts of resonance and coupled circuit

**PRINCIPAL**

**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukottai Village,  
 Chidambaranagar - Vepemkulam Road,  
 Thatchanallur, Tirunelveli - 627 358.

CO205.4	Analyze the transient response for AC and DC circuits
CO205.5	Understand the concepts of Two port networks
<b>CS8251 &amp; Programming in C</b>	
CO206.1	Develop simple applications in C using basic and control constructs.
CO206.2	Design and implement applications using arrays and strings
CO206.3	Develop and implement applications in C using functions and pointers.
CO206.4	Develop applications in C using structures and pointers.
CO206.5	Design applications using sequential and random access file processing.
<b>CS8261 &amp; C Programming Laboratory</b>	
CO207.1	Develop C programs for simple applications making use of basic constructs, arrays and strings.
CO207.2	Develop C programs involving functions, recursion, pointers, and structures.
CO207.3	Design applications using sequential and random access file processing.
<b>GE8261 Engineering Practices Laboratory</b>	
CO208.1	Analyze the working components, gates, soldering practices.
CO208.2	Examine the quantities such as resistance capacitance, inductance etc.
<b>SEMSTER III</b>	
<b>MA8351 &amp; Discrete Mathematics</b>	
CO301.1	Understand the concepts needed to test the logic of a program
CO301.2	Solve mathematical induction problems and permutation & combination techniques in data structures.
CO301.3	Analyze the graph for finding isomorphism between two graphs and use in finding the shortest path in computer networks.
CO301.4	Understand concepts and properties of algebraic structures such as groups, rings and fields.
CO301.5	Apply Boolean algebra in computer circuits, computer programming, and mathematical logic.

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE  
 Chathirampudukulam Village,  
 Chidambaranagar - Vepankulam Road,  
 Thalchannallur, Tirunelveli - 627 353.



<b>CS8351 &amp; Digital Principles and System Design</b>	
CO302.1	Implement linear and non-linear data structure operations using C
CO302.2	Suggest appropriate linear / non-linear data structure for any given data set
CO302.3	Apply hashing concepts for a given problem
CO302.4	Modify or suggest new data structure for an application
CO302.5	Appropriately choose the sorting algorithm for an application
<b>CS8391 &amp; Data Structures</b>	
CO303.1	Implement abstract data types for linear data structures.
CO303.2	Apply the different linear data structures to problem solutions
CO303.3	Students can apply the different non- linear data structures to problem solutions
CO303.4	Students can implement abstract data type for Graph and apply them to problem solutions
CO303.5	Students can analyze the various sorting and searching algorithms and hashing techniques
<b>CS8392 &amp; Object Oriented Programming</b>	
CO304.1	Students are able to develop Java programs using OOP principles and gain knowledge about the Java environment.
CO304.2	Students are able to understand the concepts inheritance & interfaces and develop Java programs on it.
CO304.3	Students are able to build Java applications with built-in and own exceptions.
CO304.4	Students are able to develop Java applications with threads and generic classes.
CO304.5	Students are able to develop interactive Java programs using swings and applets
<b>EC8395 &amp; Communication Engineering</b>	
EC8395.1	Ability to comprehend and appreciate the significance and role of this course in the present contemporary World.
EC8395.2	Apply analog and digital communication techniques.
EC8395.3	Use data and pulse communication techniques.

**PRINCIPAL**

**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaranagar - Veperukulam Road,  
 Thatchanallur, Tirunelveli - 627 353.

EC8395.4	Analyze Source and Error control coding.
<b>CS8381 &amp; Data Structures Laboratory</b>	
CO306.1	Students are able to write functions to implement linear and non-linear data structure operations.
CO306.2	Students are able to suggest appropriate linear / non-linear data structure operations for solving a given problem.
CO306.3	Students are able to appropriately use the linear / non-linear data structure operations for a given problem.
CO306.4	Students are able to apply appropriate hash functions that result in a collision free scenario for data storage and retrieval.
<b>CS8383 &amp; Object Oriented Programming Laboratory</b>	
CO307.1	Students are able to write Java programs for simple applications that make use of classes, packages and interfaces.
CO307.2	Students are able to write and implement Java programs with array list, exception handling and multithreading.
CO307.3	Students are able to design applications using file processing.
CO307.4	Students are able to design applications using Event handling.
CO307.5	Students are able to design applications using generic programming.
<b>HS8381 Interpersonal Skills/Listening&amp; Speaking</b>	
CO309.1	Listen sharply and reading keenly to understand and act aptly
CO309.2	Employ the soft skills to become a Successful leader
CO309.3	Make effective presentation and to excel in Group Discussions
CO309.4	Participate confidently and appropriately in conversations both formal and informal
<b>SEMSTER IV</b>	
<b>MA8402 &amp; Probability and Queuing Theory</b>	
CO401.1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
CO401.2	Understand the basic concepts of one and two dimensional random variable and apply in Engineering applications
CO401.3	Apply the concepts of random processes in Engineering disciplines

**PRINCIPAL**

**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudikulam Village,  
 Chidambarnagar - Veperambalam Road,  
 Thatchanallur, Tirunelveli - 627 053.



CO401.4	Acquire skills in analyzing queuing models.
CO401.5	Understand and characterize phenomenon which evolve with respect to time in a probabilistic manner.
<b>CS8491 &amp; Computer Architecture</b>	
CO402.1	Understand the basics structure of computers, operations and instructions
CO402.2	Design arithmetic and logic unit.
CO402.3	Understand pipelined execution and design control unit
CO402.4	Understand parallel processing architectures
CO402.5	Understand the various memory systems and I/O communication
<b>CS8492 Database Management Systems</b>	
CO403.1	Illustrate the database design for applications.
CO403.2	Map ER diagram and normalization techniques in database application.
CO403.3	Apply concurrency control & normalization mechanism for database problems.
CO403.4	Apply the various query optimization techniques.
CO403.5	Comparing various storage techniques differs from traditional databases.
<b>CS8451 Design and Analysis of Algorithms</b>	
CO404.1	Design algorithms for various computing problems.
CO404.2	Analyze the time and space complexity of algorithms.
CO404.3	Critically analyze the efficiency of alternative algorithmic solutions for the same problem.
CO404.4	Understand the limitations of various algorithms.
CO404.5	Apply algorithms for real world problems.
<b>CS8493 Operating Systems</b>	
CO405.1	Students can understand the concept of operating systems.

**PRINCIPAL**

**THAMIRABHARAN ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaranagar - Veppankulam Road  
 Thatchanallur, Tirunelveli - 627 558.

CO405.2	Students can analyze various scheduling algorithms and understand deadlock, prevention and avoidance algorithms.
CO405.3	Students can compare and contrast various memory management schemes.
CO405.4	Students can understand the functionality of file systems.
CO405.5	Perform administrative tasks on Linux Servers and Compare iOS and Android Operating Systems.
<b>CS8494 Software Engineering</b>	
CO406.1	Identify the key activities in managing a software project.
CO406.2	Compare different process models.
CO406.3	Concepts of requirements engineering and Analysis Modeling.
CO406.4	Understand systematic procedure for software design and deployment.
CO406.5	Compare and contrast the various testing and maintenance.
CO406.6	Manage project schedule, estimate project cost and effort required.
<b>CS8481 Database Management Systems Laboratory</b>	
CO407.1	Make use of typical data definitions and manipulation commands
CO407.2	Test the implementation of nested and join queries.
CO407.3	Develop simple applications using views, sequences and synonyms.
CO407.4	Inspect and implement applications that require front-end tools.
CO407.5	Examine database programming using implicit and explicit cursors.
<b>CS8461 Operating Systems Laboratory</b>	
CO408.1	Compare the performance of various CPU Scheduling Algorithms
CO408.2	Implement Deadlock avoidance and Detection Algorithms
CO408.3	Create processes and implement IPC
CO408.4	Analyze the performance of the various Page Replacement Algorithms
CO408.5	Implement File Organization and File Allocation Strategies



PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE

Chathirampudukulam Village,  
Chidambaramnagar - Vepemkulam Road.  
Thatchanallur, Tirunelveli - 627 358.



<b>HS8461 Advanced Reading and Writing</b>	
CO409.1	Apply the concept of critical reading and Analytical reading and comprehend the key ideas and gist of a passage.
CO409.2	Understand the importance of the presentation skills; analyze the given topic and the principles of grammar in written expressions.
CO409.3	Apply the concepts of grammar, various strategies and the usage of formal language in written expression.
CO409.4	Apply the concepts of accurate English while writing and become equally at ease in using good vocabulary and language skills.
<b>SEMESTER V</b>	
<b>MA8551 Algebra and Number Theory</b>	
CO501.1	Apply the basic notions of groups, rings, fields which will then be used to solve related problems.
CO501.2	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts
CO501.3	Demonstrate accurate and efficient use of advanced algebraic techniques.
CO501.4	Demonstrate their mastery by solving non - trivial problems related to the concepts, and by proving simple theorems about the, statements proven by the text
CO501.5	Apply integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject
<b>CS8591 Computer Networks</b>	
CO502.1	Enable the students to visualize the different aspects of networks, protocols and network design models.
CO502.2	Enable the students to examine various Data Link layer design issues and Data Link protocols.
CO502.3	Enable the students to analyze and compare different LAN protocols.
CO502.4	Enable the students to compare and select appropriate routing algorithms for a network.
CO502.5	Enable the students to examine the important aspects and functions of network layer, transport layer and application layer by internetworking.
<b>EC8691 Microprocessors and Microcontrollers</b>	

**PRINCIPAL**

**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampududai Village,  
 Chidambaramagar - Veperudam Road,  
 Thatchanallur, Tirunelveli - 627 558.

CO503.1	Apply knowledge and demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor and microcontroller.
CO503.2	Compare accepted standards and guidelines to select appropriate Microprocessor (8085 & 8086) and Microcontroller to meet specified performance requirements.
CO503.3	Analyze assembly language programs; select appropriate assemble into machine a cross assembler utility of a microprocessor and microcontroller.
CO503.4	Design electrical circuitry to the Microprocessor I/O ports in order to interface the processor to external devices.
CO503.5	Evaluate assembly language programs and download the machine code that will provide solutions real-world control problems
<b>CS8501 Theory of Computation</b>	
CO504.1	Students able to understand the language hierarchy and construct the finite automata.
CO504.2	Students able to understand regular expressions and construct automata for any given pattern.
CO504.3	Students able to write CFG for any construct.
CO504.4	Students able to design turing machine for any language.
CO504.5	Students able to verify whether a problem is decidable or not.
<b>CS8592 Object Oriented Analysis and Design</b>	
CO505.1	Express software design with UML diagrams
CO505.2	Design software applications using OO concepts.
CO505.3	Identify various scenarios based on software requirements
CO505.4	Transform UML based software design into pattern based design using design patterns
CO505.5	Understand the various testing methodologies for OO software
<b>OAN551 &amp; Sensors and Transducers</b>	
CO506.1	Understand the need of transducers, their classification, advantages and disadvantages.
CO506.2	Analyze the working principle of resistive, inductive and capacitive transducers and their applications.

  
PRINCIPAL

**THAMIRABHARANI ENGINEERING COLLEGE**  
Chathirampudikulam Village,  
Chidambaranagar - Vepankulam Road,  
Thatchanallur, Tirunelveli - 627 353



CO506.3	Understand the working of various transducers and sensors.
CO506.4	Understand the acoustic, optical and other sensors and with their applications.
CO506.5	Discuss the basics of signal conditioning and data acquisition system
<b>EC8681 Microprocessors and Microcontrollers Laboratory</b>	
CO507.1	Write ALP programs for fixed, floating point and arithmetic operations
CO507.2	Interface different input and output devices with 8086 processor
CO507.3	Generate waveforms using microprocessors
CO507.4	Execute programs in 8051
CO507.5	Differentiate simulator from emulator
<b>CS8582 Object Oriented Analysis and Design Laboratory</b>	
CO508.1	Students able to perform OO analysis and design for a given problem specification.
CO508.2	Students able to identify and map basic software requirements in UML mapping
CO508.3	Students able to improve the software quality using design patterns and to explain the rationale behind applying specific design patterns
CO508.4	Students able to test the compliance of the software with the SRS.
<b>CS8581 Networks Laboratory</b>	
CO509.1	To learn and use network commands.
CO509.2	To learn socket programming.
CO509.3	To implement and analyze various network protocols.
CO509.4	To learn and use simulation tools.
CO509.5	To use simulation tools to analyze the performance of various network protocols.
<b>CS8651 Internet Programming</b>	

**SEMESTER – VI**

**PRINCIPAL**

**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaramagar - Vepemkulam Road,  
 Thatchanailur, Tirunelveli - 627 353.

CO601.1	To be familiar with Web page design using HTML/XML and style sheets
CO601.2	To be exposed to creation of user interfaces using Java frames and applets.
CO601.3	To learn to create dynamic web pages using server side scripting.
CO601.4	To learn to write Client Server applications.
CO601.5	To be familiar with the PHP programming.
<b>CS8691 Artificial Intelligence</b>	
CO602.1	Use appropriate search algorithms for any AI problem
CO602.2	Represent a problem using first order and predicate logic
CO602.3	Provide the apt agent strategy to solve a given problem
CO602.4	Design software agents to solve a problem
CO602.5	Design applications for NLP that use Artificial Intelligence
<b>CS8601 Mobile Computing</b>	
CO603.1	Characterize a wireless channel and evolve the system design specifications.
CO603.2	Design a cellular system based on resource availability and traffic demands
CO603.3	Evaluate the concepts of multiple antenna techniques
CO603.4	Identify suitable signaling and multipath mitigation techniques for the wireless channel and system under consideration.
CO603.5	Apply the advanced features in wireless communication for real world applications
<b>CS8602 Compiler Design</b>	
CO604.1	Students able to design a lexical analyzer for a sample language.
CO604.2	Students able to analyze different parsing algorithms to develop the parsers for a given grammar.
CO604.3	Students able to understand syntax-directed translation and run-time environment.
CO604.4	Students able to learn to implement code optimization techniques and a simple code generator.
CO604.5	Students able to design and implement a scanner and a parser using LEX and YACC tools.



PRINCIPAL

THAMIRASARANI ENGINEERING COLLEGE  
 Chathirampudukulam Village,  
 Chidambaramagar - Vepankulam Road,  
 Thatchanallur, Tirunelveli - 627 353.



<b>CS8603 Distributed Systems</b>	
CO605.1	Elucidate the foundations and issues of distributed systems.
CO605.2	Understand the various synchronization issues and global state for distributed systems.
CO605.3	Understand the Mutual Exclusion and Deadlock detection algorithms in distributed systems.
CO605.4	Describe the agreement protocols and fault tolerance mechanisms in distributed systems.
CO605.5	Describe the features of peer-to-peer and distributed shared memory systems.
<b>IT8076 Software Testing</b>	
CO606.1	Students able to design test cases suitable for a software development for different domains.
CO606.2	Students can identify suitable tests to be carried out.
CO606.3	Students can understand the different levels of testing and prepare test planning based on the document .
CO606.4	Students can document test plans and test cases designed.
CO606.5	Students able to understand various automation testing tools.
<b>CS8661 Internet Programming Laboratory</b>	
CO607.1	Students able to design test cases suitable for a software development for different domains.
CO607.2	Students can identify suitable tests to be carried out.
CO607.3	Students can understand the different levels of testing and prepare test planning based on the document .
CO607.4	Students can document test plans and test cases designed.
CO607.5	Students able to understand various automation testing tools.
<b>CS8662 Mobile Application Development Laboratory</b>	
CO608.1	Develop mobile applications using GUI and Layouts.
CO608.2	Develop mobile applications using Event Listener.
CO608.3	Develop mobile applications using Databases.

**PRINCIPAL**

**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaranagar - Vepankulam Road.  
 Thatchanallur, Tirunelveli - 627 353.

CO608.4	Develop mobile applications using RSS Feed, Internal/External Storage, SMS, Multi-threading and GPS.
CO608.5	Analyze and discover your own mobile app for simple needs.
<b>CS8611 &amp; Mini Project</b>	
CO609.1	Able to take up practical problems.
CO609.2	Understand and find solutions by formulating proper methodology.
CO609.3	Develop modules and integrate them into completed projects.
CO609.4	Perform well in teams.
CO609.5	Able to communicate during reviews and present report.
<b>HS8581 Professional Communication</b>	
CO610.1	Understand and apply knowledge of human communication and language processes as they occur across various contexts
CO610.2	Evaluate key theoretical approaches used in the interdisciplinary field of communication
CO610.3	Communicate effectively orally and in writing
CO610.4	Demonstrate his verbal and non-verbal communication ability through presentations
CO610.5	Participate effectively in group discussions
<b>SEMESTER – VII</b>	
<b>MG8591 Principles of Management</b>	
CO701.1	To insight the concept of management.
CO701.2	Students should able to apply the techniques to their profession.
CO701.3	Students will know about organizations development.
CO701.4	Demonstrate the ability to directing, leadership and communicate effectively.
CO701.5	To analysis isolate issues and formulate best control methods.
<b>CS8792 Cryptography and Network Security</b>	

PRINCIPAL

THAMIRABHARAN ENGINEERING COLLEGE  
 Chathirampudukulam Village,  
 Chidambaramagar - Vapemkulam Road,  
 Thatchanallur, Tirunelveli - 627 353.



CO702.1	Students able to understand the basics of network security with threats and classical encryption techniques.
CO702.2	Students able to understand the different cryptographic operations of symmetric cryptographic algorithms.
CO702.3	Students able to analyze the different cryptographic operations of public key cryptography and key exchange algorithms.
CO702.4	Students able to understand and analyze the various authentication schemes to simulate different applications.
CO702.5	Students able to analyze various security practices and system security standards
<b>CS8791 Cloud Computing</b>	
CO703.1	Describe the principles of Parallel and Distributed Computing and evolution of cloud computing from existing technologies.
CO703.2	Implement different types of Virtualization technologies and Service Oriented Architecture systems.
CO703.3	Elucidate the concepts of NIST Cloud Computing architecture and its design challenges.
CO703.4	Analyze the issues in Resource provisioning and Security governance in the cloud.
CO703.5	Choose among various cloud technologies to install and use current cloud technologies for implementing applications.
<b>CS8082 Machine Learning Techniques</b>	
CO705.1	Differentiate between supervised, unsupervised, semi-supervised machine learning approaches
CO705.2	Discuss the decision tree algorithm and identity and overcome the problem of overfitting
CO705.3	Discuss and apply the back propagation algorithm and genetic algorithms to various problems
CO705.4	Apply the Bayesian concepts to machine learning
CO705.5	Analyses and suggest appropriate machine learning approaches for various types of problems
<b>GE8074 Human Rights</b>	
CO706.1	Understand the origin and detailed classification about the human rights.
CO706.2	Describe and analysis the evolutionary concepts and theories of human rights.
CO706.3	Develop the critical thinking and understanding of UN Laws and its agencies.
CO706.4	Understand and analyze the constitutional Provisions & Guarantees of Human rights in India

**PRINCIPAL**

**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaranagar - Veperukulam Road,  
 Thatchanallur, Tirunelveli - 627 358.

CO706.5	Apply the implementation of Human rights commission, Judiciary and social movements to all.
<b>CS8711 Cloud Computing Laboratory</b>	
CO707.1	Write programs in ARM for any specific application
CO707.2	Interface memory, A/D and D/A convertors with ARM system
CO707.3	Analyze the performance of interrupt in embedded systems
CO707.4	Write program for interfacing keyboard, display, motor and sensors
CO707.5	Design and implement a mini project using embedded system design concepts
<b>IT8761 Security Laboratory</b>	
CO708.1	Students will be able to develop code for classical Encryption Techniques to solve the problems.
CO708.2	Students will be able to build cryptosystems by applying symmetric and public key encryption algorithms.
CO708.3	Students will be able to construct code for authentication algorithms.
CO708.4	Students will be able to develop a signature scheme using Digital signature standard.
CO708.5	Students will be able to understand the network security system using open source tools.
<b>SEMESTER – VIII</b>	
<b>CS8080 Information Retrieval Technologies</b>	
CO801.1	Students will be able to understand an open source search engine framework and explore its capabilities.
CO801.2	Students will be able to understand information retrieval models.
CO801.3	Students will be able to analyze the different methods of classification and clustering.
CO801.4	Students will be able to understand the features of search engine and its ranking.
CO801.5	Students will be able to analyze the methods in recommended systems.
<b>CS8074 Cyber Forensics</b>	
CO802.1	Understand the basics of computer forensics.
CO802.2	Apply a number of different computer forensic tools to a given scenario.





CO802.3	Analyze and validate forensics data.
CO802.4	Identify the vulnerabilities in a given network infrastructure.
CO802.5	Implement real-world hacking techniques to test system security.
<b>CS8811 Project Work</b>	
CO803.1	Identify the problem by applying acquired knowledge.
CO803.2	Analyze and classify executable project modules after Risk analysis.
CO803.3	Choose effective tools for designing project modules.
CO803.4	Integrate all the tested modules through effective team work.
CO803.5	Elaborate the completed project and compile the project report.

  
**PRINCIPAL**  
**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaramagar - Veppenkulam Road,  
 Thatchanallur, Tirunelveli - 627 333.



# THAMIRABHARANI ENGINEERING COLLEGE

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

## DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

### LIST OF COURSE OUTCOMES

#### SEMESTER I

#### HS8151 Communicative English

CO101.1	Read articles of a general kind in magazines and newspapers
CO101.2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English
CO101.3	Comprehend conversations and short talks delivered in English
CO101.4	Write short essays of a general kind and personal letters and emails in English
CO101.5	Develop vocabulary of a general kind by developing their reading skills

#### MA8151 Engineering Mathematics – I

CO102.1	Apply differential calculus tools in solving various application problems
CO102.2	Apply differentiation to solve maxima and minima problems
CO102.3	Apply different methods of integration in solving practical problems
CO102.4	Apply multiple integral ideas in solving areas, volumes and other practical problems
CO102.5	Apply various techniques in solving differential equations

#### PH8151 Engineering Physics

CO103.1	Gain knowledge on the basics of properties of matter and its applications
CO103.2	Analyze the concept of waves and optical devices and their applications in fiber optics

*[Signature]*

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE  
Chathirampudukulam Village,  
Chidambaranagar - Vepemkulam Road,  
Thatchanallur, Tirunelveli - 627 358.



CO103.3	Analyze the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers
CO103.4	Understand the advanced physics concepts of quantum theory and its applications in tunneling microscopes
CO103.5	Understand the basics of crystals, their structures and different crystal growth techniques
<b>CY8151 Engineering Chemistry</b>	
CO104.1	Understand the principles of water, characterization and treatment for potable and industrial purposes
CO104.2	Apply the knowledge of adsorption and catalysis in engineering technology
CO104.3	Understand the phase transition of one component and two component systems and the types of alloys and their applications
CO104.4	Understand the chemistry of various fuels and their combustion
CO104.5	Analyze the different forms of energy sources and compare the materials for constructing Battery and fuel cells
<b>GE8151 Problem Solving and Python Programming</b>	
CO105.1	Develop algorithmic solutions to simple computational problems.
CO105.2	Read, write, execute by hand simple Python programs.
CO105.3	Structure simple Python programs for solving problems.
CO105.4	Represent compound data using Python lists, tuples, and dictionaries.
CO105.5	Read and write data from/to files in Python Programs.
<b>GE8152 Engineering Graphics</b>	
CO106.1	Familiarize with the fundamentals and standards of Engineering graphics
CO106.2	Perform freehand sketching of basic geometrical constructions and multiple views of objects
CO106.3	Project orthographic projections of lines and plane surfaces
CO106.4	Draw projections and solids and development of surfaces
CO106.5	Visualize and to project isometric and perspective sections of simple solids
<b>GE8161 Problem Solving and Python Programming Laboratory</b>	

PRINCIPAL

THAMIRABARAN ENGINEERING COLLEGE

Chattampudukulam Village,  
Chidambaram - Vepernkulam Road,  
Thatchanallur, Tirunelveli - 627 353.

CO107.1	Write, test, and debug simple Python programs
CO107.2	Implement Python programs with conditionals and loops
CO107.3	Develop Python programs step-wise by defining functions and calling them
CO107.4	Use Python lists, tuples, and dictionaries for representing compound data
CO107.5	Read and write data from/to files in Python
<b>BS8161 Physics and Chemistry Laboratory</b>	
CO108.1	Apply the physics principles of Thermal physics and Properties of Matter to evaluate properties of materials
CO108.2	Understand measurement technique and usage of new instrument in Optics for real time application in Engineering
CO108.3	Apply the knowledge of semiconducting material, to evaluate the band gap of material useful for engineering solutions
CO108.4	Apply the knowledge of velocity of sound and compressibility of liquid – Ultrasonic interferometer
CO108.5	Understand measurements of air wedge method and evaluate the wavelength of spectrum
CO108.6	Obtain hands-on knowledge in the quantitative chemical analysis of water quality related parameters
CO108.7	Understand the experimental concepts in the mixture of acids and bases
CO108.8	Appreciate the need of Potentiometer, pH meter and Conductivity meter in the determination of concentration of ions
<b>SEMESTER II</b>	
<b>HS8251 Technical English</b>	
CO201.1	Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, and argue using appropriate communicative strategies
CO201.2	Write effectively and persuasively and produce different types of writings such as narration, description, exposition
CO201.3	Write the argument with creative, critical, analytical and evaluation writing
CO201.4	Read different genres of texts, infer implied meanings and critically analyze and evaluate them for ideas as well as for method of presentation
CO201.5	Listen / view and comprehend different spoken excerpts critically and infer unspoken and implied meanings

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE  
 Chathirampudukulam Village,  
 Chidambaramagar - Vepankulam Road.  
 Thatchanallur, Tirunelveli - 627 353.



<b>MA8251 Engineering Mathematics – II</b>	
CO202.1	Compute Eigen values and Eigen vectors of a matrix, diagonalise symmetric matrices and similar matrices
CO202.2	Explain gradients, potential functions, and directional derivatives of functions of several variables. Compute line, surface and volume integral using Gauss divergence, Green's and Stoke's theorem
CO202.3	Discuss analytic functions in heat and fluid flow
CO202.4	Extend the concept of contour integrals in evaluating Real integrals
CO202.5	Discuss Laplace Transform methods to solve initial value problems for constant coefficient linear ODEs
<b>PH8253 Physics for Electronics Engineering</b>	
CO203.1	Gain knowledge on classical and quantum electron theories, and energy band structures
CO203.2	Acquire knowledge on basics of semiconductor physics and its applications in various devices
CO203.3	Get knowledge on magnetic and dielectric properties of materials
CO203.4	Have the necessary understanding on the functioning of optical materials for optoelectronics
CO203.5	Understand the basics of quantum structures and their applications in spintronics and carbon electronics
<b>BE8252 Basic Civil and Mechanical Engineering</b>	
CO204.1	Measure distances and area by surveying.
CO204.2	Explain the usage of construction material and proper selection of construction materials.
CO204.3	Appreciate the Civil and Mechanical Engineering components of Projects.
CO204.4	Elaborate the components of refrigeration and Air conditioning cycle.
CO204.5	Demonstrate working principles of petrol and diesel engine.
CO204.6	Identify the components used in power plant cycle.
<b>EE8251 Circuit Theory</b>	
CO205.1	Analyze the electrical circuits using mesh and nodal method.
CO205.2	Analyze the network reduction and theorem for DC and AC circuits

**PRINCIPAL**

**THAMIRABHARANI ENGINEERING COLLEGE**

Chathirampudukuzha Village,  
Chidambaranagar - Veperankulam Road,  
Thatchanallur, Tirunelveli - 627 358.

CO205.3	Analyze the transient response of RLC circuits and DC and AC excitation using Laplace transforms
CO205.4	Analyze the three phase balanced and unbalanced star and delta network.
CO205.5	Analyze the resonance and coupled circuits
<b>GE8291 Environmental Science and Engineering</b>	
CO206.1	Understand different component of environment and their function.
CO206.2	Find solution to environmental problems
CO206.3	Understand the importance of natural resources and their role in sustainable development
CO206.4	Understand the issues related to environment and their impact on the human life.
CO206.5	Create awareness about the problems caused by population and related issues
<b>GE8261 Engineering Practices Laboratory</b>	
CO207.1	Analyze the basic home electrical wire connections like single way switch, two way switch and fluorescent lamp wiring connections.
CO207.2	Examine the electrical quantities such as voltage current, power etc.,
CO207.3	Elaborate on the components, gates, soldering practices.
CO207.4	Fabricate carpentry components and pipe connections including plumbing works.
CO207.5	Use welding equipments to join the structures.
CO207.6	Carry out the basic machining operations
CO207.7	Make the models using sheet metal works.
CO207.8	Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings.
<b>EE8261 Electric Circuits Laboratory</b>	
CO208.1	Students able to understand and apply circuits theorems and concepts in engineering applications.
CO208.2	Simulate electric circuits.

**PRINCIPAL**

**THAMIRABHARANI ENGINEERING COLLEGE**

Chathirampudukottai Village,  
Chidambaramagar - Vepernkulam - 605 001.  
Thatchanallur, Tirunelveli - 6.

**SEMSTER III**



<b>MA8353 Transforms and Partial Differential Equations</b>	
CO301.1	Understand how to solve the given standard partial differential equations
CO301.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications
CO301.3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
CO301.4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
CO301.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems
<b>EE8351 Digital Logic Circuits</b>	
CO302.1	Understand the concepts of various number systems, binary codes and logic families and error detecting and correcting codes.
CO302.2	Simplify and implement Boolean functions, combinational circuits using logic gates, Boolean algebra and k map.
CO302.3	Design and implement the synchronous sequential circuits using flip flops
CO302.4	Design and analysis of asynchronous sequential circuits and programmable logic device.
CO302.5	Simulate digital logic circuit using VHDL for various applications.
<b>EE8391 Electromagnetic Theory</b>	
CO303.1	Ability to understand the various coordinate systems and the application of Coulomb's and Gauss's law.
CO303.2	Ability to understand the basic concepts about electrostatic field, electric potential, energy density and to solve the problems based on boundary conditions in electric field.
CO303.3	Ability to understand the basic concepts about magneto static field, magnetic flux density, vector potential and to solve the problems based on boundary conditions in magnetic field.
CO303.4	Ability to understand the Maxwell's equation relating to the electric and magnetic fields and the applications in the machines.
CO303.5	Ability to understand the basic concepts electromagnetic waves and characterizing parameters.
<b>EE8301 Electrical Machines – I</b>	
CO304.1	Analyze various types of magnetic circuits.
CO304.2	Understand and analyze the performance of transformer.

