CHENDHURAN
COLLEGE OF ENGINEERING AND TECHNOLOGY

Pilivalam (Po), Thirumayam (Tk), Pudukkottai (Dt.) – 622 507.
(An ISO 9001: 2008 Certified Institution) Accredited by NAAC with B+ Grade
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Program Outcomes, Program Specific Outcomes and Course Outcomes

Department of Civil Engineering

Department of Civil Engineering	After successful completion of four year degree program in Department of Civil Engineering
Programme Outcomes	1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. 2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. 3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. 4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. 5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. 6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. 7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. 8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

	9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
	10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
	11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
	12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
Programme Specific Outcomes	1. To prepare students for successful careers in Civil Engineering field that meets the needs
	2. To develop the confidence and ability among students to synthesize data and technical concepts and thereby apply it in real world problems.
	3. To develop students to use modern techniques, skill and mathematical engineering tools for solving problems in Civil Engineering.
	4. To provide students with a sound foundation in mathematical, scientific and engineering fundamentals necessary to formulate, solve and analyse engineering problems and to prepare them for graduate studies.
	5. To promote students to work collaboratively on multi-disciplinary projects and make them engage in life-long learning process throughout their professional life.

Course Outcomes : Civil Engineering Semester-I	
Course	**Outcomes** After completion of these courses students should be able to;
HS8151 : Communicative English	- Read articles of a general kind in magazines and newspapers. - Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English. - Comprehend conversations and short talks delivered in English - Write short essays of a general kind and personal letters and emails in English
MA8151 Engineering Mathematics – I	- Use both the limit definition and rules of differentiation to differentiate functions. - Apply differentiation to solve maxima and minima problems. - Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus. Apply integration to compute multiple integrals, area, volume, integrals in polar - Coordinates, in addition to change of order and change of variables. Evaluate integrals using techniques of integration, such as substitution, partial fractions - Integration by parts. Determine convergence/divergence of improper integrals and evaluate convergent Improper integrals. - Apply various techniques in solving differential equations.
PH8151 Engineering Physics	- The students will gain knowledge on the basics of properties of matter and its applications, - The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics, - The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers. - The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and - The students will understand the basics of crystals, their structures and different crystal growth techniques.

CY8151 Engineering Chemistry	• The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.
GE8151 Problem Solving and Python Programming	• Develop algorithmic solutions to simple computational problems Read, write, execute by hand simple Python programs • Structure simple Python programs for solving problems. • Decompose a Python program into functions. • Represent compound data using Python lists, tuples, dictionaries. • Read and write data from/to files in Python Programs.
GE8152 Engineering Graphics	• Familiarize with the fundamentals and standards of Engineering graphics perform freehand sketching of basic geometrical constructions and multiple views of objects. project orthographic projections of lines and plane surfaces • Draw projections and solids and development of surfaces. • Visualize and to project isometric and perspective sections of simple solids.
GE8161 Problem Solving and Python Programming Laboratory	• Write, test, and debug simple Python programs. • Implement Python programs with conditionals and loops. • Develop Python programs step-wise by defining functions and calling them. • Use Python lists, tuples, dictionaries for representing compound data. • Read and write data from/to files in Python .
BS8161 Physics and Chemistry Laboratory	• Apply principles of elasticity, optics and thermal properties for engineering applications. • The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.
Course Outcomes: Civil Engineering Semester-II	
HS8251 Technical English	• Read technical texts and write area- specific texts effortlessly. Listen and comprehend lectures and talks in their area of specialization successfully.

	• Speak appropriately and effectively in varied formal and informal contexts. • Write reports and winning job applications.
MA8251 Engineering Mathematics – II	• Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices. Gradient, divergence and curl of a vector point function and related identities. • Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification. • Analytic functions, conformal mapping and complex integration. • Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.
PH8201 Physics For Civil Engineering	• The students will have knowledge on the thermal performance of buildings, • The students will acquire knowledge on the acoustic properties of buildings, • The students will get knowledge on various lighting designs for buildings, • The students will gain knowledge on the properties and performance of engineering materials, and • The students will understand the hazards of buildings.
BE8251 Basic Electrical and Electronics Engineering	• Ability to identify the electrical components and explain the characteristics of electrical machines. • Ability to identify electronics components and understand the characteristics
GE8291 Environmental Science and Engineering	• Environmental Pollution or problems cannot be solved by mere laws. • Public participation is an important aspect which serves the environmental Protection. • One will obtain knowledge on the following after completing the course. • Public awareness of environmental is at infant stage. • Ignorance and incomplete knowledge has lead to misconceptions • Development and improvement in std. of living has lead to serious environmental disasters

GE8292 Engineering Mechanics	• Illustrate the vectorial and scalar representation of forces and moments analyse the rigid body in equilibrium Evaluate the properties of surfaces and solids • Calculate dynamic forces exerted in rigid body • Determine the friction and the effects by the laws of friction
GE8261 Engineering Practices Laboratory	• Fabricate carpentry components and pipe connections including plumbing works. use welding equipments to join the structures. • Carry out the basic machining operations • Make the models using sheet metal works • Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings • Carry out basic home electrical works and appliances • Measure the electrical quantities • Elaborate on the components, gates, soldering practices.
CE8211 Computer Aided Building Drawing	• The students will be able to draft the plan, elevation and sectional views of the buildings, industrial structures, and framed buildings using computer softwares.
Course Outcomes: Civil Engineering **Semester-III**	
MA8353 Transforms and Partial Differential Equations	• Understand how to solve the given standard partial differential equations. • Solve differential equations using Fourier series analysis which plays a vital role in engineering applications. • Appreciate the physical significance of Fourier series techniques in solving one and two • Dimensional heat flow problems and one dimensional wave equations. • Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering. • Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.
CE8301 Strength of Materials	• Understand the concepts of stress and strain, principal stresses and principal planes.

	• Determine Shear force and bending moment in beams and understand concept of theory of simple bending. • Calculate the deflection of beams by different methods and selection of method for determining slope or deflection. • Apply basic equation of torsion in design of circular shafts and helical springs. • Analyze the pin jointed plane and space trusses
CE8302 Fluid Mechanics	• Get a basic knowledge of fluids in static, kinematic and dynamic equilibrium. • Understand and solve the problems related to equation of motion. • Gain knowledge about dimensional and model analysis. • Learn types of flow and losses of flow in pipes. • Understand and solve the boundary layer problems.
CE8351 Surveying	• The student will be able to understand the use of various surveying instruments and mapping • Measuring Horizontal angle and vertical angle using different instruments • Methods of Leveling and setting Levels with different instruments • Concepts of astronomical surveying and methods to determine time, longitude, latitude and azimuth • Concept and principle of modern surveying.
CE8391 Construction Materials	• Compare the properties of most common and advanced building materials. • Understand the typical and potential applications of lime, cement and aggregates • Know the production of concrete and also the method of placing and making of concrete elements. • Understand the applications of timbers and other materials • Understand the importance of modern material for construction.
CE8392 Engineering Geology	• Will be able to understand the importance of geological knowledge such as earth, earthquake, volcanism and the action of various geological agencies.

	• Will get basics knowledge on properties of minerals. • Gain knowledge about types of rocks, their distribution and uses. • Will understand the methods of study on geological structure. • Will understand the application of geological investigation in projects such as dams, tunnels, bridges, roads, airport and harbor
CE8311 Construction Materials Laboratory	• The students will have the required knowledge in the area of testing of construction materials and components of construction elements experimentally
CE8361 Surveying Laboratory	• Students completing this course would have acquired practical knowledge on handling basic survey instruments including Theodolite, Tacheometry, Total Station and GPS and • Have adequate knowledge to carryout Triangulation and Astronomical surveying including general field marking for various engineering projects and Location of site etc.
HS8381 Interpersonal Skills/ Listening & Speaking	• Listen and respond appropriately. • Participate in group discussions • Make effective presentations • Participate confidently and appropriately in conversations both formal and informal
Course Outcomes : Civil Engineering **Semester-IV**	
MA8491-Numerical Methods	• Understand the basic concepts and techniques of solving algebraic and transcendental equations. • Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations. • Apply the numerical techniques of differentiation and integration for engineering problems. • Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations. • Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

CE8401- Construction Techniques and Practices	• Know the different construction techniques and structural systems • Understand various techniques and practices on masonry construction, flooring, and roofing. • Plan the requirements for substructure construction. • Know the methods and techniques involved in the construction of various types of super structures • Select, maintain and operate hand and power tools and equipment used in the building construction sites.
CE8402 Strength of Materials-II	• Determine the strain energy and compute the deflection of determinate beams, frames and trusses using energy principles. • Analyze propped cantilever, fixed beams and continuous beams using theorem of three moment equation for external loadings and support settlements. • Find the load carrying capacity of columns and stresses induced in columns and cylinders • Determine principal stresses and planes for an element in three dimensional state of stress and study various theories of failure • Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and find the stresses in curved beams.
CE8403 Applied Hydraulic Engineering	• Apply their knowledge of fluid mechanics in addressing problems in open channels. • Able to identify a effective section for flow in different cross sections. • To solve problems in uniform, gradually and rapidly varied flows in steady state conditions. • Understand the principles, working and application of turbines. • Understand the principles, working and application of pumps.
CE8404 Concrete Technology	• The various requirements of cement, aggregates and water for making concrete • The effect of admixtures on properties of concrete • The concept and procedure of mix design as per IS method • The properties of concrete at fresh and hardened state • The importance and application of special concretes.

CE8491 Soil Mechanics	- Classify the soil and assess the engineering properties, based on index properties. - Understand the stress concepts in soils - Understand and identify the settlement in soils. - Determine the shear strength of soil - Analyze both finite and infinite slopes.
CE8481 Strength of Materials Laboratory	The students will have the required knowledge in the area of testing of materials and components of structural elements experimentally.
CE8461 Hydraulic Engineering Laboratory	- The students will be able to measure flow in pipes and determine frictional losses. - The students will be able to develop characteristics of pumps and turbines.
HS8461 Advanced Reading and Writing	- Write different types of essays. - Write winning job applications. - Read and evaluate texts critically. - Display critical thinking in various professional contexts.

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Course Outcomes: Civil Engineering

Semester-V

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CE6501 Structural Analysis I	- Analysis trusses, frames and arches - Analyse structures for moving loads and - Will be conversant with classical methods of analysis.
CE6502 Foundation Engineering	Students will have the ability to select type of foundation required for the soil at a place and able to design shallow, foundation, deep foundation and retaining structures.
CE6504 Highway Engineering	The students completing this course would have acquired knowledge on planning, design, construction and maintenance of highways as per IRC standards and other methods.
CE6505 Design of Reinforced Concrete Elements	The student shall be in a position to design the basic elements of reinforced concrete structures.
CE6506 Construction Techniques, Equipment and Practice	- Students completing the course will have understanding of different construction techniques, practices and equipments. - They will be able to plan the requirements for substructure and superstructure a construction.
GE6674 Communication and Soft Skills	- Take international examination such as IELTS and TOEFL - Make presentations and Participate in Group Discussions. - Successfully answer questions in interviews.

CE6511 Soil Mechanics Laboratory	• Students know the techniques to determine index properties and engineering properties such as shear strength, compressibility and permeability by conducting appropriate tests.
CE6512 Survey Camp	• Students completing this course would have acquired practical knowledge on handling basic survey instruments including Theodolite, Tacheometry, Total Station and GPS and have adequate knowledge to carryout Triangulation and Astronomical surveying including general field marking for various engineering projects and Location of site etc

Course Outcomes: Civil Engineering	
Semester-VI	
CE6601 Design of Reinforced Concrete & Brick Masonry Structures	• The student shall have a comprehensive design knowledge related to various structural systems.
CE6602 Structural Analysis II	• The student will have the knowledge on advanced methods of analysis of structures including space and cable structures.
CE6603 Design of Steel Structures	• The students would have knowledge on the design of structural steel members subjected to compressive, tensile and bending forces, as per current code and also know to design structural systems such as roof trusses and gantry girders.
CE6604 Railways, Airports and Harbour Engineering	• The students will have the ability to Plan and Design various civil Engineering aspects of Railways, Airports and Harbour.
CE6605-Environmental Engineering II	• Ability to estimate sewage generation and design sewer system including sewage pumping stations • Required understanding on the characteristics and composition of sewage, self purification of streams • Ability to perform basic design of the unit operations and processes that are used in sewage treatment.
CE6002 Concrete Technology	• The student will possess the knowledge on properties of materials required for concrete tests on those materials and design procedures for making conventional and special concretes.
CE6611 Environmental Engineering Laboratory	• Characterize wastewater and conduct treatability studies.
CE6612 Concrete and Highway Engineering Laboratory	• Student knows the techniques to characterize various pavement materials through relevant tests.

