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DR. C.V. RAMAN UNIVERSITY

Chhattisgarh, Bilaspur AN AISECT GROUP UNIVERSITY

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POs, PSOs and COs

FACULTY OF ENGINEERING & TECHNOLOGY

Add: Kargi Road, Kota, Bilaspur (C.G.)
Ph. 07753-253801, E-Mail: info@cvru.ac.in

FACULTY OF ENGINEERING

DIPLOMA IN ENGINEERING (CIVIL)
PROGRAMME CODE -05DIP003

Program Educational Objectives (PEOs)

- Capability to manage large infrastructure projects ensuring safe and cost-effective execution of projects having knowledge of fast track construction and project management.
- Ability to use building software packages to calculate safe loads and stresses for designing structural members to ensure safety and serviceability.
- Ability to provide innovative solutions for traffic safety and efficiency through intelligent transportation systems, and mitigate the environmental impact of construction by adopting green building concepts.

Program Outcomes (POs)

- **PO-1 Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
- **PO-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.
- **PO-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.
- **PO-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.
- **PO-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.
- **PO-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.
- **PO-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.
- **PO-8 Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO-9 Individual or teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

- **PO-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.
- **PO-11 Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO-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 to technological change.

Program Specific Outcomes (PSOs)

- Proficiency in Civil Engineering problem identification, formulation, analysis, design and execution, optimizing the cost, time, quality, and safety using appropriate tools.
- Support the society with solutions to various Civil Engineering problems focusing on sustainable development and upholding professional ethics.

Course Code: 2TDDE 101
Course Name: Mathematics-I

Course objective:

- To develop the basic Mathematical skills of engineering students that are imperative for effective understanding of engineering subjects.
- To provide detailed of matrices which is applied for solving system of linear equations and useful in various fields of technology.
- To provide an overview of partial derivatives and its applications which is used for solving optimization problems and concepts.
- This course enables the students to learn the concept of imaginary numbers and gives awareness about algebra of complex numbers which helps in understanding of engineering subjects like electrical circuits, Electromagnetic wave theory, and complex analysis etc.

Course outcomes

- At the end of this course, students will be able to
- Apply the knowledge of matrices to solve the problems.
- Know and to understand various types of numerical methods.
- Ability to interpret the mathematical results in physical or practical terms for complex numbers.
- Inculcate the Habit of Mathematical Thinking through Indeterminate forms and Taylor series expansion.

Course Code: 2TDDE 102
Course Name: Applied Mechanics

Course objective

- Ability to apply knowledge of mathematics, science, and engineering.
- Solve for the resultants of any force systems.
- Determine equivalent force systems.
- Determine the internal forces in plane frames, simple span trusses and beams.
- Solve the mechanics problems associated with friction forces.
- Obtain the centroid, first moment and second moment of an area.

Course outcomes

- Through this syllabus the diploma student will learn the basic concepts of counting principle through permutation and combination,
- Expansion of a binomial function,
- Breaking up a complex fraction into simpler partial fractions, trigonometric ratio and concept of matrix

Course Code: 2TDDE103
Course Name: Physics

Course objective

- The course aims at making students to understand the basic concepts of Principles of Physics in a broader sense with a view to lay foundation for the various engineering courses.
- Students will be able to demonstrate competency and understanding of the concepts found in Mechanics, Harmonic Oscillations, Waves in one dimension, wave Optics, Lasers, Fiber Optics and a broad base of knowledge in physics.
- The main purpose of this course is to equip engineering undergraduates with an understanding of the scientific method, so that they may use the training beneficially in their higher pursuits.
- Today the need is to stress principles rather than specific procedures, to select areas of contemporary interest rather than of past interest, and to condition the student to the atmosphere of change he will encounter during his career.

Course Outcome

- The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competencies *Select proper measuring instrument on the basis of range, least count & precision required for measurement.

- Analyze properties of material & their use for the selection of material mostly applicable for engineering users.
- Identify good & bad conductors of heat and proper temperature scale for temperature measurement Identify.
- Analyze, discriminate and interpret logical sequence of field problems with the study of physics.
- Analyze variation of sound intensity with respect to distance and follow the principles used in the physical properties, its measurement and selections.

Course Code: 2TDDE 104
Course Name: Environmental Engineering & Safety

Course objective

- To improve the quality of life of the local community through management and conservation of natural resources.
- To ensure that the natural environment is used wisely as well as judiciously. The natural resources are continuously available for the benefit and enjoyment of future generations.
- To decrease vulnerability and improve adaptation capacity among poor local communities associated with Climate Change.

Course outcomes

- After successful completion of this course students will able to
- Enhance the use of recycled material for construction work and optimize the use of conventional energy sources.
- Take care of issues related to Conservation & Hazard Management while working as chemical engineer.
- Assess the effects of pollution on resources.
- Justify need of renewable energy for sustainable development.
- Identify concept of waste management and methods of recycling.
- Prepare list of use of do's and don'ts applicable during disasters.

Course Code: 2TDDE105
Course Name: Communication Skill-I

Course objective

- The main aim of communicating is to pass information so that other people may know about what you are talking off. This can be through facts or even feelings.
- To apply knowledge of human communication and language processes as they occur across various contexts.
- To understand and evaluate key theoretical approaches used in the interdisciplinary field of communication.

Course outcomes

- Through this syllabus the diploma students will learn the basic concept of English. Student should gain the ability to read understand, analyze, intercept and extrapolate from the complex texts that are at the heart of the diver's traditions of the English language.
- Students will be able to understand the research methods associated with the study of human communication and apply at least one of those approaches to the analysis and evaluation of human communication.

Course Code: 2TDDE201
Course Name: Mathematics-II

Course objective

- To understand the foundations of mathematics
- To be able to perform basic computations in higher mathematics
- To be able to read and understand middle-level proofs
- To be able to write and understand basic proof.

Course outcomes

- Develop and maintain problem-solving skills
- Use mathematical ideas to model real-world problems
- Be able to communicate mathematical ideas with others
- Have experience using technology to address mathematical ideas

Course Code: 2TDDE202
Course Name: Engineering Graphics

Course objective

- To familiarize with the construction of geometrical figures.
- To familiarize with the projection of 1D, 2D and 3D elements.
- To familiarize with the sectioning of solids and development of surfaces.
- To familiarize with the Preparation and interpretation of building drawing.

Course outcomes

- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to solid modelling
- Exposure to creating working drawings
- Ability to draw projections and analysing multiple views of object.

Course Code: 2TDDE203
Course Name: Chemistry

Course objective

- The objective of the Chemistry in Polytechnique courses is to acquaint the students with the basic phenomenon/ concepts of chemistry, the student face during course of their studying the industry. The student with the knowledge of the basic chemistry will understand and explain scientifically the various chemistry related problems in the industry/engineering field. The student will able to understand the new developments and break through sufficient lying engineering and technology.
- To appreciate the need and importance of chemistry for industrial and domestic use.
- To gain the knowledge on existing and future upcoming materials used in device fabrication.

Course Outcomes

- After the completion of the course, the learner will be able to:
- Analyze the need, design and perform a set of experiments.
- Differentiate hard and soft water, solve the related numerical problems on water purification and its significance in industry and daily life.
- Apply the principles of green chemistry in designing alternative reaction methodologies to minimize hazards and environmental degradation.
- Understand the causes of corrosion, its consequences and methods to minimize corrosion to improve industrial designs.
- Explain the properties, separation techniques of natural gas and crude oil along with potential applications and role of petrochemicals in national economy.
- Equipped with basic knowledge of polymers and its application.

Course Code: 2TDDE204
Course Name: Fundamentals Computer & IT

Course objective

- Learn basic principles of using Windows operation system.
- Learn and practice basic keyboarding and mouse use.
- Be able to access the Internet, Worldwide Web, as well as use Internet directories and search engines, and locate www addresses.
- Be able to find and evaluate information on the Web (learn how to be critical and evaluate what is valid and reliable).
- Learn basic computer and keyboarding related vocabulary in English.