**PRINCIPAL**

**THAMIRABHARANI ENGINEERING COLLEGE**

Chattikampudukulam Village,  
Chidambaranagar - Veppankulam Road,  
Thatchanallur, Tirunelveli - 627 353.

CO304.3	Understand the principle of electromechanical energy conversion, concepts in rotating machines and analyze the electromagnetic system
CO304.4	Understand the working principle, types and analyze the performance of DC Generator.
CO304.5	Understand the working principle, types and analyze the performance of DC Motor.
<b>EC8353 Electron Devices and Circuits</b>	
CO305.1	Explain the structure and operation of basic electronic devices.
CO305.2	Analyze the characteristics of different electronic devices.
CO305.3	Analyze frequency response of amplifiers.
CO305.4	Analyze the operation of multistage amplifier and differential amplifier
CO305.5	Able to analyze the oscillators.
<b>ME8792 Power Plant Engineering</b>	
CO306.1	Apply the knowledge about Binary Cycles and Cogeneration systems in thermal power plant.
CO306.2	Classify the knowledge about layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants
CO306.3	Construct and analyze about nuclear power plants and its various types of reactor.
CO306.4	Illustrate about layout, construction and working of the components inside Renewable energy power plants.
CO306.5	Analyze power plant economics and environmental hazards.
<b>EC8311 Electronics Laboratory</b>	
CO307.1	Able to explain the characteristics of semiconductor devices.
CO307.2	Analyze the characteristics of voltage controlled device.
CO307.3	Analyze the characteristics of photo sensitive semiconductor device.
CO307.4	Design and implement converter circuit.
CO307.5	Infer amplitude, frequency and phase measurements using CRO.
<b>EE8311 Electrical Machines Laboratory – I</b>	

**PRINCIPAL**

**THAMIRABHARAN ENGINEERING COLLEGE**

Chathirampudukulam Village,

Chidambaram - Veerankulam Road.

Thatchanallur, Tirunelveli - 627 353.



CO308.1	Understand and analyze the performance of DC Generator.
CO308.2	Understand and analyze the performance of DC Motor.
CO308.3	Understand and analyze the performance of single phase transformer
CO308.4	Understand and analyze the performance of three phase transformer.
CO308.5	Acquire knowledge on DC Motor starters and three phase transformer connection.
<b>SEMSTER IV</b>	
<b>MA8491 Numerical Methods</b>	
CO401.1	Understand the basic concepts and techniques of solving algebraic and transcendental equations.
CO401.2	Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations.
CO401.3	Apply the numerical techniques of differentiation and integration for engineering problems.
CO401.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
CO401.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
<b>EE8401 Electrical Machines – II</b>	
CO402.1	Analyze the performance of salient and non-salient pole synchronous generators.
CO402.2	Analyze the performance of synchronous motor.
CO402.3	Analyze the performance of three phase induction motor.
CO402.4	Analyze the various types of starters and speed control of three phase induction motor
CO402.5	Analyze the performance of single phase induction motor and special machines.
<b>IC8451 Control Systems</b>	
CO403.1	Show control system components and explain the use of transfer function models for analysis of physical systems.
CO403.2	Explain about time response of the systems and steady state analysis.
CO403.3	Analyze the open loop and closed loop frequency responses of systems.

**PRINCIPAL**

**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukottam Village,  
 Chidambaramnagar - Vepernkulam Road,  
 Thatchanallur, Tirunelveli - 627 353.

CO403.4	Classify stability analysis and design of compensators.
CO403.5	Design state variable representation of physical systems.
<b>EE8402 Transmission and Distribution</b>	
CO404.1	Students able to understand the Concept of transmission line parameters.
CO404.2	Students able to understand the concepts of lines and insulators.
CO404.3	Students able to understand the concepts of performance of transmission lines.
CO404.4	Students able to understand the concept of underground cables and distribution of electric power system.
CO404.5	Students able to understand the function of different components used in the transmission and distribution level of power system.
<b>EE8403 &amp; Measurements and Instrumentation</b>	
CO405.1	Understand about different functional elements of instrumentation.
CO405.2	Analyze to choose an instrument for measuring different electrical and magnetic parameters.
CO405.3	Design a suitable Bridge circuit to determine the values of various resistor, inductor and capacitor.
CO405.4	Explain the construction and working principle of various types of storage and display devices.
CO405.5	Explain the construction and working of various types of transducers and function of different blocks involved in data acquisition systems.
<b>EE8451 Linear Integrated Circuits and Applications</b>	
CO406.1	Able to understand the fabrication process of ICs
CO406.2	Able to understand and analyze the characteristics of OP-AMP
CO406.3	Able to analyze and design the linear and non-linear applications of OP-AMP
CO406.4	Able to understand the functional blocks of Timer and PLL.
CO406.5	Able to understand the applications of OP-AMP in special ICs.
<b>EE8411 Electrical Machines Laboratory – II</b>	
CO407.1	Understand the importance of synchronous machines and analyze the performance of synchronous generator using EMF, MMF, ZPF and ASA methods.



using EMF, MMF, ZPF and ASA  
**THAMIRABHARAN ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaranagar - Vepernkulam Road,  
 Thatchanallur, Tirunelveli - 627 358.



CO407.2	Analyze the characteristics of V and Inverted V curves of synchronous motor.
CO407.3	Analyze the performance of three phase induction motor.
CO407.4	Analyze the performance of single phase induction motor.
CO407.5	Acquire knowledge on separation of no-load losses and types of starters used in three phase induction motor.
<b>EE8461 Linear and Digital Integrated Circuits Laboratory</b>	
CO408.1	To understand and implement Boolean Functions.
CO408.2	To understand the importance of code conversion.
CO408.3	To Design and implement 4-bit shift registers.
CO408.4	To acquire knowledge on Application of Op-Amp.
CO408.5	To Design and implement counters using specific counter IC.
<b>EE8412 Technical Seminar</b>	
CO409.1	To Encourage the students to study recent engineering advancements.
CO409.2	To prepare and present reports and projects.
CO409.3	To encourage the students to use various teaching aids like ICT tools.
<b>SEMESTER V</b>	
<b>EE8501 Power System Analysis</b>	
CO501.1	Analyze the power system under standard operating condition.
CO501.2	Apply iterative techniques for power flow analysis.
CO501.3	Classify short circuit studies-Symmetrical fault analysis on power system,
CO501.4	Prioritize short circuit studies-Unsymmetrical fault analysis on power system.
CO501.5	Analyze stability problems in power system.

  
PRINCIPAL

**THAMIRABHARANI ENGINEERING COLLEGE**

Chathirampudukulam Village,  
Chidambaramagar - Veppankulam Road,  
Thatchanallur, Tirunelveli - 627 353.

<b>EE8551 Microprocessors and Microcontrollers</b>	
CO502.1	Students able to understand the architecture of 8085 and the concepts of need and use of interrupt structure.
CO502.2	Students able to understand the addressing modes and instruction set of 8085 and write the assembly language programs for the basic operation.
CO502.3	Students able to understand the architecture, concepts of need and use of interrupt structure and memory organization of 8051.
CO502.4	Students able to describe the interfacing of external peripherals to 8085 using peripheral interfacing ICS.
CO502.5	Students able to understand the addressing modes and instruction set of 8051 and its applications and develop the Microcontroller based applications.
<b>EE8552 Power Electronics</b>	
CO503.1	Ability to identify and select the switching devices for different power converter applications.
CO503.2	Ability to choose power converter for given dc load specification from AC input.
CO503.3	Analyze different DC-DC converter with various loads.
CO503.4	Analyze the operation of single and three phase inverters.
CO503.5	Explain the operation of ac voltage controller and cyclo converter.
<b>EE8591 Digital Signal Processing</b>	
CO504.1	Students will be able to acquire knowledge on Signals and systems & their mathematical representation.
CO504.2	Students will be able to understand and analyze the discrete time systems.
CO504.3	Students will be able to analyze the transformation techniques & their computation.
CO504.4	Students will be able to understand and design the types of filters and their design for digital implementation.
CO504.5	Students will be able to acquire knowledge on programmability digital signal processor & quantization effects.
<b>CS8392 Object Oriented Programming</b>	
CO505.1	Students able to develop Java programs using OOP principles and gain knowledge about Java environment.
CO505.2	Students able to understand the concepts inheritance & interfaces and develop Java programs on it.
CO505.3	Students able to build Java applications with built-in and own exceptions.




**PRINCIPAL**

**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaramagar - Vepankulam Road,  
 Thatchanallur, Tirunelveli - 627 353.



CO505.4	Students able to develop Java applications with threads and generic classes.
CO505.5	Students able to develop interactive Java programs using swings and applets
<b>OAN551 Sensors and Transducers</b>	
CO506.1	Understand the need of transducers, their classification, advantages and disadvantages.
CO506.2	Analyze the working principle of resistive, inductive and capacitive transducers and their applications.
CO506.3	Understand the working of various transducers and sensors.
CO506.4	Understand the acoustic, optical and other sensors and with their applications.
CO506.5	Discuss the basics of signal conditioning and data acquisition system
<b>EE8511 Control and Instrumentation Laboratory</b>	
CO507.1	Understand the working of Bridge networks.
CO507.2	Analyze Instrumentation amplifier, active filters, regulated power supply.
CO507.3	Examine the signal conditioning circuit for Thermocouple, strain gauge and RTD.
CO507.4	Acquire knowledge on P, PI and PID controllers
CO507.5	Apply the simulation in control systems.
<b>HS8581 Professional Communication</b>	
CO508.1	Understand and apply knowledge of human communication and language processes as they occur across various contexts.
CO508.2	Evaluate key theoretical approaches used in the interdisciplinary field of communication.
CO508.3	Able to communicate effectively orally and in writing.
CO508.4	To demonstrate his verbal and non-verbal communication ability through presentations.
CO508.5	Participate effectively in group discussions.
<b>CS8383 Object Oriented Programming Laboratory</b>	
CO509.1	Students able to write Java programs for simple applications that make use of classes, packages and interfaces.



PRINCIPAL

THAMRABHARAN ENGINEERING COLLEGE  
 Chathirampudukulam Village,  
 Chidambaram - Veranikulam Road,  
 Thatchanallur, Tirunelveli - 627 358.

CO509.2	Include the division into network layers, role of each layer relationships between the layers
CO509.3	Students able to design applications using file processing, generic programming and event handling.
<b>SEMESTER – VI</b>	
<b>EE8601 Solid State Drives</b>	
CO601.1	Understand the dynamic and load torque characteristics of electric motor drives.
CO601.2	Design the converter and chopper fed DC motor drives.
CO601.3	Explain the speed control techniques of Induction motor drives and its performance.
CO601.4	Explain the speed control techniques of Synchronous motor drives and its performance.
CO601.5	Analyze and design the current and speed controllers for a closed loop solid state DC motor drive
<b>EE8602 Protection and Switchgear</b>	
CO602.1	Students able to understand the concepts of Electromagnetic and Static Relays
CO602.2	Students able to understand the concepts of suitability circuit breaker.
CO602.3	Students able to understand the causes of abnormal operating conditions of the apparatus and system.
CO602.4	Students able to understand the concepts of apparatus\ protection, static and numerical relays.
CO602.5	Students able to understand the basic knowledge on functioning of circuit breaker.
<b>EE8691 Embedded Systems</b>	
CO603.1	Ability to Use various Embedded Development Strategies.
CO603.2	Ability to choose embedded system Networking.
CO603.3	Describe and analyze different phases of EDLC.
CO603.4	Analyze the basics of real time operating system.
CO603.5	Discover and acquire knowledge on various embedded system application.
<b>EE8002 Design of Electrical Apparatus</b>	
CO604.1	Rotating and static electrical machines and ability to design of field system for its application.



PRINCIPAL

**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaramnagar - Vepernkulam Road.  
 Thatchanallur, Tirunelveli - 627 358.



CO604.2	Analyze and design of single and three phase transformer.
CO604.3	Analyze and design of armature and field of DC machines.
CO604.4	Analyze and design of stator and rotor of induction motor.
CO604.5	Analyze and design of synchronous machines.
<b>EC8395 Communication Engineering</b>	
CO605.1	Comprehend and appreciate the importance and purpose of this course.
CO605.2	Apply analog communication techniques.
CO605.3	Apply digital communication techniques.
CO605.4	Analyze data and pulse communication techniques.
CO605.5	Analyze Source and Error control coding.
<b>EE8661 Power Electronics and Drives Laboratory</b>	
CO606.1	Analyze the performance converter and inverter circuits.
CO606.2	Analyze the switching characteristics various switches.
CO606.3	Analyze about AC to DC converter circuits.
CO606.4	Analyze about DC to AC circuits and AC to AC converters.
CO606.5	Understand and acquire knowledge on simulation software.
<b>EC8681 Microprocessors and Microcontrollers Laboratory</b>	
CO607.1	Write ALP programs for fixed, floating point and arithmetic operations
CO607.2	Interface different input and output devices with 8086 processor
CO607.3	Generate waveforms using microprocessors
CO607.4	Execute programs in 8051
CO607.5	Differentiate simulator from emulator

*any*

<b>EE8611 Mini Project</b>	
CO608.1	Ability to identify the solution to solve a specific problem right from its identification.
CO608.2	Ability to analyze, design, implements and handle prototype projects with a complete and organized solution methodologies.
CO608.3	Ability to work as individuals or in a team in development of technical projects.
CO608.4	Ability to apply the engineering knowledge in solving the problem.
CO608.5	Ability to develop effective communication skills for presentation of project related activities.
<b>SEMESTER – VII</b>	
<b>EE8701 High Voltage Engineering</b>	
CO701.1	Students able to categorize the various types of over voltages in power system.
CO701.2	Students able to understand the various types of breakdown mechanisms in power systems..
CO701.3	Students able to understand the operation of vandigrift generator.
CO701.4	Students able to understand the various measurement techniques for measuring high voltage.
CO701.5	Students able to test power apparatus and insulation coordination.
<b>EE8702 Power System Operation and Control</b>	
CO702.1	Understand the significance of power system operation and control and analyze the control actions to be implemented on the system to meet the variation of system demand.
CO702.2	Understand and analyze the real-power frequency interaction.
CO702.3	Understand and analyze the reactive-power voltage interaction.
CO702.4	Understand and analyze the economic operation of power system.
CO702.5	Understand the operation of SCADA system and its application for real time operation and control of power systems
<b>EE8703 Renewable Energy Systems</b>	
CO703.1	Explain the various renewable energy resources and technologies and current & possible future role of renewable energy sources.
CO703.2	Analyze the wind energy conversion systems.

PRINCIPAL

**THAMIRABHARAN ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaramagar - Vepernkulam Road,  
 Thatchanallur, Tirunelveli - 627 353.



CO703.3	Analyze different the solar energy technologies.
CO703.4	Understand basics about biomass energy and geothermal energy.
CO703.5	Understand basics about tidal energy, wave energy, Ocean thermal energy conversion and fuel cell.
<b>GE8071 Disaster Management</b>	
CO704.1	Able to differentiate types of disasters, causes and impact on environment and society.
CO704.2	Able to assess vulnerability and provide disaster risk reduction.
CO704.3	Able to assess the interrelationship between disaster and development.
CO704.4	Able to understand the disaster risk management in India.
CO704.5	Able to understand the disaster management through case studies and field work.
<b>GE8077 Total Quality Management</b>	
CO705.1	Describe the dimensional barrier regarding Quality.
CO705.2	Summarize the Total quality principles.
CO705.3	Demonstrate the tools utilization for quality improvement.
CO705.4	Analyze the various types of techniques are used to measure quality.
CO705.5	Apply the various quality systems in implementation of Total quality management.
<b>OCS752 Introduction to C Programming</b>	
CO706.1	Develop algorithmic solutions to simple computational problems.
CO706.2	Read, write, execute by hand simple C programs.
CO706.3	Structure simple C programs for solving problems using statements.
CO706.4	Represent data using arrays and strings operations.
CO706.5	Decompose a C program into functions and pointers.
CO706.6	Represent and write program using structure and union

  
PRINCIPAL

**THAMIRABHARANI ENGINEERING COLLEGE**

Chathirampudukulam Village,

Chidambaramnagar - Vepernkulam Road,

Thatchanallur, Tirunelveli - 627 358.

<b>EE8711 Power System Simulation Laboratory</b>	
CO707.1	Ability to develop the coding to analyze the performance of transmission line and to formulate bus impedance and admittance matrix for the given electrical power network.
CO707.2	Ability to develop the coding to analyze the power flow using Gauss Seidal and Newton Raphson method.
CO707.3	Ability to develop the coding to analyze the power system under symmetrical and unsymmetrical fault conditions and to analyze the economic dispatch.
CO707.4	Ability to design the simulation model to analyze the transient stability of the power system, to examine the stability level of single and multi-machine system and to analyze the load frequency dynamics of multi area system.
CO707.5	Ability to design the simulation model to analyze the occurrence of electromagnetic transients in power system
<b>EE8712 Renewable Energy Systems Laboratory</b>	
CO708.1	Analyze the performance of characteristics of solar energy collector system.
CO708.2	Analyze the performance parameter of micro wind mills.
CO708.3	Analyze the performance parameter of hybrid energy (solar-wind) system.
CO708.4	Analyze the performance of hybrid energy fuel cell system.
CO708.5	Understand and acquire knowledge about on simulation of renewable energy sources.
<b>SEMESTER – VIII</b>	
<b>EE8015 Electric Energy Generation, Utilization and Conservation</b>	
CO801.1	Analyze the various properties of generation, utilization and conservation.
CO801.2	Identify an appropriate method of heating for any particular industrial application.
CO801.3	Summarize domestic wiring connection and debug any faults occurred.
CO801.4	Construct an electric connection for any domestic appliance like refrigerator.
CO801.5	Analyze a battery charging circuit for a specific household application.
<b>EE8017 High Voltage Direct Current Transmission</b>	
CO802.1	Develop the knowledge of HVDC transmission and HVDC converters and the applicability and advantage of HVDC transmission over conventional AC transmission.

  
**PRINCIPAL**  
**THAMIRABHARAN ENGINEERING COLLEGE**  
 Chathirangudi Junction, Karaikal  
 Chidambaram Road - Karaikal - 627 358.  
 Thatchanallur, Thanjavur - 627 358.



CO802.2	Formulate and solve mathematical problems related to rectifier and inverter control methods and learn about different control schemes as well as starting and stopping of DC links.
CO802.3	Analyze the different harmonics generated by the converters and their variation with the change in firing angles.
CO802.4	Develop harmonic models and use the knowledge of circuit theory to develop filters and assess the requirement and type of protection for the filters.
CO802.5	Review the existing HVDC systems along with MTDC systems and their controls and recognize the need to follow the advancements in both the existing systems and HVDC systems and determine the most economic coexistence of both.
<b>EE8811 Project Work</b>	
CO803.1	Use of fundamental knowledge and skills in engineering and apply it effectively on a project
CO803.2	Plan and manage the time effectively as a team
CO803.3	Present orally and demonstrate your project to peers, academicians and industry community
CO803.4	Provide solutions to the social problems from an engineer's perspective
CO803.5	Explore and apply the knowledge of the 'real world' situations that a professional engineer can encounter

  
**PRINCIPAL**  
**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaramagar - Vepankulam Road,  
 Thatchanallur, Tirunelveli - 627 553.



# THAMIRABHARANI ENGINEERING COLLEGE

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepankulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

## DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

### LIST OF COURSE OUTCOMES

SEMESTER I	
<b>HS8151 Communicative English</b>	
CO101.1	Read articles of a general kind in magazines and newspapers
CO101.2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English
CO101.3	Comprehend conversations and short talks delivered in English
CO101.4	Write short essays of a general kind and personal letters and emails in English
CO101.5	Develop vocabulary of a general kind by developing their reading skills
<b>MA8151 Engineering Mathematics - I</b>	
CO102.1	Apply differential calculus tools in solving various application problems
CO102.2	Apply differentiation to solve maxima and minima problems
CO102.3	Apply different methods of integration in solving practical problems
CO102.4	Apply multiple integral ideas in solving areas, volumes and other practical problems
CO102.5	Apply various techniques in solving differential equations
<b>PH8151 Engineering Physics</b>	
CO103.1	Gain knowledge on the basics of properties of matter and its applications
CO103.2	Analyze the concept of waves and optical devices and their applications in fiber optics
CO103.3	Analyze the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers
CO103.4	Understand the advanced physics concepts of quantum theory and its applications in tunneling microscopes
CO103.5	Understand the basics of crystals, their structures and different crystal growth techniques

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE  
Chathirampudukulam Village,

Chidambaranagar - Vepankulam Road,  
Thatchanallur, Tirunelveli - 627 358.



<b>CY8151 Engineering Chemistry</b>	
CO104.1	Understand the principles of water, characterization and treatment for potable and industrial purposes
CO104.2	Apply the knowledge of adsorption and catalysis in engineering technology
CO104.3	Understand the phase transition of one component and two component systems and the types of alloys and their applications
CO104.4	Understand the chemistry of various fuels and their combustion
CO104.5	Analyze the different forms of energy sources and compare the materials for constructing Battery and fuel cells
<b>GE8151 Problem Solving and Python Programming</b>	
CO105.1	Develop algorithmic solutions to simple computational problems.
CO105.2	Read, write, execute by hand simple Python programs.
CO105.3	Structure simple Python programs for solving problems.
CO105.4	Represent compound data using Python lists, tuples, dictionaries.
CO105.5	Read and write data from/to files in Python Programs.
<b>GE8152 Engineering Graphics</b>	
CO106.1	Familiarize with the fundamentals and standards of Engineering graphics
CO106.2	Perform freehand sketching of basic geometrical constructions and multiple views of objects
CO106.3	Project orthographic projections of lines and plane surfaces
CO106.4	Draw projections and solids and development of surfaces
CO106.5	Visualize and to project isometric and perspective sections of simple solids
<b>GE8161 Problem Solving and Python Programming Laboratory</b>	
CO107.1	Write, test, and debug simple Python programs
CO107.2	Implement Python programs with conditionals and loops
CO107.3	Develop Python programs step-wise by defining functions and calling them
CO107.4	Use Python lists, tuples, and dictionaries for representing compound data
CO107.5	Read and write data from/to files in Python

PRINCIPAL

**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaramagar - Veperankulam Road,  
 Thatchanallur, Tirunelveli - 627 001

<b>BS8161 Physics and Chemistry Laboratory</b>	
CO108.1	Apply the physics principles of Thermal physics and Properties of Matter to evaluate properties of materials
CO108.2	Understand measurement technique and usage of new instrument in Optics for real time application in Engineering
CO108.3	Apply the knowledge of semiconducting material, to evaluate the band gap of material useful for engineering solutions
CO108.4	Apply the knowledge of velocity of sound and compressibility of liquid – Ultrasonic interferometer
CO108.5	Understand measurements of air wedge method and evaluate the wavelength of spectrum
CO108.6	Obtain hands-on knowledge in the quantitative chemical analysis of water quality related parameters
CO108.7	Understand the experimental concepts in the mixture of acids and bases
CO108.8	Appreciate the need of Potentiometer, pH meter and Conductivity meter in the determination of concentration of ions
<b>SEMESTER II</b>	
<b>HS8251 Technical English</b>	
CO201.1	Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, and argue using appropriate communicative strategies
CO201.2	Write effectively and persuasively and produce different types of writings such as narration, description, exposition
CO201.3	Write the argument with creative, critical, analytical and evaluation writing
CO201.4	Read different genres of texts, infer implied meanings and critically analyze and evaluate them for ideas as well as for method of presentation
CO201.5	Listen / view and comprehend different spoken excerpts critically and infer unspoken and implied meanings
<b>MA8251 Engineering Mathematics - II</b>	
CO202.1	Compute Eigen values and Eigen vectors of a matrix, diagonalise symmetric matrices and similar matrices
CO202.2	Explain gradients, potential functions, and directional derivatives of functions of several variables. Compute line, surface and volume integral using Gauss divergence, Green's and Stoke's theorem
CO202.3	Discuss analytic functions in heat and fluid flow
CO202.4	Extend the concept of contour integrals in evaluating Real integrals
CO202.5	Discuss Laplace Transform methods to solve initial value problems for constant coefficient linear ODEs

  
**PRINCIPAL**  
**THAMIRABARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaram - Veperur Road,  
 Thatchanallur, Tirunelveli.



<b>PH8253 Physics for Electronics Engineering</b>	
CO203.1	Gain knowledge on classical and quantum electron theories, and energy band structures
CO203.2	Acquire knowledge on basics of semiconductor physics and its applications in various devices
CO203.3	Get knowledge on magnetic and dielectric properties of materials
CO203.4	Have the necessary understanding on the functioning of optical materials for optoelectronics
CO203.5	Understand the basics of quantum structures and their applications in spintronics and carbon electronics
<b>BE8254 Basic Electrical and Instrumentation Engineering</b>	
CO204.1	Acquire knowledge of analyzing three phase power circuits and measurement
CO204.2	Analyze the working principle of transformer and their applications
CO204.3	Understand the concepts of DC Machines
CO204.4	Describe the construction and working principle of AC Machines
CO204.5	Understand the need of measurement, their classification, advantages and disadvantages
<b>EC8251 Circuit Analysis</b>	
CO205.1	Analyze electrical circuits using mesh, nodal analysis and network terminology
CO205.2	Apply network theorem concepts to solve AC and DC circuits
CO205.3	Explain the concepts of resonance and coupled circuit
CO205.4	Analyze the transient response for AC and DC circuits
CO205.5	Understand the concepts of Two port networks
<b>EC8252 Electronic Devices</b>	
CO206.1	Understand the construction, theory and operation of the basic electronic devices PN Junction diodes
CO206.2	Understand the construction, theory and operation of the Bipolar Junction Transistor
CO206.3	Understand the construction, theory and operation of the Field Effect Transistor
CO206.4	Understand the construction, theory and operation of the special electronic devices
CO206.5	Understand the construction, theory and operation of the Power device; and display devices

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE  
Chathirampudukulam Village,

Chidambaram - Veperikulam Road,  
Thatchanallur, Tirunelveli - 627 353.

<b>EC8261 Circuits and Devices Laboratory</b>	
CO207.1	Analyze the characteristics of basic electronic devices
CO207.2	Design the RL circuits
CO207.3	Design the RC circuits
CO207.4	Verify Thevenin & Norton theorem
CO207.5	Verify KVL & KCL, and Superposition theorems
<b>GE8261 Engineering Practices Laboratory</b>	
CO208.1	Analyze the basic home electrical wire connections like single way switch, two way switch and fluorescent lamp wiring connections
CO208.2	Examine the electrical quantities such as voltage current, power etc
CO208.3	Elaborate on the components, gates, soldering practices
CO208.4	Fabricate carpentry components and pipe connections including plumbing works
CO208.5	Use welding equipment to join the structures
CO208.6	Carry out the basic machining operations
CO208.7	Make the models using sheet metal works
CO208.8	Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings
<b>SEMSTER III</b>	
<b>MA8352 Linear Algebra and Partial Differential Equations</b>	
CO301.1	Express some of algebra operations between linear transformation
CO301.2	Understand the relationship between a linear transformation and its matrix representation
CO301.3	Demonstrate knowledge of general inner product space by constructing an orthogonal basis for an inner product space by using Gram Schmidt process
CO301.4	Able to solve various type of partial differential equations
CO301.5	Apply Fourier series methods to solve boundary value problems for PDEs

**PRINCIPAL**

**THAMIRABHARATHI ENGINEERING COLLEGE**

Ghathirampudukulam Village,  
Chidambaramagar - Vepernkulam Road,  
Thatchanallur, Tirunelveli - 627 358.



<b>EC8393 Fundamentals of Data Structures in C</b>	
CO302.1	Implement linear and non-linear data structure operations using C
CO302.2	Suggest appropriate linear / non-linear data structure for any given data set
CO302.3	Apply hashing concepts for a given problem
CO302.4	Modify or suggest new data structure for an application
CO302.5	Appropriately choose the sorting algorithm for an application
<b>EC8351 Electronic Circuits- I</b>	
CO303.1	Acquire knowledge in working principles, characteristics and applications of BJT and FET
CO303.2	Acquire knowledge and analysis the frequency response characteristics of BJT and FET amplifiers
CO303.3	Analyze the performance of small signal BJT and FET amplifiers - single stage and multi stage amplifiers
CO303.4	Design and analyze the Regulated Power Supplies
CO303.5	Apply the knowledge gained in the design of Electronic circuits
<b>EC8352 Signals and Systems</b>	
CO304.1	Determine and analyze the given system is linear/causal/stable
CO304.2	Analyze the continuous time signals using Laplace and Fourier transform
CO304.3	Compute and to analyze the Continuous Time LTI systems in the time domain and frequency domain
CO304.4	Analyze the continuous time signals using DTFT and Z - transform
CO304.5	Compute and to analyze the Discrete Time LTI systems in the time domain and frequency domain
<b>EC8392 Digital Electronics</b>	
CO305.1	Understand the digital fundamentals and applications
CO305.2	Design various combinational digital circuits using logic gates
CO305.3	Analyze and design the synchronous sequential circuits
CO305.4	Analyze and design the asynchronous sequential circuits
CO305.5	Understand and analyze the semiconductor memories and related technology

PRINCIPAL

THAMIRABHARAN ENGINEERING COLLEGE

Chathirampudukulam Village,

Chidambaramagar - Veperambur Road,

Thatchanallur, Tirunelveli - 627 336.