Course Outcomes: Civil Engineering	
Semester-VII	
CE6701 Structural Dynamics and Earthquake Engineering	• Student will have the knowledge to analyse structures subjected to dynamic loading and to design the structures for seismic loading as per code provisions.
CE6702 Prestressed Concrete Structures	• Student shall have a knowledge on methods of prestressing and able to design various prestressed concrete structural elements.
CE6703 Water Resources and Irrigation Engineering	• The students will have knowledge and skills on Planning, design, operation and management of reservoir system. • The student will gain knowledge on different methods of irrigation including canal irrigation.
CE6704 Estimation and Quantity Surveying	• The student shall be able to estimate the material quantities, prepare a bill of quantities, make specifications and prepare tender documents. • Student shall be able to prepare value estimates.
CE6007 Housing Planning and Management	• The students should have a comprehensive knowledge of planning, design, evaluation, construction and financing of housing projects.
EN6501 Municipal Solid Waste Management	• An understanding of the nature and characteristics of municipal solid wastes and the regulatory requirements regarding municipal solid waste management • Ability to plan waste minimisation and design storage, collection, transport, processing and disposal of municipal solid waste
CE6711 Computer Aided Design and Drafting Laboratory	• The student acquires hands on experience in design and preparation of structural drawings for concrete / steel structures normally encountered in Civil Engineering practice.
CE6712- Design Project	• Students will have a better experience in designing various design problems related to Civil Engineering.
Course Outcomes: Civil Engineering **Semester-VIII**	
G6851 Principles of Management	• Students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management

CE6016 Prefabricated Structures	- The student shall be able to design some of the prefabricated elements and also have the knowledge of the construction methods in using these elements.
CE6021- Repair And Rehabilitation Structures	- Students must gained knowledge on quality of concrete, durability aspects, causes of deterioration, assessment of distressed structures, repairing of structures and demolition procedures.
CE6811 Project Work	- Students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

Department of Computer Science and Engineering

Department of Computer Science and Engineering	
Department of Computer Science and Engineering	After Successful Completion of four year degree program in computer science and Engineering
Program Outcomes	1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. 2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. 3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. 4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

	5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. 6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. 7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. 8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. 9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. 10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. 11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. 12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
Program Specific Outcomes	1. To analyze, design and develop solutions by applying foundational concepts of Computer Science engineering.

	2. To apply software engineering principles and practices for developing quality software for scientific and business applications.
	3. To adapt to emerging information and communication technologies (ICT) to innovate ideas and solutions to existing/novel problems.

Course Outcomes: Computer Science and Engineering Semester-I	
Course	**Outcomes** At the end of the course, students would be able to
HS8151 Communicative English	• Read articles of a general kind in magazines and newspapers. • Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English. • Comprehend conversations and short talks delivered in English • Write short essays of a general kind and personal letters and emails in English.
MA8151 Engineering Mathematics – I	• Use both the limit definition and rules of differentiation to differentiate functions. • Apply differentiation to solve maxima and minima problems. • Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus. • Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables. • Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts. • Determine convergence/divergence of improper integrals and evaluate convergent improper integrals. • Apply various techniques in solving differential equations.
PH8151 Engineering Physics	• The students will gain knowledge on the basics of properties of matter and its applications, • The students will acquire knowledge on the concepts of waves and optical devices and their applications in fiber optics.

	• The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers, • The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and • The students will understand the basics of crystals, their structures and different crystal growth techniques.
CY8151 Engineering Chemistry	• The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.
GE8151 Problem Solving and Python Programming	• Develop algorithmic solutions to simple computational problems • Read, write, execute by hand simple Python programs. • Structure simple Python programs for solving problems. • Decompose a Python program into functions. • Represent compound data using Python lists, tuples, dictionaries. • Read and write data from/to files in Python Programs.
GE8152 Engineering Graphics	• Familiarize with the fundamentals and standards of Engineering graphics • Perform freehand sketching of basic geometrical constructions and multiple views of objects. • Project orthographic projections of lines and plane surfaces. • Draw projections and solids and development of surfaces. • Visualize and to project isometric and perspective sections of simple solids.
BS8161 Physics and Chemistry Laboratory	• Apply principles of elasticity, optics and thermal properties for engineering applications. • The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters

Course Outcomes: Computer Science and Engineering	
Semester-II	
HS8251 Technical English	• Read technical texts and write area- specific texts effortlessly. • Listen and comprehend lectures and talks in their area of specialisation successfully. • Speak appropriately and effectively in varied formal and informal contexts. • Write reports and winning job applications.
MA8251 Engineering Mathematics – II	• Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices. • Gradient, divergence and curl of a vector point function and related identities. • Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification. • Analytic functions, conformal mapping and complex integration. • Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.
PH8252 Physics for Information Science	• Gain knowledge on classical and quantum electron theories, and energy band structures, • Acquire knowledge on basics of semiconductor physics and its applications in various devices, • Get knowledge on magnetic properties of materials and their applications in data storage, • Have the necessary understanding on the functioning of optical materials for optoelectronics, • Understand the basics of quantum structures and their applications in carbon electronics.
BE8255 Basic Electrical, Electronics and Measurement Engineering	• Discuss the essentials of electric circuits and analysis. • Discuss the basic operation of electric machines and transformers • Introduction of renewable sources and common domestic loads. • Introduction to measurement and metering for electric circuits.
GE8291 Environmental Science and Engineering	• Public awareness of environmental is at infant stage.

	• Ignorance and incomplete knowledge has lead to misconceptions • Development and improvement in std. of living has lead to serious environmental disasters
CS8251 Programming in C	• Develop simple applications in C using basic constructs • Design and implement applications using arrays and strings • Develop and implement applications in C using functions and pointers. • Develop applications in C using structures. • Design applications using sequential and random access file processing.
GE8261 Engineering Practices Laboratory	• Fabricate carpentry components and pipe connections including plumbing works • Use welding equipments to join the structures. • Carry out the basic machining operations • Make the models using sheet metal works • Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings • Carry out basic home electrical works and appliances Measure the electrical quantities • Elaborate on the components, gates, soldering practices.
CS8261 C Programming Laboratory	• Develop C programs for simple applications making use of basic constructs, arrays and strings. • Develop C programs involving functions, recursion, pointers, and structures. • Design applications using sequential and random access file processing.
Course Outcomes : Computer Science and Engineering **Semester-III**	
MA8351 Discrete Mathematics	• Have knowledge of the concepts needed to test the logic of a program. • Have an understanding in identifying structures on many levels. • 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. • Be aware of the counting principles. • Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.

Course	Outcomes
CS8351 Digital Principles and System Design	• Simplify Boolean functions using K Map • Design and Analyze Combinational and Sequential Circuits • Implement designs using Programmable Logic Devices • Write HDL code for combinational and Sequential Circuits
CS8391 Data Structures	• Implement abstract data types for linear data structures. • Apply the different linear and non-linear data structures to problem solutions. • Critically analyze the various sorting algorithms.
CS 8392 Object Oriented Programming	• Develop and implement Java programs for simple applications that make use of classes, packages and interfaces. • Develop and implement Java programs with array list, exception handling and multi Threading. • Design applications using file processing, generic programming and event handling.
EC8395 Communication Engineering	• Ability to comprehend and appreciate the significance and role of this course in the present contemporary world • Apply analog and digital communication techniques. • Use data and pulse communication techniques. • Analyze Source and Error control coding.
CS8381 Data Structures Laboratory	• Write functions to implement linear and non-linear data structure operations • Suggest appropriate linear / non-linear data structure operations for solving a given problem • Appropriately use the linear / non-linear data structure operations for a given problem • Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval.
CS8383 Object Oriented Programming Laboratory	• Develop and implement Java programs for simple applications that make use of classes, packages and interfaces. • Develop and implement Java programs with array list, exception handling and multi threading.

	• Design applications using file processing, generic programming and event handling.
CS8382 Digital Systems Laboratory	• Implement simplified combinational circuits using basic logic gates • Implement combinational circuits using MSI devices • Implement sequential circuits like registers and counters • Simulate combinational and sequential circuits using HDL
HS8381 Interpersonal Skills / Listening&Speaking	• Listen and respond appropriately. • Participate in group discussions • Make effective presentations • Participate confidently and appropriately in conversations both formal and informal

Course Outcomes : Computer Science and Engineering	
Semester-IV	
MA8402 Probability and Queueing Theory	• Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon. • Understand the basic concepts of one and two dimensional random variables and apply in engineering applications. • Apply the concept random processes in engineering disciplines. • Acquire skills in analyzing queuing models. • Understand and characterize phenomenon which evolve with respect to time in a probabilistic manner
CS8491 Computer Architecture	• Understand the basics structure of computers, operations and instructions. • Design arithmetic and logic unit. • Understand pipelined execution and design control unit. • Understand parallel processing architectures. • Understand the various memory systems and I/O communication.
CS8492 Database Management Systems	• Classify the modern and futuristic database applications based on size and complexity • Map ER model to Relational model to perform database design effectively • Write queries using normalization criteria and optimize queries • Compare and contrast various indexing strategies in different database systems

	• Appraise how advanced databases differ from traditional databases.
CS8451 Design and Analysis of Algorithms	• Design algorithms for various computing problems. • Analyze the time and space complexity of algorithms. • Critically analyze the different algorithm design techniques for a given problem. • Modify existing algorithms to improve efficiency.
CS8493 Operating Systems	• Analyze various scheduling algorithms. • Understand deadlock, prevention and avoidance algorithms. • Compare and contrast various memory management schemes. • Understand the functionality of file systems. • Perform administrative tasks on Linux Servers. • Compare iOS and Android Operating Systems.
CS8494 Software Engineering	• Identify the key activities in managing a software project. • Compare different process models. • Concepts of requirements engineering and Analysis Modeling. • Apply systematic procedure for software design and deployment. • Compare and contrast the various testing and maintenance. • Manage project schedule, estimate project cost and effort required.
CS8481 Database Management Systems Laboratory	• Use typical data definitions and manipulation commands. • Design applications to test Nested and Join Queries • Implement simple applications that use Views • Implement applications that require a Front-end Tool • Critically analyze the use of Tables, Views, Functions and Procedures.
CS8461 Operating Systems Laboratory	• Compare the performance of various CPU Scheduling Algorithms • Implement Deadlock avoidance and Detection Algorithms • Implement Semaphores • Create processes and implement IPC

	• Analyze the performance of the various Page Replacement Algorithms • Implement File Organization and File Allocation Strategies
HS8461 Advanced Reading and Writing	• Write different types of essays. • Write winning job applications. • Read and evaluate texts critically. • Display critical thinking in various professional contexts.

<table>
<tr><td colspan="2" align="center">Course Outcomes :Computer Science Engineering
Semester-V</td></tr>
<tr><td>MA6566 Discrete Mathematics</td><td>• Have knowledge of the concepts needed to test the logic of a program.
• Have an understanding in identifying structures on many levels.
• 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.
• Be aware of the counting principles.
• Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.</td></tr>
<tr><td></td><td>• Implement Java programs.
• Create a basic website using HTML and Cascading Style Sheets.
• Design and implement dynamic web page with validation using JavaScript objects and by applying different event handling mechanisms.
• Design rich client presentation using AJAX.
• Design and implement simple web page in PHP, and to present data in XML format.
• Design and implement server side programs using Servlets and JSP.</td></tr>
<tr><td>CS6502 Object Oriented Analysis and Design</td><td>• Design and implement projects using OO concepts.
• Use the UML analysis and design diagrams.
• Apply appropriate design patterns.
• Create code from design.
• Compare and contrast various testing techniques.</td></tr>
<tr><td>CS6503 Theory of Computation</td><td>• Design Finite State Machine, Pushdown Automata, and Turing Machine.
• Explain the Decidability or Undesirability of various problems</td></tr>
<tr><td>CS6504 Computer Graphics</td><td>• Design two dimensional graphics.
• Apply two dimensional transformations.</td></tr>
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	• Design three dimensional graphics. • Apply three dimensional transformations. • Apply Illumination and color models. • Apply clipping techniques to graphics. • Design animation sequences.
CS6511 Case Tools Laboratory	• Design and implement projects using OO concepts. • Use the UML analysis and design diagrams. • Apply appropriate design patterns. • Create code from design. • Compare and contrast various testing techniques.
CS6512 Internet Programming Laboratory	• Design Web pages using HTML/XML and style sheets • Create user interfaces using Java frames and applets. • Create dynamic web pages using server side scripting. • Write Client Server applications. • Use the frameworks JSP Strut, Hibernate, spring. • Create applications with AJAX.
CS6513 Computer Graphics Laboratory	• Create 3D graphical scenes using open graphics library suits • Implement image manipulation and enhancement Create 2D animations using tools.
Course Outcomes: Computer Science and Engineering **Semester-VI**	
CS6601 Distributed Systems	• Discuss trends in Distributed Systems. • Apply network virtualization. • Apply remote method invocation and objects. • Design process and resource management systems.
IT6601 Mobile Computing	• Explain the basics of mobile telecommunication system • Choose the required functionality at each layer for given application • Identify solution for each functionality at each layer • Use simulator tools and design Ad hoc networks. • Develop a mobile application.
CS6660 Compiler Design	• Design and implement a prototype compiler. • Apply the various optimization techniques. • Use the different compiler construction tools.