Course outcomes

- Demonstrate a basic understanding of computer hardware and software.

- Demonstrate problem-solving skills.
- Apply logical skills to programming in a variety of languages.
- Utilize web technologies.
- Demonstrate basic understanding of network principles.
- Working effectively in teams.
- Apply the skills that are the focus of this program to business scenarios.

Course Code: 2TDDE205
Course Name: Communication Skills-II

Course objective

- The students, after completing the course ,will be able to use general purpose words of English to express himself in speaking reasonably clearly and correctly on routine matters Develop a habit of reading with comprehension to achieve an optimum speed of 75 wpm Write reasonably and grammatically correct English
- The students, after completing the course, will be able to
- Understand slowly delivered spoken material in Indian English.
- Understand general purpose words of English.
- Use general purpose words of English to express himself in speaking reasonably clearly and correctly on routine matters.
- Write reasonably and grammatically correct English.
- Develop a habit of reading with comprehension to achieve an optimum speed of 75 WPM.
- Communicate effectively in a professional environment through speaking and writing to achieve desired objectives.

Course outcomes

- Seeks to develop the students' abilities in grammar, oral skills, reading, writing and study skills. students should improve their speaking ability in English both in terms of fluency and comprehensibility

Course Code: 2TDCE301
Course Name: Surveying

Course Objective

- To measure the land area, to prepare map and to find out the elevation of a point for constructional purpose.

Course Outcomes

- Students are expected to use basic surveying equipments like dumpy level,compass etc. perform chain survey, contour maps and carry out surveying worksrelated to land and civil engineering projects.

Course Code: 2TDCE302
Course Name: Material Technology

Course Objective

- To Learn the material manufacturing process, types applications and testing procedures for building materials.

Course Outcomes

- The student will be able to identify the use of different materials used in civil engineering.

Course Code: 2TDCE303
Course Name: Transportation Engineering-I

Course Objective

- To impart the knowledge of planning, design, construction and maintenance of railway tracks, airports and harbours.

Course Outcomes

- Student will be able to get knowledge on planning, design, construction and maintenance of highways as per IRC standards and other methods.

Course Code: **2TDCE304**
Course Name: **Hydraulics**

Course Objective

- To study the properties of a moving fluid like velocity and acceleration, and the forces on fluid through the continuity equation, Euler's and Bernoulli's equations.

Course Outcomes

- The student will be able to get Knowledge of the basic concepts and principles of fluidmechanics.

Course Code: 2TDCE305
Course Name: Building Drawing

Course Objective

- To understand the concept of building planning. To understand the various building codes to be followed while planning a building. To have the knowledge of various building components.

Course Outcomes

- Understanding of building planning, orientation, drawing and architectural aspects.

Course Code: 2TDCE401
Course Name: Advance Surveying

Course Objective

- To learn the different aspects of Geomatics surveying and the advancement in the different types of Surveying. The course will enable the engineers to the new frontiers of science like Hydrographic surveying, EDM, Global Positioning System and Photogrammetry and Remote Sensing.

Course Outcomes

- The student will be able to plan a survey for applications such as road alignment andheight of the building.

Course Code: 2TDCE402
Course Name: Soil Mechanics

Course Objective

- To provide the hands on training in determination of Engineering and index properties of soils, applied in field problems.

Course Outcomes

- Students have the ability to determine Index properties and classify the soil. They can alsoknow to determine engineering properties through standard tests and empirical correction withindex properties.

Course Code: 2TDCE403
Course Name: Mechanics of Structure

Course Objective

- To understand the stresses developed in bars, compounds bars, beams, shafts, cylinders and spheres.

Course Outcomes

- An ability to identify and compute various mechanical stresses in material and thematerial's response to each.

Course Code: 2TDCE404
Course Name: Computer Aided Drawing

Course Objective

- To have the knowledge of various software for building drawing / civil construction on digital form.

Course Outcomes

- Students will be able to draw and design civil engineering drawing with ease.

Course Code: 2TDCE405
Course Name: Entrepreneurship

Course Objective

- To help student understand the concept of self-employment, startups in the field of civil engineering.

Course Outcomes

- Students will be able to learn the basic concepts of Entrepreneurship in the field ofcivil engineering and how to create new opportunities in construction industry.

Course Code: 2TDCE501
Course Name: Irrigation Engineering

Course Objective

- To impart the knowledge of planning, design, and construction of various irrigation system.

Course Outcomes

- The student will gain knowledge on different methods of irrigation including canal irrigation.

Course Code: 2TDCE502
Course Name: Quantity Surveying and Costing -I

Course Objective

- To provide hands-on experience on estimation, measurement and rate analysis of various building components and works.

Course Outcomes

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

Course Code: 2TDCE503
Course Name: Transportation Engineering - II

Course Objective

- Introduce basic highway geometric element and familiarize with road parameters, traffic engineering.

Course Outcomes

- Students will have adequate knowledge to design flexible and rigid pavements basedon IRC guidelines. Further they know various techniques to evaluate performance of pavements , and traffic engineering.

Course Code: 2TDCE504
Course Name: Structural Design & Drafting – I (RCC)

Course Objective

- To bring about an exposure to advanced topics in structural design comprising of RCC retaining walls, water tanks, design of bridges and prestressed concrete.

Course Outcomes:

- At the end of the course the student acquires hands on experience in design and preparation of structural drawings for concrete structures normally encountered in Civil Engineering practice

Course Code: 2TDCE505
Course Name: Work Origination and Management

Course Objective

- To know about the basics and importance of construction management and contracts related to tenders and construction industry

Course Outcomes

- Students will have the ability to select shortest activity to construct a structure.

Course Code: 2TDCE601
Course Name: Public Health Engineering

Course Objective

- The course is developed and designed to cover the emerging needs and challenges in the public health system in the country

Course Outcomes

- Student should be able to acquire theoretical knowledge and develop practical skills to apply a scientific approach to the management of public health services.

Course Code: 2TDCE601
Course Name: Green Building Technology

Course Objective

- The course is developed and designed to cover the emerging needs and challenges in the development and efficient use of technology in green buildings, where buildings are developed keeping in mind less use of energy.

Course Outcomes

- The students completing the course will have ability to describe the concepts of sustainable design and green building techniquesincluding energy efficiency and indoor environmental quality management create drawings and models of their own personal green building project

Course Code: 2TDCE602
Course Name: Quantity Survey Costing - II

Course Objective

- To provide hands-on experience on estimation of RCC, steel, masonry buildings and roads and culverts and inculcate the fundamentals of valuation, contracts and tendering.

Course Outcomes

- Upon completion of the course, Students will have the ability to economic planning, estimation and costing for construction of bridges, culverts, water supply systems, andother various RCC and steel structures

Course Code: 2TDCE603
Course Name: Structural Design & Drafting – II (Steel)

Course Objective

- Top develop the knowledge in designing special steel structure

Course Outcomes

- At the end of the course the student acquires hands on experience in design and preparation of structural drawings for steel structures normally encountered in Civil Engineering practice.

Course Code: 2TDCE604
Course Name: Project

Course Objective

- The necessity of the project work has been emphasized on group work proper group functioning is a pre requisite for maximing output from a problem- solving group in work environment, proper organization of project work should be able to simulate such a situation that the student may be able to effectively work in groups and thus gain confidence to effectively take up responsibility in their careers . Thus student will prepare a final project report.

Course Code: 2TDCE605
Course Name: Professional Activity

Course Objective

- Acquire information from different sources .
- Prepare notes for given topic.
- Present the given topic in a seminar.
- Interact with peers to share thoughts .
- Prepare a report on industrial visit, expert lecture.