<b>EC8391 Control Systems Engineering</b>	
CO306.1	Show control system components and explain the use of transfer function models for analysis of physical systems
CO306.2	Explain about time response of the systems and steady state analysis
CO306.3	Analyze the open loop and closed loop frequency responses of systems
CO306.4	Classify stability analysis and design of compensators
CO306.5	Design state variable representation of physical systems
<b>EC8381 Fundamentals of Data Structures in C Laboratory</b>	
CO307.1	Develop C programs for simple applications making use of basic constructs
CO307.2	Implement the appropriate linear and non-linear data structures in problem solving
CO307.3	Solve the problems using trees and Binary Search trees
CO307.4	Choose appropriate searching and sorting algorithm for an application and implement it in a modularized way
CO307.5	Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval
<b>EC8361 Analog and Digital Circuits Laboratory</b>	
CO308.1	Design and Test rectifiers, filters and regulated power supplies
CO308.2	Design and Test BJT/JFET amplifiers
CO308.3	Analyze the limitation in bandwidth of single stage and multi stage amplifier
CO308.4	Measure CMRR in differential amplifier and simulate and analyze amplifier circuits using PSpice.
CO308.5	Design and Test the digital logic circuits
<b>HS8381 Interpersonal Skills/Listening&amp; Speaking</b>	
CO309.1	Listen sharply and reading keenly to understand and act aptly
CO309.2	Employ the soft skills to become a Successful leader
CO309.3	Make effective presentation and to excel in Group Discussions
CO309.4	Participate confidently and appropriately in conversations both formal and in formal

PRINCIPAL

**THAMIRABHARANI ENGINEERING COLLEGE**  
Chathirampudukulam Village,

Chidambaramagar - Veperukulam Road,  
Thatchanallur, Tirunelveli - 627 613.



SEMSTER IV	
<b>MA8451 Probability and Random Processes</b>	
CO401.1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon
CO401.2	Understand the basic concepts of one and two dimensional random variables and apply in engineering application
CO401.3	Apply the concept random processes in engineering disciplines
CO401.4	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.
CO401.5	Analyze the response of random inputs to linear time invariant systems
<b>EC8452 Electronic Circuits II</b>	
CO402.1	Analyze different types of amplifier with negative feedback
CO402.2	Design & Analysis of transistorized RC Oscillators & LC oscillators
CO402.3	Analyze transistorized tuned amplifiers
CO402.4	Analysis of wave shaping circuits
CO402.5	Summarize the operation of power amplifiers
<b>EC8491 Communication Theory</b>	
CO403.1	Understand and design of an AM communication systems
CO403.2	Understand and design of angle modulated communication systems
CO403.3	Apply the concepts of random process to the design of Communication systems
CO403.4	Analyze the noise performance of AM and FM systems
CO403.5	Gain knowledge in sampling and quantization that leads to the design of digital systems.
<b>EC8451 Electromagnetic Fields</b>	
CO404.1	Understand the fundamental electromagnetic laws and concepts
CO404.2	Study Maxwell's equations in integral, differential and phasor forms
CO404.3	Explain and analyze electromagnetic wave propagation in lossy and in lossless media
CO404.4	Solve simple problems requiring estimation of electric and magnetic field quantities
CO404.5	Learn and analyze wave propagation between parallel planes and wave guides

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE

Chathirampudukulam Village,

Chidambaram - Vengaloor Road,

Tamil Nadu, Tirunelveli

<b>EC8453 Linear Integrated Circuits</b>	
CO405.1	Understand the building blocks and characteristics of OP-AMP
CO405.2	Design linear and non-linear applications of OP AMPS
CO405.3	Understand and analyze analog multiplier and PLL circuits
CO405.4	Design ADC and DAC using OP – AMPS
CO405.5	Generate waveforms using OP – AMP and Analyse special function IC s
<b>GE8291 Environmental Science and Engineering</b>	
CO406.1	Understand different components of the environment and their functions
CO406.2	Find solutions to environmental problems
CO406.3	Understand the importance of natural resources and their roles in sustainable development
CO406.4	Understand the issues related to the environment and their impact on human lives
CO406.5	Create awareness about the problems caused by population and related issues
<b>EC8461 Circuits Design and Simulation Laboratory</b>	
CO407.1	Analyze various types of feedback amplifiers
CO407.2	Design oscillators, tuned amplifiers, wave-shaping circuits and multivibrators
CO407.3	Design and simulate feedback amplifiers, oscillators, tuned amplifiers, wave-shaping circuits and multivibrators using simulation tool
<b>EC8462 Linear Integrated Circuits Laboratory</b>	
CO408.1	Design amplifiers, oscillators, D-A converters using operational amplifiers
CO408.2	Design filters using op-amp and performs experiments on frequency response
CO408.3	Analyze the working of PLL and describe its application as a frequency multiplier
CO408.4	Design DC power supply using ICs
CO408.5	Analyze the performance of filters, multi vibrators, A/D converter and analog multiplier using p

THAMIRASARAN ENGINEERING COLLEGE

Chettinampudukottai Village,

Chidambaram - Veperambalam Road,

SRIRANGAPATTUR, Tirunelveli - 627 353.



SEMESTER V	
<b>EC8501 Digital Communication</b>	
CO501.1	Understand the limits set by information theory
CO501.2	Understand the various waveform coding schemes
CO501.3	Design and implement base band transmission schemes
CO501.4	Design and implement band pass signaling schemes
CO501.5	Analyze the spectral characteristics of band pass signaling schemes and their noise performance
CO501.6	Design Error control coding schemes
<b>EC8553 Discrete-Time Signal Processing</b>	
CO502.1	Apply DFT for the analysis discrete time signals and systems
CO502.2	Design IIR filters
CO502.3	Design FIR filters
CO502.4	Understand the characteristic effects of finite precision representation on digital filters
CO502.5	Understand the architecture and functionalities of Digital Signal Processor
<b>EC8552 Computer Architecture and Organization</b>	
CO503.1	Describe data representation, instruction formats and the operation of a digital computer
CO503.2	Illustrate the fixed point and floating-point arithmetic for ALU operation
CO503.3	Discuss about implementation schemes of control unit and pipeline performance
CO503.4	Understand the concept of various memories, interfacing and organization of multiple processors
CO503.5	Discuss parallel processing technique and unconventional architectures
<b>EC8551 Communication Networks</b>	
CO504.1	Identify the components required to build different types of networks
CO504.2	Understanding the various issues at data link layer and their solutions
CO504.3	Trace the flow of information from one node to another node in the network and understanding the different routing protocols

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE

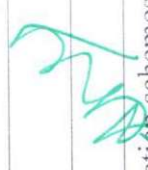
Chathirampudukuppam Village,

Chidambaram - Veperakata Road,

Chidambaram - Veperakata Road,

Thatchanallur, Tirunelveli - 627 352.

CO504.4	Understand the transport layer and the traffic flow mechanisms
CO504.5	Understand the network security issues at the application level
<b>GE8077 Total Quality Management</b>	
CO505.1	Know about the importance of quality management
CO505.2	Lead and motivate the teamwork and also to improve their customer satisfaction
CO505.3	Understand the basic concepts of tools and techniques
CO505.4	Apply different tools and techniques to manufacturing and services processes for quality management
CO505.5	Get knowledge of ISO registration, auditing and used in their Organization
<b>OR0551 Renewable Energy Sources</b>	
CO506.1	Understand and analyze the physics of solar radiation.
CO506.2	Ability to classify and analyze the solar energy collectors and methodologies of storing solar energy.
CO506.3	Knowledge in applying solar energy in a useful way.
CO506.4	Knowledge in wind energy and biomass and analyze its economic aspects.
CO506.5	Knowledge in capturing and applying other forms of energy sources like ocean and geothermal energies.
<b>EC8562 Digital Signal Processing Laboratory</b>	
CO507.1	Understand the basic signal processing operations
CO507.2	Understand the MATLAB based implementation of IIR and FIR filter systems
CO507.3	Analyze the architecture of a DSP Processor
CO507.4	Design and Implement the FIR and IIR Filters in DSP Processor for performing filtering operation over real-time signals
CO507.5	Design a DSP system for various applications of DSP
<b>EC8561 Communication Systems Laboratory</b>	
CO508.1	Simulate & validate the various functional modules of a communication system
CO508.2	Demonstrate their knowledge in base band signaling schemes through implementation of digital modulation schemes.
CO508.3	Analyze various channel coding schemes & demonstrate their capabilities towards the improvement of the communication system.

  
**PRINCIPAL**  
**THAMIRASHARAN ENGINEERING COLLEGE**  
 Chakkampudukulam Village,  
 Chidambaram - Veperukulam Road,  
 Thatchanallur, Tirunelveli - 627 353.



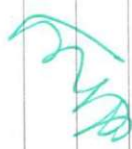
CO508.4	Construct end-to-end communication Link	
<b>EC8563 Communication Networks Laboratory</b>		
CO509.1	Understand the structure and organization of computer networks	
CO509.2	Include the division into network layers, role of each layer relationships between the layers	
CO509.3	Understand the basic concepts of application layer protocol design including client/server models, peer to peer models, and network naming	
CO509.4	Understand about transport layer concepts and protocol design including connection oriented and connection-less models, techniques to provide reliable data delivery and algorithms for congestion control and flow control	
CO509.5	Analyze the performance of various network protocols using simulation tools	
<b>SEMESTER – VI</b>		
<b>EC8691 Microprocessors and Microcontrollers</b>		
CO601.1	Execute programs based on 8086 microprocessor	
CO601.2	Analyze the system configurations based on 8086 microprocessor	
CO601.3	Design and implement 8086 microprocessor based systems	
CO601.4	Execute programs based on 8051 microcontroller	
CO601.5	Design and implement 8051 microcontroller based systems	
<b>EC8095 VLSI Design</b>		
CO602.1	Understand the fundamentals of CMOS circuits and its characteristics	
CO602.2	Learn the design and realization of combinational circuits	
CO602.3	Learn the design and realization of sequential digital circuits	
CO602.4	Understand the concepts of Architectural choices and performance trade-offs involved in designing and realizing the circuits in CMOS technology	
CO602.5	Learn the different FPGA architectures and testability of VLSI circuits	
<b>EC8652 Wireless Communication</b>		
CO603.1	Characterize a wireless channel and evolve the system design specifications.	
CO603.2	Design a cellular system based on resource availability and traffic demands	

**PRINCIPAL**

**THAMIRABHARANI ENGINEERING COLLEGE**

Chathirampudussery Village,  
Chidambaramagar - Veerapattinam Road,  
Thalchannallur, Tiruvarur - 627 353.

CO603.3	Evaluate the concepts of multiple antenna techniques	
CO603.4	Identify suitable signaling and multipath mitigation techniques for the wireless channel and system under consideration.	
CO603.5	Apply the advanced features in wireless communication for real world applications	
<b>MG8591 Principles of Management</b>		
CO604.1	Define the concept of management roles and skills	
CO604.2	Analyze the planning process and strategic management	
CO604.3	Create the organization with proper human resource management	
CO604.4	Evaluate the human behavior and create effective communication skill	
CO604.5	Generalize the budget control techniques to maintain standards in productivity	
<b>EC8651 Transmission Lines and RF Systems</b>		
CO605.1	Explain the characteristics of transmission lines and its losses	
CO605.2	Understand and analyze the standing wave ratio and input impedance in high frequency transmission lines	
CO605.3	Analyze impedance matching by stubs using smith charts	
CO605.4	Analyze the characteristics of TE and TM waves	
CO605.5	Design a RF transceiver system for wireless communication	
<b>CS8792 Cryptography and Network Security</b>		
CO606.1	Understand the basics of network security with threats and classical encryption techniques	
CO606.2	Understand the different cryptographic operations of symmetric cryptographic algorithms	
CO606.3	Analyze the different cryptographic operations of public key cryptography and key exchange algorithms	
CO606.4	Understand and analyze the various authentication schemes to simulate different applications	
CO606.5	Analyze various security practices and system security standards	
<b>EC8681 Microprocessors and Microcontrollers Laboratory</b>		
CO607.1	Write ALP programs for fixed, floating point and arithmetic operations	
CO607.2	Interface different input and output devices with 8086 processor	
CO607.3	Generate waveforms using microprocessors	



PRINCIPAL

**THAMIRABHARANI ENGINEERING COLLEGE**


Chathirempudukulam Village,

Chidambaram - Veperankulam Road,

Thatchanallur, Tirunelveli - 627 333.



CO607.4	Execute programs in 8051	
CO607.5	Differentiate simulator from emulator	
<b>EC8661 VLSI Design Laboratory</b>		
CO608.1	Learn Hardware Descriptive Language (Verilog/VHDL)	
CO608.2	Learn the fundamental principles of VLSI circuit design in digital domain	
CO608.3	Learn the fundamental principles of VLSI circuit design in analog domain	
CO608.4	Familiarize fusing of logical modules on FPGAs	
CO608.5	Provide hands on design experience with professional design (EDA) platforms	
<b>EC8611 Technical Seminar</b>		
CO609.1	Understand the importance of Listening and responding appropriately	
CO609.2	Selecting a subject, narrowing the subject into a topic and stating an objective	
CO609.3	Make effective presentations	
CO609.4	Participate confidently in conversations	
CO609.5	Manage time efficiently	
<b>HS8581 Professional Communication</b>		
CO610.1	Understand and apply knowledge of human communication and language processes as they occur across various contexts	
CO610.2	Evaluate key theoretical approaches used in the interdisciplinary field of communication	
CO610.3	Communicate effectively orally and in writing	
CO610.4	Demonstrate his verbal and non-verbal communication ability through presentations	
CO610.5	Participate effectively in group discussions	
<b>SEMESTER – VII</b>		
<b>EC8701 Antennas and Microwave Engineering</b>		
CO701.1	Understand the basic principles and antenna parameters and link power budget.	
CO701.2	Design and access the performance of various antennas.	

  
**PRINCIPAL**  
**THAMIRABHARAN ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaram Road,  
 Chidambaram - 627 358.  
 Thatchanallur, Tirunelveli - 627 358.

CO701.3	Explain antenna arrays and its applications.
CO701.4	Understand the various microwave systems.
CO701.5	Design the microwave amplifier, filter and Oscillator.
<b>EC8751 Optical Communication</b>	
CO702.1	Realize and understand the basic elements in optical fibers, different modes and configurations.
CO702.2	Analyze the transmission characteristics associated with dispersion and polarization techniques.
CO702.3	Design optical sources and detectors with their use in optical communication system.
CO702.4	Construct fiber optic receiver systems, measurements and coupling techniques.
CO702.5	Design optical communication systems and its networks.
<b>EC8791 Embedded and Real Time Systems</b>	
CO703.1	Understand and analyze the concepts of designing an embedded system.
CO703.2	Learn and apply the architecture and programming of ARM processor.
CO703.3	Understand and apply the concepts of embedded systems programming.
CO703.4	Analyze the basic concepts of real time system design.
CO703.5	Model the real-time applications using embedded-system design concepts.
<b>EC8702 Ad hoc and Wireless Sensor Networks</b>	
CO704.1	Understand the basics of Ad hoc networks and Wireless Sensor Networks
CO704.2	Apply this knowledge to identify the suitable routing algorithm based on the network and user requirement
CO704.3	Apply the knowledge to identify appropriate physical and MAC layer protocols
CO704.4	Understand the transport layer and security issues possible in Ad hoc and sensor networks
CO704.5	Analyze the OS used in Wireless Sensor Networks and build basic modules
<b>EC8071 Cognitive Radio</b>	
CO705.1	Gain knowledge on the design principles on software defined radio and cognitive radio
CO705.2	Develop the ability to design and implement algorithms for cognitive radio spectrum sensing and dynamic spectrum access
CO705.3	Build experiments and projects with real time wireless applications

*[Handwritten Signature]*

PRINCIPAL  
**THAMIRABHARAN ENGINEERING COLLEGE**  
 THAMIRABHARAN ENGINEERING COLLEGE  
 Chidambaram - Veperur Road  
 Thatchanallur, Tirunelveli - 627 353.



CO705.4	Understand and analyze various layer designs	
CO705.5	Apply the knowledge of advanced features of cognitive radio for real world applications	
<b>OBM752 Hospital Management</b>		
CO706.1	Understand the principles of Hospital administration	
CO706.2	Identify and discuss the importance of Human resource management	
CO706.3	Understand and analyze the various recruitment training and techniques research techniques in Hospital administration	
CO706.4	Understand and analyze various Information management systems and their uses	
CO706.5	Understand and discuss safety procedures followed in hospitals	
<b>EC8711 Embedded Laboratory</b>		
CO707.1	Write programs in ARM for any specific application	
CO707.2	Interface memory, A/D and D/A converters with ARM system	
CO707.3	Analyze the performance of interrupt in embedded systems	
CO707.4	Write program for interfacing keyboard, display, motor and sensors	
CO707.5	Design and implement a mini project using embedded system design concepts	
<b>EC8761 Advanced Communication Laboratory</b>		
CO708.1	Analyze the performance of simple optical link by the measurement of losses	
CO708.2	Analyze the mode characteristics of fiber	
CO708.3	Understand the intricacies in microwave system design and analyze the characteristics of Directional Couplers, Isolators, various Tees	
CO708.4	Understand the characteristics of Gunn diode	
CO708.5	Compute the VSWR, wavelength, frequency, using microwave system design	
<b>SEMESTER – VIII</b>		
<b>EC8093 Digital Image Processing</b>		
CO801.1	Understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms	
CO801.2	Operate on images using the techniques of smoothing, sharpening and enhancement	

PRINCIPAL

**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaramagar - Vepekkulam Road,  
 Thatchanallur, Tirunelveli - 627 358.

CO801.3	Understand the restoration concepts and filtering techniques
CO801.4	Learn the basics of segmentation and various methods of segmenting the images
CO801.5	Know about compressing and recognizing the images for color models
<b>IT 8006 Principles of Speech Processing</b>	
CO802.1	Understand the speech signal and its spectrum parameters by STFT and mel spectrum
CO802.2	Understand the speech compression techniques
CO802.3	Analyze the speech recognition process using Hidden Markov Model
CO802.4	Understand the speaker recognition techniques
CO802.5	Design text to speech synthesis systems
<b>EC8811 Project Work</b>	
CO803.1	Use of fundamental knowledge and skills in engineering and apply it effectively on a project
CO803.2	Plan and manage the time effectively as a team
CO803.3	Present orally and demonstrate your project to peers, academicians and industry community
CO803.4	Provide solutions to the social problems from an engineer's perspective
CO803.5	Explore and apply the knowledge of the 'real world' situations that a professional engineer can encounter

  
**PRINCIPAL**  
**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukottam Village,  
 Chathirampudukottam Road,  
 Chidambaram - 627 353.  
 Thatchanallur, Tirunelveli





# THAMIRABHARANI ENGINEERING COLLEGE

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

## DEPARTMENT OF MECHANICAL ENGINEERING

### LIST OF COURSE OUTCOMES

#### SEMESTER I

#### HS8151 Communicative English

CO101.1	Read articles of a general kind in magazines and newspapers
CO101.2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English
CO101.3	Comprehend conversations and short talks delivered in English
CO101.4	Write short essays of a general kind and personal letters and emails in English
CO101.5	Develop vocabulary of a general kind by developing their reading skills

#### MA8151 Engineering Mathematics - I


CO102.1	Apply differential calculus tools in solving various application problems
CO102.2	Apply differentiation to solve maxima and minima problems
CO102.3	Apply different methods of integration in solving practical problems
CO102.4	Apply multiple integral ideas in solving areas, volumes and other practical problems
CO102.5	Apply various techniques in solving differential equations

#### PH8151 Engineering Physics

CO103.1	Gain knowledge on the basics of properties of matter and its applications
CO103.2	Analyze the concept of waves and optical devices and their applications in fiber optics
CO103.3	Analyze the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers
CO103.4	Understand the advanced physics concepts of quantum theory and its applications in tunneling microscopes
CO103.5	Understand the basics of crystals, their structures and different crystal growth techniques

PRINCIPAL  
THAMIRABHARANI ENGINEERING COLLEGE  
Chathirampudukulam Village,  
Thatchanallur, Tirunelveli - 627 353.  
Chidambaranagar - Vepemkulam Road.

<b>CY8151 Engineering Chemistry</b>	
CO104.1	Understand the principles of water, characterization and treatment for potable and industrial purposes
CO104.2	Apply the knowledge of adsorption and catalysis in engineering technology
CO104.3	Understand the phase transition of one component and two component systems and the types of alloys and their applications
CO104.4	Understand the chemistry of various fuels and their combustion
CO104.5	Analyze the different forms of energy sources and compare the materials for constructing Battery and fuel cells
<b>GE8151 Problem Solving and Python Programming</b>	
CO105.1	Develop algorithmic solutions to simple computational problems.
CO105.2	Read, write, execute by hand simple Python programs.
CO105.3	Structure simple Python programs for solving problems.
CO105.4	Represent compound data using Python lists, tuples, dictionaries.
CO105.5	Read and write data from/to files in Python Programs.
<b>GE8152 Engineering Graphics</b>	
CO106.1	Familiarize with the fundamentals and standards of Engineering graphics
CO106.2	Perform freehand sketching of basic geometrical constructions and multiple views of objects
CO106.3	Project orthographic projections of lines and plane surfaces
CO106.4	Draw projections and solids and development of surfaces
CO106.5	Visualize and to project isometric and perspective sections of simple solids
<b>GE8161 Problem Solving and Python Programming Laboratory</b>	
CO107.1	Write, test, and debug simple Python programs
CO107.2	Implement Python programs with conditionals and loops
CO107.3	Develop Python programs step-wise by defining functions and calling them
CO107.4	Use Python lists, tuples, and dictionaries for representing compound data
CO107.5	Read and write data from/to files in Python

  
**PRINCIPAL**  
**THAMIRABARANI ENGINEERING COLLEGE**  
 Chathirampudikulam Village,  
 Chidambaram - Veerapattinam Road,  
 Thatchanallur, Tiruvarur - 627 353.



<b>BS8161 Physics and Chemistry Laboratory</b>	
CO108.1	Apply the physics principles of Thermal physics and Properties of Matter to evaluate properties of materials
CO108.2	Understand measurement technique and usage of new instrument in Optics for real time application in Engineering
CO108.3	Apply the knowledge of semiconducting material, to evaluate the band gap of material useful for engineering solutions
CO108.4	Apply the knowledge of velocity of sound and compressibility of liquid – Ultrasonic interferometer
CO108.5	Understand measurements of air wedge method and evaluate the wavelength of spectrum
CO108.6	Obtain hands-on knowledge in the quantitative chemical analysis of water quality related parameters
CO108.7	Understand the experimental concepts in the mixture of acids and bases
CO108.8	Appreciate the need of Potentiometer, pH meter and Conductivity meter in the determination of concentration of ions
<b>SEMESTER II</b>	
<b>HS8251 Technical English</b>	
CO201.1	Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, and argue using appropriate communicative strategies
CO201.2	Write effectively and persuasively and produce different types of writings such as narration, description, exposition
CO201.3	Write the argument with creative, critical, analytical and evaluation writing
CO201.4	Read different genres of texts, infer implied meanings and critically analyze and evaluate them for ideas as well as for method of presentation
CO201.5	Listen / view and comprehend different spoken excerpts critically and infer unspoken and implied meanings
<b>MA8251 Engineering Mathematics - II</b>	
CO202.1	Compute Eigen values and Eigen vectors of a matrix, diagonalise symmetric matrices and similar matrices
CO202.2	Explain gradients, potential functions, and directional derivatives of functions of several variables. Compute line / surface and volume integral using Gauss divergence, Green's and Stoke's theorem
CO202.3	Discuss analytic functions in heat and fluid flow
CO202.4	Extend the concept of contour integrals in evaluating Real integrals
CO202.5	Discuss Laplace Transform methods to solve initial value problems for constant coefficient linear ODEs

  
**PRINCIPAL**  
**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampattikulam Village,  
 Chidambaram - Veppudam Road,  
 Chidambaram, Tiruvelur - 627 353.

<b>PH8251 Material Science</b>	
CO203.1	Gain knowledge on classical and quantum electron theories, and energy band structures.
CO203.2	Acquire knowledge on basics of semiconductor physics and its applications in various devices.
CO203.3	Get knowledge on magnetic and dielectric properties of materials.
CO203.4	Have the necessary understanding on the functioning of optical materials for optoelectronics.
CO203.5	Understand the basics of quantum structures and their applications in spintronics and carbon electronics.
<b>BE8523 Basic Electrical, Electronics and Instrumentation Engineering</b>	
CO204.1	Analyze the electrical circuits using fundamental laws and theorems.
CO204.2	Understand the fundamental working principle, types of electrical machines and its performance characteristics.
CO204.3	Understand the types and working principle of renewable energy sources, protective devices and common domestic loads.
CO204.4	Understand the constructional details, working principle of electronic circuits and its characteristics.
CO204.5	Understand the constructional details, working principle of electronic circuits and its characteristics.
<b>GE8291 Environmental Science and Engineering</b>	
CO205.1	Understand different components of the environment and their functions.
CO205.2	Find solutions to environmental problems.
CO205.3	Understand the importance of natural resources and their roles in sustainable development.
CO205.4	Understand the issues related to the environment and their impact on human lives.
CO205.5	Create awareness about the problems caused by population and related issues.
<b>GE8292 Engineering Mechanics</b>	
CO206.1	Compute the resultant force for planar and spatial system of forces.
CO206.2	Estimate the force, moment for planar and spatial system of forces.
CO206.3	Compute the centroid, second moment of area, center of gravity, product moment of inertia and mass moment of inertia.
CO206.4	Compute the motion parameters like displacement, velocity, acceleration using dynamics.
CO206.5	Compute the reaction force by applying principles of friction and the motion parameters of rigid body.

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE

Chathirampudiyalam Village,

Chidambaram, Vengalpet Taluk, District - 605 003.



<b>GE8261 Engineering Practices Laboratory</b>	
CO207.1	To know about different types of lines & use of different types of pencils in an Engineering. Drawing
CO207.2	To know how to represents letters & numbers in drawing sheet
CO207.3	To know about different types of projection
CO207.4	To know projection of points ,straight lines, solids etc.
CO207.5	To know development of different types of surfaces, Isometric Projection.
<b>BE8261 Electrical, Electronics and Instrumentation Engineering Laboratory</b>	
CO208.1	Ability to determine the speed characteristic of different electrical machines.
CO208.2	Verify the theoretical characteristics of diodes, transistors, OP-amps and digital electronic components experimentally
CO208.3	Ability to design simple circuits involving diodes and transistors.
CO208.4	Implement and analyze various circuits viz. Rectifiers, Voltage Regulators, Amplifier circuits, Op-Amp based linear & non-linear circuits
CO208.5	Ability to use operational amplifiers.
<b>SEMSTER III</b>	
<b>MA8353 Transforms and Partial Differential Equations</b>	
CO301.1	Understand how to solve the given standard partial differential equations.
CO301.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
CO301.3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
CO301.4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
CO301.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.
<b>ME8391 Engineering Thermodynamics</b>	
CO302.1	Illustrate the basic concepts and laws of thermodynamics.

**PRINCIPAL**

**THAMIRABHARANI ENGINEERING COLLEGE**

Chathirampudukudam Village,

Chidambaramagar - Veperankulam Road,

Thatchanallur, Tirunelveli - 627 353.

CO302.2	Apply the concepts of enthalpy and entropy in thermal systems.
CO302.3	Explain the working principle of steam power cycles.
CO302.4	Apply the concepts of thermodynamics to ideal gases and real gases and its relationships.
CO302.5	Apply the concepts of gas mixtures and psychrometry.
<b>ME8351 Manufacturing Technology – I</b>	
CO303.1	Relate different types of patterns, casting process and furnaces used in foundry.
CO303.2	Distinguish different types of welding process and welding defects.
CO303.3	Explain hot working and cold working process.
CO303.4	Summarize different types of forming processes.
CO303.5	Explain manufacturing methods of plastic components.
<b>EE8353 Electrical Drives and Controls</b>	
CO304.1	Understand the principle of electrical drives & be able to understand the dynamics of electrical drive systems.
CO304.2	Select a drive for a particular application based on power rating & to select a drive based on mechanical characteristics for a particular drive application.
CO304.3	Operate and maintain solid state drives for speed control of DC machines.
CO304.4	Operate and maintain solid state drive for speed control of various special electrical machines.
CO304.5	Understand various starting and braking methods on electrical drives including their effects on power supply, motor and load
<b>CE8394 Fluid Mechanics and Machinery</b>	
CO305.1	Apply mathematical knowledge to predict the properties and characteristics of a fluid.
CO305.2	Classify and explain the flow of fluid through circular conduits.
CO305.3	Extend and infer the importance of dimensional analysis.
CO305.4	Classify and interpret the performance characteristics of various pumps in engineering fields.
CO305.5	Classify and compare the performance characteristics of various turbines in engineering fields.
<b>ME8361 Manufacturing Technology Laboratory – I</b>	
CO306.1	Demonstrate the safety precautions exercised in the mechanical workshop.


PRINCIPAL

THAMIRABHARAN! ENGINEERING COLLEGE

Chattirampudukulam Village,  
Chidambaramnagar - Veerankulam Road,  
Thatchanallur, Tirunelveli - 627 653.



CO306.2	Make the work piece as per given shape and size using Lathe.
CO306.3	Join two metals using arc welding.
CO306.4	Use sheet metal fabrication tools and make simple tray and funnel.
CO306.5	Use different moulding tools, patterns and prepare sand moulds.
<b>ME8381 Computer Aided Machine Drawing</b>	
CO307.1	Acquire the knowledge of various standards and specifications about standard machine components.
CO307.2	Apply the knowledge of fits and tolerances for various applications.
CO307.3	Model components of their choice using CAD software.
CO307.4	Sketch Manual drawings of assemblies with the help of given part.
CO307.5	Create detailing of a Machine component.
<b>EE8361 Electrical Engineering Laboratory</b>	
CO308.1	Analyze various types of magnetic circuits.
CO308.2	Understand and analyze the performance of transformer.
CO308.3	Understand the principle of electromechanical energy conversion, concepts in rotating machines and analyze the electromagnetic system.
CO308.4	Understand the working principle, types and analyze the performance of DC Generator.
CO308.5	Understand the working principle, types and analyze the performance of DC Motor.
<b>SEMSTER IV</b>	
<b>MA8452 Statistics and Numerical Methods</b>	
CO401.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.
CO401.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.
CO401.3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
CO401.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.