IT6502 Digital Signal Processing	• Perform frequency transforms for the signals. • Design IIR and FIR filters. • Finite word length effects in digital filters.
CS6659 Artificial Intelligence	• Identify problems that are amenable to solution by AI methods. • Identify appropriate AI methods to solve a given problem. • Formalize a given problem in the language/framework of different AI methods. • Implement basic AI algorithms. • Design and carry out an empirical evaluation of different algorithms on a problem formalization, and state the conclusions that the evaluation supports.
IT6004 Software Testing	• Design test cases suitable for a software development for different domains. • Identify suitable tests to be carried out. • Prepare test planning based on the document. • Document test plans and test cases designed. • Use automatic testing tools. • Develop and validate a test plan.
CS6611 Mobile Application Development Laboratory	• Design and Implement various mobile applications using emulators. Deploy applications to hand-held devices.
CS6612 Compiler Laboratory	• Implement the different Phases of compiler using tools • Analyze the control flow and data flow of a typical program • Optimize a given program • Generate an assembly language program equivalent to a source language program.
GE6674 Communication and Soft Skills-Laboratory Based	• Take international examination such as IELTS and TOEFL • Make presentations and Participate in Group Discussions. • Successfully answer questions in interviews.
Course Outcomes : Computer Science and Engineering **Semester-VII**	
CS6701 Cryptography and Network Security	• Compare various Cryptographic Techniques • Design Secure applications • Inject secure coding in the developed applications.
CS6702 Graph Theory and Applications	• Write precise and accurate mathematical definitions of objects in graph theory.

	• Use mathematical definitions to identify and construct examples and to distinguish examples from non-examples. • Validate and critically assess a mathematical proof. • Use a combination of theoretical knowledge and independent mathematical thinking in creative investigation of questions in graph theory. • Reason from definitions to construct mathematical proofs.
CS6703 Grid and Cloud Computing	• Apply grid computing techniques to solve large scale scientific problems. • Apply the concept of virtualization. • Use the grid and cloud tool kits. • Apply the security models in the grid and the cloud environment.
CS6704 Resource Management Techniques	• Solve optimization problems using simplex method. • Apply integer programming and linear programming to solve real-life applications. • Use PERT and CPM for problems in project management
CS6003 Ad Hoc and Sensor Networks	• Explain the concepts, network architectures and applications of ad hoc and wireless sensor networks • Analyze the protocol design issues of ad hoc and sensor networks • Design routing protocols for ad hoc and wireless sensor networks with respect to some protocol design issues • Evaluate the QoS related performance measurements of ad hoc and sensor networks.
CS6007 Information Retrieval	• Apply information retrieval models. • Design Web Search Engine. • Use Link Analysis. • Use Hadoop and Map Reduce. • Apply document text mining techniques.
CS6711 Security Laboratory	• Implement the cipher techniques • Develop the various security algorithms • Use different open source tools for network security and analysis.
CS6712 Grid and Cloud Computing Laboratory	• Use the grid and cloud tool kits. • Design and implement applications on the Grid. • Design and Implement applications on the Cloud.

Course Outcomes : Computer Science and Engineering	
Semester-VIII	
CS6801 Multi-Core Architectures and Programming	• Program Parallel Processors. • Develop programs using OpenMP and MPI. • Compare and contrast programming for serial processors and programming for parallel processors.
CS6010 Social Network Analysis	• Develop semantic web related applications. • Represent knowledge using ontology. • Predict human behavior in social web and related communities. • Visualize social networks.
MG6088 Software Project Management	• At the end of the course the students will be able to practice Project Management principles while developing software.
CS6811 Project Work	• On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

Department of Electrical and Electronics Engineering

Department of Electrical and Electronics Engineering	After successful completion of four year degree program in Department of Electrical and Electronics Engineering
Program Outcomes	**1. Engineering knowledge**: Apply the Mathematical knowledge and the basics of Science and Engineering to solve the pertaining to Electronics and Instrumentation Engineering problems. **2. Problem analysis**: Identify and formulate Electrical and Electronics Engineering problems from research literature and be ability to analyze the problem using first principles of Mathematics and Engineering Sciences. **3. Design/development of solutions**: Come out with solutions for the complex problems and to design system components or process that fulfill the particular needs taking into account public health and safety and the social, cultural and environmental issues.

	4. Conduct investigations of complex problems: Draw well-founded conclusions applying the knowledge acquired from research and research methods including design of experiments, analysis and interpretation of data and synthesis of information and to arrive at significant conclusion.
	5. Modern tool usage: Form, select and apply relevant techniques, resources and Engineering and IT tools for Engineering activities like electronic prototyping, modeling and control of systems and also being conscious of the limitations.
	6. The engineer and society: Understand the role and responsibility of the Professional Electrical and Electronics Engineer and to assess societal, health, safety issues based on the reasoning received from the contextual knowledge.
	7. Environment and sustainability: Be aware of the impact of professional Engineering solutions in societal and environmental contexts and exhibit the knowledge and the need for Sustainable Development.
	8. Ethics: Apply the principles of Professional Ethics to adhere to the norms of the engineering practice and to discharge ethical responsibilities.
	9. Individual and team work: Function actively and efficiently as an individual or a member/leader of different teams and multidisciplinary projects.
	10. Communication: Communicate efficiently the engineering facts with a wide range of engineering community and others, to understand and prepare reports and design documents; to make effective presentations and to frame and follow instructions.
	11. Project management and finance: Demonstrate the acquisition of the body of engineering knowledge and insight and Management Principles and to apply them as member / leader in teams and multidisciplinary environments.
	12. Life-long learning: Recognize the need for self and life-long learning, keeping pace with technological challenges in the broadest sense.

Program Specific Outcomes	1. Apply the fundamental knowledge of mathematics, science, electrical and electronics engineering to analyse and solve the complex problems in electrical, electronics and allied interdisciplinary areas. 2. Design, develop and implement electrical and electronics and allied interdisciplinary projects to meet the demands of industry and to provide solutions to the current real time problems.

Course Outcomes: Electrical and Electronics Engineering

Semester-I

Course	Outcomes After completion of these courses students should be able to;
HS8151 Communicative English	• Read articles of a general kind in magazines and newspapers. • Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English. • Comprehend conversations and short talks delivered in English • Write short essays of a general kind and personal letters and emails in English.
MA8151 Engineering Mathematics - I	• Use both the limit definition and rules of differentiation to differentiate functions. • Apply differentiation to solve maxima and minima problems. • Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus. • Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables. • Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts. • Determine convergence/divergence of improper integrals and evaluate convergent improper integrals. • Apply various techniques in solving differential equations.

PH8151 Engineering Physics	• The students will gain knowledge on the basics of properties of matter and its applications, • The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics, • The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers, • The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and • The students will understand the basics of crystals, their structures and different crystal growth techniques
CY8151 Engineering Chemistry	• The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.
GE8151 Problem Solving and Python Programming	• Develop algorithmic solutions to simple computational problems • Read, write, execute by hand simple Python programs. • Structure simple Python programs for solving problems. • Decompose a Python program into functions. • Represent compound data using Python lists, tuples, dictionaries. • Read and write data from/to files in Python Programs.
GE8152 Engineering Graphics	• Familiarize with the fundamentals and standards of Engineering graphics • Perform freehand sketching of basic geometrical constructions and multiple views of objects. • Project orthographic projections of lines and plane surfaces. • Draw projections and solids and development of surfaces. • Visualize and to project isometric and perspective sections of simple solids.
GE8161 Problem Solving and Python Programming G Laboratory	• Write, test, and debug simple Python programs. • Implement Python programs with conditionals and loops. • Develop Python programs step-wise by defining functions and calling them.

	• Use Python lists, tuples, dictionaries for representing compound data. • Read and write data from/to files in Python
BS8161 Physics and Chemistry Laboratory	Apply principles of elasticity, optics and thermal properties for engineering applications. The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.

Course Outcomes: Electrical and Electronics Engineering

Semester-II

HS8251 Technical English	• Read technical texts and write area- specific texts effortlessly. • Listen and comprehend lectures and talks in their area of specialisation successfully. • Speak appropriately and effectively in varied formal and informal contexts. • Write reports and winning job applications.
MA8251 Engineering Mathematics – II	• Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices. • Gradient, divergence and curl of a vector point function and related identities. • Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification. • Analytic functions, conformal mapping and complex integration. • Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.
PH8253 Physics for Electronics Engineering	• Gain knowledge on classical and quantum electron theories, and energy band structuues, • Acquire knowledge on basics of semiconductor physics and its applications in various devices, • Get knowledge on magnetic and dielectric properties of materials, • Have the necessary understanding on the functioning of optical materials for optoelectronics, • Understand the basics of quantum structures and their applications in spintronics and carbon electronics.
BE8252 Basic Civil and Mechanical Engineering	• Appreciate the Civil and Mechanical Engineering components of Projects.

	• Explain the usage of construction material and proper selection of construction materials. • Measure distances and area by surveying • Identify the components used in power plant cycle. • Demonstrate working principles of petrol and diesel engine. • Elaborate the components of refrigeration and Air conditioning cycle.
EE8251 Circuit Theory	• Ability to analyse electrical circuits • Ability to apply circuit theorems • Ability to analyse transients
GE8291 Environmental Science and Engineering	• Environmental Pollution or problems cannot be solved by mere laws. • Public participation is an important aspect which serves the environmental Protection. • One will obtain knowledge on the following after completing the course. • Public awareness of environmental is at infant stage. • Ignorance and incomplete knowledge has lead to misconceptions • Development and improvement in std. of living has lead to serious environmental disasters
GE8261 Engineering Practices Laboratory	• Fabricate carpentry components and pipe connections including plumbing works. • Use welding equipments to join the structures • Carry out the basic machining operations • Make the models using sheet metal works • Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings • Carry out basic home electrical works and appliances • Measure the electrical quantities • Elaborate on the components, gates, soldering practices.
EE8261 Electric Circuits Laboratory	• Understand and apply circuit theorems and concepts in engineering applications • Simulate electric circuits.
Course Outcomes: Electrical and Electronics Engineering **Semester-III**	
MA8353 Transforms and Partial Differential Equations	• Understand how to solve the given standard partial differential equations.

	• Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
	• Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
	• Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
	• Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.
EE8351 Digital Logic Circuits	• Ability to design combinational and sequential Circuits.
	• Ability to simulate using software package.
	• Ability to study various number systems and simplify the logical expressions using Boolean functions.
	• Ability to design various synchronous and asynchronous circuits.
	• Ability to introduce asynchronous sequential circuits and PLDs
	• Ability to introduce digital simulation for development of application oriented logic circuits.
EE8391 Electromagnetic Theory	• Ability to understand the basic mathematical concepts related to electromagnetic vector fields.
	• Ability to understand the basic concepts about electrostatic fields, electrical potential, energy density and their applications.
	• Ability to acquire the knowledge in magneto static fields, magnetic flux density, vector potential and its applications.
	• Ability to understand the different methods of emf generation and Maxwell's equations
	• Ability to understand the basic concepts electromagnetic waves and characterizing parameters
	• Ability to understand and compute Electromagnetic fields and apply them for design and analysis of electrical equipment and systems
EE8301 Electrical Machines – I	• Ability to analyze the magnetic-circuits.

	• Ability to acquire the knowledge in constructional details of transformers. • Ability to understand the concepts of electromechanical energy conversion. • Ability to acquire the knowledge in working principles of DC Generator. • Ability to acquire the knowledge in working principles of DC Motor • Ability to acquire the knowledge in various losses taking place in D.C. Machines
EC8353 Electron Devices and Circuits	• Explain the structure and working operation of basic electronic devices. • Able to identify and differentiate both active and passive elements • Analyze the characteristics of different electronic devices such as diodes and transistors • Choose and adapt the required components to construct an amplifier circuit. • Employ the acquired knowledge in design and analysis of oscillators.
ME8792 Power Plant Engineering	• Explain the layout, construction and working of the components inside a thermal power plant. • Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants. • Explain the layout, construction and working of the components inside nuclear power plants. • Explain the layout, construction and working of the components inside Renewable energy power plants. • Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.
EC8311 Electronics Laboratory	• Ability to understand and analyse electronic circuits.
EE8311 Electrical Machines Laboratory –I	• Ability to understand and analyze DC Generator • Ability to understand and analyze DC Motor • Ability to understand and analyse Transformers.