BACHELOR OF ENGINEERING (CIVIL)
PROGRAMME CODE - 05UGR003

Program Educational Objectives (PEOs)

- Capability to manage large infrastructure projects ensuring safe and cost-effective execution of projects having knowledge of fast-track construction and project management.
- Ability to use building software packages to calculate safe loads and stresses for designing structural members to ensure safety and serviceability.
- Ability to provide innovative solutions for traffic safety and efficiency through intelligent transportation systems, and mitigate the environmental impact of construction by adopting green building concepts.

Program Outcomes (POs)

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

PO-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.

PO-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.

PO-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.

PO-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.

PO-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.

PO-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.

PO-8 Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO-9 Individual or teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO-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.

PO-11 Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as member and leader in a team, to manage projects and in multidisciplinary environments.

PO-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 to technological change.

Program Specific Outcomes (PSOs)

- Proficiency in Civil Engineering problem identification, formulation, analysis, design and execution, optimizing the cost, time, quality, and safety using appropriate tools.
- Support the society with solutions to various Civil Engineering problems focusing on sustainable development and upholding professional ethics.

Course Code: 3TBPH101
Course Name: Engineering Physics

Course Objective

- To understand the basic laws of physics and their applications in engineering and technology.
- To develop scientific temper and analytical capability.
- To solve various engineering problems.

Course Outcome

- Gain a knowledge and understanding of fundamental physical concepts in the areas covered in this class.
- Apply an understanding of these concepts to various systems and devises.
- Acquire problem solving skills, mathematical techniques, and the ability to synthesize.
- The ability to formulate, conduct, analyzes and interprets experiments in engineering physics.

Course Code: 3TBMA102
Course Name: **Mathematics-I**

Course Objective

- To introduce the idea of applying differential and integral calculus to notions of curvature and to improper integrals. Apart from some applications it gives a basic introduction on Beta and Gamma functions.
- To introduce the fallouts of Role's. Theorem that is fundamental to application of analysis to Engineering problems.
- To develop the tool of ordinary differential equation for learning advanced Engineering Mathematics.
- To familiarize the student with functions of several variables that is essential in most branches of engineering. To develop the essential tool of matrices and linear algebra in a comprehensive manner.

Course Outcome

- This Syllabus has been designed to equip engineering student s with necessary mathematical tool's to handle mathematical problem in their core subjects.
- Through this syllabus they will learn many thing about calculus specially first order differential equation , Roles ,Lagrange's concept about existence of derivatives in some interval
- Expansion of function in an infinite series by Maclaurin's and Taylor theorem
- Partial derivative off unction's through which maxima minima of two variable function application of matrices in solving linear simultaneous equations, Eigen value Eigen vector,Calay-Hamilton theoremto find Inverse of a matrix ,and concept of vector space.

Course Code: 3TBME103
Course Name: Basic Mechanical Engineering

Course Objective

- To familiarize with the basic concept of Mechanical Engineering
- To familiarize with the scope of Mechanical Engineering
- To familiarize with the job prospects of Mechanical Engineer.

Course Outcome
At the end of this course students will able to:

- Identify engineering materials, their properties, testing and manufacturing methods encountered in engineering practice.
- Understand Concept of measurement by using measuring instrument Verniercalliper, Micrometer, Dial gauge, Slip gauge etc.
- Understand basics of thermodynamics and components of a thermal power plant
- Understand the construction, operation and performance of different IC engines.
- Understand basics of fluids, their properties and laws of fluid Mechanics.

Course Code: 3TBCE104
Course Name: Basic Civil & Engg Mechanics

Course Objective

- To introduce to student relevance of civil engineering for various engineering applications.
- To introduce to student various elements of buildings and construction materials.
- To introduce to student various methods of land survey and to make him use surveying equipment
- To make student aware of modern investigation techniques in land survey.
- To introduce to student about the water management and transportation engineering.
- Ability to apply knowledge of mathematics, science, and engineering.
- Solve for the resultants of any force systems.

Course Outcome
At the end of the course, the student will be able to:

- Describe the role of civil engineer in the development of the society and explain relationship of civil engineering with other branches of engineering and technology.
- Discuss types of buildings and select materials of construction.
- Explain the elements of water supply such as dam, canal and elements of transportation structures.
- Measure heights, distances and angles on ground using basic surveying instruments and plot them on paper.
- Explain the advantages of advances in civil engineering like remote sensing techniques, GIS and GPS.
- Determine the resultant force and moment for a given system of forces.

Course Code: 3TBCS105
Course Name: Communication Skills

Course Objective

- The objective of this course is to learn the second language learners' ability and to use the four fundamental language skills-reading writing speaking and listening.
- It will enable the students to speak English correctly and with confidence.

Course Outcome

- Student will develop knowledge, skills and judgment around human communication that facilitate their ability to work collaboratively with others.
- Such skills could include communication competencies such as managing conflict, understanding small group process, active listening, appropriate self disclosure, etc.

Course Code: 3TBHH106
Course Name: Health, Hygiene & Yoga

Course Objective

- It is very important for the protection of our health and helps to present the spread of communicable diseases personal hygiene has social and aesthetic values.
- The provision of hygiene information first impacts on knowledge and then practice.
- Yoga education helps in self discipline and self control, leading to immense amount of awareness concentration and higher level of consciousness.
- This course can prepare the students physically & mentally for the integration of their physical, mental and spiritual faculties so that the students can become healthier, saner and more integrated members of the society & of the nation.

Course Outcome

- The student to have good health.
- Student have good mental hygiene.
- Possess emotional stability.
- Integrated moral values.
- Attain higher level of consciousness.

Course Code: 3TBRO107
Course Name: Rural Outreach

Course Objective

- The main objective of introducing this course is to sensitize students about the socio-cultural aspects of the rural areas parochial to their colleges.
- Students are expected to observe, investigate and learn about the following aspects of the rural region:
- Demographics, Literacy, Geographical parameters of the Village
- Schemes of government of India and State of Madhya Pradesh in operation in the villages
- Social/ Cultural aspects ranging from popular dance forms, music and customs of the concerned village.

Course Code: 3TBCH201
Course Name: Engineering Chemistry

Course Objective

- Apply the electrochemical principles in batteries, understand the fundamentals of corrosion.
- Analysis of water for its various parameters and its significance in industrial and domestic Applications.
- Analyze microscopic chemistry in terms of atomic, molecular orbitals and Intermolecular forces
- Analysis of major chemical reactions that are used in the synthesis of molecules.
- Understand the chemistry of various fuels and their combustion

Course Outcome

- Describe and understand the operation of electrochemical systems for the production of electric energy, i.e., batteries. Explain the mode by which potable water is produced through the processes of screening, micro-Straining, aeration, coagulation and flocculation, sedimentation, flotation, filtration and disinfection.
- Recognize that molecular orbital theory is a method used by chemists to determine the energy of the electron in a molecule as well as its geometry.
- Demonstrate an ability to design, implement, and evaluate the results of experimentation using standard scientific methodologies such as hypothesis formulation and testing.
- Analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
- Rationalize bulk properties and processes using thermodynamic considerations.
- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
- List major chemical reactions that are used in the synthesis of molecules

Course Code: 3TBMA202
Course Name: Mathematics-II

Course Objective

- Students will demonstrate the ability to formulate, interpret and draw inferences from mathematical models.
- Students will demonstrate competence with a wide variety of mathematical tools and techniques.
- Students will demonstrate the ability to assess the accuracy, implications and limitations of their mathematical results.
- Students will demonstrate a breadth of general mathematical knowledge as well as depth in at least one area.

Course Outcome

- Today calculus has become the heart of every engineering stream.
- Through this syllabus student will learn different techniques of solving different kind of higher order ordinary and partial differential equations.
- Expansion of periodic function in an infinite series of sine and cosine function through Fourier series, Function of complex variable's based on complex number and also vector calculus based on vectors.

Course Code: 3TBEG203
Course Name: Engineering Graphics

Course Objective
- To familiarize with the construction of geometrical figures.
- To familiarize with the projection of 1D, 2D and 3D elements.
- To familiarize with the sectioning of solids and development of surfaces.
- To familiarize with the Preparation and interpretation of building drawing.