  
**PRINCIPAL**  
**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaram Taluk, Pudukkottai District,  
 Tamil Nadu - 621 303.

CO401.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
<b>ME8492 Kinematics of Machinery</b>	
CO402.1	Understand the basics of mechanisms and its application.
CO402.2	Determine the velocity and acceleration at any point of a link in a mechanism.
CO402.3	Draw the different types of cam profile for different types of follower motion.
CO402.4	Design the various types of gears and gear trains used in various machines.
CO402.5	Analyze the friction developed and power requirement to operate the screw jack, belt drives, clutch and brakes.
<b>ME8451 Manufacturing Technology – II</b>	
CO403.1	Aware of the different types of special purpose machines and its working principle used in machining processes.
CO403.2	Apply the machining procedure to achieving the better surface finish in a component.
CO403.3	Analyze the different types of forces developed during machining process.
CO403.4	Write programming for different types of contours and profiles in CNC machines.
CO403.5	Create different types of contours and sizes in a component.
<b>ME8491 Engineering Metallurgy</b>	
CO404.1	Explain the phase developments during heating and cooling of alloys.
CO404.2	Choose specific engineering materials based on the application.
CO404.3	Apply basic equation of simple torsion in designing of shafts and helical spring.
CO404.4	Summarize the properties and applications of non-metallic materials.
CO404.5	Explain and infer failure modes & mechanism of materials.
<b>CE8395 Strength of Materials for Mechanical Engineers</b>	
CO405.1	Calculate stress, strain of ductile and composite material for different cross section.
CO405.2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.
CO405.3	Design of shaft, helical and carriage spring.
CO405.4	Apply mathematics concepts and calculate the deflection and slope by various methods.

  
 PRINCIPAL  
 THAMIRABARANI ENGINEERING COLLEGE  
 Chathirampudurai-627 353.  
 Chidambaram - Veperur Road.  
 Thatchanallur, Tirunelveli - 627 353.



CO405.5	Analyze and design thin and thick shells for the applied internal and external pressures.
<b>ME8493 Thermal Engineering - I</b>	
CO406.1	Apply thermodynamic concepts to different air standard cycles and solve problems
CO406.2	Solve problems in single stage and multistage air compressors
CO406.3	Explain the functioning and features of IC engines, components and auxiliaries.
CO406.4	Calculate performance parameters of IC Engines
CO406.5	Explain the flow in Gas turbines and solve problems
<b>ME8462 Manufacturing Technology Laboratory – II</b>	
CO407.1	Aware of the different types of special purpose machines and its working principle used in machining processes.
CO407.2	Analyze the different types of forces developed during machining process.
CO407.3	Analyze the different types of forces developed during machining process.
CO407.4	Write programming for different types of contours and profiles in CNC machines.
CO407.5	Create different types of contours and sizes in a component.
<b>CE8381 Strength of Materials and Fluid Mechanics and Machinery Laboratory</b>	
CO408.1	Perform Tension, Torsion, Hardness, Compression, and Deformation test on Solid materials.
CO408.2	Analyze the mechanical properties by conducting heat treatment process.
CO408.3	Use the measurement equipments for flow measurement.
CO408.4	Perform test on different fluid machinery.
<b>HS8461 Advanced Reading and Writing</b>	
CO409.1	Write different types of essays.
CO409.2	Read and evaluate texts critically.
CO409.3	Write winning job applications.
CO409.4	Display critical thinking in various professional contexts.
CO409.5	Enhance their writing skills with specific reference to technical writing.

PRINCIPAL

**THAMIRABHARANI ENGINEERING COLLEGE**

Chathirampudukottam Village,  
Chidambaram - 605 006

Chidambaram - 605 006  
Thalichanallur, Tirunelveli - 627 533.

**SEMESTER V**

**ME8595 Thermal Engineering – II**

CO501.1	Apply the Concept in Steam Nozzle.
CO501.2	Explain the functioning and features of different types of Boilers and auxiliaries and calculate performance parameters.
CO501.3	Explain the flow in steam turbines, draw velocity diagrams for steam turbines and solve problems.
CO501.4	Summarize the concept of Cogeneration, Working features of Heat pumps and Heat exchangers.
CO501.5	Apply the concepts using refrigerant table / charts and psychometric charts.

**ME8593 Design of Machine Elements**

CO502.1	Calculate the steady stresses and variable stresses in various machine components.
CO502.2	Design the shafts, keys and couplings
CO502.3	Design the temporary and permanent joints
CO502.4	Design the energy storing elements and machine components.
CO502.5	Design of the hydrodynamic bearings

**ME8501 Metrology and Measurements**

CO503.1	Know about basic concept of metrology and measurement.
CO503.2	Learn about various linear and angular measurements.
CO503.3	Understand the principle and measurement of various form of an objects.
CO503.4	Explain the advancements in metrology and Lasers.
CO503.5	Learn about various measuring methods of mechanical parameters.

**ME8594 Dynamics of Machines**

CO504.1	Infer the force-motion relationship in components subjected to external forces and its analysis.
CO504.2	Solve problems related to balancing of rotating and reciprocating masses.
CO504.3	Comprehend the effect of free vibrations.
CO504.4	Know the effect of dynamics of forced vibrations.



PRINCIPAL

**THAMIRABHARANI ENGINEERING COLLEGE**

Chattampi Subramanian Vignana

Chidambaram Nagar - Veperur Road,

Tiruchanallur, Tamil Nadu - 627 658.




CO504.5	Extend the mechanism principles used for speed control and stability control.
<b>OAT 552 Internal Combustion Engines</b>	
CO505.1	Understand the internal combustion engine apply thermodynamic concepts to different air standard cycles and solve problems.
CO505.2	Explain the construction and working principle of petrol engines.
CO505.3	Explain the construction and working principle of diesel engine.
CO505.4	Understand the principle and applications of various types cooling and lubrication system.
CO505.5	Understand and analysis the modern technology and describe the constructional and operational features of CRDI, GDI, fuel cell and hybrid electric technology.
<b>ME8511 Kinematics and Dynamics Laboratory</b>	
CO506.1	Design the different types of gear trains.
CO506.2	Analysis the different types of vibrations and its effects on the machine components.
CO506.3	Calculate the speed range of different types of governors.
CO506.4	Find out the mass moment of inertia of the different types of machine components.
CO506.5	Evaluate the effects of gyroscope and its application on different fields of engineering.
<b>ME8512 &amp; Thermal Engineering Laboratory</b>	
CO507.1	Measure thermal conductivity of materials of composite Materials.
CO507.2	Conduct tests on natural and forced convective heat transfer apparatus and evaluate heat transfer coefficient.
CO507.3	Conduct tests on radiative heat transfer apparatus and evaluate Stefan Boltzmann constant and emissivity.
CO507.4	Evaluate the performance of parallel/counter flow heat exchanger apparatus and reciprocating air compressor.
CO507.5	Evaluate the performance of refrigeration and air conditioning test rigs.
<b>ME8513 Metrology and Measurements Laboratory</b>	
CO508.1	Measure the linear and angular dimensions of given specimens.
CO508.2	Measure the form measurement parameters.
CO508.3	Measure the gear dimensions parameters.
CO508.4	Measure surface finish parameters.

**PRINCIPAL**

**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chattrampudukulam Village,  
 Chidambaramagar - Vepernkulam Road.  
 Thatchanallur, Tirunelveli - 627 359.

CO508.5	Measure force, torque and tool geometry by using appropriate instruments.
<b>SEMESTER – VI</b>	
<b>ME8651 Design of Transmission Systems</b>	
CO601.1	Acquire knowledge the 2D and 3D transformations, clipping algorithm, Manufacturing models and Metrics.
CO601.2	Explain the fundamentals of parametric curves, surfaces and solids.
CO601.3	Summarize the different types of Standard systems used in CAD.
CO601.4	Apply NC & CNC programming concepts to develop part programme for Lathe & Milling Machines.
CO601.5	Summarize the different types of techniques used in Cellular Manufacturing and FMS.
<b>ME8691 Computer Aided Design and Manufacturing</b>	
CO602.1	Acquire knowledge the 2D and 3D transformations, clipping algorithm, Manufacturing models and Metrics.
CO602.2	Explain the fundamentals of parametric curves, surfaces and solids.
CO602.3	Summarize the different types of Standard systems used in CAD.
CO602.4	Apply NC & CNC programming concepts to develop part programme for Lathe & Milling Machines.
CO602.5	Summarize the different types of techniques used in Cellular Manufacturing and FMS.
<b>ME8693 Heat and Mass Transfer</b>	
CO603.1	Explain the conduction mode with respect to various geometry.
CO603.2	Explain the concept of convection principle and estimate boundary layer for different flow types.
CO603.3	Apply the concept of heat transfer and design the heat exchangers.
CO603.4	Estimate radiation and heat transfer of different bodies with shape factor.
CO603.5	Explain the concept of mass transfer with different mass transfer correlations.
<b>ME8692 Finite Element Analysis</b>	
CO604.1	Comprehend the need for Mathematical Modelling & Evaluation of Finite Element Method.
CO604.2	Solve One Dimensional Solid Mechanics, Heat Transfer & Vibration Problems.
CO604.3	Solve Two Dimensional Scalar Variable Problems using Finite Element Method ply finite element formulations to solve two dimensional scalar Problems.

  
**PRINCIPAL**  
**CHIDAMBARAM ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambarnagar - Vepernkulam Road,  
 Thatchanallur, Tirunelveli - 627 353.



CO604.4	Solve Two Dimensional Vector Variable Problems using Finite Element Method fields.
CO604.5	Formulate the ISO parametric element.
<b>ME8694 Hydraulics and Pneumatics</b>	
CO605.1	Understand the basics of fluids and their properties with respect to its potential to do the work.
CO605.2	Understand the basic components and systems with respect to Hydraulics.
CO605.3	Understand the circuits for various applications with respect to Hydraulic system.
CO605.4	Understand the basic components and systems with respect to pneumatics.
CO605.5	Design the circuits for various applications using Hydraulics and Pneumatics.
<b>ME8091 Automobile Engineering</b>	
CO606.1	Understand the various parts of the automobile and their functions and materials.
CO606.2	Explain the engine auxiliary systems and engine emission control.
CO606.3	Distinguish the working of different types of transmission systems.
CO606.4	Explain the Steering, Brakes and Suspension Systems.
CO606.5	Understand the possible alternate sources of energy for IC Engines.
<b>ME8681 CAD / CAM Laboratory</b>	
CO607.1	Work in CAD software and Design simple Components.
CO607.2	Work in CAM software and to program to machine simple components by manually.
CO607.3	Work in CAM software and to know computer aided part programming.
CO607.4	Expose students to modern control systems to control the CNC Machine Tool.
CO607.5	Know the application of various CNC machines like CNC lathe, CNC Vertical Machining center, CNC EDM and CNC wire-cut and studying of Rapid prototyping.
<b>ME8682 Design and Fabrication Project</b>	
CO608.1	Identify the suitable project, technology to be adopted, rationale behind selection of technology and the objective to be met by the project.

PRINCIPAL

THANJAVUR ANNA ENGINEERING COLLEGE

Chidambaranagar - Vepankulam Road

Thatchanallur, Tirunelveli - 627 353.

CO608.2	Work as a team in planning and execution of project work, preparation of review presentations and project report.
CO608.3	Apply relevant and appropriate knowledge of Engineering to achieve identified objectives of the project.
CO608.4	Create the tangible or intangible and demonstrable output at the end of the project either at our campus or in an industrial environment.
<b>HS8581 Professional Communication</b>	
CO609.1	Understand and apply knowledge of human communication and language processes as they occur across various contexts
CO609.2	Evaluate key theoretical approaches used in the interdisciplinary field of communication
CO609.3	Communicate effectively orally and in writing
CO609.4	Demonstrate his verbal and non-verbal communication ability through presentations
CO609.5	Participate effectively in group discussions
<b>SEMESTER – VII</b>	
<b>ME8792 Power Plant Engineering</b>	
CO701.1	Apply the knowledge about Binary Cycles and Cogeneration systems in thermal power plant.
CO701.2	Classify the knowledge about layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.
CO701.3	Construct and analyze about nuclear power plants and its various types of reactor.
CO701.4	Illustrate about layout, construction and working of the components inside Renewable energy power plants.
CO701.5	Analyze power plant economics and environmental hazards.
<b>GE8077 Total Quality Management</b>	
CO702.1	Describe the dimensional barrier regarding Quality.
CO702.2	Summarize the Total quality principles.
CO702.3	Demonstrate the tools utilization for quality improvement
CO702.4	Analyze the various types of techniques are used to measure quality.
CO702.5	Apply the various quality systems in implementation of Total quality management.
<b>ME8791 Mechatronics</b>	
CO703.1	Acquire knowledge on the basic principles of mechatronics system and working of various sensors.

PRINCIPAL

**THAMIRABHARANI ENGINEERING COLLEGE**

Chathirampudukulam Village 3,

Chidambaramagar - Vepankulam Road.

Thatchanallur, Tirunelveli - 627 353.



CO703.2	Acquire knowledge on 8085 microprocessor and 8051 micro controller system.
CO703.3	Comprehend the Programmable Peripheral Interface system and its application.
CO703.4	Gain knowledge of PLC system and its application.
CO703.5	Comprehend the various types of actuators and design of mechatronics system.
<b>ME8793 Process Planning and Cost Estimation</b>	
CO704.1	Understand the process planning methods, process planning selection and evaluating parameters for drawing interpretation.
CO704.2	Calculate the process parameters for various production processes and its economics.
CO704.3	Know the procedure for preparing the cost estimation.
CO704.4	Solve problems in the calculation of cost of different types of jobs.
CO704.5	Calculate the time required for various machining operations.
<b>OIE751 Robotics</b>	
CO705.1	Explain the concepts of industrial robots, classification, specifications and coordinate systems. Also summarize the need and application of robots in different sectors.
CO705.2	Illustrate the different types of robot drive systems as well as robot end effectors.
CO705.3	Apply the different sensors and image processing techniques in robotics to improve the ability of robots.
CO705.4	Develop robotic programs for different tasks and familiarize with the kinematics motions of robot.
CO705.5	Examine the implementation of robots in various industrial sectors and interpolate the economic analysis of robots.
<b>ME8097 Non Destructive Testing and Evaluation</b>	
CO706.1	Understand the fundamental of destructive and nondestructive testing and its method.
CO706.2	Explain the concept Liquid Penetrant Testing and Magnetic Particle Testing
CO706.3	Explain the concept thermography and eddy current testing.
CO706.4	Understand the concept ultrasonic testing and acoustic emission.
CO706.5	Understand the concept radiography testing.
<b>ME8711 Simulation and Analysis Laboratory</b>	
CO707.1	Work in MATLAB software and solve simple problems in vibration.

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE

Chithirampudukulam Village,

Chathirampudukulam Road,

Chidambaram - Veperankulam Road,

Tatchanallur, Tirunelveli - 627 036.

CO707.2	Simulate mechanisms using multi body dynamics software.
CO707.3	Perform force and stress analysis of various components and beams.
CO707.4	Analyze thermal stress and heat transfer of plates and cylindrical shells.
CO707.5	Perform dynamic analysis of various components and beams.
<b>ME8781 Mechatronics Laboratory</b>	
CO708.1	Work in Contoller and to know Assembly level language of 8085 processor.
CO708.2	Study operations of PLC.
CO708.3	Study Image processing technique.
CO708.4	Design, model & analyse the basic electrical, hydraulic & pneumatic Systems.
CO708.5	Design a mechatronics system with the help of Microprocessor, PLC and other electrical and Electronics Circuits.
<b>ME8712 Technical Seminar</b>	
CO708.1	Make effective presentations.
CO708.2	Participate confidently in Group Discussions.
CO708.3	Attend job interviews and be successful in them.
CO708.4	Develop adequate Soft Skills required for the workplace.
CO708.5	Demonstrate the knowledge of professional and ethical responsibilities.
<b>SEMESTER – VIII</b>	
<b>MG8591 Principles of Management</b>	
CO801.1	Understand the evolution of management theories and organization culture.
CO801.2	Understand the concepts of planning, types and decision making ability with strategic planning.
CO801.3	Understand the concept of organization, departmentalization and activities of HR.
CO801.4	Understand individual and group behavior, motivational techniques and leadership qualities with effective communication.
CO801.5	Understand and control effectively budgetary and non-budgetary items using modern IT tools.
<b>MG8091 Entrepreneurship Development</b>	
CO802.1	Upon completion of the course, students will be able to gain knowledge and skills needed to run a business successfully.
CO802.2	Able to identify the major Motives Influencing an Entrepreneur.
CO802.3	To understand the concept of Business.

PRINCIPAL

THAMIRABARANI ENGINEERING COLLEGE

Chathiramudukulam Village.

Chidambaramagar - Veppankulam Road.

Tirunelveli - 627 356.



CO802.4	Demonstrate the ability to financing and accounting effectively.
CO802.5	Students are able to converting as venture and support to venture.
<b>ME8811 Project Work</b>	
CO803.1	Develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same.
CO803.2	Discover new method to solve the related problems.
CO803.3	Apply the engineering knowledge in solving the problem.
CO803.4	Agree and work as a team to come to a common conclusion.

  
**PRINCIPAL**  
**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chethirampudukulam Village,  
 Chidambaramagar - Vepemkulam Road,  
 Thatchanallur, Tiruchveli - 627 358.



**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

**Department of Civil Engineering**

**Course Outcomes (R-2013)**

**Semester / Year, Branch: 01 – 08, I – IV, B.E. Civil Engineering**

**Regulations: 2013**

**I Year (ODD SEMESTER)**

C101: HS6151 Technical English I, Year of study 2015-2016

C101.1	Explain clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies.
C101.2	Construct cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
C101.3	Organize different genres of texts adopting various reading strategies.
C101.4	Distinguish and comprehend different spoken discourses/excerpts in different accents.
C101.5	Improve listening to different accents, speeches and presentations.

C102: MA6151 Mathematics I, Year of study 2015-2016

C102.1	The students will be able to infer canonical form from quadratic form using the concepts of Eigen values and Eigen vectors.
C102.2	Students will be able to test the convergence of sequences and series.
C102.3	Students will be able to apply the techniques of differential calculus to find the evolute and envelope of curves.
C102.4	Students will be able to determine the maxima and minima of functions of two variables using partial derivatives.
C102.5	Students will be able to find the area enclosed by plane curves and volume of solids using multiple integrals

C103: PH6151 Engineering Physics I, Year of study 2015-2016

C103.1	Describe the crystal structures and various crystal growth techniques
C103.2	Analyze the elastic nature of materials and thermal behaviour of materials.
C103.3	Apply the knowledge of quantum mechanics and classical mechanics in addressing the problems related to science and technology.
C103.4	Apply the knowledge about designing an auditorium with good acoustical properties and make use of Ultrasonics and its applications in various fields.
C103.5	Illustrate the advantages of optical communication using LASER.

C104: CY6151 Engineering Chemistry I, Year of study 2015-2016

C104.1	Describe the methods of polymerization, types, properties and uses of polymers.
C104.2	Illustrate the concepts of basic thermodynamics and problem solving skills in various disciplines of Engineering.
C104.3	Discuss the laws of photochemistry in recognizing the interaction of light with matter and its applications in luminescence and spectroscopy.
C104.4	Review the use of phase rule in identifying its applications in metallurgy and alloys.





**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

C104.5

Summarize the basic knowledge in Nanochemistry and distinguish the existing technology with nanotechnology.

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE

Chathirampudukulam Village,  
Chidambaranagar - Vepemkulam Road,  
Thatchanallur, Tirunelveli - 627 358.



**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

C105: GE6151 - Computer Programming, Year of study 2015-2016

C105.1	Elaborate the organization of a digital computer and design the solution for simple computing problems using algorithm, flowchart and pseudo code
C105.2	Apply different looping structures to solve simple scientific and statistical problems
C105.3	Devise solutions for simple problems using array and strings
C105.4	Demonstrate the usage of Dynamic memory allocation and pointer variables
C105.5	Illustrate the concepts of structures and unions with example programs

C106: GE6152 Engineering Graphics, Year of study 2015-2016

C106.1	The students will be able to sketch the conic sections, special curves, and draw orthographic views from pictorial views and models.
C106.2	Students will be able to apply the principles of orthographic projections of points in all quadrants, lines and planes in first quadrant.
C106.3	Students will be able to sketch the projections of simple solids like prisms, pyramids, cylinder and cone and obtain the traces of plane figures.
C106.4	Students will be able to practice the sectional views of solids like cube, prisms, pyramids, cylinders & cones and extend its lateral surfaces.
C106.5	Students will be able to sketch the perspective projection of simple solids, truncated prisms, pyramids, cone and cylinders and sketch the isometric projection of simple machine parts.

C107: GE6161 Computer Programming Laboratory, Year of study 2015-2016

C107.1	Understand the usage of office automation tools.
C107.2	Apply good programming design methods for program development.
C107.3	Design and implement the C programs for simple applications.
C107.4	Develop and implement the recursive programs.
C107.5	Implement the c programs with the help of structures and unions.

C108: EPL, Year of study 2015-2016

C108(L).1	Construct carpentry components and pipe connections including plumbing works
C108(L).2	Use welding equipment's to join the structures
C108(L).3	Illustrate the basic machining operations.
C108(L).4	Construct the models using sheet metal works.
C108(L).5	Describe centrifugal pump, Air conditioner, operations of smithy, foundry and fittings.
C108(L).5	Construct the basic electrical and electronic circuits.
C108(L).5	Examine the different types of electronic circuits and components.
C108(L).5	Explain the electrical safety rules, grounding, general house wiring.
C108(L).5	Perform soldering in various electronic circuits.





**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepenkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

C108(L).5	Illustrate the basic operation of domestic electrical appliances.
-----------	---

  
PRINCIPAL  
THAMIRABHARANI ENGINEERING COLLEGE  
Chathirampudukulam Village,  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.



**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

C109: GE6163 Physics and Chemistry Laboratory – I, Year of study 2015-2016

C109(L).1	The hands on exercises undergone by the students will help them to apply physics principles of optics and thermal physics to evaluate engineering properties of materials.
C109(L).2	Perform the quantitative chemical analysis of chloride and dissolved oxygen.
C109(L).3	Determine the amount of acids by using the instruments of conductivity meter and pH meter.

I

**Year (EVEN SEMESTER)**

C110: HS6251 Technical English II, Year of study 2015-2016

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

C111: MA6251 Mathematics II, Year of study 2015-2016

C111.1	Students will be able to apply the knowledge of vector calculus in engineering disciplines
C111.2	Students will be able to solve ordinary differential equations that model the engineering problems
C111.3	Students will be able to find the Laplace transform of functions and solve the ordinary differential equations using Laplace transform
C111.4	Students will be able to construct analytic functions and apply the knowledge of conformal mappings in engineering disciplines
C111.5	Students will be able to evaluate contour integration and apply it in engineering problems

C112: PH6251 Engineering Physics II, Year of study 2015-2016

C112.1	Describe the conducting materials and their properties.
C112.2	Analyze the semiconductors and able to differentiate various types of semiconductors.
C112.3	Apply the knowledge of magnetic and superconducting materials for modern day to day applications.
C112.4	Explain the properties and applications of dielectrics.
C112.5	Apply the knowledge about the modern engineering materials for various applications.

C113: CY6251 Engineering Chemistry II, Year of study 2015-2016

C113.1	Describe water technology in the purification of water in domestic and industrial applications.
--------	---





**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

C113.2

Explain the principles of electrochemistry, the factors affecting corrosion and the prevention of corrosion.

PRINCIPAL

**THAMIRABHARANI ENGINEERING COLLEGE**

Chathirampudukulam Village,  
Chidambaranagar - Vepemkulam Road,  
Thatchanallur, Tirunelveli - 627 358.



**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

C113.3	Classify the different alternative sources of energy and the generation processes.
C113.4	Enumerate the different types of engineering materials and their applications.
C113.5	Discuss the industrial techniques of petroleum processing and the determination of calorific values and combustion parameters.

C114: GE6252 Basic Electrical and Electronics Engineering, Year of study 2015-2016

C114.1	Apply the basic concepts of electric circuits and measuring instruments.
C114.2	Demonstrate the construction and working of various electrical machines.
C114.3	Illustrate the characteristics of various electronic devices.
C114.4	Explore the basics concepts in design of digital circuits.
C114.5	Explain the basics of different communication systems.

C115: GE6253 Engineering Mechanics, Year of study 2015-2016

C115.1	Determine the magnitude of force in rigid bodies under equilibrium conditions.
C115.2	Determine the resultant of the forces and moments of rigid body system under equilibrium conditions.
C115.3	Calculate the center of gravity, centroid and moment of inertia of surfaces and solids.
C115.4	Explain the differential principles apply to solve engineering problem dealing with force, displacement, velocity and acceleration.
C115.5	Solve the elements of rigid body dynamics subjected to frictional forces and dynamic forces.

C116: GE6261 Computer Aided Drafting and Modelling Laboratory, Year of study 2015-2016

C116(L).1	Use the software packages for drafting and modeling.
C116(L).2	Create 2D and 3D models of Engineering Components.

C117: GE6262 Physics and Chemistry Laboratory – II, Year of study 2015-2016

C117(L).1	The students will have the ability to test materials by using their knowledge of applied physics principles in optics and properties of matter.
C117(L).2	Determine the hardness, alkalinity and metal ion content in the water samples by volumetric titration.
C117(L).3	Estimate the water quality parameters by potentiometer, conductometer and flame photometer.

  
**PRINCIPAL**  
**THAMIRABHARANI ENGINEERING COLLEGE**  
Chathirampudukulam Village,  
Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli - 627 358.





**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

**II**

**Year (ODD SEMESTER)**

C201: MA6351 Transforms and Partial Differential Equations, Year of study 2016-2017

C201.1	Solve the Partial Differential Equations.
C202.2	Determine the Fourier series expansion of functions and hence evaluate the value of infinite series.
C203.3	Apply the method of separation of variables to solve one dimensional wave equation, one dimensional heat equation and two dimensional heat equation
C204.4	Find the Fourier transform of functions and also evaluate definite integrals using Fourier transform.
C205.5	Calculate the Z-transform of discrete time systems and solve the difference equation using Z-transform.

C202: GE6351 Environmental Science and Engineering, Year of study 2016-2017

C202.1	Understand the importance of public awareness on environment and nature of biodiversity.
C202.2	Know about the various causes, effect and control measures of environmental pollution.
C202.3	Comprehend the human development that leads to environmental disasters, the value of natural resources and their conservation.
C202.4	Recognize the value of public participation in environmental protection, Environmental Management and Legislation Acts and sustainable development.
C202.5	Learn the problems related to population and their remedial measures.

C203: CE6301 Engineering Geology, Year of study 2016-2017

C203.1	Explain the importance of geology in civil engineering and the theory of plate tectonics.
C203.2	Enumerate the formation of minerals and identify the properties of minerals.
C203.3	Illustrate the formation of rocks and differentiate them based on their properties.
C203.4	Examine geological maps and identify the geological structures from the maps.
C203.5	Design and construction of engineering projects such as dams, tunnels and roads.

C204: CE6302 Mechanics of Solids, Year of study 2016-2017

C204.1	Define the fundamental concepts of stresses and strain in mechanics of solids.
C204.2	Analysis the beams and to draw shear force and bending moment diagrams.
C204.3	Compute the slopes and deflections of determinant beams using different methods.
C204.4	Find the stresses and deflections in various shafts and helical springs.
C204.5	Find the stresses and deflections in various shafts and helical springs.

C205: CE6303 Mechanics of Fluids, Year of study 2016-2017

C205.1	Define fundamental concepts of fluid mechanics including hydro static forces on surfaces, pressure measurement, buoyancy and floatation.
--------	--

PRINCIPAL  
THAMIRABHARANI ENGINEERING COLLEGE  
Chathirampudukulam Village,  
Chidambaranagar - Vepemkulam Road.



**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

C205.2	Apply Euler's and Bernoulli's equations and the conservation of mass to determine velocities, pressures, and accelerations for incompressible and in viscid fluids.
C205.3	Determine flow rates, pressure changes, minor and major head losses for viscous flows through

**PRINCIPAL**  
**THAMIRABHARANI ENGINEERING COLLEGE**  
Chathirampudukulam Village,  
Chidambaranagar - Vepemkulam Road.  
Thatchanallur, Tirunelveli - 627 358.





**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

	pipes, ducts, simple networks and the effects of pumps, fans, and blowers in such systems.
C205.4	Develop the concepts of viscous boundary layers and the momentum integral and use them to determine integral thicknesses, wall shear stresses, and skin friction coefficients.
C205.5	Make use of principles of dimensional analysis and similitude to simple models using Dimensionless parameters.

C206: CE6304 Surveying I, Year of study 2016-2017

C206.1	Identify error sources and the procedures to minimize the error.
C206.2	Compute the included angles in compass surveying and to convert the field observations into a small scale map using plane table surveying.
C206.3	Find the differences in elevation using different methods of leveling.
C206.4	Calculate the cross sectional areas and volumes using Contour methods
C206.5	Determine the elevation of the objects.