Course Outcomes: Electrical and Electronics Engineering	
Semester-IV	
MA8491 Numerical Methods	• Understand the basic concepts and techniques of solving algebraic and transcendental equations. • Appreciate the numerical techniques of interpolation and error approximations in various • Intervals in real life situations. • Apply the numerical techniques of differentiation and integration for engineering problems. • Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations. • Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
EE8401 Electrical Machines – II	• Ability to understand the construction and working principle of Synchronous Generator • Ability to understand MMF curves and armature windings. • Ability to acquire knowledge on Synchronous motor. • Ability to understand the construction and working principle of Three phase Induction Motor • Ability to understand the construction and working principle of Special Machines • Ability to predetermine the performance characteristics of Synchronous Machines.
EE8402 Transmission and Distribution	• To understand the importance and the functioning of transmission line parameters. • To understand the concepts of Lines and Insulators. • To acquire knowledge on the performance of Transmission lines. • To understand the importance of distribution of the electric power in power system. • To acquire knowledge on Underground Cabilitys.

	• To become familiar with the function of different components used in Transmission and Distribution levels of power system and modeling of these components.
EE8403 Measurements and Instrumentation	• To acquire knowledge on Basic functional elements of instrumentation. • To understand the concepts of Fundamentals of electrical and electronic instruments • Ability to compare between various measurement techniques. • To acquire knowledge on Various storage and display devices. • To understand the concepts Various transducers and the data acquisition systems. • Ability to model and analyze electrical and electronic Instruments and understand the operational features of display devices and data acquisition system.
EE8451 Linear Integrated Circuits and Applications	• Ability to acquire knowledge in IC fabrication procedure. • Ability to analyze the characteristics of Op-Amp • To understand the importance of Signal analysis using Op-amp based circuits. • Functional blocks and the applications of special ICs like Timers, PLL circuits, regulator Circuits. • To understand and acquire knowledge on the Applications of Op-amp. • Ability to understand and analyse, linear integrated circuits their Fabrication and Application.
IC8451 Control Systems	• Ability to develop various representations of system based on the knowledge of Mathematics, Science and Engineering fundamentals. • Ability to do time domain and frequency domain analysis of various models of linear system. • Ability to interpret characteristics of the system to develop mathematical model. • Ability to design appropriate compensator for the given specifications. • Ability to come out with solution for complex control problem. • Ability to understand use of PID controller in closed loop system.

EE8411 Electrical Machines Laboratory II	• Ability to understand and analyze EMF and MMF methods. • Ability to analyze the characteristics of V and Inverted V curves • Ability to understand the importance of Synchronous machines • Ability to understand the importance of Induction Machines • Ability to acquire knowledge on separation of losses.
EE8461 Linear and Digital Integrated Circuits Laboratory	• Ability to understand and implement Boolean Functions. • Ability to understand the importance of code conversion • Ability to Design and implement 4-bit shift registers • Ability to acquire knowledge on Application of Op-Amp • Ability to Design and implement counters using specific counter IC.
EE8412 Technical Seminar	• Ability to review, prepare and present technological developments • Ability to face the placement interviews
Course Outcomes: Electrical and Electronics Engineering **Semester-V**	
EE6501 Power System Analysis	• Ability to understand and analyze power system operation, stability, control and protection.
EE6502 Microprocessors and Microcontrollers	• Ability to understand and analyse, linear and digital electronic circuits. • To understand and apply computing platform and software for engineering problems.
ME6701 Power Plant Engineering	• Upon completion of this course, the Students can able to understand different types of power plant, and its functions and their flow lines and issues related to them. • Analyse and solve energy and economic related issues in power sectors.
EE6503 Power Electronics	• Ability to understand and analyse, linear and digital electronic circuits.
EE6504 Electrical Machines – II	• Ability to model and analyze electrical apparatus and their application to power system
IC6501 Control Systems	• Ability to understand and apply basic science, circuit theory, theory control theory Signal processing and apply them to electrical engineering problems.

EE6511 Control and Instrumentation Laboratory	• Ability to understand and apply basic science, circuit theory, Electro-magnetic field theory control theory and apply them to electrical engineering problems.
GE6674 Communication and Soft Skills- Laboratory Based	• Take international examination such as IELTS and TOEFL • Make presentations and Participate in Group Discussions. • Successfully answer questions in interviews.
EE6512 Electrical Machines Laboratory II	• Ability to model and analyze electrical apparatus and their application to power system

<table>
<tr><td colspan="2" align="center">Course Outcomes: Electrical and Electronics Engineering
Semester-VI</td></tr>
<tr><td>EC6651 Communication Engineering</td><td>• Ability to understand and analyse, linear and digital electronic circuits.</td></tr>
<tr><td>EE6601 Solid State Drivesl</td><td>• Ability to understand and apply basic science, circuit theory, Electro-magnetic field theory control theory and apply them to electrical engineering problems.</td></tr>
<tr><td>EE6602 Embedded Systems</td><td>• Ability to understand and analyse, linear and digital electronic circuits.</td></tr>
<tr><td>EE6603 Power System Operation and Control</td><td>• Ability to understand and analyze power system operation, stability, control and protection.</td></tr>
<tr><td>EE6604 Design Of Electrical Machines</td><td>• Ability to model and analyze electrical apparatus and their application to power system.</td></tr>
<tr><td>EE6002 Power System Transients</td><td>• Ability to understand and analyze power system operation, stability, control and protection.</td></tr>
<tr><td>EE6611 Power Electronics and Drives Laboratory</td><td>• Ability to understand and analyse, linear and digital electronic circuits.</td></tr>
<tr><td>EE6612 Microprocessors and Microcontrollers Laboratory</td><td>• Ability to understand and analyse, linear and digital electronic circuits.
• To understand and apply computing platform and software for engineering problems.</td></tr>
<tr><td>EE6613 Presentation Skills and Technical Seminar</td><td>• Ability to review, prepare and present technological developments.

• Ability to face the placement interviews.</td></tr>
</table>

<table>
<tr><td colspan="2" align="center">Course Outcomes: Electrical and Electronics Engineering
Semester-VII</td></tr>
<tr><td>E6701 High Voltage Engineering</td><td>• Ability to understand and analyze power system operation, stability, control and protection.</td></tr>
<tr><td>EE6702 Protection and Switchgear</td><td>• Ability to understand and analyze power system operation, stability, control and protection.</td></tr>
</table>

EE6703 Special Electrical Machines	• Ability to model and analyze electrical apparatus and their application to power system.
MG6851 Principles of Management	• Students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management.
EE6005 Power Quality	• Ability to understand and analyze power system operation, stability, control and protection.
EE6008 Microcontroller Based System Design	• To understand and apply computing platform and software for engineering problems. • To understand ethical issues, environmental impact and acquire management skills.
EE6711 Power System Simulation Laboratory	• Ability to understand and analyze power system operation, stability, control and protection.
EE6712 Comprehension	• Ability to review, prepare and present technological developments.
Course Outcomes: Electrical and Electronics Engineering **Semester-VIII**	
EE6801 Electric Energy Generation, Utilization And Conservation	• Ability to understand and analyze power system operation, stability, control and protection. • Ability to handle the engineering aspects of electrical energy generation and utilization.
EE6010 High Voltage Direct Current Trasmission	• Ability to understand and analyze power system operation, stability, control and protection.
GE6757 Total Quality Management	• The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.
EE6811 Project Work	• On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology

Department of Electronics and Communication Engineering

Department of Electronics and Communication Engineering	After successful completion of four year degree program in Department of Electronics and Communication Engineering
Programme Outcomes	1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. 2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. 3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. 4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. 5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. 6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. 7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. 8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

	9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. 10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. 11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. 12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
Programme Specific Outcomes	1. To analyze, design and develop solutions by applying foundational concepts of electronics and communication engineering. 2. To apply design principles and best practices for developing quality products for scientific and business applications. 3. To adapt to emerging information and communication technologies (ICT) to innovate ideas and solutions to existing/novel problems.
Course Outcomes: Electronics and Communication Engineering **Semester-I**	
Course	**Outcomes** After completion of these courses students should be able to;
HS8151 Communicative English	• Read articles of a general kind in magazines and newspapers. • Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English. • Comprehend conversations and short talks delivered in English • Write short essays of a general kind and personal letters and emails in English.

MA8151 Engineering Mathematics – I	• Use both the limit definition and rules of differentiation to differentiate functions. • Apply differentiation to solve maxima and minima problems. • Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus. • Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables. • Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts. • Determine convergence/divergence of improper integrals and evaluate convergent improper integrals. • Apply various techniques in solving differential equations.
PH8151 Engineering Physics	• The students will gain knowledge on the basics of properties of matter and its applications, • The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics, • The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers, • The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and • The students will understand the basics of crystals, their structures and different crystal growth techniques.
CY8151 Engineering Chemistry	• The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.
GE8151 Problem Solving and Python Programming	• Develop algorithmic solutions to simple computational problems • Read, write, execute by hand simple Python programs. • Structure simple Python programs for solving problems. • Decompose a Python program into functions. • Represent compound data using Python lists, tuples, dictionaries.

	• Read and write data from/to files in Python Programs.
GE8152 Engineering Graphics	• Familiarize with the fundamentals and standards of Engineering graphics • Perform freehand sketching of basic geometrical constructions and multiple views of objects. • Project orthographic projections of lines and plane surfaces. • Draw projections and solids and development of surfaces. • Visualize and to project isometric and perspective sections of simple solids.
GE8161 Problem Solving and python Programming Laboratory	• Write, test, and debug simple Python programs. • Implement Python programs with conditionals and loops. • Develop Python programs step-wise by defining functions and calling them. • Use Python lists, tuples, dictionaries for representing compound data. • Read and write data from/to files in Python.
BS8161 Physics and Chemistry Laboratory	• Apply principles of elasticity, optics and thermal properties for engineering applications. • The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.
Course Outcomes: Electronics and Communication Engineering Semester-II	
HS8251 Technical English	• Read technical texts and write area- specific texts effortlessly. • Listen and comprehend lectures and talks in their area of specialisation successfully. • Speak appropriately and effectively in varied formal and informal contexts. • Write reports and winning job applications.
MA8251 Engineering Mathematics – II	• Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices. • Gradient, divergence and curl of a vector point function and related identities. • Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification. • Analytic functions, conformal mapping and complex integration.

	• Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.
PH8253 Physics for Electronics Engineering	• Gain knowledge on classical and quantum electron theories, and energy band structuues, • Acquire knowledge on basics of semiconductor physics and its applications in various devices, • Get knowledge on magnetic and dielectric properties of materials, • Have the necessary understanding on the functioning of optical materials for optoelectronics, • Understand the basics of quantum structures and their applications in spintronics and carbon electronics.
BE8254 Basic Electrical and Instrumentation Engineering	• Understand the concept of three phase power circuits and measurement. • Comprehend the concepts in electrical generators, motors and transformers • Choose appropriate measuring instruments for given application
EC8251 Circuit Analysis	• Develop the capacity to analyze electrical circuits, apply the circuit theorems in real time • Design and understand and evaluate the AC and DC circuits
EC8252 Electronic Devices	• Explain the V-I characteristic of diode, UJT and SCR • Describe the equivalence circuits of transistors • Operate the basic electronic devices such as PN junction diode, Bipolar and Field effect Transistors, Power control devices, LED, LCD and other Opto-electronic devices
EC8261 Circuits and Devices Laboratory	• Analyze the characteristics of basic electronic devices • Design RL and RC circuits • Verify Thevinin & Norton theorem KVL & KCL, and Super Position Theorems
GE8261 Engineering Practices Laboratory	• Fabricate carpentry components and pipe connections including plumbing works. • Use welding equipments to join the structures. • Carry out the basic machining operations • Make the models using sheet metal works

	• Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings • Carry out basic home electrical works and appliances • Measure the electrical quantities • Elaborate on the components, gates, soldering practices.