Course Outcome
- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to solid modeling
- Exposure to creating working drawings
- Ability to draw projections and analyzing multiple views of object.

Course Code: 3TBEE204
Course Name: Basic Electrical Engineering

Course Objective
- To provide knowledge of basic concepts related to electrical engineering.
- To provide knowledge of basic Circuits: 1- phase AC Circuits, 3-phase AC Circuits, Magnetic Circuits, Electrical Machines

Course Outcome
After successful completion of course,
- Students are expected to possess an in-depth understanding and Knowledge of 1-phase A Circuits, 3-phase AC Circuits, Magnetic Circuits, Electrical Machines
- Develop the concepts of basic electrical engineering for all the undergraduate students of different branches of engineering.

Course Code: 3TBCS205
Course Name: Basic Computer Engineering

Course Objective
By the end of this course, the student will be able to:-
- Analyzing problems, and designing and implementing algorithmic solutions.

- Solving problems properly, achieving an implementation that is correct, effective and efficient.
- Using computers at user level, including operative systems and programming environments.
- Knowledge of computer equipment, including both hardware and software.
- Identifying information needs to solve problems, recovering information and applying it to the resolution.
- Opportunity to learn key concepts of computer, as well as fundamentals and applications of computer.

Course Outcome

- Analyzing problems and designing and implementing algorithmic solutions.
- Solving problems properly, achieving an implementation that is correct, effective and efficient.
- Using computers at user level, including operative systems and programming environments.
- Knowledge of computer equipment, including both hardware and software.
- Identifying information needs to solve problems, recovering information and applying it to the resolution.
- Opportunity to learn key concepts of computer, as well as fundamentals and applications of computer.

Course Code: 3TBMP206
Course Name: Manufacturing Practices

Course Objective

- To familiarize with the basic soft tools and equipments used in fitting , carpentry ,sheet metal ,welding and smithy
- To familiarize with the production of simple models in the above trades.

Course Outcome

- On completion of this course, students will be able to
- Make half lap joint and dovetail joint in carpentry.
- Make welded lap joint, butt joint and T-joint.
- Prepare sand mould for cube, conical bush, pipes and V pulley.
- Fabricate parts like tray, frustum of cone and square box in sheet metal.

Course Code: 3TBED207
Course Name: Entrepreneurship Development

Course Objective

- Understanding basic concepts of entrepreneurship and key steps in the elaboration of business ideas,
- Developing personal creativity and entrepreneurial initiative.

Course Outcome

- Understanding basic concepts in the area of entrepreneurship,
- Understanding the stages of the entrepreneurial process, adopting of the key steps in the elaboration of business ideas, Developing personal creativity and entrepreneurial initiative.

Course Code: 3TBBE- 301
Course Name: Mathematics-III

Course Objective

- To introduce effective mathematical tools for the Numerical Solutions algebraic and transcendental equations.
- To enable young technocrats to acquire mathematical knowledge to understand Laplace transformation, Inverse Laplace transformation which are used in various branches of engineering?
- To acquaint the student with mathematical tools available in Statistics needed in various field of science and engineering.

Course Outcomes

- The curriculum of the Department is designed to satisfy the diverse needs of students.
- Coursework is designed to provide students the opportunity to learn key concepts of Transforms, Numerical Methods for Solving Ordinary Differential Equations of First Order & Concept of Probability.

Course Code: 3TBCE-302
Course Name: Building Material & Construction

Course Objective

- To learn the manufacturing process, types, applications and testing procedures for building materials

Course Outcome

- The student will be able to identify the use of different materials used in civil engineering.

Course Code: 3TBCE-303
Course Name: Surveying

Course Objective

- To measure the land area, to prepare map and to find out the elevation of a point for constructional purpose.

Course Outcomes

- Students are expected to use basic surveying equipments like dumpy level, compass etc. prepare chain survey, contour maps and carry out surveying works related to land and civil engineering projects.

Course Code: 3TBCE-304
Course Name: Building Planning & Architecture

Course Objective

- To understand the concept of building planning and architecture. To understand the various building codes to be followed while planning a building. To have the knowledge of various building components.

Course Outcomes

- Understanding of building planning, orientation, drawing and architectural aspects.
- Representation of a building on Paper.

Course Code: 3TBCE-305
Course Name: Strength of Material

Course Objective

- To understand the stresses developed in bars, compounds bars, beams, shafts, cylinders and spheres.

Course Outcomes

- An ability to identify and compute various mechanical stresses in material land the material's response to each.
- An ability to apply this knowledge in science and engineering models

Course Code: 3TBCE-306
Course Name: Software lab –I Auto CAD

Course Objective

- The objective of this course is to teach student the basic commands and tools necessary for professional 2D and 3D drawing, design and drafting using AutoCAD

Course Outcomes

- Students will become familiar with Auto Cad two dimensional drawings.

Course Code: STCE-307
Course Name: Skill -I: Water Harvesting & management

Course Objective

- Sensitizing and educating learners on augmentation and utilization of water resources; imparting knowledge, skills and expertise to understand water harvesting techniques; and enabling learners to act as trainers and organizers at household and community levels for efficient water management in terms of its usage and also for water conservation.

Course Code: STME-307
Course Name: Skill -I: Basic Automobile Maintenance

Course Objective:

- On completion of this course, the students are expected to understand the various repair activities, fundamental principle, operation, performance of IC Engines and its auxiliary systems.

Course Outcomes

- Acquire the knowledge of engine components and other systems likesteering, brake, transmission, electrical etc.
- Understand the working and repair of engine auxiliary systems.
- Understand the various maintenance activities of four wheeler
- Understand the combustion aspects of CI Engines

Course Code:3TBBE 401
Course Name: Energy & Environmental Engg.

Course Objective

- The objective of this Course is to provide an introduction to energy systems and renewable energy resources, with a scientific examination of the energy field.
- An emphasis on alternative energy sources and their technology and application.

Course Outcome

On completion of this course, students will be able to

- Describe a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- Critically analyze technical subject matter (written or oral) for scientific merit apply learned environmental knowledge and understanding to solve technical/research problems in new contexts

Course Code: 3TBBE-401
Course Name: Energy & Environmental Engineering

Course Objective

- The objective of this Course is to provide an introduction to energy systems and renewable energy resources, with a scientific examination of the energy field and an emphasis on alternative energy sources and their technology and application.

Course Outcomes

- On completion of this course, students will be able to describe a system, component, or process to meet desired needs within realistic constraints such as economic,

environmental, social, political, ethical, health and safety, manufacture ability, and sustainability.

- Critically analyze technical subject matter (written or oral) for scientific merit apply learned environmental knowledge and understanding to solve technical /research problems in new contexts.

Course Code: 3TBCE-402
Course Name: Construction Technology

Course Objective

- To know about the supporting structures, building amenities and construction equipment's.

Course Outcomes

- Ability to perform various tests on concrete ingredients and also on concrete (Fresh and hardened).
- Ability to analyze various special concrete and their applications

Course Code: 3TBCE-403
Course Name: Structural Analysis-I

Course Objective

- To introduce the students to basic theory and concepts of structural analysis and the classical methods for the analysis of buildings.

Course Outcomes

- Ability to distinguish between determinate and indeterminate structures.
- Ability to analyze determinate and indeterminate structures.
- Ability to use influence line diagrams as a valid tool for structural analysis.

Course Code: 3TBCE-404
Course Name: Fluid Mechanics

Course Objective

- To study the properties of a moving fluid like velocity and acceleration, and the forces on fluid through the continuity equation, Euler's and Bernoulli's equations

Course Outcomes

- The student will be able to get knowledge of the basic concepts and principles of fluid mechanics.
- The student will get ability to analyze fluid flow problems with the application of momentum and energy equations.