C207(L): CE6311 Survey Practical – I, Year of study 2016-2017

C207(L).1	Acquire practical knowledge on handling basic survey instruments including leveling and development of contour map on given area
-----------	--

C208(L): CE6312 Computer Aided Building Drawing, Year of study 2016-2017

C208(L).1	Draw the plan, elevation and sectional views of the buildings, industrial structures and framed buildings using AutoCAD.
-----------	--

## II

### Year (EVEN SEMESTER)

C209: MA6459 Numerical Methods, Year of study 2016-2017

C209.1	Solve the algebraic, transcendental and system of linear equations.
C209.2	Apply the interpolation and approximations in various problems.
C209.3	Find the differentiations and integration using numerical tools.
C209.4	Determine the solution of initial value problems for ordinary differential equations.
C209.5	Determine the Solution of boundary value problems in ordinary and partial differential equations.

C210: CE6401 Construction Materials, Year of study 2016-2017

C210.1	Compare the properties of most common building materials such as stones bricks and concrete blocks.
C210.2	Interpret the fundamentals of construction materials and mainly focusing on cement, aggregate and mortar.
C210.3	Outline the importance of fresh and hardened concrete properties in the construction industry.
C210.4	Identify different materials such as plywood, steel and paint for use applications in the construction field.



**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

C210.5 | Explain the typical and potential application of modern construction materials.

  
**PRINCIPAL**  
**THAMIRABHARANI ENGINEERING COLLEGE**  
Chathirampudukulam Village,  
Chidambaranagar - Vepemkulam Road,  
Thatchanallur, Tirunelveli - 627 358.





**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

C211:CE6402 Strength of Materials, Year of study 2016-2017

C211.1	Define the fundamental concepts of stress energy principles.
C211.2	Analysis of indeterminate beams and use of energy method for estimating the slope and deflections of beams and trusses.
C211.3	Assess the behavior of columns, beams and failure of materials.
C211.4	Find the principal stresses, principal strain and principal planes.
C211.5	Analyze bending of beams and curved beams.

C212:CE6403 Applied Hydraulic Engineering– II, Year of study 2016-2017

C212.1	Apply their knowledge of fluid mechanics in addressing problems in open channels.
C212.2	Solve problems in gradually varied flows in steady state conditions
C212.3	Apply the energy equation and momentum equation for rapidly varied flow.
C212.4	Analyze the performance of turbines.
C212.5	Describe the characteristic performance of a centrifugal pump and working principle of reciprocating pumps

C213:CE6404 Surveying II, Year of study 2016-2017

C213.1	Explain the different surveying methods.
C213.2	Apply corrections and adjust simple triangulation networks
C213.3	Understand total station surveying and its maintenance.
C213.4	Summarize the working principle, signal structure, components and error sources of GPS.
C213.5	Understand the fundamentals of route surveying, hydrographic surveying, astronomical surveying, photogrammetry and remote sensing.

C214:CE6404 Soil Mechanics, Year of study 2016-2017

C214.1	Determine Index properties, classify the soil and to select the suitable method to compact the particular soil mass.
C214.2	Calculate permeability of soil, seepage flow and seepage pressure.
C214.3	Understand the stress distribution in soil medium and to make use of Terzaghi's one dimensional consolidation theory to know the settlement characteristics of soil mass.
C214.4	Determine shear strength of cohesionless and cohesive soils and its measurement using laboratory methods.
C214.5	Identify the stability of infinite and finite slopes by applying the principles of soil mechanics.

C215(L):CE6411 Strength of Materials Laboratory, Year of study 2016-2017

C215(L).1	At the end of this course students would have acquired practical knowledge on testing various materials for its strength and components of structural experimentally
-----------	--

C216(L): CE6412 Hydraulic Engineering Laboratory, Year of study 2016-2017

PRINCIPAL  
THAMIRABHARANI ENGINEERING COLLEGE  
Chathirampudukulam, Villupuram  
Chidambaram Road  
Thatchanallur, Tirunelveli - 627 358



**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

C216(L).1	Measure flow in pipes and determine frictional losses
C216(L).2	Develop characteristics of pumps and turbines

  
**PRINCIPAL**  
**THAMIRABHARANI ENGINEERING COLLEGE**  
Chathirampudukulam Village,  
Chidambaranagar - Vepemkulam Road.  
Thatchanallur, Tirunelveli - 627 358.





**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

C217(L):CE6413 Survey Practical II, Year of study 2016-2017

C217(L).1	Handle survey instruments like theodolite, tacheometry and total station and have adequate knowledge to carryout triangulation astronomical surveying including general field marking for various engineering projects and curves setting.
-----------	--

**III**

**Year (ODD SEMESTER)**

C301: CE6501 Structural Analysis I, Year of study 2017-2018

C301.1	Analysis indeterminate trusses and frames by energy and consistent deformation method.
C301.2	Analysis the determinate and indeterminate structures for moving load.
C301.3	Analysis the different types of arches.
C301.4	Conversant with slope deflection method.
C301.5	Conversant with moment distribution method

C302: CE6502 Foundation Engineering, Year of study 2017-2018

C302.1	Investigate the soil condition.
C302.2	Learn about types and purposes of different foundation systems and structures.
C302.3	Build the necessary theoretical background for design and construction of foundation systems
C302.4	Select type of foundation required for the soil at a place.
C302.5	Design shallow foundation, deep foundation and retaining structures

C303: CE6503 Environmental Engineering, Year of study 2017-2018

C303.1	Explain the basic concepts of water supply system and water quality characteristics.
C303.2	Compute hydraulics of flow in pressure pipes as gravity mains.
C303.3	Plan for the primary water treatment units.
C303.4	Summarize the concepts and terminologies of advanced water treatment units.
C303.5	Analyse the water distribution networks.

C304: CE6504 Highway Engineering, Year of study 2017-2018

C304.1	Explain the highway planning with respect to classification and know about the factors influencing highway alignment
C304.2	Interpret the geometric design fundamentals of highway and focusing on horizontal and vertical curves.
C304.3	Develop the road pavement design and analysis of flexible and rigid pavement.
C304.4	Identify the different materials to be used in different layers of road and suitable construction machineries.
C304.5	Explain the possible causes of defects and appropriate road monitoring and maintenance program

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE  
Chathirampudukulam Village,  
Chidambaranagar, Vepemkulam Road



**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

C305: CE6505 Design of Reinforced Concrete Elements, Year of study 2017-2018

C305.1	Explain the concept of elastic, ultimate load and limit state methods.
--------	--

  
PRINCIPAL

**THAMIRABHARANI ENGINEERING COLLEGE**  
Chathirampudukulam Village,  
Chidambaranagar - Vepemkulam Road,  
Thatchanallur, Tirunelveli - 627 358.





**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

C305.2	Design of Reinforced concrete beams and slabs subjected to various boundary conditions.
C305.3	Analyze the behaviour of RC members subjected to shear and torsion.
C305.4	Design short circular and rectangular columns for axial, uniaxial and biaxial bending.
C305.5	Design axially and eccentrically loaded rectangular footing

C306: CE6506 Construction Techniques, Equipment and Practice, Year of study 2017-2018

C306.1	Apply the theoretical concepts of concrete technology in the real world construction techniques.
C306.2	Summarize the construction practices starting from sub structure to super structure using different materials and innovative techniques
C306.3	Explain the construction knowledge of sub structure element using techniques such as tunneling, piling, shoring for deep cutting and dewatering
C306.4	Find the different construction techniques for super structure construction
C306.5	Identify and select the construction equipment for earth work.

C307(L): GE6674 -Communication & Soft Skills – Laboratory Based, Year of study 2017-2018

C307(L).1	Listen and interpret visuals, involve in formal and informal conversations, make presentations, and participate in GD.
C307(L).2	Solve reading comprehension passages of higher levels, draft Resume, cover letter, reports, emails, and write blogs.
C307(L).3	Possess knowledge about IELTS, TOEFL, GRE, and placement oriented verbal ability.
C307(L).4	Perform well in a job interview with the non-verbal and paralinguistic skills acquired.
C307(L).5	Exhibit leadership traits, team skills and essential soft skills and efficiency to excel as a professional.

C308(L): CE6511 - Soil Mechanics Laboratory, Year of study 2017-2018

C308(l).1	Able to execute how to measure the basic properties and engineering characteristics of soils.
C308(l).2	Able to practice how to use index and engineering properties in geotechnical designs.

C309(L): CE6512 – Survey Camp, Year of study 2017-2018

C309(L).1	Acquire practical knowledge and handling survey instruments like theodolite, tacheometry and total station and have adequate knowledge to carryout triangulation and trilateration including general field marking for various engineering projects.
-----------	--

### III

#### Year (EVEN SEMESTER)

C310: CE6601 Design of Reinforced Concrete & Brick Masonry Structures, Year of study 2017-2018

C310.1	Design cantilever and counterfort retaining walls.
C310.2	Design rectangular and circular water tanks above and below the ground level.
C310.3	Design and draw the detailing of staircases & flat slabs and prepare bar bending schedule



**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepenkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

C310.4	Apply the design principles of mat foundation, box culvert, road bridges and apply the concept of yield line theory for designing various types of slabs
C310.5	Analyze and design the brick masonry walls and continuous beams subjected to various load conditions.

  
**PRINCIPAL**  
**THAMIRABHARANI ENGINEERING COLLEGE**  
Chathirampudukulam Village,  
Chidambaranagar - Vepenkulam Road,  
Thatchanallur, Tirunelveli - 627 358.





**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

C311: CE6602 Structural Analysis II, Year of study 2017-2018

C311.1	Explain the different types of indeterminacy and the use of compatibility conditions in analyzing indeterminate structures.
C311.2	Construct the element stiffness matrix and assemble the structure stiffness matrix for solving indeterminate problems
C311.3	Able to apply the concept of finite element method to the structural analysis.
C311.4	Calculate the collapse loads for beams and frames using plastic analysis.
C311.5	Determine the member forces in suspension bridges and space truss.

C312: CE6603 Design of Steel Structures, Year of study 2017-2018

C312.1	Explain the different failure modes of bolted connections for tension or compression members.
C312.2	Design the tension members.
C312.3	Analyze the most suitable section shape and size for a compression member as per provisions of current code (IS 800 – 2007).
C312.4	Design the beams and plate girders.
C312.5	Design the structural systems such as roof trusses, side coverings and gantry girders.

C313: CE6604 Railways, Airport and Harbour Engg, Year of study 2017-2018

C313.1	Apply the fundamental concepts of railway planning and describe the engineering survey for track alignment.
C313.2	Explain the railway track construction, maintenance and able to find out the suitable method of tunneling.
C313.3	Describe the criteria for airport site selection and airport layout.
C313.4	Find the basic runway length required for an airport and explain marking and lighting for runway and taxiway
C313.5	Classify the harbour and describe the harbour requirements and various coastal structures.

C314: CE6605 Environmental Engineering II, Year of study 2017-2018

C313.1	Summarize the sewage characteristics and estimate sewage flow and runoff
C313.2	Compute hydraulics of flow in sewers and identify suitable pumps and pipes.
C313.3	Plan for the primary sewage treatment units
C313.4	Design the biological treatment units for sewages.
C313.5	Explain the sewage disposal methods and sludge management.

C315: GE6075 Professional Ethics, Year of study 2017-2018

C315.1	Apply ethics, morals and human values in society.
C315.2	Explain about engineering ethics
C315.3	Realize the responsibilities of engineers as experimenters.
C315.4	Recognize the safety, risks, risk benefit analysis and rights of an engineer
C315.5	Discuss the importance of the global issues, moral leadership and code of conduct.





**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepenkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

C316(L): CE6611 Environmental Engineering Laboratory, Year of study 2017-2018

C316(L).1	Perform common environmental experiments relating to water and wastewater quality.
C316(L).2	Characterize wastewater conduct treatability studies
C316(L).3	Determine the amount of COD and COD present in the sample
C316(L).4	Estimate the amount of pollutant present in the waste water.
C316(L).5	Apply the laboratory results to the problem identification

C317 (L): CE6612 Concrete and Highway Engg. Laboratory, Year of study 2017-2018

C317(L).1	Explain the properties of concrete and testing procedures.
C317(L).2	Measure the test values and compare the test results.
C317(L).3	Ensure quality control while testing/sampling and acceptance criteria
C317(L).4	Determine the properties of fresh and hardened concrete.
C317(L).5	Practice the usage of bitumen as pavement material in the highway engineering field.

#### IV

#### Year (ODD SEMESTER)

C401: CE6701 Structural Dynamics and Earthquake Engineering, Year of study 2018-2019

C401.1	explain the fundamental concepts of static and dynamics in structural response.
C401.2	evaluate the equations of motion of multi degree of freedom system
C401.3	Illustrate the earthquake parameters, magnitude and intensity.
C401.4	Analyse the effect on reinforced cement concrete, steel and pre-stressed concrete structure under earthquake load.
C401.5	Design the structures for seismic loading as per code provisions IS: 13920-1993.

C402: CE6702 Prestressed Concrete Structures, Year of study 2018-2019

C402.1	Determine the suitable method of prestressing according to the requirements and calculate the various losses of prestress.
C402.2	design the Type I, Type II post-tensioned, pretensioned beams and shear based on IS code
C402.3	Determine the anchorage zone stresses in posttensioned beams and design the anchorage zone reinforcement.
C402.4	calculate the resultant stresses developed in composite beams and to analyse for the secondary moments
C402.5	design the various tension and compression members according to the requirements.

C403: CE6703 Water Resources and Irrigation Engineering, Year of study 2018-2019

C403.1	Estimate the reservoir capacity based on the water requirement for Irrigation and Drinking
C403.2	Identify the importance of National water policy and Economics of water resources planning.
C403.3	Calculate the water requirements of crops based on crop's base period and delta
C403.4	Explain about the Irrigation structures such as Dams and diversion head works





**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

C403.5 | Differentiate different types of Irrigation methods.

PRINCIPAL  
THAMIRABHARANI ENGINEERING COLLEGE  
Chathirampudukulam Village,  
Chidambaranagar - Vepemkulam Road.  
Thatchanallur, Tirunelveli - 627 358.



**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

C404: CE6704 Estimation and Quantity Surveying, Year of study 2018-2019

C404.1	Estimate the different item of work in residential building
C404.2	Estimate the different type of structure such as culvert, road work, sanitary and water supply works.
C404.3	Arrive the schedule of rates, tender, contract document.
C404.4	Value the building with depreciation.
C404.5	Prepare a report on estimate of residential building, culvert

C405: CE6006 Traffic Engineering and Management (E II), Year of study 2018-2019

C405.1	Describe the Characteristics of Vehicles, Road users and the fundamentals of traffic flow.
C405.2	Examine about origin and destination, parking, accident studies and traffic forecasting.
C405.3	Describe the design of Traffic signals, signal coordination, grade separation and traffic signs
C405.4	Explain the road accidents, street lighting, traffic and environment hazards.
C405.5	Describe the Traffic System Management and the Intelligent Transport System.

C406: CE6011 Air Pollution Management (E III), Year of study 2018-2019

C406.1	Explain the nature and characteristics of air pollutants and basic concepts of air quality management.
C406.2	Design stacks and particulate air pollution control devices to meet applicable standards
C406.3	Explain the gaseous pollutant control by adsorption, absorption, condensation and combustion
C406.4	Demonstrate the environmental impact assessment and air quality.
C406.5	Identify and solve noise pollution problems.

C407(L): CE6711 Computer Aided Design and Drafting Laboratory, Year of study 2018-2019

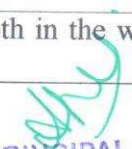
C407(L):.1	Acquires hands on experience in design and preparation of structural drawings for concrete/steel structures normally encountered in civil engineering practice
------------	--

C408(L): CE6712 Design Project, Year of study 2018-2019

C408(L).1	Design engineering solutions to complex projects using fundamental knowledge, skills and attitudes of a professional engineer
C408(L).2	Identify project outcomes, constraints, deliverables, performance criteria, control needs, and resource requirements etc.
C408(L).3	Analyze the structure related to Civil Engineering design problems
C408(L).4	Interact with team members in a professional and ethical manner, respecting differences, to ensure a collaborative project environment
C408(L).5	Communicate effectively to present ideas clearly and coherently both in the written and oral forms

**IV Year (EVEN SEMESTER)**

C409: MG6851 Principles of Management, Year of study 2018-2019

  
**PRINCIPAL**  
**THAMIRABHARANI ENGINEERING COLLEGE**  
Chathirampudukulam Village,  
Chidambaranagar - Vepemkulam Road,  
Thatchanallur, Tirunelveli - 627 358.





**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

C409.1	Discuss the evolution of management, functions and roles of managers
C409.2	Explain the different types of planning process and tools used for planning

  
PRINCIPAL  
THAMIRABHARANI ENGINEERING COLLEGE  
Chathirampudukulam Road,  
Chidambaranagar - Vepemkulam Road,  
Thatchanallur, Tirunelveli - 627 358.



**THAMIRABHARANI ENGINEERING COLLEGE**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

C409.3	Elaborate different organization structures and functions of human resources manager
C409.4	Illustrate the different theories of motivation and leadership
C409.5	Describe the control techniques and the role of technology in management

C410: CE6016 Prefabricated Structures, Year of study 2018-2019

C410.1	Explain the prefabricated elements and also have the knowledge of the construction methods.
C410.2	Determine the importance and purpose of constructing the shear wall in building.
C410.3	Explain the design of cross section based on efficiency of the materials.
C410.4	Describe the different types of joints in precast connection.
C410.5	Determine the loads for considering abnormal effects such as earthquakes, cyclones, etc.

C411: CE6021 Repair and Rehabilitation of Structures, Year of study 2018-2019

C411.1	Explain the concepts of Repair and Rehabilitation, importance of maintenance and Assessment procedure for evaluating a damaged structure.
C411.2	Apply the concept of durability aspects and properties of Concrete in damaged Structures.
C411.3	Identify the quality of concrete, causes of deterioration and effects of cover thickness.
C411.4	Explain the purposes of special concretes like Polymer concrete, Sulphur infiltrated concrete, Fibre reinforced concrete, High strength concrete, etc.,
C411.5	Identify the techniques for repair and protection methods and Acquire knowledge in techniques of Strengthening of Structural elements and Demolition.

C412(L): CE8611 Project Work, Year of study 2018-2019

C412(L).1	Design engineering solutions to complex projects using fundamental knowledge, skills and attitudes of a professional engineer.
C412(L).2	Identify project outcomes, constraints, deliverables, performance criteria, control needs, and resource requirements etc
C412(L).3	Demonstrate effective project execution that results in successful projects.
C412(L).4	Interact with team members in a professional and ethical manner, respecting Differences, to ensure a collaborative project environment.
C412(L).5	Communicate effectively to present ideas clearly and coherently both in the written And oral forms.
C412(L).6	Learn independently and synthesize knowledge from various areas of learning, and critically and creatively apply it to real life situations.

  
PRINCIPAL  
THAMIRABHARANI ENGINEERING COLLEGE  
Chathirampudukulam Village,  
Chidambaranagar - Vepemkulam Road,  
Thatchanallur, Tirunelveli - 627 358.





**THAMIRABHARANI ENGINEERING COLLEGE**

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)  
Chathirampudukulam, Chidambaranagar - Vepemkulam Road  
Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**LIST OF COURSE OUTCOMES- R2013**

PRINCIPAL

**THAMIRABHARANI ENGINEERING COLLEGE**

Chathirampudukulam Village,  
Chidambaranagar - Vepemkulam Road,  
Thatchanallur, Tirunelveli - 627 358.

SEMESTER I	
<b>HS6151 Technical English – I</b>	
CO101.1	Explain clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies.
CO101.2	Construct cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
CO101.3	Organize different genres of texts adopting various reading strategies.
CO101.4	Distinguish and comprehend different spoken discourses/excerpts in different accents.
CO101.5	Listen to different accents, speeches and presentations.
<b>MA6151 Mathematics</b>	
CO102.1	Infer canonical form from quadratic form using the concepts of Eigen values and Eigen vectors.
CO102.2	Test the convergence of sequences and series.
CO102.3	Apply the techniques of differential calculus to find the evaluate and envelope of curves.
CO102.4	Determine the maxima and minima of functions of two variables using partial derivatives.
CO102.5	Find the area enclosed by plane curves and volume of solids using multiple integrals.
<b>PH6151 Engineering Physics-I</b>	
CO103.1	Describe the crystal structures and various crystal growth techniques.
CO103.2	Analyze the elastic nature of materials and thermal behaviour of materials.
CO103.3	Apply the knowledge of quantum mechanics and classical mechanics in addressing the problems related to science and technology.
CO103.4	Apply the knowledge about designing an auditorium with good acoustical properties and make use of Ultrasonics and its applications in various fields.
CO103.5	Illustrate the advantages of optical communication using LASER.
<b>CY6151 Engineering Chemistry-I</b>	
CO104.1	Describe the methods of polymerization, types, Properties and uses of polymers.
CO104.2	Illustrate the concepts of basic thermodynamics and problem solving skills in various disciplines of Engineering.
CO104.3	Discuss the laws of photochemistry in recognizing the interaction of light with matter and its applications in luminescence and spectroscopy.
CO104.4	Review the use of phase rule in identifying its applications in metallurgy and alloys.
CO104.5	Summarize the basic knowledge in Nanochemistry and distinguish the existing technology with nanotechnology.
<b>GE6151 Computer Programming</b>	



CO109.4	Explore soldering practices.
<b>SEMESTER II</b>	
<b>HS6251 Technical English – II</b>	
CO201.1	Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, argue using appropriate communicative strategies.
CO201.2	Write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
CO201.3	Read different genres of texts, infer implied meanings and critically analyse and evaluate them for ideas as well as for method of presentation.
CO201.4	Listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.
CO201.5	Read and write effectively for a variety of professional and social settings
<b>MA6251 Mathematics – II</b>	
CO202.1	Apply the knowledge of vector calculus in engineering disciplines.
CO202.2	Solve ordinary differential equations that model the engineering problems.
CO202.3	Find the Laplace transform of functions and solve the ordinary differential equations using Laplace transform.
CO202.4	Construct analytic functions and apply the knowledge of conformal mappings in engineering disciplines.
CO202.5	Evaluate contour integration and apply it in engineering problems.
<b>PH6251 Engineering Physics – II</b>	
CO203.1	Describe the conducting materials and their properties.
CO203.2	Analyze the semiconductors and able to differentiate various types of semiconductors.
CO203.3	Apply the knowledge of magnetic and superconducting materials for modern day to day applications.
CO203.4	Explain the properties and applications of dielectrics.
CO203.5	Apply the knowledge about the modern engineering materials for various applications.
<b>CY6251 Engineering Chemistry – II</b>	
CO204.1	Describe water technology in the purification of water in domestic and industrial applications.
CO204.2	Explain the principles of electrochemistry, the factors affecting corrosion and the prevention of corrosion.
CO204.3	Classify the different alternative sources of energy and the generation processes.
CO204.4	Enumerate the different types of engineering materials and their applications.

**PRINCIPAL**

**THAMIRABHARANI ENGINEERING COLLEGE**

Chathirampudukulam Village,

Chidambaram, Thanjavur Road



CO209.3	Apply the different data structures for implementing solutions to practical problems.
CO209.4	Develop searching and sorting programs.
<b>SEMSTER III</b>	
<b>MA6351 Transforms and Partial Differential Equations</b>	
CO301.1	Solve the Partial Differential Equations.
CO301.2	Determine the Fourier series expansion of functions and hence evaluate the value of infinite series.
CO301.3	Apply the method of separation of variables to solve one dimensional wave equation, one dimensional heat equation and two dimensional heat equation.
CO301.4	Find the Fourier transform of functions and also evaluate definite integrals using Fourier transform.
CO301.5	Calculate the Z-transform of discrete time systems and solve the difference equations using Z-transform.
<b>CS6301 Programming and Data Structure II</b>	
CO302.1	Explain the basic concepts of Object Oriented programming.
CO302.2	Apply the concepts of polymorphism, inheritance and virtual functions for problem solutions.
CO302.3	Explore the generic problem solution, standard libraries with required errors by means of exception handling.
CO302.4	Comprehend the usage of different advanced nonlinear data structure - Set, Heaps and Height balanced trees.
CO302.5	Apply the non-linear data structure graph in solving the real world problems.
<b>CS6302 Database Management Systems</b>	
CO303.1	Explore the basic concepts of Database Management system.
CO303.2	Create database using query languages.
CO303.3	Explain the concepts of transaction processing and concurrency control.
CO303.4	Explore and gain the knowledge on internal storage Structure and indexing techniques.
CO303.5	Relate security concepts to databases.
<b>CS6303 Computer Architecture</b>	
CO304.1	Describe the operations and Instructions in "Microprocessor without Interlocked Pipeline Stages" (MIPS) architecture.
CO304.2	Model arithmetic and logic unit including Floating Point
CO304.3	Multiplication and Division Algorithms.
CO304.4	Develop MIPS architecture by building pipelined data path and control path.
CO304.5	Analyze pipelined control units with Instruction Level Parallelism.
<b>CS6304 Analog and Digital Communication</b>	
CO305.1	Apply various analog communication techniques in all communication systems.



CO402.1	Describe the Network fundamentals and terminology
CO402.2	Recognize the different internetworking devices and their functions
CO402.3	Explore the network with routing and multicasting
CO402.4	Explain the detailed inner workings of TCP/IP protocol suit.
CO402.5	Analyze the features and operations of various application layer protocols such as HTTP, DNS, and SMTP.
<b>CS6401 Operating Systems</b>	
CO403.1	Summarize the basic concepts, System call, structure and functions of Operating Systems.
CO403.2	Design the various Scheduling algorithms, Deadlock prevention, Deadlock avoidance algorithms and apply the principles of concurrency.
CO403.3	Demonstrate the usage of various memory management schemes.
CO403.4	Encapsulate the concepts of Mass Storage Structure, File System Structure and I/O Systems.
CO403.5	Implement administrative tasks on Linux servers.
<b>CS6402 Design and Analysis of Algorithms</b>	
CO404.1	Describe the fundamentals of algorithmic problem solving and able to analyse recursive and non-recursive algorithms.
CO404.2	Design algorithms for various computing problems using brute force and divide-and conquer technique.
CO404.3	Analyze the time and space complexity of various algorithms using dynamic programming and greedy technique.
CO404.4	Analyze the different algorithm design techniques for a given problem using iterative improvement.
CO404.5	Modify existing algorithms to improve efficiency.
<b>EC6504 Microprocessor and Microcontroller</b>	
CO405.1	Design and implement programs on 8086 microprocessor.
CO405.2	Implement the system bus structure of 8086 and coprocessor.
CO405.3	Describe the I/O devices, peripherals and bus interfacing.
CO405.4	Elaborate the operation of 8051 microcontroller architecture and implement ALP using 8051 instructions.
CO405.5	Design and implement 8051 microcontroller based systems.
<b>CS6403 Software Engineering</b>	
CO406.1	Identify the key activities in managing a software project.
CO406.2	Compare different process models.
CO406.3	Concepts of requirements engineering and Analysis Modeling.
CO406.4	Understand systematic procedure for software design and deployment.
CO406.5	Compare and contrast the various testing and maintenance.

PRINCIPAL



CO503.3	Analyze and design use case modeling and domain modeling.
CO503.4	Apply appropriate design patterns.
CO503.5	Design and implement projects using Object Oriented concepts and compare various testing techniques.
<b>CS6503 Theory of Computation</b>	
CO504.1	Students able to understand the language hierarchy and construct the finite automata.
CO504.2	Students able to understand regular expressions and construct automata for any given pattern.
CO504.3	Students able to write CFG for any construct.
CO504.4	Students able to design turing machine for any language.
CO504.5	Students able to verify whether a problem is decidable or not.
<b>CS6504 Computer Graphics</b>	
CO505.1	Describe the graphics hardware devices, software used and different drawing algorithms.
CO505.2	Apply two dimensional transformations and clipping techniques to graphical objects.
CO505.3	Design three-dimensional graphical objects and apply three dimensional transformations into graphical objects.
CO505.4	Explain the illumination and color models.
CO505.5	Design an animation sequences.
<b>CS6511 Case Tools Laboratory</b>	
CO506.1	Design and implement projects using Object Oriented concepts.
CO506.2	Use the UML analysis and design diagrams.
CO506.3	Apply appropriate design patterns
CO506.4	Create code from design
CO506.5	Compare and contrast various testing techniques.
<b>CS6512 Internet Programming Laboratory</b>	
CO507.1	Design user interfaces using Java frames and applets.
CO507.2	Design Web pages using HTML/XML and style sheets.
CO507.3	Develop dynamic web pages using server side scripting and write client server applications.
CO507.4	Use the frameworks like JSP Strut, Hibernate, Spring.
CO507.5	Create applications with AJAX and web services.
<b>CS6513 Computer Graphics Laboratory</b>	
CO508.1	Explain the basics of graphics programming.
CO508.2	Create 2D animations.
CO508.3	Implement image manipulation and enhancement.



CO605.4	Design Finite Impulse response (FIR) digital filters.
CO605.5	Analyse the finite Word length effects in digital filters.
<b>CS6659 Artificial Intelligence</b>	
CO606.1	Identify appropriate AI methods to solve a problem using search technique.
CO606.2	Demonstrate the knowledge in predicate and propositional logic and their roles in logic programming.
CO606.3	Formalise a given problem in the language / framework of different AI methods.
CO606.4	Apply the machine learning techniques in solving the real world problems.
CO606.5	Elucidate the idea of Knowledge Acquisition and Expert Systems
<b>IT6004 Software Testing</b>	
CO607.1	Students able to design test cases suitable for a software development for different domains.
CO607.2	Students can identify suitable tests to be carried out.
CO607.3	Students can understand the different levels of testing and prepare test planning based on the document .
CO607.4	Students can document test plans and test cases designed.
CO607.5	Students able to understand various automation testing tools.
<b>CS6611 Mobile Application Development Laboratory</b>	
CO608.1	Explain the architecture of mobile application development frameworks.
CO608.2	Choose the required architecture based upon the mobile application to be developed.
CO608.3	Design mobile applications using various layout and widgets.
CO608.4	Implement various mobile applications using emulators.
CO608.5	Deploy applications to hand-held devices.
<b>CS6612 Compiler Laboratory</b>	
CO608.1	Explain and Use the compiler writing tools.
CO608.2	Implement the different Phases of compiler using tools.
CO608.3	Analyze the control flow and data flow of a typical program.
CO608.4	Optimize a given program.
CO608.5	Generate an assembly language program equivalent to a source language program.
<b>GE6674 Communication and Soft Skills -Laboratory Based</b>	
CO609.1	Identify and interpret visuals, communicate in formal and informal conversations, give presentations, and participate in GD.
CO609.2	Explain reading comprehension passages of higher levels, draft Resume, cover letter, reports, emails, and write blogs.
CO609.3	Differentiate between IELTS & TOEFL and take placement oriented verbal ability tests.