MA8352 Linear Algebra and Partial Differential Equations	• Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts. • Demonstrate accurate and efficient use of advanced algebraic techniques. • Demonstrate their mastery by solving non - trivial problems related to the concepts and by proving simple theorems about the statements proven by the text. • Able to solve various types of partial differential equations. • Able to solve engineering problems using Fourier series.
EC8393 Fundamentals of Data Structures In C	• Implement linear and non-linear data structure operations using C • Suggest appropriate linear / non-linear data structure for any given data set. • Apply hashing concepts for a given problem • Modify or suggest new data structure for an application • Appropriately choose the sorting algorithm for an application
EC8351 Electronic Circuits I	• Acquire knowledge of Working Principle,Characteristics and Applications of BJT and FET • Frequency response characteristics of BJT and FET amplifiers • Analyze the performance of small signal BJT and FET amplifiers - single stage and multi stage amplifiers • Apply the knowledge gained in the design of Electronic circuits
EC8352 Signals and Systems	• To be able to determine if a given system is linear/causal/stable • Capable of determining the frequency components present in a deterministic signal

	• Capable of characterizing LTI systems in the time domain and frequency domain • To be able to compute the output of an LTI system in the time and frequency domains
EC8392 Digital Electronics	• Use digital electronics in the present contemporary world • Design various combinational digital circuits using logic gates • Do the analysis and design procedures for synchronous and asynchronous sequential circuits • Use the semiconductor memories and related technology • Use electronic circuits involved in the design of logic gates
EC8391 Control Systems Engineering	• Identify the various control system components and their representations. • Analyze the various time domain parameters. • Analysis the various frequency response plots and its system. • Apply the concepts of various system stability criterions. • Design various transfer functions of digital control system using state variable models
EC8381 Fundamentals of Data Structures in C Laboratory	• Write basic and advanced programs in C • Implement functions and recursive functions in C • Implement data structures using C • Choose appropriate sorting algorithm for an application and implement it in a modularized way
EC8361 Analog and Digital Circuits Laboratory	• Design and Test rectifiers, filters and regulated power supplies. • Design and Test BJT/JFET amplifiers. • Differentiate cascode and cascade amplifiers. • Analyze the limitation in bandwidth of single stage and multi stage amplifier • Measure CMRR in differential amplifier • Simulate and analyze amplifier circuits using PSpice. • Design and Test the digital logic circuits.
HS8381 Interpersonal Skills/Listening &Speaking	• Listen and respond appropriately. • Participate in group discussions • Make effective presentations • Participate confidently and appropriately in conversations both formal and informal

Course Outcomes: Electronics and Communication Engineering Semester-IV	
MA8451 Probability and Random Processes	• Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon. • Understand the basic concepts of one and two dimensional random variables and apply in engineering applications. • Apply the concept random processes in engineering disciplines. • Understand and apply the concept of correlation and spectral densities. • The students will have an exposure of various distribution functions and help in acquiring skills in handling situations involving more than one variable. Able to analyze the response of random inputs to linear time invariant systems.
EC8452 Electronic Circuits II	• Analyze different types of amplifier, oscillator and multivibrator circuits • Design BJT amplifier and oscillator circuits • Analyze transistorized amplifier and oscillator circuits • Design and analyze feedback amplifiers • Design LC and RC oscillators, tuned amplifiers, wave shaping circuits, multivibrators, power amplifier and DC convertors.
EC8491 Communication Theory	• Design AM communication systems • Design Angle modulated communication systems • Apply the concepts of Random Process to the design of Communication systems • Analyze the noise performance of AM and FM systems • Gain knowledge in sampling and quantization
EC8451 Electromagnetic Fields	• Display an understanding of fundamental electromagnetic laws and concepts • Write Maxwell's equations in integral, differential and phasor forms and explain their physical meaning • Explain electromagnetic wave propagation in lossy and in lossless media • Solve simple problems requiring estimation of electric and magnetic field quantities based on these concepts and laws

EC8453 Linear Integrated Circuits	• Design linear and non linear applications of OP – AMPS • Design applications using analog multiplier and PLL • Design ADC and DAC using OP – AMPS • Generate waveforms using OP – AMP Circuits • Analyze special function ICs
GE8291 Environmental Science and Engineering	• Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course. • Public awareness of environmental is at infant stage. • Ignorance and incomplete knowledge has lead to misconceptions • Development and improvement in std. of living has lead to serious environmental disasters
EC8461 Circuits Design and Simulation Laboratory	• Analyze various types of feedback amplifiers • Design oscillators, tuned amplifiers, wave-shaping circuits and multivibrators • Design and simulate feedback amplifiers, oscillators, tuned amplifiers, wave-shaping circuits and multivibrators using SPICE Tool.
EC8462 Linear Integrated Circuits Laboratory	• Design amplifiers, oscillators, D-A converters using operational amplifiers. • Design filters using op-amp and performs an experiment on frequency response. • Analyze the working of PLL and describe its application as a frequency multiplier. • Design DC power supply using ICs. • Analyze the performance of filters, multivibrators, A/D converter and analog multiplier using SPICE.
Course Outcomes: Electronics and Communication Engineering **Semester-V**	
EC6501 Digital Communication	• Design PCM systems • Design and implement base band transmission schemes • Design and implement band pass signaling schemes

	• Analyze the spectral characteristics of band pass signaling schemes and their noise performance • Design error control coding schemes
EC6502 Principles of Digital Signal Processing	• Apply DFT for the analysis of digital signals & systems design IIR and FIR filters • Characterize finite Word length effect on filters • Design the Multirate Filters • Apply Adaptive Filters to equalization • Design multirate filters • Apply adaptive filters appropriately in communication systems
EC6503 Transmission Lines and Wave Guides	• Discuss the propagation of signals through transmission lines. • Analyze signal propagation at Radio frequencies. • Explain radio propagation in guided systems. • Utilize cavity resonators.
GE6351 Environmental Science and Engineering	• Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course. • Public awareness of environment at infant stage. • Ignorance and incomplete knowledge has lead to misconceptions. • Development and improvement in standard of living has lead to serious environmental disasters.
EC6504 Microprocessor and Microcontroller	• Design and implement programs on 8086 microprocessor. • Design I/O circuits. • Design Memory Interfacing circuits. • Design and implement 8051 microcontroller based systems.
EC6511 Digital Signal Processing Laboratory	• Carry out simulation of DSP systems • Demonstrate their abilities towards DSP processor based implementation of DSP systems • Analyze Finite word length effect on DSP systems • Demonstrate the applications of FFT to DSP • Implement adaptive filters for various applications of DSP

EC6512 Communication Systems Laboratory	• Simulate end-to-end Communication Link • Demonstrate their knowledge in base band signaling schemes through implementation of FSK, PSK and DPSK • Apply various channel coding schemes & demonstrate their capabilities towards the improvement of the noise performance of communication system • Simulate & validate the various functional modules of a communication system
EC6513 Microprocessor and Microcontroller Laboratory	• Write ALP Programmes for fixed and Floating Point and Arithmetic • Interface different I/Os with processor • Generate waveforms using Microprocessors • Execute Programs in 8051 • Explain the difference between simulator and Emulator
Course Outcomes: Electronics and Communication Engineering	
Semester-VI	
MG6851 Principles of Management	• Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management
CS6303 Computer Architecture	• Design arithmetic and logic unit. • Design and anlayse pipelined control units • Evaluate performance of memory systems. • Understand parallel processing architectures
CS6551 Computer Networks	• Identify the components required to build different types of networks • Choose the required functionality at each layer for given application • Identify solution for each functionality at each layer • Trace the flow of information from one node to another node in the network
EC6601 VLSI Design	• Explain the basic CMOS circuits and the CMOS process technology. • Discuss the techniques of chip design using programmable devices. • Model the digital system using Hardware Description Language.
EC6602 Antenna and Wave Propagation	• Explain the various types of antennas and wave propagation. • Write about the radiation from a current element.

	• Analyze the antenna arrays, aperture antennas and special antennas such as frequency independent and broad band
EC6001 Medical Electronics	• Discuss the application of electronics in diagnostic and therapeutic area. • Measure biochemical and various physiological information. • Describe the working of units which will help to restore normal functioning.
EC6611 Computer Networks Laboratory	• Communicate between two desktop computers. • Implement the different protocols • Program using sockets. • Implement and compare the various routing algorithms • Use simulation tool.
EC6612 VlSI Design Laboratory	• Write HDL code for basic as well as advanced digital integrated circuits. • Import the logic modules into FPGA Boards. • Synthesize, Place and Route the digital IPs. • Design, Simulate and Extract the layouts of Analog IC Blocks using EDA tools
GE6674 Communication and Soft Skills Laboratory	• Take international examination such as IELTS and TOEFL • Make presentations and Participate in Group Discussions. • Successfully answer questions in interviews.
Course Outcomes: Electronics and Communication Engineering Semester-VII	
EC6701 RF and Microwave Engineering	• Explain the active & passive microwave devices & components used in Microwave communication systems. • Analyze the multi- port RF networks and RF transistor amplifiers. • Generate Microwave signals and design microwave amplifiers. • Measure and analyze Microwave signal and parameters.
EC6702 Optical Communication and Networks	• Discuss the various optical fiber modes, configurations and various signal degradation factors associated with optical fiber. • Explain the various optical sources and optical detectors and their use in the optical communication system. • Analyze the digital transmission and its associated parameters on system performance.

EC6703 Embedded and Real Time Systems	• Describe the architecture and programming of ARM processor. • Outline the concepts of embedded systems • Explain the basic concepts of real time Operating system design. • Use the system design techniques to develop software for embedded systems • Differentiate between the general purpose operating system and the real time operating system • Model real-time applications using embedded-system concepts
EC6004 Satellite Communication	• Analyze the satellite orbits. • Analyze the earth segment and space segment. • Design various satellite applications
EC6011 Electromagnetic Interference and Compatibility	• Find solution to EMI Sources, EMI problems in PCB level / Subsystem and system level design. • To measure emission immunity level from different systems to couple with the prescribed EMC standards
EC6013 Advanced Microprocessors and Microcontrollers	• The student will be able to work with suitable microprocessor / microcontroller for a specific real world application
EC6711 Embedded Laboratory	• Write programs in ARM for a specific Application • Interface memory and Write programs related to memory operations • Interface A/D and D/A convertors with ARM system • Analyse the performance of interrupt • Write programmes for interfacing keyboard, display, motor and sensor. • Formulate a mini project using embedded system
EC6712 Optical and Microwave Laboratory	• Analyze the performance of simple optical link. • Test microwave and optical components. • Analyse the mode characteristics of fiber • Analyse the radiation of pattern of antenna.
Course Outcomes: Electronics and Communication Engineering **Semester-VIII**	
EC6801 Wireless Communication	• Characterize wireless channels • Design and implement various signaling schemes for fading channels • Design a cellular system

	• Compare multipath mitigation techniques and analyze their performance • Design and implement systems with transmit/receive diversity and MIMO systems and analyze their performance
EC6802 Wireless Networks	• Conversant with the latest 3G/4G and WiMAX networks and its architecture. • Design and implement wireless network environment for any application using latest wireless protocols and standards
EC6018 Multimedia Compression and Communication	• Describe various multimedia components • Describe compression and decompression techniques. • Apply the compression concepts in multimedia communication.
CS6701 Cryptography and Network Security	• Compare various Cryptographic Techniques • Design Secure applications • Inject secure coding in the developed applications
EC6811 Project Work	• On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

Department of Mechanical Engineering

Department of Mechanical Engineering	After successful completion of four year degree program in Department of Mechanical Engineering
Program Outcomes	1. An ability to apply knowledge of mathematics and engineering sciences to develop mathematical models for industrial problems. 2. An ability to identify, formulates, and solve complex engineering problems. with high degree of competence. 3. An ability to design and conduct experiments, as well as to analyze and interpret data obtained through those experiments. 4. An ability to design mechanical systems, component, or a process to meet desired needs within the realistic constraints such as environmental, social, political and economic sustainability. 5. An ability to use modern tools, software and equipment to analyze multidisciplinary problems.

	6. An ability to demonstrate on professional and ethical responsibilities.
	7. An ability to communicate, write reports and express research findings in a scientific community.
	8. An ability to adapt quickly to the global changes and contemporary practices.
	9. An ability to engage in life-long learning.

Course Outcomes: Mechanical Engineering

Semester - I

Course	Outcomes After completion of these courses students should be able to;
HS8151 Communicative English	• Read articles of a general kind in magazines and newspapers. • Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English. • Comprehend conversations and short talks delivered in English • Write short essays of a general kind and personal letters and emails in English.
MA8151 Engineering Mathematics – I	• Use both the limit definition and rules of differentiation to differentiate functions. • Apply differentiation to solve maxima and minima problems. • Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus. • Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables. • Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts. • Determine convergence/divergence of improper integrals and evaluate convergent improper integrals. • Apply various techniques in solving differential equations
PH8151 Engineering Physics	• The students will gain knowledge on the basics of properties of matter and its applications, • the students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics.

	- The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers. - The students will get knowledge on advanced physics concepts of quantum theory and its 17 applications in tunneling microscopes, and - The students will understand the basics of crystals, their structures and different crystal growth techniques.
CY8151 Engineering Chemistry	The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.
GE8151 Problem Solving and Python Programming	- Develop algorithmic solutions to simple computational problems - Read, write, execute by hand simple Python programs. - Structure simple Python programs for solving problems. - Decompose a Python program into functions. - Represent compound data using Python lists, tuples, dictionaries. - Read and write data from/to files in Python Programs
GE8152 Engineering Graphics	- Familiarize with the fundamentals and standards of Engineering graphics - Perform freehand sketching of basic geometrical constructions and multiple views of objects. - Project orthographic projections of lines and plane surfaces. - Draw projections and solids and development of surfaces. - Visualize and to project isometric and perspective sections of simple solids.
GE8161 Problem Solving and Python Programming Laboratory	- Write, test, and debug simple Python programs. - Implement Python programs with conditionals and loops. - Develop Python programs step-wise by defining functions and calling them. - Use Python lists, tuples, dictionaries for representing compound data. - Read and write data from/to files in Python.