Course Code: 3TBBE-401
Course Name: Engineering Geology & Remote Sensing

Course Objective

- To understand the properties of rocks, various types of strength of rocks, stress-strain relation of rocks, grouting, system, testing, the application of rocks for engineers.

Course Outcomes

- Ability to apply geological concepts and approaches to rock engineering projects.
- Ability to identify and classify rocks using basic geological classifications and understand the formation and properties of each category.

Course Code: 3TBCE-406
Course Name: Software lab –II STAAD. Pro

Course Objective:

- Course is designed for civil and structural engineers to have hands-on experience onwidely used software for structural analysis and design. Develops skills and techniques to develop, maintain and support high standard design requirements.

Course Outcome

- The learner cultivates powerful analysis and designing abilities that can be implemented by niche industries and leading engineering consultancies

Course Code: STCE-407
Course Name: Fire Safety & Management

Course Objective

- Students will be able to recognize and evaluate occupational safety and health hazards in the workplace, and to determine appropriate hazard controls following the hierarchy of controls.
- Students will furthermore be able to analyze the effects of workplace exposures, injuries and illnesses, fatalities and the methods to prevent incidents using the hierarchy of controls, effective safety and health management systems and task oriented training.

Course Code: STCE-407
Course Name: Advanced Material Testing

Course Objective

- Understanding basic concepts of entrepreneurship and key steps in the elaboration of business ideas, Developing personal creativity and entrepreneurial initiative.

Course Code: STME-408
Course Name: Basic Refrigeration and Air-Conditioning Maintenance

Course Objective

- To repair and service in refrigerator, water cooler, bottle cooler, deep freezer, Cooler, Walk in Cooler, Ice candy plant, Cold storage, Ice plant, Split Air Conditioner, Package Air Conditioner, Central Air Conditioner

Course Outcomes

- Acquire the knowledge of various Refrigeration and Air-conditioning systems like evaporator,
- Condenser, Expansion Valve, compressor etc.
- Able to diagnose and repair the faults in the Refrigeration systems.
- Understand the various maintenance activities of Air-Conditioning systems.
- Understand the Performance aspects of Refrigerator and Air-conditioner.

Course Code: 3TBCE-501
Course Name: Transportation Engineering –I

Course Objective

- To impart the knowledge of planning, design, construction and maintenance of railway tracks, airports and harbours.

Course Outcomes

- Student will be able to get knowledge on Transportation system and basic planning& design of bridge by different methods.

Course Code: 3TBCE-502
Course Name: Advanced Surveying

Course Objective

- To learn the different aspects of Geo-mastics surveying and the advancement in the different types of Surveying.
- The course will enable the engineers to the new frontiers of science like Hydrographic surveying, EDM, Global Positioning System and Photogrammetry and Remote Sensing.

Course Outcomes

- The student will be able to understand the basic principles of surveying and how there implemented in practice.
- The student will be able to plan a survey for applications such as road alignment and height of the building.

Course Code: 3TBCE-503
Course Name: Structural Analysis –II

Course Objective

- To enable student to solve statically indeterminate structures.

Course Outcomes

- The student will have the knowledge on advanced methods of analysis of structures including space and cable structures.

Course Code: 3TBCE-504
Course Name: Structural Design & Drawing -1 (R.C.C.)

Course Objective

- To bring about an exposure to advanced topics in structural design comprising of RCC retaining walls, water tanks, yield line theory, flat slabs, design of bridges and pre-stressed concrete.

Course Outcomes

- The student shall be in a position to design the basic elements of reinforced concrete structures.

Course Code: 3TBCE-505
Course Name: Irrigation Engineering & Hydrology

Course Objective

- To acquire analytical ability in solving mathematical problems as applied to the respective branches of Engineering.

Course Outcomes

- The student will gain knowledge on different methods of irrigation including canal irrigation.

Course Code: 3TBCE-506
Course Name: Software lab –III 3Ds Max

Course Objective

- The primary objective of this course is to teach students the essentials of working in3D using an array of features and tools.
- This course teaches new users the basics of creating, embellishing, and animating 3D scenes.

Course Outcomes

- After completing this course, student should be able to: Model object susing a variety of techniques Design and apply materials Adjust basic lighting animate simple object.

Course Code: STCE-507
Course Name: Waste management

Course Objective
The overall objectives of the waste management assessment are summarized below:

- To assess the activities involved for the proposed and determine the type, nature and estimated volumes of waste to be generated.
- To identify any potential environmental impacts from the generation of waste at the site.
- To recommend appropriate waste handling and disposal measures / routings in accordance with the current legislative and administrative requirements.
- To categories waste material where practicable (inert material / waste fractions) for disposal considerations i.e. public filling areas / landfill.

Course Code: STCE-507
Course Name: Elective – I Personality Development& Communication Skills

Course Objective

- The objective of this course is to learn the second language learner's ability and to use the four fundamental language skills-reading writing speaking and listening. It will enable the students to speak English correctly and with confidence.

Course Outcome

- Student will develop knowledge, skills and judgment around human communication that facilitate their ability to work collaboratively with others.
- Such skills could include communication competencies such as managing conflict, understanding small group process, active listening, appropriate self-disclosure, etc.

Course Code: 3TBCE-601
Course Name: Transportation Engg. - II

Course Objective

- To introduce basic highway geometric element and familiarize with its design.
- To attain knowledge on the concepts of planning and design of airport components

Course Outcomes

- Student will be able to get knowledge on planning, design, construction and maintenance of highways as per IRC standards and other methods.

Course Code: 3TBCE-602
Course Name: Water Supply & Waste Engineering

Course Objective

- To learn the fundamental concepts in the field of water supply and environmental engineering and design of water supply schemes and treatment units.

Course Outcomes

- The student will gain knowledge on treatment process of drinking water and wastewater. Ability to understand permissible parameter of noise for human.

Course Code:3TBCE-603
Course Name: Environmental Engineering-I

Course Objective

- Learn the objectives and methods of water treatment and study the features and function of different water treatment units.

Course Outcome

- The students after completing this course will be able to design and draw various units of municipal water treatment plants.

Course Code: 3TBE-604
Course Name: Structural Design & Drawing –II (Steel)

Course Objective

- To develop knowledge in designing special steel structures.

Course Outcomes

- The students would have knowledge on the design of structural steel members subjected to compressive, tensile and bending forces, as per current code.

Course Code: 3TBCE-605
Course Name: Quantity Surveying & Costing

Course Objective

- To provide hands-on experience on estimation of RCC, steel, masonry buildings and roads and culverts and inculcate the fundamentals of valuation, contracts and tendering.

Course Outcomes

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

Course Code: 3TBCE-606
Course Name: Software lab –IV

Course Objective

- Primavera is the standard project management software tool used worldwide in industries such as Construction, Oil & Gas, Manufacturing, Energy and even IT.
- Primavera P6 helps users manage projects, handle portfolios, evaluate performance, control costs and track progress.

Course outcomes

- Develop the Master Schedule, Time Baseline & Cost Baseline. Project, Program & Portfolio Management. Resource Planning, Updating & creating Project Reports. Analysis & Forecasting the Project performance and further decision making.

Course Code: STCE-607
Course Name: Skill-IV Quantity Estimation & Bill Preparation

Course Objective

- To learn the fundamental concepts in the field of water supply and environmental engineering and design of water supply schemes and treatment units.

Course Code: STCE-607
Course Name: Skill-IV Disaster Management

Course Objective

- To learn the fundamental concepts in the field of water supply and environmental engineering and design of water supply schemes and treatment units.

Course Code: 3TBCE-701
Course Name: Design of Hydraulic Structure

Course Objective

- The purpose of this course is to get exposure about the function of various hydraulic structures.

Course Outcomes

- Ability of provide support to water retaining structures.
- Ability to design of hydraulic structures

Course Code: 3TBCE-702
Course Name: Geotechnical Engineering –I

Course Objective

- To provide the hands on training in determination of Engineering and index properties of soils, applied in field problems.