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE

Chettinad, Tamil Nadu



<b>CS6004 Cyber Forensics</b>	
CO706.1	Understand the basics of computer forensics.
CO706.2	Apply a number of different computer forensic tools to a given scenario.
CO706.3	Analyze and validate forensics data.
CO706.4	Identify the vulnerabilities in a given network infrastructure.
CO706.5	Implement real-world hacking techniques to test system security.
<b>CS6711 Security Laboratory</b>	
CO707.1	Implement the cipher techniques
CO707.2	Develop the various security algorithms
CO707.3	Use different open source tools for network security and analysis.
<b>CS6712 Grid and Cloud Computing Laboratory</b>	
CO708.1	Develop application using Globus toolkit.
CO708.2	Develop web services/application using Grid framework
CO708.3	Run Virtual machine and install software on it.
CO708.4	Setup a private cloud using OpenStack / Open Nebula /Ecualyptus
CO708.5	Implement applications using MapReduce approach in Hadoop environment.
<b>SEMESTER – VIII</b>	
<b>CS6801 Multi –Core Architectures and Programming</b>	
CO801.1	Describe the parallel architecture and parallel programming model
CO801.2	Analyze the issues related to various challenges in parallel programming
CO801.3	Develop parallel programming applications using openMP
CO801.4	Design and develop distributed programming application using openMPI.
CO801.5	Compare and analyze the programming model for serial processor and parallel processor implementation.
<b>CS6008 Human Computer Interaction</b>	
CO802.1	Explain the basic foundations of Human Computer Interaction.
CO802.2	Design effective HCI for individuals and persons with disabilities.
CO802.3	Simplify the issues in the HCI Models and assess the importance of user feedback
CO802.4	State the Mobile HCI implications for designing multimedia/ ecommerce/ e-learning Web sites.
CO802.5	Develop the meaningful user interface.
<b>CS8811 Project Work</b>	
CO803.1	Identify the problem by applying acquired knowledge.
CO803.2	Analyze and classify executable project modules after Risk analysis.
CO803.3	Choose effective tools for designing project modules.
CO803.4	Integrate all the tested modules through effective team work.



**THAMIRABHARANI ENGINEERING COLLEGE****TIRUNELVELI - 62358****DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING****2013 - REGULATION****SEMESTER – I****Course Name: HS6151 & Technical English - I**

CO101.1	Explain clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies.
CO101.2	Construct cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
CO101.3	Organize different genres of texts adopting various reading strategies.
CO101.4	Distinguish and comprehend different spoken discourses/excerpts in different accents
CO101.5	Improve listening to different accents, speeches and presentations.

**Course Name: MA6151 & Mathematics - I**

CO102.1	Infer canonical form from quadratic form using the concepts of Eigen values and Eigen vectors.
CO102.2	Test the convergence of sequences and series.
CO102.3	Apply the techniques of differential calculus to find the evolutes and envelope of curves.
CO102.4	Determine the maxima and minima of functions of two variables using partial derivatives.
CO102.5	Find the area enclosed by plane curves and volume of solids using multiple integrals.

**Course Name: PH6151 & Engineering Physics - I**

CO103.1	Describe the crystal structures and various crystal growth techniques.
CO103.2	Analyze the elastic nature of materials and thermal behaviour of materials.
CO103.3	Apply the knowledge of quantum mechanics and classical mechanics in addressing the problems related to science and technology
CO103.4	Apply the knowledge about designing an auditorium with good acoustical properties and make use of Ultrasonics and its applications in various fields.
CO103.5	Illustrate the advantages of optical communication using LASER.

**Course Name: CY6151 & Engineering Chemistry - I**

CO104.1	Describe the methods of polymerization, types, properties and uses of polymers.
CO104.2	Illustrate the concepts of basic thermodynamics and problem solving skills in various disciplines of Engineering.
CO104.3	Discuss the laws of photochemistry in recognizing the interaction of light with matter and its applications in luminescence and spectroscopy.
CO104.4	Review the use of phase rule in identifying its applications in metallurgy and alloys.
CO104.5	Summarize the basic knowledge in Nano-chemistry and distinguish the existing technology with nanotechnology.

**Course Name: GE6151 & Computer Programming**

C O105.1	Elaborate the organization of a digital computer and design the solution for simple computing problems using algorithm, flowchart and pseudo code.
CO105.2	Apply different looping structures to solve simple scientific and statistical problems.
CO105.3	Devise solutions for simple problems using array and strings.
CO105.4	Demonstrate the usage of Dynamic memory allocation and pointer variables.
CO105.5	Illustrate the concepts of structures and unions with example programs.

**Course Name: GE6152 & Engineering Graphics**

CO106.1	Sketch the conic sections, special curves, and draw orthographic views from pictorial views and models.
CO106.2	Apply the principles of orthographic projections of points in all quadrants, lines and planes in first quadrant.
CO106.3	Sketch the projections of simple solids like prisms, pyramids, cylinder and cone and obtain the traces of plane figures.
CO106.4	Practice the sectional views of solids like cube, prisms, pyramids, cylinders & cones and extend its lateral surfaces.
CO106.5	Sketch the perspective projection of simple solids, truncated prisms, pyramids, cone and cylinders and sketch the isometric projection of simple machine parts.

**Course Name: GE6161 & Computer Practices Laboratory**

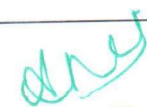
CO107.1	Understand the usage of office automation tools.
CO107.2	Apply good programming design methods for program development.
CO107.3	Design and implement the C programs for simple applications.
CO107.4	Develop and implement the recursive programs.
CO107.5	Implement the c programs with the help of structures and unions.

**Course Name: GE6162 & Engineering Practices Laboratory**

CO108.1	Construct carpentry components and pipe connections including plumbing works.
CO108.2	Use welding equipment's to join the structures.
CO108.3	Describe centrifugal pump, Air conditioner, operations of smithy, foundry and fittings.
CO108.4	Construct the basic Electrical and Electronics circuits.
CO108.5	Examine the different types of electronic circuits and components.

**Course Name: GE6163 & Physics and Chemistry Laboratory**

CO109.1	The hands on exercises undergone by the students will help them to apply physics principles of optics and thermal physics to evaluate engineering properties of materials.
CO109.2	Perform the quantitative chemical analysis of chloride and dissolved oxygen.
CO109.3	Determine the amount of acids by using the instruments of conductivity meter and pH meter.
CO109.4	Apply the knowledge of velocity of sound and compressibility of liquid – Ultrasonic interferometer.
CO109.5	To understand measurements of air wedge method and evaluate the wavelength of spectrum.
CO109.6	The students will be able to obtain hands-on knowledge in the quantitative chemical analysis of water quality related parameters.

  
**PRINCIPAL**  
**THAMIRABHARANI ENGINEERING COLLEGE**  
 Cheludam Village.



CO109.7	The students will be able to understand the experimental concepts in the mixture of acids and bases.
CO109.8	The students will be able to appreciate the need of Potentiometer, pH meter and Conductivity meter in the determination of concentration of ions.

## SEMESTER – II

### Course Name: HS6251 & Technical English - II

CO201.1	Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, and argue using appropriate communicative strategies.
CO201.2	Write effectively and persuasively and produce different types of writings such as narration, description, exposition.
CO201.3	Write the argument with creative, critical, analytical and evaluation writing.
CO201.4	Read different genres of texts, infer implied meanings and critically analyze and evaluate them for ideas as well as for method of presentation.
CO201.5	Listen / view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.

### Course Name: MA6251 & Mathematics – II

CO202.1	Apply the knowledge of vector calculus in engineering disciplines.
CO202.2	Solve ordinary differential equations that model the engineering problems.
CO202.3	Find the Laplace transform of functions and solve the ordinary differential equations using Laplace transform.
CO202.4	Construct analytic functions and apply the knowledge of conformal mappings in engineering disciplines.
CO202.5	Evaluate contour integration and apply it in engineering problems.

### Course Name: PH6251 & Engineering Physics - II

CO203.1	Describe the conducting materials and their properties.
CO203.2	Analyze the semiconductors and able to differentiate various types of semiconductors.
CO203.3	Apply the knowledge of magnetic and superconducting materials for modern day to day applications.
CO203.4	Explain the properties and applications of dielectrics.
CO203.5	Apply the knowledge about the modern engineering materials for various applications

### Course Name: CY6251 & Engineering Chemistry - II

CO204.1	Understand the principles of water, characterization and treatment for potable and industrial purposes.
CO204.2	Apply the knowledge of Adsorption and Catalysis in Engineering Technology.
CO204.3	Understand the phase transition of one component and two component systems and the types of alloys and their applications.
CO204.4	Understand the chemistry of various fuels and their combustion.

PRINCIPAL  
MADABHARANI ENGINEERING COLLEGE

CO204.5	Analyze the different forms of energy sources and compare the materials for constructing Battery and fuel cells.
---------	--

**Course Name: GE6251 & Basic Civil and Mechanical Engineering**

CO205.1	Measure distances and area by surveying.
CO205.2	Explain the usage of construction material and proper selection of construction materials.
CO205.3	Appreciate the Civil and Mechanical Engineering components of Projects.
CO205.4	Identify and compare the materials best suited for construction of Battery and fuel cells.
CO205.5	Demonstrate working principles of petrol and diesel engine.
CO205.6	Identify the components used in power plant cycle.

**Course Name: EE6201 & Circuit Theory**

CO206.1	Analyze the electrical circuits using mesh and nodal method.
CO206.2	Analyze the network reduction and theorem for DC and AC circuits.
CO206.3	Analyze the transient response of RLC circuits and DC and AC excitation using Laplace transform.
CO206.4	Analyze the three phase balanced and unbalanced star and delta network.
CO206.5	Analyze the resonance and coupled circuits.

**Course Name: GE6262 & Physics and Chemistry Laboratory**

CO207.1	Understand different components of the environment and their functions.
CO207.2	Find solutions to environmental problems.
CO207.3	Understand the importance of natural resources and their roles in sustainable development.
CO207.4	Understand the issues related to the environment and their impact on human lives.
CO207.5	Create awareness about the problems caused by population and related issues.

**Course Name: GE6263 & Computer Programming Laboratory**

CO208.1	Analyze the basic home electrical wire connections like single way switch, two way switch and fluorescent lamp wiring connections.
CO208.2	Examine the electrical quantities such as voltage current, power etc.,
CO208.3	Elaborate on the components, gates, soldering practices.
CO208.4	Fabricate carpentry components and pipe connections including plumbing works.
CO208.5	Use welding equipments to join the structures.
CO208.6	Carry out the basic machining operations.
CO208.7	Make the models using sheet metal works.
CO208.8	Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings.

**Course Name: EE6211 & Electric Circuits Laboratory**

CO209.1	Simulate electric circuits.
CO209.2	Apply the circuit theorems and concepts in engineering applications

  
**PRINCIPAL**  
**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaramagar - Vepamkulam Road,  
 Tirunelveli - 627 355.



### SEMESTER – III

**Course Name: MA6351 & Transforms and Partial Differential Equations**

CO301.1	Understand how to solve the given standard partial differential equations.
CO301.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
CO301.3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
CO301.4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
CO301.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.

**Course Name: EE6301 & Digital Logic Circuits**

CO302.1	Understand the concepts of various number systems, binary codes and logic families and error detecting and correcting codes.
CO302.2	Simplify and implement Boolean functions, combinational circuits using logic gates, Boolean algebra and k map.
CO302.3	Design and implement the synchronous sequential circuits using flip flops.
CO302.4	Design and analysis of asynchronous sequential circuits and programmable logic device.
CO302.5	Simulate digital logic circuit using VHDL for various applications.

**Course Name: EE6302 & Electromagnetic Theory**

CO303.1	Ability to understand the various coordinate systems and the application of Coulombs and Gauss's law.
CO303.2	Ability to understand the basic concepts about electrostatic field, electric potential, energy density and to solve the problems based on boundary conditions in electric field.
CO303.3	Ability to understand the basic concepts about magneto static field, magnetic flux density, vector potential and to solve the problems based on boundary conditions in magnetic field.
CO303.4	Ability to understand the Maxwell's equation relating to the electric and magnetic fields and the applications in the machines.
CO303.5	Ability to understand the basic concepts electromagnetic waves and characterizing parameters.

  
**PRINCIPAL**  
**THAMIRABHARANI ENGINEERING COLLEGE**  
Chathirampudukulam Village,  
Thiruvananthapuram - Veperur Road,  
Thiruvananthapuram - 611 005

**Course Name: GE6351 & Environmental Science and Engineering**

CO304.1	Analyze various types of magnetic circuits.
CO304.2	Understand and analyze the performance of transformer.
CO304.3	Understand the principle of electromechanical energy conversion, concepts in rotating machines and analyze the electromagnetic system.
CO304.4	Understand the working principle, types and analyze the performance of DC Generator.
CO304.5	Understand the working principle, types and analyze the performance of DC Motor.

**Course Name: EC6202 & Electron Devices and Circuits**

CO305.1	Explain the structure and operation of basic electronic devices.
CO305.2	Analyze the characteristics of different electronic devices.
CO305.3	Analyze frequency response of amplifiers.
CO305.4	Analyze the operation of multistage amplifier and differential amplifier.
CO305.5	Able to analyze the oscillators.

**Course Name: EE6303 & Linear Integrated Circuits and Applications**

CO306.1	Apply the knowledge about Binary Cycles and Cogeneration systems in thermal power plant.
CO306.2	Classify the knowledge about layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.
CO306.3	Construct and analyze about nuclear power plants and its various types of reactor.
CO306.4	Illustrate about layout, construction and working of the components inside Renewable energy power plants.
CO306.5	Analyze power plant economics and environmental hazards.

  
**PRINCIPAL**  
**THAMIRABHARANI ENGINEERING COLLEGE**  
Chathirampudukulam Village,  
Chidambaranagar - Vepemkulam Road,  
Thatchanallur, Tirunelveli - 627 344



**Course Name: EC6361 & Electronics Laboratory**

CO307.1	Able to explain the characteristics of semiconductor devices.
CO307.2	Analyze the characteristics of voltage controlled devices.
CO307.3	Analyze the characteristics of photosensitive semiconductor devices.
CO307.4	Design and implement converter circuit.
CO307.5	Infer amplitude, frequency and phase measurements using CRO

**Course Name: EE6311 & Linear and Digital Integrated Circuits Laboratory**

CO308.1	Understand and analyze the performance of DC Generator.
CO308.2	Understand and analyze the performance of DC Motor.
CO308.3	Understand and analyze the performance of single phase transformer.
CO308.4	Understand and analyze the performance of three phase transformer.
CO308.5	Acquire knowledge on DC Motor starters and three phase transformer connection.

**SEMESTER – IV****Course Name: MA6459 & Numerical Methods**

CO401.1	Understand the basic concepts and techniques of solving algebraic and transcendental equations.
CO401.2	Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations.
CO401.3	Apply the numerical techniques of differentiation and integration for engineering problems.
CO401.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
CO401.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

**Course Name: EE6401 & Electrical Machines - I**

CO402.1	Analyze the performance of salient and non-salient pole synchronous generators.
CO402.2	Analyze the performance of synchronous motor.
CO402.3	Analyze the performance of three phase induction motor.
CO402.4	Analyze the various types of starters and speed control of three phase induction motor
CO402.5	Analyze the performance of single phase induction motor and special machines.

**Course Name: CS6456 & Object Oriented Programming**

CO403.1	Show control system components and explain the use of transfer function models for analysis of physical systems.
CO403.2	Explain about time response of the systems and steady state analysis.
CO403.3	Analyze the open loop and closed loop frequency responses of systems.
CO403.4	Classify stability analysis and design of compensators
CO403.5	Design state variable representation of physical systems.

**Course Name: EE6402 & Transmission and Distribution**

CO404.1	Students able to understand the Concept of transmission line parameters.
CO404.2	Students able to understand the concepts of lines and insulators.
CO404.3	Students able to understand the concepts of performance of transmission lines.
CO404.4	Students able to understand the concept of underground cables and distribution of electric power system.
CO404.5	Students able to understand the function of different components used in the transmission and distribution level of power system.

**Course Name: EE6403 & Discrete Time Systems and Signal Processing**

CO405.1	Understand about different functional elements of instrumentation.
CO405.2	Analyze to choose an instrument for measuring different electrical and magnetic parameters.
CO405.3	Design a suitable Bridge circuit to determine the values of various resistor, inductor and capacitor.
CO405.4	Explain the construction and working principle of various types of storage and display devices.
CO405.5	Explain the construction and working of various types of transducers and function of different blocks involved in data acquisition systems.

**Course Name: EE6404 & Measurements and Instrumentation**

CO406.1	Understand about different functional elements of instrumentation.
CO406.2	Analyze to choose an instrument for measuring different electrical and magnetic parameters.
CO406.3	Design a suitable Bridge circuit to determine the values of various resistor, inductor and capacitor.
CO406.4	Explain the construction and working principle of various types of storage and display devices.
CO406.5	Explain the construction and working of various types of transducers and function of different blocks involved in data acquisition systems.



**Course Name: CS6461 & Object Oriented Programming Laboratory**

CO407.1	Able to understand the fabrication process of ICs
CO407.2	Able to understand and analyze the characteristics of OP-AMP
CO407.3	Able to analyze and design the linear and non-linear applications of OP-AMP
CO407.4	Able to understand the functional blocks of Timer and PLL
CO407.5	Able to understand the applications of OP-AMP in special ICs

**Course Name: EE6411 & Electrical Machines Laboratory - I**

CO408.1	Understand the importance of synchronous machines and analyze the performance of synchronous generator using EMF, MMF, ZPF and ASA methods.
CO408.2	Analyze the characteristics of V and Inverted V curves of synchronous motor.
CO408.3	Analyze the performance of three phase induction motor.
CO408.4	Analyze the performance of single phase induction motor.
CO408.5	Acquire knowledge on separation of no-load losses and types of starters used in three phase induction motor.

**SEMESTER – V**

**Course Name: EE6501 & Power System Analysis**

CO501.1	Analyze the power system under standard operating conditions.
CO501.2	Apply iterative techniques for power flow analysis
CO501.3	Classify short circuit studies-Symmetrical fault analysis on power system,
CO501.4	Prioritize short circuit studies-Unsymmetrical fault analysis on power systems.
CO501.5	Analyze stability problems in the power system.

**Course Name: EE6502 & Microprocessors and Microcontrollers**

CO502.1	Students able to understand the architecture of 8085 and the concepts of need and use of interrupt structure.
CO502.2	Students able to understand the addressing modes and instruction set of 8085 and write the assembly language programs for the basic operation.
CO502.3	Students able to understand the architecture, concepts of need and use of interrupt structure and memory organization of 8051.
CO502.4	Students able to describe the interfacing of external peripherals to 8085 using peripheral interfacing ICS.

CO502.5	Students able to understand the addressing modes and instruction set of 8051 and its applications and develop the Microcontroller based applications.
---------	---

**Course Name: ME6701 & Power Plant Engineering**

CO503.1	Ability to identify and select the switching devices for different power converter applications.
CO503.2	Ability to choose power converter for given dc load specification from AC input.
CO503.3	Analyze different DC-DC converter with various loads.
CO503.4	Analyze the operation of single and three phase inverters.
CO503.5	Explain the operation of ac voltage controller and cyclo converter.

**Course Name: EE6503 & Power Electronics**

CO504.1	Ability to identify and select the switching devices for different power converter applications.
CO504.2	Ability to choose power converter for given dc load specification from AC input.
CO504.3	Analyze different DC-DC converter with various loads.
CO504.4	Analyze the operation of single and three phase inverters.
CO504.5	Explain the operation of ac voltage controller and cyclo converter.

**Course Name: EE6504 & Electrical Machines - II**

CO505.1	Students will be able to acquire knowledge on Signals and systems & their mathematical representation.
CO505.2	Students will be able to understand and analyze the discrete time systems.
CO505.3	Students will be able to analyze the transformation techniques & their computation.
CO505.4	Students will be able to understand and design the types of filters and their design for digital implementation.
CO505.5	Students will be able to acquire knowledge on programmability digital signal processor & quantization effects.

**Course Name: IC6501 & Control Systems**

CO506.1	Students are able to develop Java programs using OOP principles and gain knowledge about the Java environment.
CO506.2	Students are able to understand the concepts inheritance & interfaces and develop Java programs on it.
CO506.3	Students are able to build Java applications with built-in and own exceptions.
CO506.4	Students are able to develop Java applications with threads and generic classes.
CO506.5	Students are able to develop interactive Java programs using swings and applets



**Course Name: EE6511 & Control and Instrumentation Laboratory**

CO507.1	Understand the working of Bridge networks.
CO507.2	Analyze Instrumentation amplifier, active filters, regulated power supply.
CO507.3	Examine the signal conditioning circuit for Thermocouple, strain gauge and RTD.
CO507.4	Acquire knowledge on P, PI and PID controllers
CO507.5	Apply the simulation in control systems.

**Course Name: GS6563 & Communication Skills Laboratory Based**

CO508.1	Understand and apply knowledge of human communication and language processes as they occur across various contexts.
CO508.2	Evaluate key theoretical approaches used in the interdisciplinary field of communication.
CO508.3	Able to communicate effectively orally and in writing.
CO508.4	To demonstrate his verbal and non-verbal communication ability through presentations.
CO508.5	Participate effectively in group discussions

**Course Name: EE6512 & Electrical Machines Laboratory - II**

CO509.1	Students are able to write Java programs for simple applications that make use of classes, packages and interfaces.
CO509.2	Students are able to write and implement Java programs with array list, exception handling and multithreading.
CO509.3	Students are able to design applications using file processing.
CO509.4	Students are able to design applications using event handling.
CO509.5	Students are able to design applications using generic programming.

**SEMESTER – VI****Course Name: EC6651 & Communication Engineering**

CO601.1	Comprehend and appreciate the importance and purpose of this course.
CO601.2	Apply analog communication techniques.
CO601.3	Apply digital communication techniques.
CO601.4	Analyze data and pulse communication techniques.
CO601.5	Analyze Source and Error control coding.

**Course Name: EE6601 & Solid State Drives**

CO602.1	Students able to understand the concepts of Electromagnetic and Static Relays
CO602.2	Students able to understand the concepts of suitability circuit breaker.
CO602.3	Students able to understand the causes of abnormal operating conditions of the apparatus and system.
CO602.4	Students able to understand the concepts of apparatus\ protection, static and numerical relays.
CO602.5	Students able to understand the basic knowledge on functioning of circuit breaker.

**Course Name: EE6602 & Embedded Systems**

CO603.1	Ability to Use various Embedded Development Strategies.
CO603.2	Ability to choose embedded system Networking.
CO603.3	Describe and analyze different phases of EDLC.
CO603.4	Analyze the basics of real time operating system.
CO603.5	Discover and acquire knowledge on various embedded system application.

**Course Name: EE6603 & Power System Operation and Control**

CO604.1	Ability to Use various Embedded Development Strategies.
CO604.2	Ability to choose embedded system Networking.
CO604.3	Describe and analyze different phases of EDLC.
CO604.4	Analyze the basics of real time operating system.
CO604.5	Discover and acquire knowledge on various embedded system application.

**Course Name: EE6604 & Design of Electrical Machines**

CO605.1	Rotating and static electrical machines and ability to design of field system for its application.
CO605.2	Analyze and design of single and three phase transformer.
CO605.3	Analyze and design of armature and field of DC machines.
CO605.4	Analyze and design of stator and rotor of induction motor.
CO605.5	Analyze and design of synchronous machines.

**Course Name: EE6004 & Power System Transients (Elective-I)**

CO606.1	Rotating and static electrical machines and ability to design of field system for its application.
CO606.2	Analyze and design of single and three phase transformer.
CO606.3	Analyze and design of armature and field of DC machines.
CO606.4	Analyze and design of stator and rotor of induction motor.
CO606.5	Analyze and design of synchronous machines.

**Course Name: EE6611 & Power Electronics and Drives Laboratory**

CO607.1	Analyze the performance converter and inverter circuits.
CO607.2	Analyze the switching characteristics various switches.
CO607.3	Analyze about AC to DC converter circuits.
CO607.4	Analyze about DC to AC circuits and AC to AC converters.
CO607.5	Understand and acquire knowledge on simulation software.

  
**PRINCIPAL**  
**THAMIRABHARANI ENGINEERING COLLEGE**  
Chathirampudukulam Village,  
Chidambaranagar - Vepemkulam Road,  
Tamil Nadu - 617 358.



**Course Name: EE6612 & Microprocessors and Microcontrollers Laboratory**

CO608.1	Students are able to design and develop assembly language programs using 8085 microprocessors and 8051 microcontrollers.
CO608.2	Ability to programming logics for code conversion.
CO608.3	Ability to understand basics of serial communication and to acquire knowledge on A/D and D/A.
CO608.4	To understand and impart knowledge in DC and AC motor interfacing.
CO608.5	Ability to understand basics of software simulators

**Course Name: EE6613 & Presentation Skills and Technical Seminar**

CO609.1	Ability to identify the solution to solve a specific problem right from its identification.
CO609.2	Ability to analyze, design, implement and handle prototype projects with a complete and organized solution methodologies.
CO609.3	Ability to work as an individuals or in a team in development of technical projects
CO609.4	Ability to apply the engineering knowledge in solving the problem.
CO609.5	Ability to develop effective communication skills for presentation of project related activities.

**SEMESTER – VII**

**Course Name: EE6701 & High Voltage Engineering**

CO701.1	Students able to categorize the various types of over voltages in power system.
CO701.2	Students able to understand the various types of breakdown mechanisms in power systems.
CO701.3	Students able to understand the operation of vandi graft generator.
CO701.4	Students able to understand the various measurement techniques for measuring high voltage.
CO701.5	Students able to test power apparatus and insulation coordination.

**Course Name: EE6702 & Protection and Switchgear**

CO702.1	Understand the significance of power system operation and control and analyze the control actions to be implemented on the system to meet the variation of system demand.
CO702.2	Understand and analyze the real-power frequency interaction.
CO702.3	Understand and analyze the reactive-power voltage interaction.
CO702.4	Understand and analyze the economic operation of power system.
CO702.5	Understand the operation of SCADA system and its application for real time operation and control of power systems

Course Name: EE6703 & Special Electrical Machines

CO703.1	Explain the various renewable energy resources and technologies and current & possible future role of renewable energy sources.
CO703.2	Analyze the wind energy conversion systems.
CO703.3	Analyze different the solar energy technologies.
CO703.4	Understand basics about biomass energy and geothermal energy.
CO703.5	Understand basics about tidal energy, wave energy, Ocean thermal energy conversion and fuel cell.

**Course Name: MG6851 & Principles of Management**

CO704.1	Able to differentiate types of disasters, causes and impact on environment and society.
CO704.2	Able to assess vulnerability and provide disaster risk reduction.
CO704.3	Able to assess the interrelationship between disaster and development.
CO704.4	Able to understand the disaster risk management in India.
CO704.5	Able to understand the disaster management through case studies and field work.

**Course Name: EE6005- Power Quality (Elective-II )**

CO705.1	Describe the Power quality problems.
CO705.2	Able to understand the voltage sags, harmonics and methods of control.
CO705.3	Able to understand the over voltage problems
CO705.4	Able to understand the sources and effect of harmonics in power systems.
CO705.5	Able to understand the various methods of power quality monitoring.

**Course Name: EE6008- Microcontroller based system design (Elective-III )**

CO706.1	Able to understand architecture of PIC Microcontroller
CO706.2	Able to understand the various interrupts and timer
CO706.3	Able to understand Peripheral devices for data communication and transfer
CO706.4	Able to understand the functional blocks of ARM processor
CO706.5	Able to understand architecture of ARM processors



**Course Name: EE6711 & Power System Simulation Laboratory**

CO707.1	Ability to develop the coding to analyze the performance of transmission line and to formulate bus impedance and admittance matrix for the given electrical power network.
CO707.2	Ability to develop the coding to analyze the power flow using Gauss Seidal and Newton Raphson method.
CO707.3	Ability to develop the coding to analyze the power system under symmetrical and unsymmetrical fault conditions and to analyze the economic dispatch.
CO707.4	Ability to design the simulation model to analyze the transient stability of the power system, to examine the stability level of single and multi-machine system and to analyze the load frequency dynamics of multi area system.
CO707.5	Ability to design the simulation model to analyze the occurrence of electromagnetic transients in power system.

**Course Name: EE6712 & Comprehension**

CO708.1	Analyze the performance of characteristics of solar energy collector system.
CO708.2	Analyze the performance parameter of micro wind mills.
CO708.3	Analyze the performance parameter of hybrid energy (solar-wind) system.
CO708.4	Analyze the performance of hybrid energy fuel cell system.
CO708.5	Understand and acquire knowledge about on simulation of renewable energy sources.

**SEMESTER – VIII**

**Course Name: EE6801 & Electric Energy Generation, Utilization and Conservation**

CO801.1	Analyze the various properties of generation, utilization and conservation.
CO801.2	Identify an appropriate method of heating for any particular industrial application.
CO801.3	Summarize domestic wiring connection and debug any faults occurred.
CO801.4	Construct an electric connection for any domestic appliance like refrigerator.
CO801.5	Analyze a battery charging circuit for a specific household application.