RBS8161 Physics and Chemistry Laboratory	• Apply principles of elasticity, optics and thermal properties for engineering applications. • The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.
Course Outcomes: Mechanical Engineering Semester - II	
HS8251 Technical English	• Read technical texts and write area- specific texts effortlessly. • Listen and comprehend lectures and talks in their area of specialisation successfully. • Speak appropriately and effectively in varied formal and informal contexts. • Write reports and winning job applications.
MA8251 Engineering Mathematics – II	• Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices. • Gradient, divergence and curl of a vector point function and related identities. • Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification. • Analytic functions, conformal mapping and complex integration. • Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.
PH8251 Materials Science	• the students will have knowledge on the various phase diagrams and their applications • the students will acquire knowledge on Fe-Fe_3C phase diagram,various microstructures and alloys • the students will get knowledge on mechanical properties of materials and their measurement the students will gain knowledge on magnetic, dielectric and superconducting properties of materials • the students will understand the basics of ceramics, composites and nanomaterials
BE8253 Basic Electrical, Electronics and Instrumentation Engineering	• Understand electric circuits and working principles of electrical machines • Understand the concepts of various electronic devices

	• Choose appropriate instruments for electrical measurement for a specific application
GE8291 Environmental Science and Engineering	• Public awareness of environmental is at infant stage. • Ignorance and incomplete knowledge has lead to misconceptions • Development and improvement in std. of living has lead to serious environmental disasters
GE8292 Engineering Mechanics	• Illustrate the vectorial and scalar representation of forces and moments • Analyse the rigid body in equilibrium • Evaluate the properties of surfaces and solids • Calculate dynamic forces exerted in rigid body • Determine the friction and the effects by the laws of friction
GE8261 Engineering Practices Laboratory	• Fabricate carpentry components and pipe connections including plumbing works. • Use welding equipments to join the structures. • Carry out the basic machining operations • Make the models using sheet metal works • Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings • Carry out basic home electrical works and appliances • Measure the electrical quantities • Elaborate on the components, gates, soldering practices.
BE8261 Basic Electrical, Electronics and Instrumentation Engineering Laboratory	• Ability to determine the speed characteristic of different electrical machines • Ability to design simple circuits involving diodes and transistors • Ability to use operational amplifiers
Course Outcomes: Mechanical Engineering **Semester - III**	
MA8353 Transforms and Partial Differential Equations	• Understand how to solve the given standard partial differential equations. • Solve differential equations using Fourier series analysis which plays a vital role in engineering applications. • Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.

	• Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering. • Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.
ME8391 Engineering Thermodynamics	• Apply the first law of thermodynamics for simple open and closed systems under steady and unsteady conditions. • Apply second law of thermodynamics to open and closed systems and calculate entropy and availability. • Apply Rankine cycle to steam power plant and compare few cycle improvement methods • Derive simple thermodynamic relations of ideal and real gases • Calculate the properties of gas mixtures and moist air and its use in psychometric processes
CE8394 Fluid Mechanics and Machinery	• Apply mathematical knowledge to predict the properties and characteristics of a fluid. • Can analyse and calculate major and minor losses associated with pipe flow in piping networks. • Can mathematically predict the nature of physical quantities • Can critically analyse the performance of pumps • Can critically analyse the performance of turbines.
ME8351Manufacturing Technology – I	• Explain different metal casting processes, associated defects, merits and demerits • Compare different metal joining processes. • Summarize various hot working and cold working methods of metals. • Explain various sheet metal making processes. • Distinguish various methods of manufacturing plastic components.
EE8353 Electrical Drives and Controls	• Upon Completion of this subject, the students can able to explain different types of electrical machines and their performance
ME8361 Manufacturing Technology Laboratory – I	• Upon the completion of this course the students will be able to • Demonstrate the safety precautions exercised in the mechanical workshop.

	• Make the workpiece as per given shape and size using Lathe. • Join two metals using arc welding. • Use sheet metal fabrication tools and make simple tray and funnel. • Use different moulding tools, patterns and prepare sand moulds.
ME8381 Computer Aided Machine Drawing	• Follow the drawing standards, Fits and Tolerances • Re-create part drawings, sectional views and assembly drawings as per standards.
EE8361 Electrical Engineering Laboratory	• Ability to perform speed characteristic of different electrical machine
HS8381 Interpersonal Skills/Listening & Speaking	• Listen and respond appropriately. • Participate in group discussions • Make effective presentations • Participate confidently and appropriately in conversations both formal and informal
Course Outcomes: Mechanical Engineering **Semester – IV**
MA8452 Statistics and Numerical Methods	• Apply the concept of testing of hypothesis for small and large samples in real life problems. • Apply the basic concepts of classifications of design of experiments in the field of agriculture. • Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems. • Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations. • Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications
ME8492 Kinematics Of Machinery	• Discuss the basics of mechanism • Calculate velocity and acceleration in simple mechanisms • Develop CAM profiles • Solve problems on gears and gear trains • Examine friction in machine elements
ME8451 Manufacturing Technology – II	• Explain the mechanism of material removal processes.

	• Describe the constructional and operational features of centre lathe and other special purpose lathes. • Describe the constructional and operational features of shaper, planner, milling, drilling, sawing and broaching machines. • Explain the types of grinding and other super finishing processes apart from gear manufacturing processes. • Summarize numerical control of machine tools and write a part program.
ME8491 Engineering Metallurgy	• Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification. • Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes. • Clarify the effect of alloying elements on ferrous and non-ferrous metals • Summarize the properties and applications of non metallic materials. • Explain the testing of mechanical properties. .
CE8395 Strength of Materials for Mechanical Engineers	• Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes. • Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment. • Apply basic equation of simple torsion in designing of shafts and helical spring • Calculate the slope and deflection in beams using different methods. • Analyze and design thin and thick shells for the applied internal and external pressures.
ME8493 Thermal Engineering - I	• Apply thermodynamic concepts to different air standard cycles and solve problems. • Solve problems in single stage and multistage air compressors • Explain the functioning and features of IC engines, components and auxiliaries. • Calculate performance parameters of IC Engines. • Explain the flow in Gas turbines and solve problems.
ME8462 Manufacturing Technology Laboratory – II	• Use different machine tools to manufacturing gears • Ability to use different machine tools to manufacturing gears.

	• Ability to use different machine tools for finishing operations • Ability to manufacture tools using cutter grinder • Develop CNC part programming
CE8381 Strength of Materials and Fluid Mechanics and Machinery Laboratory	• Ability to perform Tension, Torsion, Hardness, Compression, and Deformation test on Solid materials. • Perform Tension, Torsion, Hardness, Compression, and Deformation test on Solid materials. • Use the measurement equipments for flow measurement. • Perform test on different fluid machinery.
HS8461 Advanced Reading and Writing	• Write different types of essays. • Write winning job applications. • Read and evaluate texts critically. • Display critical thinking in various professional contexts.
Course Outcomes: Mechanical Engineering **Semester-V**	
ME6501 Computer Aided Design	• The students can able to use computer and CAD software's for modeling of mechanical components
ME6502 Heat and Mass Transfer	• The students can able to understand and apply different heat and mass transfer principles of different applications.
ME6503 Design of Machine Elements	• The students can able to successfully design machine component
ME6504 Metrology and Measurements	• The Students can demonstrate different measurement technologies and use of them in Industrial Components
ME6505 Dynamics of Machines	• The Students can able to predict the force analysis in mechanical system and related vibration issues and can able to solve the problem
GE6075 Professional Ethics in Engineering	• The student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society
ME6511 Dynamics Laboratory	• Ability to demonstrate the principles of kinematics and dynamics of machinery • Ability to use the measuring devices for dynamic testing.
ME6512 Thermal Engineering Laboratory – II	• Ability to demonstrate the fundamentals of heat and predict the coefficient used in that transfer application and also design refrigeration cycle.

ME6513 Metrology and Measurements Laboratory	• Ability to handle different measurement tools and perform measurements in quality impulsion

ME6601 Design of Transmission Systems	• The students can able to successfully design transmission components used in Engine and machines
MG6851 Principles of Management	• Students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management
ME6602 Automobile Engineering	• The students will be able to identify the different components in automobile engineering. • Have clear understanding on different auxiliary and transmission systems usual.
ME6603 Finite Element Analysis	• The students can able to understand different mathematical Techniques used in FEM analysis and use of them in Structural and thermal problem
ME6604 Gas Dynamics and Jet Propulsion	• The students can able to successfully apply gas dynamics principles in the Jet and Space Propulsion
ME6004 Unconventional Machining Processes	• The students can able to demonstrate different unconventional machining processes and know the influence of difference process parameters on the performance and their applications
ME6611 CAD / CAM Laboratory	• Ability to develop 2D and 3D models using modeling softwares. • Ability to understand the CNC control in modern manufacturing system. • Ability to prepare CNC part programming and perform manufacturing.
ME6612 Design and Fabrication Project	• Use of design principles and develop conceptual and engineering design of any components. • Ability to fabricate any components using different manufacturing tools.
GE6674 Communication and Soft Skills- Laboratory Based	• Take international examination such as IELTS and TOEFL • Make presentations and Participate in Group Discussions. • Successfully answer questions in interviews.

Course Outcomes: Mechanical Engineering Semester-VII	
ME6701 Power Plant Engineering	• He students can able to understand different types of power plant, and its functions and their flow lines and issues related to them. • Analyse and solve energy and economic related issues in power sectors
ME6702 Mechatronics	• The students can able to design mechatronics system with the help of Microprocessor, PLC and other electrical and Electronics Circuits.
ME6703 Computer Integrated Manufacturing Systems	• The student can able to understand the use of computers in process planning and use of FMS and Robotics in CIM
GE6757 Total Quality Management	• The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.
ME6005 Process Planning and Cost Estimation	• The students can able to use the concepts of process planning and cost estimation for various products.
ME6012 Maintenance Engineering	• The students can able to implement the maintenance function and different practices in industries for the successful management of maintenance activities • To identify the different maintenance categories like Preventive maintenance, condition monitoring and repair of machine elements.
ME6711 Simulation and Analysis Laboratory	• The Students can model, analyse and simulate experiments to meet real world system and evaluate the performance.
ME6712 Mechatronics Laboratory	• The students can able to design mechatronics system with the help of Microprocessor, PLC and other electrical and Electronics Circuits.
ME6713 Comprehension	• Ability to understand and comprehend any given problem related to mechanical engineering field.
Course Outcomes: Mechanical Engineering Semester-VIII	
MG6863 Engineering Economics	• Students will acquire the skills to apply the basics of economics and cost analysis to engineering and take economically sound decisions.

IE6605 Production Planning and Control	• The students can able to prepare production planning and control activities such as work study, product planning, production scheduling, Inventory Control. • They can plan manufacturing requirements manufacturing requirement Planning (MRP II) and Enterprise Resource Planning (ERP).
ME6019 Non Destructive Testing and Materials	• The students can able to use the various Non Destructive Testing and Testing methods understand for defects and characterization of industrial components
ME6811 Project Work	• On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

Department of Electronics and Communication Engineering M.E Communication Systems

Department of Electronics and Communication Engineering	After successful completion of two year degree program in Communication Systems
Programme Outcomes	1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. 2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. 3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. 4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

	5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. 6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. 7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
Programme Specific Outcomes	1. To analyze, design and develop solutions by applying foundational concepts of electronics and communication engineering. 2. To apply design principles and best practices for developing quality products for scientific and business applications. 3. To adapt to emerging information and communication technologies (ICT) to innovate ideas and solutions to existing/novel problems.

Course Outcomes: Communication Systems

Semester-I

Course	**Outcomes** After completion of these courses students should be able to;
MA5154 Applied Mathematics For Communication Engineers	• Concepts on vector spaces, linear transformation, inner product spaces, eigenvalues and generalized eigenvectors. • Apply various methods in linear algebra to solve system of linear equations. • Could develop a fundamental understanding of linear programming models, able to develop a linear programming model from problem description, apply the simplex method for solving linear programming problems.