Course Outcomes

- Students have the ability to determine Index properties and classify the soil. They can also know to determine engineering properties through standard tests and empirical correction with index properties

Course Code: 3TBCE-703
Course Name: Environmental Engineering –II

Course Objective

- The course provides a comprehensive knowledge in environmental science, environmental issues and the management.

Course Outcomes

- 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

Course Code: 3TBCE -704
Course Name: Advanced Structural Design-I (RCC)

Course Objective

- Preparation of influence lines and effect of rolling loads. Introduce classical methods in analyzing indeterminate structures (trusses, beams and plane frames).

Course Outcomes

- At the end of the course the student acquires hands on experience in design and preparation of structural drawings for concrete structures normally encountered in Civil Engineering practice.

Course Code: TBCE-705
Course Name: Computational Methods in Structural Engineering

Course Objective

Course Outcomes

- Identify, formulate, and solve statically indeterminate structural problems using direct stiffness method
- Identify, formulate, and solve statically indeterminate structural problems using finite element method
- Use the techniques, skills, and modern engineering tools necessary for analyzing and designing statically indeterminate structures
- Demonstrate base-level competency in structural design using design codes/specifications/software.

Course Code: TBCE-705
Course Name: Traffic Engineering

Course Objective

- To impart the knowledge of planning, design, construction and maintenance of railway tracks, airports and harbors.
- This subject caters to the need of technician engaged in the investigation, planning, construction & maintenance of railway, bridges and tunnels. In Practical field each component of transportation is a specialized branch of engineering.
- This subject aims at basic knowledge about railway, bridges, and tunnels in respect of their various types, materials used, functions of component parts, methods of construction, planning principles, aspects of supervision and maintenance.

Course Outcomes

- Student will be able to get knowledge on planning, design, construction and maintenance of highways as per IRC standards and other methods.

Course Code: TBCE-705
Course Name: Industrial Waste Treatment

Course Objective

- To improve the quality of life of the local community through management of waste resources.
- To ensure that the natural environment is used wisely as well as judiciously.
- To awareness for heal and safety.

Course outcomes

- After successful completion of this course students will able to
- Enhance the use of recycled material.
- Take care of issues related to Hazard Management while working as chemical engineer.
- Assess the effects of pollution on resources.
- Justify need of renewable energy for sustainable development.
- Identify concept of waste management and methods of recycling.
- Prepare list of use of dos and don'ts.

Course Code: TBCE-705
Course Name: Cost Effective & Eco-Friendly Construction

Course Objective

- To Enable The Student For Learning Sustainable Development With Eco Friendly Materials For Construction Like , Fly Ash, Ferro-Cement, Lime, Fiber, Stone Dust, Red Mud, Gypsum, Alternate Wood, Polymer**.**

Course Outcomes

- On completion of this course, students will be able to describe a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacture ability, and sustainability.
- Critically analyze technical subject matter(written or oral) for scientific merit apply learned environmental knowledge and understanding to solve technical /research problems in new contexts

Course Code: TBCE-705
Course Name: Environmental Impact Assessment

Course Objective

- To improve the quality of life of the local community through management and conservation of natural resources.

- To ensure that the natural environment is used wisely as well as judiciously. The natural resources are continuously available for the benefit and enjoyment of future generations.
- To decrease vulnerability and improve adaptation capacity among poor local communities associated with Climate Change.

Course Outcomes

- On completion of this course, students will be able to describe a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufactureability, and sustainability.
- Critically analyze technical subject matter(written or oral) for scientific merit apply learned environmental knowledge and understanding to solve technical /research problems in new contexts.

Course Code: TBCE-801
Course Name: Construction Planning & Management

Course Objective

- Provide the knowledge of construction planning to Manage the cost, timing, and quality of the project, at all times focused on project success

Course Outcomes

- Students will have the ability to select shortest activity to construct a structure.
- Students will have the ability to economic planning for construction.

Course Code: TBME-801
Course Name: Work Study & Ergonomics

Course Objective

- To provide basic understanding to the students exactly the concept and significance of work study and ergonomics. To inculcate analyzing skills among the students with respect to work place design, working postures and lifting tasks.

Course Outcomes

- Identify the appropriate type of plant location, layout and material handling techniques
- Apply and implement the manufacturing planning and control strategies in industry

Course Code: 3TBCE-802
Course Name: Geo -Technical Engineering –II

Course Objective

- Learn the principle types of foundation and the factors governing the choice of the most suitable type of foundation for a given situation, settlement of foundation

Course Outcomes

- 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.

Course Code: 3TBCE-803
Course Name: Advanced Structural Design- II (Steel)

Course Objective

- To learn the fundamental concepts in the field of water supply and environmental engineering and design of water supply schemes and treatment units.

Course Outcomes

- At the end of the course the student acquires hands on experience in design and preparation of structural drawings for steel structures normally encountered in Civil Engineering practice.

Course Code: 3TBCE-804
Course Name: Structural Dynamics & Earthquake Engineering

Course Objective

To expose the students to vibration theory and problems, earthquake hazards and earthquake engineering principles, earthquake disaster management.

Course Outcomes

- Graduates of the program will be able to demonstrate in-depth knowledge of the discipline and build capability to apply that knowledge to structural dynamics.
- Program graduates will gain knowledge and skill in integrating Earthquake engineering concepts across multiple disciplines.
- Graduates will have the ability to employ technical knowledge and leadership skills to Earthquake engineering research and consultancy problems.

Course Code: 3TBCE-804
Course Name: Pavement Design

Course Objective

- To develop skills in conducting analysis of pavements by calculating the response due to vehicular loading
- To perform design of rigid and flexible pavements based on traffic and environmental factors.

Course Outcomes

- Acquire in-depth knowledge of Transportation Engineering, including wider and global perspective, with an ability to discriminate, evaluate, analyse and synthesis existing and new knowledge, and integration of the same for enhancement of knowledge.

- Analyse complex Transportation Engineering problems critically, apply independent judgement for synthesizing information to make intellectual and/or creative advances for conducting research in a wider theoretical, practical and policy context.

Course Code: 3TBCE-804
Course Name: Air Quality Monitoring & Control

Course Objective

- To make the students aware of history of air pollution; definition of air pollution and various types of sources and classification of air pollutants.
- To make the student aware of techniques and instrumentation of ambient air monitoring, establishment of ambient air monitoring stations; stack monitoring and experimental analysis of air gaseous and particulate air pollutants; standards and limits.

Course Outcomes

- To develop environmental scientists and engineers and sensitize them towards environmental issues.
- To acquire analytical skills in assessing environmental impacts through a multi disciplinary approach.
- To identify environmental problems and solutions through organized research.
- To improve the communication and writing skill so as to face the competitive world.

Course Code: TBCE-804
Course Name: Energy Efficient & Green Building

Course Objective

- To introduce the different concepts of sustainable design and green building techniques and how they may be synthesized to best fit a specific construction project.

Course Outcomes

- Students should be able to describe the importance and necessity of green building.
- Students should be able to assess a building on the norms available for green building.
- Students should be able to suggest materials and technologies to improve energy efficiency of building.
- Students should be able to design and assess building with norms of Vaastu-shastra.

Course Code: 3TBCE-804
Course Name: Design of Pre-stressed Concrete Structure

Course Objective

- To introduce the need for prestressing as well as the methods, types and advantages of prestressing to the students. Students will be introduced to the design of prestressed concrete structures subjected to flexure and shear.

Course Outcomes

After learning the course, the students should be able to:

- apply concepts & methods for pre stressing systems for different materials.
- compute stresses in beams due to transverse loads & prestressing
- determine the losses in beams due to prestress, short- and long-term deflection, flexura land shear strength of beam
- design the pre-tensioned and post-tensioned concrete beams & slab, anchorage zones.
- analyze and design substructure, foundation and adjoining elements.