**Course Name: EE6010- High Voltage DC transmission (Elective-IV )**

CO802.1	Develop the knowledge of HVDC transmission and HVDC converters and the applicability and advantage of HVDC transmission over conventional AC transmission.
---------	--

  
PRINCIPAL  
THAMIRABHARANI ENGINEERING COLLEGE  
Chathirampudukottai

CO802.2	Formulate and solve mathematical problems related to rectifier and inverter control methods and learn about different control schemes as well as starting and stopping of DC links.
CO802.3	Analyze the different harmonics generated by the converters and their variation with the change in firing angles.
CO802.4	CO802.4 Develop harmonic models and use the knowledge of circuit theory to develop filters and assess the requirement and type of protection for the filters.
CO802.5	Study and understand the nature of faults happening on both the AC and DC sides of the converters and formulate protection schemes for the same.
CO802.6	Review the existing HVDC systems along with MTDC systems and their controls and recognize the need to follow the advancements in both the existing systems and HVDC systems and determine the most economic coexistence of both.

**Course Name: GE6757 – Total Quality Management (Elective-V )**

CO804.1	Describe the dimensional barrier regarding Quality.
CO804.2	Summarize the Total quality principles.
CO804.3	Demonstrate the tools utilization for quality improvement
CO804.4	Analyze the various types of techniques are used to measure quality.
CO804.5	Apply the various quality systems in implementation of Total quality management.

**Course Name: EE6811 & Project Work**

CO805.1	Ability to identify and solve the real world and societal importance problems in the Electrical and its allied area.
CO805.2	Ability to analyze, design, implement and handle prototype projects with a complete and organized solution methodologies.
CO805.3	Ability to apply the engineering knowledge in solving the problem.
CO805.4	Ability to work as individuals or in a team in development of technical projects.
CO805.5	Ability to develop effective communication skills for presentation of project related activities

  
**PRINCIPAL**  
**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaram - Veperur Road,  
 Thatchanallur, Tiruchelvi - 627 358.



CO104.2	Apply the knowledge of adsorption and catalysis in engineering technology
CO104.3	Understand the phase transition of one component and two component systems and the types of alloys and their applications
CO104.4	Understand the chemistry of various fuels and their combustion
CO104.5	Analyze the different forms of energy sources and compare the materials for constructing Battery and fuel cells
<b>GE6151 Computer Programming</b>	
CO105.1	Develop algorithmic solutions to simple computational problems.
CO105.2	Read, write, execute by hand simple C programs.
CO105.3	Design C Programs for problems
CO105.4	Write and execute C programs for simple applications
CO105.5	Read and write data from/to files in C Programs
<b>GE6152 Engineering Graphics</b>	
CO106.1	Familiarize with the fundamentals and standards of Engineering graphics
CO106.2	Perform freehand sketching of basic geometrical constructions and multiple views of objects
CO106.3	Project orthographic projections of lines and plane surfaces
CO106.4	Draw projections and solids and development of surfaces
CO106.5	Visualize and to project isometric and perspective sections of simple solids
<b>GE6161 Computer Practices Laboratory</b>	
CO107.1	Write, test, and debug simple C programs
CO107.2	Implement C programs with conditionals and loops
CO107.3	Develop C programs step-wise by defining functions and calling them
CO107.4	Use dictionaries for representing compound data
CO107.5	Read and write data from/to files in Turbo C compiler
<b>GE6162 Engineering Practices Laboratory</b>	
CO108.1	Examine the electrical quantities such as voltage current, power etc
CO108.2	Carry out the basic machining operations
CO108.3	Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundry and fittings
CO108.4	Analyze the basic home electrical wire connections like single way switch, two way switch and fluorescent lamp wiring connections

**PRINCIPAL**

**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chettirampudukulam Village,  
 Chidambaramnagar - Vepemkulam Road,  
 Thatchanallur, Tirunelveli - 627 353.

CO108.5	Examine the electrical quantities such as voltage current, power etc
<b>GE6163 Physics and Chemistry Laboratory - I</b>	
CO109.1	Apply the physics principles of Thermal physics and Properties of Matter to evaluate properties of materials
CO109.2	Understand measurement technique and usage of new instrument in Optics for real time application in Engineering
CO109.3	Apply the knowledge of semiconducting material. to evaluate the band gap of material useful for engineering solutions
CO109.4	Apply the knowledge of velocity of sound and compressibility of liquid - Ultrasonic interferometer
CO109.5	Understand measurements of air wedge method and evaluate the wavelength of spectrum
CO109.6	Obtain hands-on knowledge in the quantitative chemical analysis of water quality related parameters
CO109.7	Understand the experimental concepts in the mixture of acids and bases
CO109.8	Appreciate the need of Potentiometer, pH meter and Conductivity meter in the determination of concentration of ions

#### SEMESTER - II

#### HS6251 Technical English - II

CO201.1	Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, and argue using appropriate communicative strategies
CO201.2	Write effectively and persuasively and produce different types of writings such as narration, description, exposition
CO201.3	Write the argument with creative, critical, analytical and evaluation writing
CO201.4	Read different genres of texts, infer implied meanings and critically analyze and evaluate them for ideas as well as for method of presentation
CO201.5	Listen / view and comprehend different spoken excerpts critically and infer unspoken and implied meanings

#### MA6251 Mathematics - II

CO202.1	Compute Eigen values and Eigen vectors of a matrix, diagonalise symmetric matrices and similar matrices
CO202.2	Explain gradients, potential functions, and directional derivatives of functions of several variables. Compute line, surface and volume integral using Gauss divergence, Green's and stoke's theorem
CO202.3	Discuss analytic functions in heat and fluid flow
CO202.4	Extend the concept of contour integrals in evaluating Real integrals
CO202.5	Discuss Laplace Transform methods to solve initial value problems for constant coefficient linear ODEs

#### PH6251 Engineering Physics - II

CO203.1	Gain knowledge on classical and quantum electron theories, and energy band structures
CO203.2	Acquire knowledge on basics of semiconductor physics and its applications in various devices

**PRINCIPAL**

**THAMIRABARANI ENGINEERING COLLEGE**

Chathirampudukulam Village,

Chidambaramnagar - Vepenkulam Road,

Thatchanallur, Tirunelveli - 627 353.



CO203.3	Get knowledge on magnetic and dielectric properties of materials
CO203.4	Have the necessary understanding on the functioning of optical materials for optoelectronics
CO203.5	Understand the basics of quantum structures and their applications in spintronics and carbon electronics
<b>CY6251 Engineering Chemistry - II</b>	
CO204.1	Gain knowledge on boiler feed water requirements, related problems and water treatment techniques.
CO204.2	Know the principles of electro chemical reactions, redox reactions in corrosion of materials and methods for corrosion prevention and protection of materials
CO204.3	Understand the Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells
CO204.4	Learn the properties and applications of engineering materials
CO204.5	Study the Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels
<b>EC6201 Electronic Devices</b>	
CO205.1	Understand the construction, theory and operation of the basic electronic devices PN Junction diodes
CO205.2	Understand the construction, theory and operation of the Bipolar Junction Transistor
CO205.3	Understand the construction, theory and operation of the Field Effect Transistor
CO205.4	Understand the construction, theory and operation of the special electronic devices
CO205.5	Understand the construction, theory and operation of the Power devices and display devices
<b>EE6201 Circuit Theory</b>	
CO206.1	Analyze electrical circuits using mesh, nodal analysis and network terminology
CO206.2	Apply network theorem concepts to solve AC and DC circuits
CO206.3	Explain the concepts of resonance and coupled circuit
CO206.4	Analyze the transient response for AC and DC circuits
CO206.5	Understand the concepts of Two port networks
<b>GE6263 Physics and Chemistry Laboratory - II</b>	
CO207.1	Understand measurements of air wedge method and evaluate the wavelength of spectrum
CO207.2	Obtain hands-on knowledge in the quantitative chemical analysis of water quality related parameters
CO207.3	Understand the experimental concepts in the mixture of acids and bases
CO207.4	Appreciate the need of Potentiometer, pH meter
CO207.5	Conductivity meter in the determination of concentration of ions

PRINCIPAL

**THAMIRAHAGANI ENGINEERING COLLEGE**

Chathirampudukulam Village,  
Chidambaramnagar - Vepemkulam Road,

Thatchanallur, Tirunelveli - 627 358.

<b>EC6211 Circuits and Devices Laboratory</b>	
CO208.1	Analyze the characteristics of basic electronic devices
CO208.2	Design the RL circuits
CO208.3	Design the RC circuits
CO208.4	Verify Thevenin & Norton theorem
CO208.5	Verify KVL & KCL, and Superposition theorems
<b>SEMESTER - III</b>	
<b>MA6351 Transforms and Partial Differential Equations</b>	
CO301.1	Express some of algebra operations between linear transformation
CO301.2	Understand the relationship between a linear transformation and its matrix representation
CO301.3	Demonstrate knowledge of general inner product space by constructing an orthogonal basis for an inner product space by using Gram Schmidt process
CO301.4	Able to solve various type of partial differential equations
CO301.5	Apply Fourier series methods to solve boundary value problems for PDEs
<b>EE6352 Electrical Engineering and Instrumentation</b>	
CO302.1	Understand the three phase supply and power measurement.
CO302.2	Understand the concepts in electrical generators, motors.
CO302.3	Understand the concepts in transformers
CO302.4	Understand the basic measurement and instrumentation based devices.
CO302.5	Understand the relevance of digital instruments in measurements.
<b>EC6301 Object Oriented Programming and Data Structures</b>	
CO303.1	Implement linear and non-linear data structure operations using C
CO303.2	Suggest appropriate linear / non-linear data structure for any given data set
CO303.3	Apply hashing concepts for a given problem
CO303.4	Modify or suggest new data structure for an application
CO303.5	Appropriately choose the sorting algorithm for an application
<b>EC6302 Digital Electronics</b>	
CO304.1	Understand the digital fundamentals and applications

 PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE

Chattirampudukulam Village,  
Chidambaram - 627 358.  
Thatchanallur, Tirunelveli - 627 358.



CO304.2	Design various combinational digital circuits using logic gates
CO304.3	Analyze and design the synchronous sequential circuits
CO304.4	Analyze and design the asynchronous sequential circuits
CO304.5	Understand and analyze the semiconductor memories and related technology
<b>EC6303 Signals and Systems</b>	
CO305.1	Determine and analyze the given system is linear/causal/stable
CO305.2	Analyze the continuous time signals using Laplace and Fourier transform
CO305.3	Compute and to analyze the Continuous Time LTI systems in the time domain and frequency domain
CO305.4	Analyze the continuous time signals using DTFT and Z - transform
CO305.5	Compute and to analyze the Discrete Time LTI systems in the time domain and frequency domain
<b>EC6304 Electronic Circuits- I</b>	
CO306.1	Acquire knowledge in working principles, characteristics and applications of BJT and FET
CO306.2	Acquire knowledge and analysis the frequency response characteristics of BJT and FET amplifiers
CO306.3	Analyze the performance of small signal BJT and FET amplifiers - single stage and multi stage amplifiers
CO306.4	Design and analyze the Regulated Power Supplies
CO306.5	Apply the knowledge gained in the design of Electronic circuits
<b>EC6311 Analog and Digital Circuits Laboratory</b>	
CO307.1	Design and Test rectifiers, filters and regulated power supplies
CO307.2	Design and Test BJT/JFET amplifiers
CO307.3	Analyze the limitation in bandwidth of single stage and multi stage amplifier
CO307.4	Measure CMRR in differential amplifier and simulate and analyze amplifier circuits using PSpice.
CO307.5	Design and Test the digital logic circuits
<b>EC6312 OOPS and Data Structures Laboratory</b>	
CO308.1	Develop C programs for simple applications making use of basic constructs
CO308.2	Implement the appropriate linear and non-linear data structures in problem solving
CO308.3	Solve the problems using trees and Binary Search trees
CO308.4	Choose appropriate searching and sorting algorithm for an application and implement it in a modularized way
CO308.5	Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval

  
**PRINCIPAL**  
**THANIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudikulam Village,  
 Chidambaramagar - Veppankulam Road,  
 Chidambaramagar - Tirunelveli - 627 353.  
 Thatchandalur,

SEMESTER – IV	
<b>MA6451 Probability and Random Processes</b>	
CO401.1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon
CO401.2	Understand the basic concepts of one and two dimensional random variables and apply in engineering application
CO401.3	Apply the concept random processes in engineering disciplines
CO401.4	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.
CO401.5	Analyze the response of random inputs to linear time invariant systems
<b>EC6401 Electronic Circuits II</b>	
CO402.1	Analyze different types of amplifier with negative feedback
CO402.2	Design & Analysis of transistorized RC Oscillators & LC oscillators
CO402.3	Analyze transistorized tuned amplifiers
CO402.4	Analysis of wave shaping circuits
CO402.5	Summarize the operation of power amplifiers
<b>EC6402 Communication Theory</b>	
CO403.1	Understand and design of an AM communication systems
CO403.2	Understand and design of angle modulated communication systems
CO403.3	Apply the concepts of random process to the design of Communication systems
CO403.4	Analyze the noise performance of AM and FM systems
CO403.5	Gain knowledge in sampling and quantization that leads to the design of digital systems.
<b>EC6403 Electromagnetic Fields</b>	
CO404.1	Understand the fundamental electromagnetic laws and concepts
CO404.2	Study Maxwell's equations in integral, differential and phasor forms
CO404.3	Explain and analyze electromagnetic wave propagation in lossy and in lossless media
CO404.4	Solve simple problems requiring estimation of electric and magnetic field quantities
CO404.5	Learn and analyze wave propagation between parallel planes and waveguides
<b>EC6404 Linear Integrated Circuits</b>	

  
PRINCIPAL

**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaram nagar - Vepankulam Road,  
 Thatchanailur, Tirunelveli - 627 353.



CO405.1	Understand the building blocks and characteristics of OP-AMP
CO405.2	Design linear and non-linear applications of OP AMPS
CO405.3	Understand and analyze analog multiplier and PLL circuits
CO405.4	Design ADC and DAC using OP – AMPS
CO405.5	Generate waveforms using OP – AMP and Analyse special function ICs

#### EC6405 Control System Engineering

CO406.1	Show control system components and explain the use of transfer function models for analysis of physical systems
CO406.2	Explain about time response of the systems and steady state analysis
CO406.3	Analyze the open loop and closed loop frequency responses of systems
CO406.4	Classify stability analysis and design of compensators
CO406.5	Design state variable representation of physical systems

#### EC6411 Circuit and Simulation Integrated Laboratory

CO407.1	Analyze various types of feedback amplifiers
CO407.2	Design oscillators, tuned amplifiers, wave-shaping circuits and multivibrators
CO407.3	Design and simulate feedback amplifiers, oscillators, tuned amplifiers, wave-shaping circuits and multivibrators using simulation tool

#### EC6412 Linear Integrated Circuits Laboratory

CO408.1	Design amplifiers, oscillators, D-A converters using operational amplifiers
CO408.2	Design filters using op-amp and performs experiments on frequency response
CO408.3	Analyze the working of PLL and describe its application as a frequency multiplier
CO408.4	Design DC power supply using ICs
CO408.5	Analyze the performance of filters, multi vibrators, A/D converter and analog multiplier using pSPICE

#### EE6461 Electrical Engineering and Control System Laboratory

CO408.1	Provide hands on experience with generators and motors
CO408.2	Understand the working of DC/AC motors and generator
CO408.3	Learn the use of transformer
CO408.4	Understand the behavior of linear system through simulation
CO408.5	Gain knowledge of controllers

  
PRINCIPAL

THAMIRABARANI ENGINEERING COLLEGE

SEMESTER - V

THAMIRABARANI ENGINEERING College,  
Chathirampudukulam Village,

Chidambaramagar - Veerankulam Road,

Talchanaallur, Tirunelveli - 627 358.

<b>EC6501 Digital Communication</b>	
CO501.1	Understand the limits set by information theory
CO501.2	Understand the various waveform coding schemes
CO501.3	Design and implement base band transmission schemes
CO501.4	Design and implement band pass signaling schemes
CO501.5	Analyze the spectral characteristics of band pass signaling schemes and their noise performance
<b>EC6502 Principles of Digital Signal Processing</b>	
CO502.1	Apply DFT for the analysis discrete time signals and systems
CO502.2	Design IIR filters
CO502.3	Design FIR filters
CO502.4	Understand the characteristic effects of finite precision representation on digital filters
CO502.5	Understand the architecture and functionalities of Digital Signal Processor
<b>EC6503 Transmission Lines and Waveguides</b>	
CO503.1	Explain the characteristics of transmission lines and its losses
CO503.2	Understand and analyze the standing wave ratio and input impedance in high frequency transmission lines
CO503.3	Analyze impedance matching by stubs using smith charts
CO503.4	Analyze the characteristics of TE and TM waves
CO503.5	Analyze the wave behavior in rectangular and circular waveguides
<b>EC6504 Microprocessor and Microcontroller</b>	
CO504.1	Execute programs based on 8086 microprocessor
CO504.2	Analyze the system configurations based on 8086 microprocessor
CO504.3	Design and implement 8086 microprocessor based systems
CO504.4	Execute programs based on 8051 microcontroller
CO504.5	Design and implement 8051 microcontroller based systems
<b>GE6351 Environmental Science and Engineering</b>	
CO505.1	Understand different components of the environment and their functions
CO505.2	Find solutions to environmental problems
CO505.3	Understand the importance of natural resources and their roles in sustainable development

*(Signature)*

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE  
 Chathirampudukulam Village,  
 Chidambaramagar - Vepinkulam Road,  
 Thatchanallur, Tirunelveli - 627 358.



CO505.4	Understand the issues related to the environment and their impact on human lives
CO505.5	Create awareness about the problems caused by population and related issues
<b>EC6511 Digital Signal Processing Laboratory</b>	
CO506.1	Understand the basic signal processing operations
CO506.2	Understand the MATLAB based implementation of IIR and FIR filter systems
CO506.3	Analyze the architecture of a DSP Processor
CO506.4	Design and Implement the FIR and IIR Filters in DSP Processor for performing filtering operation over real-time signals
CO506.5	Design a DSP system for various applications of DSP
<b>EC6512 Communication System Laboratory</b>	
CO507.1	Simulate & validate the various functional modules of a communication system
CO507.2	Demonstrate their knowledge in base band signaling schemes through implementation of digital modulation schemes.
CO507.3	Analyze various channel coding schemes & demonstrate their capabilities towards the improvement of the noise performance of communication system
CO507.4	Construct end-to-end communication Link
<b>EC6513 Microprocessor and Microcontroller Laboratory</b>	
CO508.1	Write ALP programs for fixed, floating point and arithmetic operations
CO508.2	Interface different input and output devices with 8086 processor
CO508.3	Generate waveforms using microprocessors
CO508.4	Execute programs in 8051
CO508.5	Differentiate simulator from emulator
<b>SEMESTER – VI</b>	
<b>MG6851 Principles of Management</b>	
CO601.1	Define the concept of management roles and skills
CO601.2	Analyze the planning process and strategic management
CO601.3	Create the organization with proper human resource management
CO601.4	Evaluate the human behavior and create effective communication skill
CO601.5	Generalize the budget control techniques to maintain standards in productivity
<b>CS6303 Computer Architecture</b>	
CO602.1	Describe data representation, instruction formats and the operation of a digital computer

  
**PRINCIPAL**  
**THAMIRABHARANI ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chidambaranagar - Veperankulam Road,  
 Tirunelveli - 627 953.  
 Thatchanallur, Tirunelveli

CO602.2	Illustrate the fixed point and floating-point arithmetic for ALU operation
CO602.3	Discuss about implementation schemes of control unit and pipeline performance
CO602.4	Understand the concept of various memories, interfacing and organization of multiple processors
CO602.5	Discuss parallel processing technique and unconventional architectures
<b>CS6551 Computer Networks</b>	
CO603.1	Identify the components required to build different types of networks
CO603.2	Understanding the various issues at data link layer and their solutions
CO603.3	Trace the flow of information from one node to another node in the network and understanding the different routing protocols
CO603.4	Understand the transport layer and the traffic flow mechanisms
CO603.5	Understand the network security issues at the application level
<b>EC6601 VLSI Design</b>	
CO604.1	Understand the fundamentals of CMOS circuits and its characteristics
CO604.2	Learn the design and realization of combinational circuits
CO604.3	Learn the design and realization of sequential digital circuits
CO604.4	Understand the concepts of Architectural choices and performance trade-offs involved in designing and realizing the circuits in CMOS technology
CO604.5	Learn the different FPGA architectures and testability of VLSI circuits
<b>EC6602 Antenna and Wave propagation</b>	
CO605.1	Explain the fundamentals of radiation and types of antennas, and explain the radiation from a current element.
CO605.2	Summarize the aperture antenna characteristics and operation.
CO605.3	Explain the various types of antenna arrays.
CO605.4	Explain the special antennas such as frequency independent and broad band antenna
CO605.5	Summarize the various types of wave propagation.
<b>EC6001 Medical Electronics</b>	
CO606.1	Explain about the various physiological parameters
CO606.2	Gain knowledge about the methods of recording and also the method of transmitting
CO606.3	Study about the various assist devices used in the hospitals.
CO606.4	Understand about equipment used for physical medicine

**PRINCIPAL**

**THAMIRABHARANI ENGINEERING COLLEGE**

Chathirampudukulam Village,

Chidamberanagar - Vepenkulam Road,

Thatchanallur, Tirunelveli - 627 352.



CO606.5	Explain the various recently developed diagnostic and therapeutic techniques.
<b>EC6611 Computer Networks Laboratory</b>	
CO607.1	Understand the structure and organization of computer networks
CO607.2	Include the division into network layers, role of each layer relationships between the layers
CO607.3	Understand the basic concepts of application layer protocol design including client/server models, peer to peer models, and network naming
CO607.4	Understand about transport layer concepts and protocol design including connection oriented and connection-less models, techniques to provide reliable data delivery and algorithms for congestion control and flow control
CO607.5	Analyze the performance of various network protocols using simulation tools
<b>EC6612 VLSI Design Laboratory</b>	
CO608.1	Learn Hardware Descriptive Language (Verilog/VHDL)
CO608.2	Learn the fundamental principles of VLSI circuit design in digital domain
CO608.3	Learn the fundamental principles of VLSI circuit design in analog domain
CO608.4	Familiarize fusing of logical modules on FPGAs
CO608.5	Provide hands on design experience with professional design (EDA) platforms
<b>GE6674 Communication and Soft Skills - Laboratory Based</b>	
CO609.1	Understand and apply knowledge of human communication and language processes as they occur across various contexts
CO609.2	Evaluate key theoretical approaches used in the interdisciplinary field of communication
CO609.3	Communicate effectively orally and in writing
CO609.4	Demonstrate his verbal and non-verbal communication ability through presentations
CO609.5	Participate effectively in group discussions
<b>SEMESTER – VII</b>	
<b>EC6701 RF and Microwave Engineering</b>	
CO701.1	Understand the concepts of low frequency and high frequency parameters
CO701.2	Design of two port network and characteristics of T and PI type networks
CO701.3	Understand the various types of Tees and other microwave elements
CO701.4	Understand the various microwave systems.
CO701.5	Design the microwave amplifier, filter and Oscillator.

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE  
 Chathirampudukulam Village,  
 Chidambaranagar - Veperikulam Road,  
 Thatchanallur, Tirunelveli - 627 353.

<b>EC6702 Optical Communication and Networks</b>	
CO702.1	Realize and understand the basic elements in optical fibers, different modes and configurations.
CO702.2	Analyze the transmission characteristics associated with dispersion and polarization techniques.
CO702.3	Design optical sources and detectors with their use in optical communication system.
CO702.4	Construct fiber optic receiver systems, measurements and coupling techniques.
CO702.5	Design optical communication systems and its networks.
<b>EC6703 Embedded and Real Time Systems</b>	
CO703.1	Understand and analyze the concepts of designing an embedded system.
CO703.2	Learn and apply the architecture and programming of ARM processor.
CO703.3	Understand and apply the concepts of embedded systems programming.
CO703.4	Analyze the basic concepts of real time system design.
CO703.5	Model the real-time applications using embedded-system design concepts.
<b>IT6005 Digital Image Processing</b>	
	Understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms
CO704.1	
CO704.2	Operate on images using the techniques of smoothing, sharpening and enhancement
CO704.3	Understand the restoration concepts and filtering techniques
CO704.4	Learn the basics of segmentation and various methods of segmenting the images
CO704.5	Know about compressing and recognizing the images for color models
<b>EC6007 Speech Processing</b>	
CO705.1	Understand the speech signal and its spectrum parameters by STFT and mel spectrum
CO705.2	Understand the speech compression techniques
CO705.3	Analyze the speech recognition process using Hidden Markov Model
CO705.4	Understand the speaker recognition techniques
CO705.5	Design text to speech synthesis systems
<b>EC6016 Optoelectronic Devices</b>	
CO706.1	Understand the concepts of Semiconductor Opto Electronic Device
CO706.2	Understand the basics of solid state physics
CO706.3	Understand the basics of display devices.

**PRINCIPAL**

**THAMIRABHARAN ENGINEERING COLLEGE**

Chathirapudukulam Village,  
Chidambaramagar - Vepankulam Road,  
Thatchanallur, Tirunelveli - 627 353.



CO706.4	Design optoelectronic detection devices and modulators.
CO706.5	Design optoelectronic integrated circuits.
<b>EC6711 Optical and Microwave Laboratory</b>	
CO707.1	Analyze the performance of simple optical link by the measurement of losses
CO707.2	Analyze the mode characteristics of fiber
CO707.3	Understand the intricacies in microwave system design and analyze the characteristics of Directional Couplers, Isolators, various Tees
CO707.4	Understand the characteristics of Gunn diode
CO707.5	Compute the VSWR, wavelength, frequency, using microwave system design
<b>EC6711 Embedded Laboratory</b>	
CO708.1	Write programs in ARM for any specific application
CO708.2	Interface memory, A/D and D/A converters with ARM system
CO708.3	Analyze the performance of interrupt in embedded systems
CO708.4	Write program for interfacing keyboard, display, motor and sensors
CO708.5	Design and implement a mini project using embedded system design concepts
<b>SEMESTER - VIII</b>	
<b>EC6801 Wireless Communication</b>	
CO801.1	Explain the Characteristics of fading in wireless channels
CO801.2	Describe the fundamentals of Cellular Architecture
CO801.3	Compare the performance of channel using various propagation models
CO801.4	Analyze the various mitigation techniques to address fading and interference in multipath propagation
CO801.5	Design MIMO Systems in fading and nonfading channels
<b>EC6802 Wireless Networks</b>	
CO802.1	Explain WIMAX and Wireless LAN protocols and standards.
CO802.2	Infer the TCP enhancements for wireless protocols.
CO802.3	Explain Wireless WAN architectures, protocols and its features.
CO802.4	Analyze the latest wireless protocols for the problems associated with Wireless Networks.
CO802.5	Interpret the latest 4G networks and its architecture.
<b>GE6757 Total Quality Management</b>	

  
**PRINCIPAL**  
**THANIRABHARAN ENGINEERING COLLEGE**  
 Chathirampudukulam Village,  
 Chathirampudukulam - Veperambalam Road,  
 Thanirabharanagar - Veperambalam - 627 353.  
 Chidambaram District, Tamil Nadu  
 1

CO803.1	Understand the concept of Quality
CO803.2	Understand the Implication of Quality on Business
CO803.3	Implement Quality Implementation Programs
CO803.4	Identify requirements of quality improvement programs
CO803.5	Manage quality improvement teams
<b>GE6075 Professional Ethics in Engineering</b>	
CO804.1	Apply ethics in society
CO804.2	Discuss the ethical issues related to engineering
CO804.3	Realize the responsibilities and rights in the society
CO804.4	Create an awareness on Engineering Ethics and Human Values
CO804.5	Appreciate the rights of others
<b>EC6811 Project Work</b>	
CO805.1	Use of fundamental knowledge and skills in engineering and apply it effectively on a project
CO805.2	Plan and manage the time effectively as a team
CO805.3	Present orally and demonstrate your project to peers, academicians and industry community
CO805.4	Provide solutions to the social problems from an engineer's perspective
CO805.5	Explore and apply the knowledge of the 'real world' situations that a professional engineer can encounter

  
PRINCIPAL

**THAMIRABHARANI ENGINEERING COLLEGE**  
Chattirampudukulam Village,  
Chidambaranagar - Veperur Road,  
Thatchanallur, Tirunelveli - 627 353.





# THAMIRABHARANI ENGINEERING COLLEGE

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

Chathirampudukulam, Chidambaranagar - Vepemkulam Road

Thatchanallur, Tirunelveli 627 358, Tamil Nadu.

## DEPARTMENT OF MECHANICAL ENGINEERING

### LIST OF COURSE OUTCOMES

SEMESTER I	
<b>HS6151 Technical English – I</b>	
CO101.1	Read articles of a general kind in magazines and newspapers
CO101.2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English
CO101.3	Comprehend conversations and short talks delivered in English
CO101.4	Write short essays of a general kind and personal letters and emails in English
CO101.5	Develop vocabulary of a general kind by developing their reading skills
<b>MA6151 Mathematics - I</b>	
CO102.1	Apply differential calculus tools in solving various application problems
CO102.2	Apply differentiation to solve maxima and minima problems
CO102.3	Apply different methods of integration in solving practical problems
CO102.4	Apply multiple integral ideas in solving areas, volumes and other practical problems
CO102.5	Apply various techniques in solving differential equations
<b>PH6151 Engineering Physics – I</b>	
CO103.1	Gain knowledge on the basics of properties of matter and its applications
CO103.2	Analyze the concept of waves and optical devices and their applications in fiber optics
CO103.3	Analyze the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers
CO103.4	Understand the advanced physics concepts of quantum theory and its applications in tunneling microscopes
CO103.5	Understand the basics of crystals, their structures and different crystal growth techniques
<b>CY6151 Engineering Chemistry I</b>	
CO104.1	Understand the principles of water, characterization and treatment for potable and industrial purposes
CO104.2	Apply the knowledge of adsorption and catalysis in engineering technology

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE

Chathirampudukulam Village,

Chidambaranagar - Vepemkulam Road,

Thatchanallur, Tirunelveli - 627 358.