	• Numerical solution of differential equations by single and multistep methods • Computation of probability, random variables and their associated distributions, correlations and regression • Conceptualize the principle of optimality and sub-optimization, formulation and computational procedure of dynamic programming. • Exposing the basic characteristic features of a queuing system and acquire skills in analyzing queuing models. • Using discrete time Markov chains to model computer systems.
CU5191 Advanced Radiation Systems	• Ability to understand antenna concepts • Ability to design antenna for various applications • Knowledge of modern antenna design
CU5151 Advanced Digital Communication Techniques	• Develop the ability to understand the concepts of signal space analysis for coherent and non- coherent receivers. • Conceptually appreciate different Equalization techniques • Possess knowledge on different block codes and convolutional codes. • Comprehend the generation of OFDM signals and the techniques of multiuser detection.
AP5152 Advanced Digital Signal Processing	• Formulate time domain and frequency domain description of Wide Sense Stationary process in terms of matrix algebra and relate to linear algebra concepts. • State Parseval"s theorem, W-K theorem, principle of orthogonality, spectral factorization theorem, Widrow-Hoff LMS algorithm and Shannon"s sampling theorem, and define linear prediction, linear estimation, sample auto-correlation, periodogram, bias and consistency.

	• Explain various noise types, Yule-Walker algorithm, parametric and non-parametric methods, Wiener and Kalman filtering, LMS and RMS algorithms, Levinson Durbin algorithm, adaptive noise cancellation and adaptive echo cancellation, speed verses convergence issues, channel equalization, sampling rate change, subband coding and wavelet transform.
	• Calculate mean, variance, auto-correlation and PSD for WSS stochastic processes, and derive prediction error criterion, Wiener-Hoff equations, Parseval"stheorem,W-K theorem and normal equations.
	• Design AR, MA, ARMA models, Weiner filter, anti aliasing and anti imaging filters, and develop FIR adaptive filter and polyphase filter structures.
	• Simulate spectral estimation algorithms and basic models on computing platform
CU5192 Optical Networks	• Design and Analyze Network Components • Assess and Evaluate optical networks
VL5091 MEMS and NEMS	• Discuss micro sensors • Explain micro actuators • Outline nanosystems and Quantum mechanics
CU5161 Communication Systems Laboratory	• Measure and analyze various transmission line parameters. • Design Microstrip patch antennas. • Implement the adaptive filtering algorithms • To generate and detect digital communication signals of various modulation techniques using MATLAB. • Evaluate cellular mobile communication technology and propagation model.
Course Outcomes: Communication Systems Semester-II	
CU5291 Advanced Wireless Communications System	• Analyze MIMO system. • Discuss millimeter wave communication. • Demonstrate software defined radio and cognitive radio.
CU5201 MIC and RF System Design	• Capability to design RF circuits. • To be able to analyze RF circuits.

CU5292 Electro Magnetic Interference and Compatibility	• Identify Standards • Compare EMI test methods • Discuss EMI mitigation techniques
NC5251 Cognitive Radio Networks	• Compare MAC and network layer design for cognitive radio • Discuss cognitive radio for Internet of Things and M2M technologies
CU5003 Advanced Antenna Design	• The student would be able to understand recent design techniques in antenna. • Ability to design and assess the performance of various antenna • The student would be able to design the antenna for various industrial, medical and sensor applications.
CU5094 Software Defined Radio	• Design data converters • Evaluate smart antennas • Discuss digital hardware and software choices
CU5211 RF System Design Laboratory	• Apply knowledge to identify a suitable architecture and systematically design an RF system. • Comprehensively record and report the measured data, and would be capable of analyzing, interpreting the experimentally measured data and produce the meaningful conclusions. Design and develop microstrip filters.
Course Outcomes: Communication Systems **Semester-III**	
CU5301 Millimeter Wave Communications	• Ability to understand Millimeter devices and circuits • Ability to design antenna for Millimeter wave frequencies • Knowledge of Millimeter wave technology
CP5292 Internet of Things	• Analyze various protocols for IoT • Develop web services to access/control IoT devices. • Design a portable IoT using Rasperry Pi • Deploy an IoT application and connect to the cloud. • Analyze applications of IoT in real time scenario

NE5071 Network Management	• Diagnose problems and make minor repairs to computer networks using appropriate diagnostics software b • Demonstrate how to correctly maintain LAN computer systems • Maintain the network by performing routine maintenance tasks • Apply network management tools

Department of Computer science and Engineering

M.E Computer Science and Engineering

Department of Computer Science and Engineering	After successful completion of two year degree program in Computer Science and Engineering
Program Outcomes	1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. 2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. 3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. 4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

	5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
	6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
	7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
	8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
	9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
	10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
	11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
	12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
Program Specific Outcomes	1. To analyze, design and develop solutions by applying foundational concepts of Computer Science engineering.

	2. To apply software engineering principles and practices for developing quality software for scientific and business applications. **3.** To adapt to emerging information and communication technologies (ICT) to innovate ideas and solutions to existing/novel problems.

<table>
<tr><td colspan="2" align="center">Course Outcomes: M.E Computer Science and Engineering

Semester-I</td></tr>
<tr><td align="center">Course</td><td align="center">Outcomes
After completion of these courses students should be able to;</td></tr>
<tr>
<td>MA5160 Applied Probability and Statistics</td>
<td>

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

</td>
</tr>
<tr>
<td>CP5151 Advanced Data Structures and Algorithms</td>
<td>

Design data structures and algorithms to solve computing problems.
Design algorithms using graph structure and various string matching algorithms to solve real-life problems.
Apply suitable design strategy for problem solving.

</td>
</tr>
<tr>
<td>CP5152 Advanced Computer Architecture</td>
<td>

Identify the limitations of ILP.
Discuss the issues related to multiprocessing and suggest solutions
Point out the salient features of different multi-core architectures and how they exploit parallelism.
Discuss the various techniques used for optimizing the cache performance
Design hierarchal memory system.

</td>
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</table>

	• Point out how data level parallelism is exploited in architectures.
CP5153 Operating System Internals	• To explain the functionality of a large software system by reading its source. • To revise any algorithm present in a system. • To design a new algorithm to replace an existing one. • To appropriately modify and use the data structures of the Linux kernel for a different software system.
CP5154 Advanced Software Engineering	• Understand the advantages of various Software Development Lifecycle Models • Gain knowledge on project management approaches as well as cost and schedule • estimation strategies • Perform formal analysis on specifications • Use UML diagrams for analysis and design • Architect and design using architectural styles and design patterns • Understand software testing approaches • Understand the advantages of DevOps practices
CP5191 Machine Learning Techniques	• Distinguish between, supervised, unsupervised and semi-supervised learning. • Apply the appropriate machine learning strategy for any given problem. • Suggest supervised, unsupervised or semi-supervised learning algorithms for any given problem. • Design systems that uses the appropriate graph models of machine learning. • Modify existing machine learning algorithms to improve classification efficiency
CP5161 Data Structures Laboratory	• Design and implement basic and advanced data structures extensively. • Design algorithms using graph structures • Design and develop efficient algorithms with minimum complexity using design techniques.

Course Outcomes: M.E Computer Science and Engineering	
Semester-II	
CP5201 Network Design and Technologies	• Identify the components required for designing a network • Design a network at a high-level using different networking technologies • Analyze the various protocols of wireless and cellular networks • Discuss the features of 4G and 5G networks • Experiment with software defined networks
CP5291 Security Practices	• Understand the core fundamentals of system security • Apply the security concepts related to networks in wired and wireless scenario • Implement and Manage the security essentials in IT Sector • Able to explain the concepts of Cyber Security and encryption Concepts • Able to attain a through knowledge in the area of Privacy and Storage security and related Issues.
CP5292 Internet of Things	• Analyze various protocols for IoT • Develop web services to access/control IoT devices. • Design a portable IoT using Rasperry Pi • Deploy an IoT application and connect to the cloud. • Analyze applications of IoT in real time scenario
CP5293 Big Data Analytics	• Understand how to leverage the insights from big data analytics • Analyze data by utilizing various statistical and data mining approaches • Perform analytics on real-time streaming data • Understand the various NoSql alternative database models
IF5191 Advanced Databases	• To develop skills on databases to optimize their performance in practice. • To analyze each type of databases and its necessity • To design faster algorithms in solving practical database problems

CP5094 Information Retrieval Techniques	• Build an Information Retrieval system using the available tools. • Identify and design the various components of an Information Retrieval system. • Apply machine learning techniques to text classification and clustering which is used for • efficient Information Retrieval. • Design an efficient search engine and analyze the Web content structure
CP5261 Data Analytics Laboratory	• Process big data using Hadoop framework • Build and apply linear and logistic regression models • Perform data analysis with machine learning methods • Perform graphical data analysis
Course Outcomes: M.E Computer Science and Engineering **Semester-III**	
CP5005 Software Quality Assurance and Testing	• Perform functional and nonfunctional tests in the life cycle of the software product. • Understand system testing and test execution process. • Identify defect prevention techniques and software quality assurance metrics. • Apply techniques of quality assurance for typical applications.
CP5008 Compiler Optimization Techniques	• Identify the different optimization techniques for simple program blocks. • Design performance enhancing optimization techniques. • Perform the optimization on procedures. • Ensure better utilization of resources.
CP5009 Data Visualization Techniques	• Explain principles of visual perception • Apply core skills for visual analysis • Apply visualization techniques for various data analysis tasks • Design information dashboard

Department of Electrical and Electronics Engineering

M.E Power Electronics and Drives

Department of Electrical and Electronics Engineering	After successful completion of two year degree program in Power Electronics and Drives
Program Outcomes	1. Acquire sound knowledge in power electronics and drives. 2. Analyse power electronics and drives related engineering problems and synthesize the information for conducting high level of research. 3. Think widely to offer creative and innovative solutions of engineering problems that are inconformity with social and environmental factors. 4. Extract the new methodologies by carrying out the literature survey, proper design and conduction of experiments, interpret and analyse the data to arrive at meaningful research methodologies in power electronics and drives. 5. Learn and apply modern engineering and IT tools to solve complex engineering problems related to power converters and electric drives. 6. Ability to form, understand group dynamics and work in inter-disciplinary groups in order to achieve the goal. 7. Ability to communicate effectively in appropriate technical forums and understand the concepts and ideas to prepare reports, to make effective presentations. 8. Ability to update knowledge and skills through lifelong learning to keep abreast with the technological developments. 9. Follow the professional and research ethics, comprehend the impact of research and responsibility in order to contribute to the society. 10. Understand the leadership principles and subject oneself to introspection and take voluntary remedial measures for effective professional practice in the field of power electronics and electric drives.

Programme Specific Outcomes	1. Graduates of this program will have technical knowledge, skills and ability to design, develop and test power electronic converters and drives using advanced tools. 2. Graduates of this program will have skills and knowledge in the field of power electronics and drives to work in the design, fabrication industries and research organizations. 3. Graduates of this program will show confidence and exhibit self-learning capability and demonstrate a pursuit in life-long learning through higher studies and research. 4. Graduates of this program will show involvement and willingness in assuming responsibility in societal and environmental causes.

Course Outcomes: M.E Power Electronics and Drives
Semester-I

Course	**Outcomes** After completion of these courses students should be able to;
MA5155 Applied Mathematics for Electrical Engineers	• Apply various methods in matrix theory to solve system of linear equations. • Maximizing and minimizing the functional that occur in electrical engineering discipline. • Computation of probability and moments, standard distributions of discrete and continuous random variables and functions of a random variable. • Could develop a fundamental understanding of linear programming models, able to develop a linear programming model from problem description, apply the simplex method for solving linear programming problems. • Fourier series analysis and its uses in representing the power signals.
PX5101 Power Semiconductor Devices	• Ability to design of protection circuits and control circuits • Ability to design of semiconductor device and its parameters. • Ability to determine the suitable device for the application. Ability to determine the reliability of the system.

PX5151 Analysis of Electrical Machines	• Ability to understand the various electrical parameters in mathematical form. • Ability to understand the different types of reference frame theories and transformation relationships. • Ability to find the electrical machine equivalent circuit parameters and modeling of electrical machines.
IN5152 System Theory	• Ability to represent the time-invariant systems in state space form as well as analyze, whether the system is stabilizable, controllable, observable and detectable. • Ability to design state feedback controller and state observers • Ability to classify singular points and construct phase trajectory using delta and isocline methods. • Use the techniques such as describing function, Lyapunov Stability, Popov's Stability Criterion and Circle Criterion to assess the stability of certain class of non-linear system. • Ability to describe non-linear behaviors such as Limit cycles, input multiplicity and output multiplicity, Bifurcation and Chaos.
PX5091 Control System Design for Power Electronics	• Ability to understand an overview on modern linear and nonlinear control strategies for power electronics devices • Ability to model modern power electronic converters for industrial applications • Ability to design appropriate controllers for modern power electronics devices.
PX5111 Power Electronics Circuits Lab	• Comprehensive understanding on the switching behavior of Power Electronic Switches • Comprehensive understanding on mathematical modeling of power electronic system and ability to implement the same using simulation tools • Ability of the student to use microcontroller and its associated IDE* for power electronic applications

	- Ability of the student to design and implement analog circuits for Power electronic control applications - Ability to design and fabricate a power converter circuit at an reasonable power level - Exposure to PCB designing and fabrication - IDE – Integrate Development Environment (Code Composer Studio for Texas Instrument/MPLAB for PIC microcontrollers etc)
Course Outcomes: M.E Power Electronics and Drives **Semester-II**	
PX5201 Analysis and Design of Inverters	- Will get expertise in the working modes and operation of inverters will be able to design single phase and three phase inverters. - Will equip skills to formulate and design the inverters for generic loads and machine. - loads Will acquire knowledge on multilevel inverters and modulation techniques.
PX5202 Solid State Drives	- Will be able to formulate, design and analyze power supplies for generic loads. - Will be able to formulate the control schemes for synchronous motor drives. - Will get expertise in the field oriented control of Induction motor drives. - Will acquire knowledge on the operation of VSI and CSI fed induction motor drives. machine loads.
PX5251 Special Electrical Machines	- Understand the open loop and closed loop systems stepper motors. - Understanding the classifications and characteristics of special machines - Understanding of the control methods of special motors. - Ability to select the suitable motor for a certain job under given conditions.