DOCTOR OF PHILOSOPHY (CIVIL ENGINEERING)
PROGRAMME CODE -PH.D001

Program Educational Objectives (PEOs)

- [PEOs:1] Graduates of the PhD program lead software/system research projects in Universities or Research Labs.
- [PEOs:2] An Enviroment that encourages the students originality and creativity in their Research.
- [PEOs:3] Graduates of the PhD program produce software packages/tools that significant benefit the society and industry.
- [PEOs:4] Publishing the results of their research in high-profile scientific journals, through constructive feedback of written work and oral presentations.

Program Outcomes (POs)

- **PO1.** This programme has a thorough knowledge of the literature and a comprehensive understanding of scientific methods and techniques applicable to their own research.
- **PO2.**This programme develops the ability to critically evaluate current research and research techniques and methodologies.
- **PO3.** This programme opens the opportunity for the post graduation students in respective stream tostart research work in the interesting area which will be helpful for society.
- **PO4.** This programme creates self-direction and originality in tackling and solving problems.

Program specific outcomes (PSO's)

- **PSO.1** Develop knowledge, understanding and expertise in their chosen field of Civil Engineering.
- **PSO.2** Develop an understanding of eco-friendly software process and impact of ease of work and make eco friendly environment.
- **PSO.3**. Provide opportunities to excel in academics, research or industry expertise in their chosen field of civil Engineering
- **PSO.4.** Student makes advancement of the state-of-the-art in the field of Civil Engineering by solving an original problem

- **PSO.5.** Contribute to the advancement of knowledge in the field by solving original problems and/or performing insightful analysis of systems or techniques.

Course Code:
Course Name: Research Methodology

Course Objectives

- The objective of imparting quality and creative research with an in-depth understanding and integrated knowledge of advanced applicable theory in the field of Computer Science and Engineering

Course Outcomes

- To enable for analyzing and identifying problems and provide the appropriate solution to solve the specific problem. It also provides the educated candidates for employment which require in the academic and non academic file

Course Code:
Course Name: Research and Publication Ethics

Course Objective

- The objective of the course is to enable M. Phil/Ph.D scholar to understand about the publication ethics and publication misconduct and to create the awareness.

Course Outcome

- After learning this subject scholars will be able to understand the concepts and process of research and aware about the publication ethics and publication misconduct.

Course Code:
Course Name:Advanced Construction Technology

Course Objective

- To present the new technology of material of construction.
- To provide a coherent development to the students for special concrete.
- To involve the application of scientific and technological knowledge of timber, plywood, paints and glass materials.

Course Outcome

- To develop and innovate thenewandsmart materials for construction.
- To innovate new characteristics of Special Concrete.
- For research anddevelopment about timber, plywood, paints and glass materials.
- To get diverse knowledge of Advanced technology practices applied.

Course Code:
Course Name: Structural Engineering (STEEL)

Course Objective

- To present the new technology in behaviour of members subjected to combined forces.
- To provide a coherent development to the students for structural design.
- To involve the application of scientific and technological knowledge of behaviour of column bases and gantry girders.

Course Outcome

- To develop and innovate the new design for construction.
- To innovate new characteristics of designing Roof trusses.
- For research and development of designing Plate Girders.
- To get diverse knowledge of designing members subjected to combined forces.

Course Code:
Course Name: Structural Engineering Design (RCC)

Course Objective

To present the new technogy in the concept of reinforced cement concrete and different method of design of reinforced concrete.
To provide a coherent development to the analysis and design of footings and staircases by limit state method.
To involve the application of scientific and technological knowledge of concept of working stress method to analysis and design of beams and the concept of limit state method to analysis and design of beams, slabs and columns.

Course Outcome

After completion of this course, students will be able to:

- To develop and innovate the different method of analysis and design of reinforced concrete structures.
- To innovate new characteristics of reinforced concrete structure.
- For research and development of analysis and design of beams by working stress and limit state method
- To get diverse knowledge of analysis and design of other elements such as slabs, columns, footings and staircases.

Course Code:
Course Name: HIGHWAY ENGINEERING

Course Objective

- To present the new technogy in various means of transportation i.e., Railway Engineering, Bridge Engineering, Tunnel Engineering and Harbor Engineering.
- To provide a coherent development to the concepts of Geometric design of Railway Engineering.

- To involve the application of scientific and technological knowledge of concepts of Bridge Engineering & concepts of Tunnel and Harbor Engineering.

Course Outcome

- After completion of this course, students will be able to :
- To develop and innovate the broad vision and knowledge of different means of Transportation Engineering.
- To innovate new characteristics of safe design for railway track with high speed.
- For research and development of selection of site and collection of data for Bridge Design.
- To get diverse knowledge of methods of construction of Tunnel and Harbour.

Course Code:
Course Name: WATER RESOURCES ENGINEERING

Course Objective

- To present the new technology in different types of the dam and its design & concepts of spillways.
- To provide a coherent development to the concepts of Water Requirement of Crops.
- To involve the application of concepts of cross drainage works & concepts of design of canal

Course Outcome

- To develop and innovate the broad vision and knowledge of differenttypes of the dam and its design &concepts of spillways.
- To innovate new characteristics of Water Requirement of Crops.
- To get diverse knowledge of canal irrigation and cross drainage works.

DIPLOMA IN ENGINEERING (CSE)
PROGRAMME CODE -05DIP004

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

- Analyze, design and create computing solutions for scientific and multidisciplinary engineering challenges.
- Pursue a successful career in industry/academia/research/government driven by strong foundations and in-depth domain knowledge and contribute to the engineering sphere as a competent professional.
- Demonstrate an exceptional involvement and active participation in Research and Development leading to new innovations and optimized solutions.
- Engage in lifelong learning with persistent scientific temper for professional advancement and effective communication of the technical information.
- Work effectively in multi-disciplinary and multi-cultural environments by respecting professionalism and ethical practices within organization and society at national and international level.
- To prepare graduates who will be successful professionals in industry, government, academia, research, entrepreneurial pursuit and consulting firms.
- To prepare graduates who will achieve peer-recognition; as an individual or in a team; through demonstration of good analytical, research, design and implementation skills

PROGRAM OUTCOMES (POs)

- PO1. To prepare students to excel in Information Technology Diploma programme for
  immediate employment or to succeed in computing industry profession through quality
  education. (Preparation)
- PO2. To provide students with a solid foundation in mathematical, scientific and engineering fundamentals required to solve computing and information technology problems.(Technical Competence)
- PO3. To train students with good scientific and Information technology breadth so as to
  comprehend and create innovative computing and Information technology products and
  solutions for real life problems. (Scope)
- PO4. To inculcate in students professional and ethical attitude, communication skills, team work skills, multi-disciplinary approach and an ability to relate computer engineering issues with social awareness. (Professionalism)
- PO5. To provide students with academic environment aware of excellence leadership and
  the life-long learning needed for a successful profession career as an engineers, technocrat, administrator or an entrepreneur. (Learning Environment)

- PO6. To impart world class value based technical education in all aspects of Computer
  Science and Engineering through state of the art infrastructure and innovative approach.
- PO7. To produce ethical, motivated and skilled engineers through theoretical knowledge
  and practical applications.
- PO8. To inculcate ability for tackling simple to complex problems individually as well as
  in a team.
- PO9. To develop globally competent engineers with strong foundations, capable of out of
  the box thinking so as to adapt to the rapidly changing scenarios requiring socially conscious green computing solutions.