CO104.3	Understand the phase transition of one component and two component systems and the types of alloys and their applications
CO104.4	Understand the chemistry of various fuels and their combustion
CO104.5	Analyze the different forms of energy sources and compare the materials for constructing Battery and fuel cells
<b>GE8151 Computer Programming</b>	
CO105.1	Explain the components of computer and logical operations.
CO105.2	Convert the number system and their representation.
CO105.3	Discuss hardware and software devices
CO105.4	Summarize network fundamentals.
CO105.5	Plan the logic using flowchart and develop algorithm to write a C Program.
<b>GE6152 Engineering Graphics</b>	
CO106.1	Familiarize with the fundamentals and standards of Engineering graphics
CO106.2	Perform freehand sketching of basic geometrical constructions and multiple views of objects
CO106.3	Project orthographic projections of lines and plane surfaces
CO106.4	Draw projections and solids and development of surfaces
CO106.5	Visualize and to project isometric and perspective sections of simple solids
<b>GE6161 Computer Practices Laboratory</b>	
CO107.1	Explain the components of computer and logical operations.
CO107.2	Convert the number system and their representation.
CO107.3	Discuss hardware and software devices
CO107.4	Summarize network fundamentals.
CO107.5	Plan the logic using flowchart and develop algorithm to write a C Program.
<b>GE6162 Engineering Practices Laboratory</b>	
CO108.1	Apply the knowledge of pipeline connections to household fittings and industrial buildings.
CO108.2	Prepare the different joints in roofs, doors, windows and furniture.
CO108.3	Perform step turning operation in a lathe.
CO108.4	Perform the various welding processes and know about its applications.

PRINCIPAL

THAMIRABHARAN ENGINEERING COLLEGE

Chattampiattakulam Village,

Chidambaram - Veerankulam Road,

Thatchanallur, Tirunelveli - 627 458.



CO108.5	Produce a funnel using sheet metal.
<b>GE6163 Physics and Chemistry Laboratory-I</b>	
CO109.1	Apply the physics principles of Thermal physics and Properties of Matter to evaluate properties of materials
CO109.2	Understand measurement technique and usage of new instrument in Optics for real time application in Engineering
CO109.3	Apply the knowledge of semiconducting material, to evaluate the band gap of material useful for engineering solutions
CO109.4	Apply the knowledge of velocity of sound and compressibility of liquid – Ultrasonic interferometer
CO109.5	Understand measurements of air wedge method and evaluate the wavelength of spectrum
<b>SEMESTER II</b>	
<b>HS6251 Technical English</b>	
CO201.1	Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, and argue using appropriate communicative strategies
CO201.2	Write effectively and persuasively and produce different types of writings such as narration, description, exposition
CO201.3	Write the argument with creative, critical, analytical and evaluation writing
CO201.4	Read different genres of texts, infer implied meanings and critically analyze and evaluate them for ideas as well as for method of presentation
CO201.5	Listen / view and comprehend different spoken excerpts critically and infer unspoken and implied meanings
<b>MA6251 Engineering Mathematics - II</b>	
CO202.1	Compute Eigen values and Eigen vectors of a matrix, diagonalise symmetric matrices and similar matrices
CO202.2	Explain gradients, potential functions, and directional derivatives of functions of several variables. Compute line, surface and volume integral using Gauss divergence, Green's and Stoke's theorem
CO202.3	Discuss analytic functions in heat and fluid flow
CO202.4	Extend the concept of contour integrals in evaluating Real integrals
CO202.5	Discuss Laplace Transform methods to solve initial value problems for constant coefficient linear ODEs
<b>CY6251 Engineering Chemistry – II</b>	
CO203.1	Explain the problems of using hard water in boilers and methods of treatment of water for boiler use.
CO203.2	Design the electro chemical cells and to identify the types of corrosion and the methods of preventing
CO203.3	Illustrate the methods of harnessing energy from non-conventional energy sources

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE

Chathirampudukulam Village,  
Chathirampudukulam Road,

Chidambaranagar - Veerampudukulam  
Tatchanallur, Tirunelveli - 627 358.

CO203.4	Classify various engineering materials and their important
CO203.5	Relate the significance of solid, liquid and gaseous fuels and to calculate the calorific values of fuels and the requirement of air for combustion in furnaces.
<b>GE6252 Basic Electrical and Electronics Engineering</b>	
CO204.1	Explain the working of measuring instruments and solve the basic dc and ac circuits.
CO204.2	Describe the operation of dc generators, motors, single phase induction motors and transformers.
CO204.3	Clarify the working of basic electronic devices such as diode, transistor and rectifier.
CO204.4	Demonstrate operation of digital devices such as logic gates, counters, flip-flops analog to digital converters and digital to analog converters.
CO204.5	Justify the knowledge on working of communication systems such as radio, radar, fax and television.
<b>GE8291 Environmental Science and Engineering</b>	
CO205.1	Understand different components of the environment and their functions.
CO205.2	Find solutions to environmental problems.
CO205.3	Understand the importance of natural resources and their roles in sustainable development.
CO205.4	Understand the issues related to the environment and their impact on human lives.
CO205.5	Create awareness about the problems caused by population and related issues.
<b>GE6252 Basic Electrical and Electronics Engineering</b>	
CO206.1	Explain the working of measuring instruments and solve the basic dc and ac circuits.
CO206.2	Describe the operation of dc generators, motors, single phase induction motors and transformers.
CO206.3	Clarify the working of basic electronic devices such as diode, transistor and rectifier.
CO206.4	Demonstrate operation of digital devices such as logic gates, counters, flip-flops analog to digital converters and digital to analog converters.
CO206.5	Justify the knowledge on working of communication systems such as radio, radar, fax and television.
<b>GE6261 Engineering Mechanics</b>	
CO207.1	Determine the equilibrium of a particle in space using principle of laws of mechanics.
CO207.2	Compute the equilibrium of rigid bodies in two dimensions and in three dimensions.
CO207.3	Calculate the principal moment of inertia of plane areas.
CO207.4	Solve the problems using equation of motions and analyze impact of elastic bodies on collision.

  
**PRINCIPAL**  
**THAMIRABHARAN ENGINEERING COLLEGE**  
 Chathirampudukulam Village  
 Chidambaram - Vepernkulam Road.  
 Chidambaram - 627-358.  
 Thatchanallur, Tirunelveli



CO207.5	Solve the problems of simple system with sliding friction and calculate linear and angular acceleration of moving body in general plane motion.
<b>GE6261 Computer Aided Drafting and Modeling Laboratory</b>	
CO208.1	Sketch simple figures with title block using AutoCAD software commands.
CO208.2	Sketch curves like parabola, spiral and involute of square & circle and draw the orthographic projection of simple solids.
CO208.3	Prepare orthographic projection of simple machine parts and draw a plan of residential building.
CO208.4	Sketch simple steel truss and sectional views of simple solids.
CO208.5	Prepare 2D multi view drawing from 3D model.
<b>GE6262 Physics and Chemistry Laboratory – II</b>	
CO209.1	Appraise the Young's modulus of the beam by uniform and non-uniform bending method, the moment inertia and rigidity modules for thin wire Torsion pendulum
CO209.2	Use Poiseuille's method for determining the coefficient of viscous city of the liquid
CO209.3	Evaluate the refractive index of spectral lines for determining the dispersive power of a prism and the thickness of a thin wire through interference fringers using Air wedge apparatus.
CO209.4	Determine the type, amount of alkalinity, hardness in a given water sample and evaluate the amount of copper using EDTA method.
CO209.5	Examine the potentiometric redox titration and conductometric precipitation titration .
<b>SEMSTER III</b>	
<b>MA6351 Transforms and Partial Differential Equations</b>	
CO301.1	Understand how to solve the given standard partial differential equations.
CO301.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
CO301.3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
CO301.4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
CO301.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.
<b>CE6306 Strength of Materials</b>	
CO302.1	Calculate stress, strain of ductile and composite material for different cross section.
CO302.2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.
CO302.3	Design of shaft, helical and carriage spring.

CO302.4	Apply mathematics concepts and calculate the deflection and slope by various methods.
CO302.5	Analyze and design thin and thick shells for the applied internal and external pressures.
<b>ME6301 Engineering Thermodynamics</b>	
CO303.1	Illustrate the basic concepts and laws of thermodynamics.
CO303.2	Apply the concepts of enthalpy and entropy in thermal systems.
CO303.3	Explain the working principle of steam power cycles.
CO303.4	Apply the concepts of thermodynamics to ideal gases and real gases and its relationships.
CO303.5	Apply the concepts of gas mixtures and psychrometry.
<b>CE6451 Fluid Mechanics and Machinery</b>	
CO304.1	Apply mathematical knowledge to predict the properties and characteristics of a fluid.
CO304.2	Classify and explain the flow of fluid through circular conduits.
CO304.3	Extend and infer the importance of dimensional analysis.
CO304.4	Classify and interpret the performance characteristics of various pumps in engineering fields.
CO304.5	Classify and compare the performance characteristics of various turbines in engineering fields.
<b>ME6302 Manufacturing Technology – I</b>	
CO305.1	Relate different types of patterns, casting process and furnaces used in foundry.
CO305.2	Distinguish different types of welding process and welding defects.
CO305.3	Explain hot working and cold working process.
CO305.4	Summarize different types of forming processes.
CO305.5	Explain manufacturing methods of plastic components.
<b>EE6351 Electrical Drives and Controls</b>	
CO306.1	Understand the principle of electrical drives & be able to understand the dynamics of electrical drive systems.
CO306.2	Select a drive for a particular application based on power rating & to select a drive based on mechanical characteristics for a particular drive application.
CO306.3	Operate and maintain solid state drives for speed control of DC machines.
CO306.4	Operate and maintain solid state drive for speed control of various special electrical machines.
CO306.5	Understand various starting and braking methods on electrical drives including their effects on power supply.
<b>ME6311 Manufacturing Technology Laboratory – I</b>	



CO307.1	Demonstrate the safety precautions exercised in the mechanical workshop.
CO307.2	Make the work piece as per given shape and size using Lathe.
CO307.3	Join two metals using arc welding.
CO307.4	Use sheet metal fabrication tools and make simple tray and funnel.
CO307.5	Use different moulding tools, patterns and prepare sand moulds.
<b>CE6461 Fluid Mechanics and Machinery Laboratory</b>	
CO308.1	Calculate the coefficient of discharge for Orifice meter and Venturimeter.
CO308.2	Calibrate the Rotameter and Estimate the friction factor for flow through pipes.
CO308.3	Predict performance characteristics of centrifugal pump and submergible pump.
CO308.4	Predict performance characteristics of reciprocating pump and gear pump.
CO308.5	Predict performance characteristics of turbines.
<b>EE6365 Electrical Engineering Laboratory</b>	
CO309.1	Analyze various types of magnetic circuits.
CO309.2	Understand and analyze the performance of transformer.
CO309.3	Understand the principle of electromechanical energy conversion, concepts in rotating machines and analyze the electromagnetic system.
CO309.4	Understand the working principle, types and analyze the performance of DC Generator.
CO309.5	Understand the working principle, types and analyze the performance of DC Motor.
<b>SEMSTER IV</b>	
<b>MA6452 Statistics and Numerical Methods</b>	
CO401.1	Apply the concept of testing of hypothesis for small and large samples in real life problems.
CO401.2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.
CO401.3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.
CO401.4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
CO401.5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
<b>ME6401 Kinematics of Machinery</b>	
CO402.1	Understand the basics of mechanisms and its application.

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE

Chattirampudukulam Village,

Chidambaramagar - Veperukutani Road,

Thatchanallur, Tirunelveli - 627 358.

CO402.2	Determine the velocity and acceleration at any point of a link in a mechanism.
CO402.3	Draw the different types of cam profile for different types of follower motion.
CO402.4	Design the various types of gears and gear trains used in various machines.
CO402.5	Analyze the friction developed and power requirement to operate the screw jack, belt drives, clutch and brakes.
<b>ME6402 Manufacturing Technology – II</b>	
CO403.1	Aware of the different types of special purpose machines and its working principle used in machining processes.
CO403.2	Apply the machining procedure to achieving the better surface finish in a component.
CO403.3	Analyze the different types of forces developed during machining process.
CO403.4	Write programming for different types of contours and profiles inCNC machines.
CO403.5	Create different types of contours and sizes in a component.
<b>ME6403 Engineering Materials and Metallurgy</b>	
CO404.1	Illustrate phase diagram for multicomponent systems and explain the various microstructures of steel and cast iron.
CO404.2	Describe various types of heat treatment process and sketchisothermal transformation.
CO404.3	Compare the composition and properties of various ferrous and non-ferrous alloys.
CO404.4	Discuss properties and applications of polymers and composite materials.
CO404.5	Explain various mechanical testing methods of ferrous and non-ferrous materials.
<b>GE6351 Environmental Science and Engineering</b>	
CO405.1	Describe the structure and functions of different eco system.
CO405.2	Identify the various causes, effects and control measures of different types of pollution.
CO405.3	Summarize the over exploitation and their effects of natural resources.
CO405.4	Appraise the environmental issues and possible solution.
CO405.5	Explain the causes of population growth and explosion.
<b>ME6404 Thermal Engineering</b>	
CO406.1	Calculate the mean effective pressure and air standard efficiency of different gas power cycles.
CO406.2	Calculate the performance test on IC engines.
CO406.3	Sketch the velocity diagrams of single and multi-stage turbines.
CO406.4	Explain the classification and working principle of various types of air compressors.

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE  
 Chathirampudathur Village,  
 Chidambaram - Veperur Road,  
 Thatchanallur, Tirunelveli - 627 351.



CO406.5	Calculate properties of moist air and COP of vapor refrigeration systems by using refrigeration table and chart.
<b>ME6311 Manufacturing Technology Laboratory – II</b>	
CO407.1	Aware of the different types of special purpose machines and its working principle used in machining processes.
CO407.2	Analyze the different types of forces developed during machining process.
CO407.3	Analyze the different types of forces developed during machining process.
CO407.4	Write programming for different types of contours and profiles in CNC machines.
CO407.5	Create different types of contours and sizes in a component.
<b>ME6412 Thermal Engineering Laboratory – I</b>	
CO409.1	Measure thermal conductivity of materials of composite Materials.
CO409.2	Conduct tests on natural and forced convective heat transfer apparatus and evaluate heat transfer coefficient.
CO409.3	Conduct tests on radiative heat transfer apparatus and evaluate Stefan Boltzmann constant and emissivity.
CO409.4	Evaluate the performance of parallel/counter flow heat exchanger apparatus and reciprocating air compressor.
CO409.5	Evaluate the performance of refrigeration and air conditioning test rigs.
<b>CE6315 Strength of Materials Laboratory</b>	
CO410.1	Evaluate the values of yield stress, breaking stress and ultimate stress of the given specimen under tension test.
CO410.2	Conduct the torsion test to determine the modulus of rigidity of given specimen.
CO410.3	Justify the Rockwell hardness test over with Brinell hardness and measure the hardness of the given specimen.
CO410.4	Examine the stiffness of the open coil and closed coil spring and grade them.
CO410.5	Analyze the microstructure and characteristics of specimen.
<b>SEMESTER V</b>	
<b>ME6501 Computer Aided Design</b>	
CO501.1	Describe the product cycle design process, sequential and concurrent Engineering.
CO501.2	Explain the various types of curves, patches and surfaces and the constructive solid geometry with Boundary representation techniques.
CO501.3	Apply the principle of visual realism for line, surface and solid removal algorithms and Explore the techniques involved in shading and coloring.
CO501.4	Assemble the machine parts in different interfacing of positions and orientation and Calculate the mass property in the assembly modeling.
CO501.5	Appraise the uses of standard for GKS and open GL library.

<b>ME6502 Heat and Mass Transfer</b>	
CO502.1	Explain the conduction mode with respect to various geometry.
CO502.2	Explain the concept of convection principle and estimate boundary layer for different flow types.
CO502.3	Apply the concept of heat transfer and design the heat exchangers.
CO502.4	Estimate radiation and heat transfer of different bodies with shape factor.
CO502.5	Explain the concept of mass transfer with different mass transfer correlations.
<b>ME6503 Design of Machine Elements</b>	
CO503.1	Calculate the steady stresses and variable stresses in various machine components.
CO503.2	Design the shafts, keys and couplings
CO503.3	Design the temporary and permanent joints
CO503.4	Design the energy storing elements and machine components.
CO503.5	Design of the hydrodynamic bearings
<b>ME6504 Metrology and Measurements</b>	
CO504.1	Discuss the measurement systems, units and dimensions, calibration and correction.
CO504.2	Explain the various linear and angular measurement systems and understand the concept of interchangeability
CO504.3	Describe the working principle of auto collimator, CMM and list the applications of them.
CO504.4	Explain the various form measurements like thread, gear, straightness, flatness, roundness and surface finish.
CO504.5	Discuss the working of miscellaneous measuring equipment for measuring temperature, velocity, pressure.
<b>ME6505 Dynamics of Machines</b>	
CO505.1	Infer the force-motion relationship in components subjected to external forces and its analysis.
CO505.2	Solve problems related to balancing of rotating and reciprocating masses.
CO505.3	Comprehend the effect of free vibrations.
CO505.4	Know the effect of dynamics of forced vibrations.
CO505.5	Extend the mechanism principles used for speed control and stability control.
<b>GE6075 Professional Ethics in Engineering</b>	
CO506.1	Distinguish between Moral and Ethics.
CO506.2	Summarize the moral theories and ethical inquiries.
CO506.3	Evaluate the result of the engineering projects by applying ethical theories.

PRINCIPAL


THAMIRABHARAN ENGINEERING COLLEGE

Chathirampudukottai Village,

Chidambaramagar - Veyankulam Road,

Thatchanallur, Tirunelveli - 627 353.

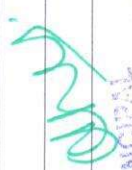


CO506.4	Discuss about professional rights, employ rights and intellectual property rights, safety and risk involved in engineering projects.
CO506.5	Judge the role of engineer in environmental issues, computer applications, weapons development, multinational corporations and Corporate Social Responsibility.
<b>ME6511 Dynamics Laboratory</b>	
CO507.1	Review the various types of gears, gear trains, kinematic mechanisms, and universal joints.
CO507.2	Estimate the mass moment of inertia of axisymmetric objects using Turn table apparatus, bi-filar suspension, compound pendulum and natural frequency for single and double rotor systems, equivalent spring mass system and transverse
CO507.3	Inspect the critical speed of shaft under the given load conditions and the gyroscopic effect and couple on motorized gyroscope.
CO507.4	Sketch the characteristic curves of Watt, Porter, Proell and Hartnell governors and motion curves for the given cam follower setup.
CO507.5	Examine the balancing of rotating masses in dynamic balancing machine.
<b>ME6512 Thermal Engineering Laboratory - II</b>	
CO508.1	Conduct a test to find thermal conductivity of various engineering materials.
CO508.2	Measure heat transfer rate in free and forced convection environment.
CO508.3	Measure emissivity of grey surface.
CO508.4	Measure the effectiveness of parallel and counter flow heat exchanger.
CO508.5	Measure COP of refrigeration and air conditioning system and performance of air compressor and fluidized bed cooling tower.
<b>ME6513 Metrology and Measurements Laboratory</b>	
CO509.1	Measure the linear and angular dimensions of given specimens.
CO509.2	Measure the form measurement parameters.
CO509.3	Measure the gear dimensions parameters.
CO509.4	Measure surface finish parameters.
CO509.5	Measure force, torque and tool geometry by using appropriate instruments.
<div style="text-align: right;">   <b>PRINCIPAL</b>  <b>THAMIRABHARANI ENGINEERING COLLEGE</b>            Chathirampudukottai Village,            Chidambaramagar - Vepernkulam Road,            Thatchanallur, Tirunelveli - 627 353         </div>	
<b>ME6601 Design of Transmission Systems</b>	
<b>SEMESTER – VI</b>	
CO601.1	Acquire knowledge the 2D and 3D transformations, clipping algorithm, Manufacturing models and Metrics.
CO601.2	Explain the fundamentals of parametric curves, surfaces and solids.

CO601.3	Summarize the different types of Standard systems used in CAD.
CO601.4	Apply NC & CNC programming concepts to develop part programme for Lathe & Milling Machines.
CO601.5	Summarize the different types of techniques used in Cellular Manufacturing and FMS.
<b>MG 6851 Principles of Management</b>	
CO602.1	Understand the evolution of management theories and organization culture.
CO602.2	Understand the concepts of planning, types and decision making ability with strategic planning.
CO602.3	Understand the concept of organization, departmentalization and activities of HR.
CO602.4	Understand individual and group behavior, motivational techniques and leadership qualities with effective communication.
CO602.5	Understand and control effectively budgetary and non-budgetary items using modern IT tools.
<b>ME6602 Automobile Engineering</b>	
CO603.1	Understand the various parts of the automobile and their functions and materials.
CO603.2	Explain the engine auxiliary systems and engine emission control.
CO603.3	Distinguish the working of different types of transmission systems.
CO603.4	Explain the Steering, Brakes and Suspension Systems.
CO603.5	Understand the possible alternate sources of energy for IC Engines.
<b>ME6603 Finite Element Analysis</b>	
CO604.1	Comprehend the need for Mathematical Modelling & Evaluation of Finite Element Method.
CO604.2	Solve One Dimensional Solid Mechanics, Heat Transfer & Vibration Problems.
CO604.3	Solve Two Dimensional Scalar Variable Problems using Finite Element Method ply finite element formulations to solve two dimensional scalar Problems.
CO604.4	Solve Two Dimensional Vector Variable Problems using Finite Element Method fields.
CO604.5	Formulate the ISO parametric element.
<b>ME6604 Gas Dynamics and Jet Propulsion</b>	
CO605.1	Discuss the basic difference between incompressible flow and compressible flow and the effect of Mach number on compressible flow.
CO605.2	Compare Fanno flow and Rayleigh flow and calculate the flow properties in Fanno flow and Rayleigh flow.
CO605.3	Compute the Prandtl Meyer equation for shock waves.
CO605.4	Compare the working of various jet engines and calculate thrust & efficiency in jet propulsion using gas dynamics principles.



CO605.5	Classify rocket engines and calculate efficiency in rocket propulsion.
<b>ME6004 Unconventional Machining Processes</b>	
CO606.1	Justify the needs of unconventional machining processes.
CO606.2	Explain the working principles of Mechanical Energy Based Processes and various process parameters influence on their performance.
CO606.3	Differentiate between Electric discharge machining and Wire cut Electric discharge machining.
CO606.4	Compare the chemical machining process with electro-chemical machining process.
CO606.5	Explain the working principles of thermal energy based processes.
<b>ME6611 CAD / CAM Laboratory</b>	
CO607.1	Work in CAD software and Design simple Components.
CO607.2	Work in CAM software and to program to machine simple components by manually.
CO607.3	Work in CAM software and to know computer aided part programming.
CO607.4	Expose students to modern control systems to control the CNC Machine Tool.
CO607.5	Know the application of various CNC machines like CNC lathe, CNC Vertical Machining center, CNC, EDM and CNC wire-cut and studying of Rapid prototyping.
<b>ME6612 Design and Fabrication Project</b>	
CO608.1	Identify the suitable project, technology to be adopted, rationale behind selection of technology and the objective(s) to be met by the project.
CO608.2	Work as a team in planning and execution of project work, preparation of review presentations and project report.
CO608.3	Apply relevant and appropriate knowledge of Engineering to achieve identified objectives of the project.
CO608.4	Create the tangible or intangible and demonstrable output at the end of the project either at our campus or in an industrial environment.
<b>GE6674 Communication and Soft Skills- Laboratory</b>	
CO609.1	Apply appropriate communication skills across settings, purposes, and audiences.
CO609.2	Demonstrate knowledge of communication theory and application.
CO609.3	Practice critical thinking to develop innovative and well-founded perspectives related to the students' emphases.
CO609.4	Build and maintain healthy and effective relationships. Use technology to communicate effectively in various settings and contexts.
CO609.5	Demonstrate appropriate and professional ethical behavior.

  
 PRINCIPAL  
 THIRUPARAI ENGINEERING COLLEGE  
 Chidambaram - Vepeinkulali Road,  
 Thatchanallur, Tirunelveli - 627 358.

# SEMESTER – VII

## ME6701 Power Plant Engineering

CO701.1	Apply the knowledge about Binary Cycles and Cogeneration systems in thermal power plant.
CO701.2	Classify the knowledge about layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.
CO701.3	Construct and analyze about nuclear power plants and its various types of reactor.
CO701.4	Illustrate about layout, construction and working of the components inside Renewable energy power plants.
CO701.5	Analyze power plant economics and environmental hazards.

## ME6702 Mechatronics

CO702.1	Acquire knowledge on the basic principles of mechatronics system and working of various sensors.
CO702.2	Acquire knowledge on 8085 microprocessor and 8051 micro controller system.
CO702.3	Comprehend the Programmable Peripheral Interface system and its application.
CO702.4	Gain knowledge of PLC system and its application.
CO702.5	Comprehend the various types of actuators and design of mechatronics system.

## ME6703 Computer Integrated Manufacturing Systems

CO703.1	Describe the elements of CIM system & an automated system, Production system and mathematical models of production performance & manufacturing control.
CO703.2	Discuss the use of computers in process planning, different aspects of planning system and control systems.
CO703.3	Solve the simple problems in part coding system in Group Technology and quantitative analysis in cellular manufacturing.
CO703.4	Discuss the flexible manufacturing system components, planning & control and Automated Guided Vehicle System.
CO703.5	Discuss the Robot anatomy, related attributes, and classification of robots, robot control systems and robot part programming.

## GE6757 Total Quality Management

CO704.1	Describe the dimensional barrier regarding Quality.
CO704.2	Summarize the Total quality principles.
CO704.3	Demonstrate the tools utilization for quality improvement
CO704.4	Analyze the various types of techniques are used to measure quality.
CO704.5	Apply the various quality systems in implementation of Total quality management.

## ME6005 Process Planning & Cost Estimation

CO705.1	Understand the process planning methods, process planning selection and evaluating parameters for drawing interpretation.
---------	---

PRINCE ENGINEERING COLLEGE

PRINCE ENGINEERING COLLEGE  
Chidambaram - Vopenturam Road,  
Chidambaram - 627 358.  
Chidambaram, Tirunelveli.



CO705.2	Calculate the process parameters for various production processes and its economics.
CO705.3	Know the procedure for preparing the cost estimation.
CO705.4	Solve problems in the calculation of cost of different types of jobs.
CO705.5	Calculate the time required for various machining operations.
<b>ME6012 Maintenance Engineering</b>	
CO706.1	Understand the principles and objectives of Maintenance Engineering.
CO706.2	Describe the various categories of maintenance.
CO706.3	Discuss various condition monitoring techniques.
CO706.4	Explain the repair methods of beds and slide ways.
CO706.5	Explain the repair methods of material handling equipments.
<b>ME6711 Simulation and Analysis Laboratory</b>	
CO707.1	Work in MATLAB software and solve simple problems in vibration.
CO707.2	Simulate mechanisms using multi body dynamics software.
CO707.3	Perform force and stress analysis of various components and beams.
CO707.4	Analyze thermal stress and heat transfer of plates and cylindrical shells.
CO707.5	Perform dynamic analysis of various components and beams.
<b>ME6712 Mechatronics Laboratory</b>	
CO708.1	Work in Controller and to know Assembly level language of 8085 processor.
CO708.2	Study operations of PLC.
CO708.3	Study Image processing technique.
CO708.4	Design, model & analyse the basic electrical, hydraulic & pneumatic Systems.
CO708.5	Design a mechatronics system with the help of Microprocessor, PLC and other electrical and Electronics Circuits.
<b>ME 6713 Comprehension</b>	
CO709.1	Understand and comprehend any given problem related to mechanical engineering field.
<b>SEMESTER – VIII</b>	
<b>ME 6863 Engineering Economics</b>	
CO801.1	Learn basics of Engineering Economics and optimum costing.
CO801.2	Understand Value Engineering and Time Value of Money.

PRINCIPAL

THAMRABHARANI ENGINEERING COLLEGE

Chattiramipudukottam Village,

Chidambaram Road,

Thatchanallur, Tiruvellore - 607 352.

CO801.3	Differentiate Cash Dominated and Revenue Dominated Cash flow.
CO801.4	Apply suitable cash flow methods for different Situations.
CO801.5	Apply Depreciation methods for Individual/Industrial/Public Alternatives.
<b>IE6605 Production Planning and Control</b>	
CO802.1	Describe the functions of production control, various production system, different aspects of product development and break even analysis.
CO802.2	Describe the concept of Method study, Motion study and work measurement techniques.
CO802.3	Perform the analysis of problems in lack of product planning, quantity determination in batch production and analysis of process capabilities in a multi product system.
CO802.4	Discuss about production scheduling, production control systems, progress reporting & expediting and techniques for aligning completion times & due dates.
CO802.5	Calculate the economic order quantity & economic lot size in inventory control.
<b>ME6016 Advanced I.C. Engines</b>	
CO803.1	Explain fuel injection systems in SI engine, types of combustion chamber and combustion process.
CO803.2	Explain different types of fuel injection system and combustion chambers of CI engine.
CO803.3	Explain the mechanism of pollution formation and the evolution of emission norms.
CO803.4	Describe the properties of various alternative fuels, engine modification required and emission characteristic of alternative fuels.
CO803.5	Discuss various ignition methods used in I.C engine and electronic engine management system.
<b>ME6811- Project Work</b>	
CO804.1	Develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same.
CO804.2	Discover new method to solve the related problems.
CO804.3	Apply the engineering knowledge in solving the problem.
CO804.4	Agree and work as a team to come to a common conclusion.

PRINCIPAL

THAMIRABHARANI ENGINEERING COLLEGE

Chathirampuduthur Village,  
Chidambaram Road,

Chidambaram - 627 353.

Thatchanallur, Tirunelveli - 627 353.