PX5252 Power Quality	• Ability to formulate, design and simulate power supplies for generic load and machine loads. • Ability to conduct harmonic analysis and load tests on power supplies and drive systems. • Ability to understand and design load compensation methods useful for mitigating power quality problems.
PX5003 Flexible AC Transmission Systems	• Ability to understand the operation of the compensator and its applications in power system. • Ability to understand the various emerging Facts controllers. • Ability to know about the genetic algorithm used in Facts controller coordination.
PS5071 Distributed Generation and Microgrid	• Learners will attain knowledge on the various schemes of conventional and nonconventional power generation. • Learners will have knowledge on the topologies and energy sources of distributed generation. • Learners will learn about the requirements for grid interconnection and its impact with NCE sources • Learners will understand the fundamental concept of Microgrid.
PX5211 Electrical Drives Laboratory	• Ability to simulate different types of machines, converters in a system. • Analyze the performance of various electric drive systems. • Ability to perform both hardware and software simulation
PX5212 Mini Project	• Acquire practical knowledge within the chosen area of technology for project development. • Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach. • Contribute as an individual or in a team in development of technical projects. • Develop effective communication skills for presentation of project related activities.

EE8412 Technical Seminar	- Ability to review, prepare and present technological developments - Ability to face the placement interviews.
Course Outcomes: M.E Power Electronics and Drives **Semester-III**	
PX5071 Wind Energy Conversion Systems	- Acquire knowledge on the basic concepts of Wind energy conversion system. - Understand the mathematical modeling and control of the Wind turbine. - Develop more understanding on the design of Fixed speed system. - Study about the need of Variable speed system and its modeling. - Able to learn about Grid integration issues and current practices of wind interconnections with power system.
PX5072 Power Electronics for Renewable Energy Systems	- Analyze the impacts of renewable energy generation on environment. - Understand the importance and qualitative analysis of solar and wind energy sources. - Apply the principle of operation of electrical machines for wind energy conversion and their performance characteristics. - Design suitable power converters for solar PV and wind energy systems.

Department of Mechanical Engineering

M.E Manufacturing Engineering

Department of Mechanical Engineering	After successful completion of two year degree program in Manufacturing Engineering
Programme Outcomes	**1.** Graduates will demonstrate knowledge Of mathematics, science and engineering. **2.** Graduates will demonstrate an ability to identify, formulate and solve engineering problems. **3.** Graduate will demonstrate an ability to design and conduct experiments, analyze and interpret data. **4.** Graduates will demonstrate an ability to design a system, component or process as per needs and specifications. **5.** Graduates will demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks. **6.** Graduate will demonstrate skills to use Modern engineering tools, software and equipment to analyze problems. **7.** Graduates will demonstrate knowledge of professional and ethical responsibilities. **8.** Graduate will be able to communicate effectively in both verbal and written form. **9.** Graduate will show the understanding of impact of engineering solutions on the society and also will be aware of contemporary issues. **10.** Graduate will develop confidence for self education and ability for life-long learning
Course Outcomes: M.E Manufacturing Engineering   **Semester-I**
Course	**Outcomes** After completion of these courses students should be able to;
MA5160 Applied Probability and Statistics	• Basic probability axioms and rules and the moments of discrete and continuous random variables. • Consistency, efficiency and unbiasedness of estimators, method of maximum likelihood estimation and Central Limit Theorem. • Use statistical tests in testing hypotheses on data.

	- Perform exploratory analysis of multivariate data, such as multivariate normal density, calculating descriptive statistics, testing for multivariate normality. - The students should have the ability to use the appropriate and relevant, fundamental and applied mathematical and statistical knowledge, methodologies and modern computational tools.
MF5101 Advanced in Manufacturing Technology	- To produce useful research output in machining of various materials - Use this knowledge to develop hybrid machining techniques - Application of this knowledge to manage shop floor problems
MF5102 Computer Integrated Manufacturing Systems	- To produce useful research output in computer integrated manufacturing - Use this knowledge to develop computer techniques - Application of this knowledge to functionalise computer aided planning .
MF5103 Advances in Casting and Welding	The students are expected to impart knowledge on basic concepts and advances in casting and welding processes.
MF5104 Metal Cutting Theory and Practice	The students are expected to impart the knowledge and train the students in the area of metal cutting theory and its importance.
MF5003 Micro Manufacturing	- The students are well experienced - To impart the principles of various basic micro manufacturing process
MF5111 CAD/CAM Laboratory	- At the end of this course the students are expected - To impart the knowledge on training the students in the area of CAD/CAM

Course Outcomes: M.E Manufacturing Engineering Semester-II	
Course	**Outcomes** After completion of these courses students should be able to;
MF5201 Optimization Techniques in Manufacturing	• At the end of this course the students will be expected to introduce the various optimization techniques and their advancements.
CM5251 Advances In Metrology and Inspection	• Understand the advanced measurement principles with ease. • Operate sophisticated measurement and inspection facilities. • Design and develop new measuring methods.
MF5202 Theory of Metal Forming	• The students are expected to upgrade their knowledge on plasticity, surface treatment for forming of various types of metal forming process.
MF5203 Tooling For Manufacturing	• State of Art in Tooling in Manufacturing and Inspection • Design and Develop tooling for Flexible Manufacturing
MF5009 Non-Destructive Testing and Evaluation	• At the end of this course the students are expected to have hands on experience on all types of NDT and their applications in Engineering.
MF5006 Materials Management	• Familiarized with the various concepts and functions of material management, so that the students will be in a position to manage the materials management department independently.
MF5211 Automation and Metal Forming Laboratory	• To impart practical knowledge on bulk metal forming and sheet metal forming processes
MF5212 Technical Seminar	• Students will develop skills to read, write, comprehend and present research papers. • Students shall give presentations on recent areas of research in manufacturing engineering in two cycles. Depth of understanding, coverage, and quality of presentation material (PPT/OHP) and communication skill of the student will be taken as measures for evaluation.

Course Outcomes: M.E Manufacturing Engineering Semester-III	
MF5012 Computer Aided Product Design	• To model a product using CAD software. • To apply the various design concepts and design tools and techniques while designing a product.
MF5013 Process Planning and Cost Estimation	• The students are expected to use the concepts of process planning and cost estimation for various products.
MF5017 Mechatronics	• The students are experts in designing Mechatronics components.

Department of Civil Engineering
M.E Structural Engineering

Department of Civil Engineering	After successful completion of two year degree program in structural Engineering
Programme Outcomes	1. Graduates will demonstrate knowledge of mathematics, science and engineering. 2. Graduates will demonstrate an ability to identify, formulate and solve engineering problems. 3. Graduate will demonstrate an ability to design and conduct experiments, analyze and interpret data. 4. Graduates will demonstrate an ability to design a system, component or process asper needs and specifications. 5. Graduates will demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks. 6. Graduate will demonstrate skills to use modern engineering tools, software andequipment to analyze problems. 7. Graduates will demonstrate knowledge of professional and ethical responsibilities.

	8. Graduate will be able to communicate effectively in both verbal and written form. 9. Graduate will show the understanding of impact of engineering solutions on the society and also will be aware of contemporary issues. 10. Graduate will develop confidence for self education and ability for life-long learning.
Course Outcomes :M.E Structural Engineering **Semester-I**	
Course	**Outcomes** After completion of these courses students should be able to;
MA5151 Advanced Mathematical Methods	• Application of Laplace and Fourier transforms to initial value, initial–boundary value and boundary value problems in Partial Differential Equations. • Maximizing and minimizing the functional that occur in various branches of Engineering Disciplines. • Construct conformal mappings between various domains and use of conformal mapping in studying problems in physics and engineering particularly to fluid flow and heat flow problems. • Understand tensor algebra and its applications in applied sciences and engineering and develops ability to solve mathematical problems involving tensors. • Competently use tensor analysis as a tool in the field of applied sciences and related fields.
ST5101 Advanced Concrete Structures	• The students will have the confidence to design various concrete structures and structural elements by limit state design and detail the same for ductility as per codal requirements.
ST5102 Dynamics of Structures	• The students will have the knowledge of vibration analysis of systems/structures with different degrees of freedom and they know the method of damping the systems.

ST5103 Theory of Elasticity and Plasticity	• The students will be familiar to the concept of elastic analysis of plane stress and plane strain problems, beams on elastic foundation and torsion on noncircular section. • They will also have sufficient knowledge in various theories of failure and plasticity
ST5002 Prefabricated Structures	• Student will have good knowledge about the prefabricated elements and the technologies used in fabrication and erection. • They will be in a position to design floors, stairs, roofs, walls and industrial buildings, and various joints for the connections.
ST5001 Maintenance and Rehabilitation of Structures	• Students will be in a position to point out the causes of distress in concrete, masonry and steel structures and also they will be able to suggest the remedial measures.
Course Outcomes: M.E Structural Engineering **Semester-II**	
ST5201 Advanced Steel Structures	• Students will be in a position to design bolted and welded connections in industrial structures. • They also know the plastic analysis and design of light gauge steel structures.
ST5202 Stability of Structures	• Student will know the phenomenon of buckling and they are in a position to calculate the buckling load on column, beam – column, frames and plates using classical and approximate methods.
ST5203 Experimental Techniques	• Students will know about measurement of strain, vibrations and wind blow. • They will be able to analyze the structure by non-destructive testing methods and model analysis.
ST5204 Finite Element Analysis of Structures	• The students will know the concept of finite element analysis and enable to analyze framed structure, Plate and Shells and modify using recent softwares.
ST5204 Finite Element Analysis of Structures	• The students will know the concept of finite element analysis and enable to analyze framed structure, Plate and Shells and modify using recent softwares.

ST5008 Industrial Structures	• Student will be able to plan industrial structures for functional requirements. • They will be able to design various structures such as Bunkers, Silos, Cooling Towers, Chimneys, and Transmission Towers with required foundations.
ST5009 Prestressed Concrete	• Students will have sufficient knowledge on various methods of prestressing and the concepts of partial pre-stressing. • They will be in a position to design beams, pipes, water tanks, posts and similar structures.
ST521 Advanced Structural Engineering Laboratory	• Students will be able to cast and test RC beams for strength and deformation behaviour. • They will be able to test dynamic testing on steel beams, static cyclic load testing of RC frames and non-destruction testing on concrete.
ST5212 Practical Training I(2Weeks)	• They are trained in tackling a practical field/industry orientated problem related to Structural Engineering.
Course Outcomes: M.E Structural Engineering **Semester-III**	
ST5301 Earthquake Analysis and Design of Structures	• The students will be able to understand the causes and effect of earthquake. • They will be able to design masonry and RC structures to the earthquake forces as per the recommendations of IS codes of practice.
ST5015 Design of Bridges	• Students will be able to design different types of RCC bridges, Steel bridges and pre-stressed concrete bridges with the bearings and substructures.
ST5017 Computer Aided Analysis and Design	• Students will be familiar and will have sufficient knowledge on the concepts and working principle of various structural engineering softwares.
ST5311 Practical Training II (2 Weeks)	• They are trained in tackling a practical field/industry orientated problem related to Structural Engineering.
ST5312 Seminar	• The students will be trained to face an audience and to tackle any problem during group discussion in the Interviews.

ST5313 Project Work (Phase I)	• She students will have a clear idea of his/her area of work and they are in a position to carry out the remaining phase II work in a systematic way.
Course Outcomes: M.E Structural Engineering **Semester-IV**	
ST5411 Practical Training III (2 Weeks)	• They are trained in tackling a practical field/industry orientated problem related to Structural Engineering.
ST5412 Project Work (PHASE II)	• On completion of the project work students will be in a position to take up any challenging practical problem and find better solutions.