PROGRAMME-SPECIFIC OUTCOMES (PSOs)

- PSO1. Able to apply knowledge of mathematics, science, and in different streams of Engineering.
- PSO2. Able to demonstrate skills to use modern engineering tools and software to analyze
  technical problems.
- PSO3. Able to identify, formulate and solve engineering problems related to Information
  Technology.
- PSO4. Able to develop logic and programming skills through immersion in the fundamental programming.
- PSO5. Able to demonstrate knowledge of professional and ethical responsibilities.
- PSO6. Able to demonstrate effective communication skills of computer subjects, in both
  oral and written forms.
- PSO7. Able to demonstrated leadership and capability to participate in teamwork in an
  environment with different disciplines of engineering, science and business.
- PSO8. Able to develop confidence for self-education, teamwork and ability for life-long
  learning.
- PSO 9. Able to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Course Code: 2TDDE 101
Course Name: Mathematics-I

Course Objectives

- Mathematics forms backbone for all technologies and hence occupies an important place in the curriculum of polytechnic education. The subject is equally important for the future self-development of Polytechnic students. In designing the curriculum for foundation course, the admission level to Polytechnics has been considered as 10th Board examination and mathematical needs of Technical subject have been given due consideration.

Course Outcomes

- Through this syllabus the diploma student will learn the basic concepts of counting principle through permutation and combination , expansion of a binomial function , breaking up a complex fraction into simpler partial fractions, trigonometric ratio and concept of matrix

Course Code: 2TDDE 102
Course Name: Applied Mechanics

Course Objectives

- Ability to apply knowledge of mathematics, science, and engineering.
- Solve for the resultants of any force systems.
- Determine equivalent force systems.
- Determine the internal forces in plane frames, simple span trusses and beams.
- Solve the mechanics problems associated with friction forces.
- Obtain the centroid, first moment and second moment of an area.

Course Code: 2TDDE 103
Course Name: Physics

Course Objectives

- The development of various diploma engineering topics is primarily based on the fundamental principles. The different principles of physics have a wide range of applications in all the branches of engineering. A reasonably good level of knowledge of physics, therefore, forms sound base for engineering students. Physics can be considered as a basic tool in the hands of an engineer through which he can pure his studies and research work in technical field. The foundation level of the subject acquired by the student is kept in mind for selection of the topics. To create interest in the students more stress is given on the applications, in engineering field.

Course Outcomes

- The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competencies Select proper measuring instrument on the basis of range, least count & precision required for measurement.
- Analyze properties of material & their use for the selection of material mostly applicable for engineering users.
- Identify good & bad conductors of heat and proper temperature scale for temperature measurement Identify.
- Analyze, discriminate and interpret logical sequence of field problems with the study of physics.

- Analyze variation of sound intensity with respect to distance and follow the principles used in the physical properties, its measurement and selections.

Course Code: 2TDDE 104
Course Name: Environmental Engineering & Safety

Course Objectives

- To improve the quality of life of the local community through management and conservation of natural resources.
- To ensure that the natural environment is used wisely as well as judiciously. The natural resources are continuously available for the benefit and enjoyment of future generations.
- To decrease vulnerability and improve adaptation capacity among poor local communities associated with Climate Change.

Course Outcomes

- After successful completion of this course students will able to
- Enhance the use of recycled material for construction work and optimize the use of conventional energy sources.
- Take care of issues related to Conservation & Hazard Management while working as chemical engineer.
- Assess the effects of pollution on resources.
- Justify need of renewable energy for sustainable development.
- Identify concept of waste management and methods of recycling.
- Prepare list of use of do's and don'ts applicable during disasters.

Course Code: 2TDDE105
Course Name: Communication Skill-I

Course Objectives

- The main aim of communicating is to pass information so that other people may know about what you are talking off. This can be through facts or even feelings.

Course Code: 2TDDE201
Course Name: Mathematics-II

Course Objectives

- The main of teaching mathematics is to provide students with an adequate knowledge on the subject to serve as a tool in the learning of various engineering subjects and to solve technical problems encountered during the course of study. It can also serve as a foundation for their future work involving computation.

Course Outcomes

- Here in this syllabus student will learn some concept of co-ordinate geometry, some part of statistics viz. mean, median, mode, deviation etc., and of course a brand new concept of differential calculus and integral calculus which play an important role in technical subjects then concept of vector number, how they are added subtracted and multiplied etc.

Course Code: 2TDDE202
Course Name: Engineering Graphics

Course Objectives

- To familiarize with the construction of geometrical figures.
- To familiarize with the projection of 1D, 2D and 3D elements.
- To familiarize with the sectioning of solids and development of surfaces.
- To familiarize with the Preparation and interpretation of building drawing.

Course Outcomes

- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to solid modelling
- Exposure to creating working drawings
- Ability to draw projections and analysing multiple views of object.

Course Code: 2TDDE203
Course Name: Chemistry

Course Objectives

- The objective of the Chemistry in polytechnique courses is to acquaint the students with the basic phenomenon/ concepts of chemistry, the student face during course of their studying the industry. The student with the knowledge of the basic chemistry will understand and explain scientifically the various chemistry related problems in the industry/engineering field. The student will able to understand the new developments and break through sufficient lying engineering and technology.
- To appreciate the need and importance of chemistry for industrial and domestic use.
- To gain the knowledge on existing and future upcoming materials used in device fabrication.
- To impart basic knowledge related to material selection and the techniques for material analysis.
- To impart knowledge of green chemical technology and its applications.
- Demonstrate knowledge of science behind common impurities in water and methods to treat them.
- Knowledge of methods to determine the calorific value of fuels.
- Apply the science for understanding corrosion and its prevention.

Course Outcomes
After the completion of the course, the learner will be able to:

- Analyze the need, design and perform a set of experiments.
- Differentiate hard and soft water, solve the related numerical problems on water purification and its significance in industry and daily life.
- Apply the principles of green chemistry in designing alternative reaction methodologies to minimize hazards and environmental degradation.
- Understand the causes of corrosion, its consequences and methods to minimize corrosion to improve industrial designs.
- Explain the properties, separation techniques of natural gas and crude oil along with potential applications and role of petrochemicals in national economy.
- Equipped with basic knowledge of polymers and its application.

Course Code: 2TDDE204
Course Name: Fundamentals Computer & IT

Course Objectives

- Learn basic principles of using Windows operation system.
- Learn and practice basic keyboarding and mouse use.
- Be able to access the Internet, Worldwide Web, as well as use Internet directories and search engines, and locate www addresses.
- Be able to find and evaluate information on the Web (learn how to be critical and evaluate what is valid and reliable).
- Learn basic computer and keyboarding related vocabulary in English.
- Learn the basics of e-mail, such as sending, forwarding and receiving mail, attaching documents, creating mailboxes, filters, and address books.
- Learn basic word processing skills with Microsoft Word, such as text input and formatting, editing, cut, copy and paste, spell check, margin and tab controls, keyboard shortcuts, printing, as well as how to include some graphics such as pictures and charts.
- In general, develop an intuitive sense of how computers work and how they can be used to make your academic work more efficient.

Course Outcomes

- Demonstrate a basic understanding of computer hardware and software.
- Demonstrate problem-solving skills.
- Apply logical skills to programming in a variety of languages.
- Utilize web technologies.
- Demonstrate basic understanding of network principles.
- Working effectively in teams.
- Apply the skills that are the focus of this program to business scenarios.

Course Code: 2TDDE205
Course Name: Communication Skills-II

Course Objectives

- The students, after completing the course, will be able to use general purpose words of English to express himself in speaking reasonably clearly and correctly on routine matters .Develop a habit of reading with comprehension to achieve an optimum speed of 75 wpm Write reasonably and grammatically correct English.

Course Outcomes

- Seeks to develop the students' abilities in grammar, oral skills, reading, writing and study skills. students should improve their speaking ability in English both in terms of fluency and comprehensibility

Course Code: 2TDCS-301
Course Name: Database management System

Course Objectives

- To study the physical and logical database designs, database modeling, relational, hierarchical, and network models
- To understand and use data manipulation language to query, update, and manage a database
- To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency,
- To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

Course Outcomes

- Define program-data independence, data models fordatabase systems, database schema and database instances.
- Recall Relational Algebra concepts, and use it to translate queries to Relational Algebra statements and vice versa.
- Identify Structure Query Language statements used in creation and manipulation of Database
- Identify the methodology of conceptual modeling through Entity Relationship model.
- Identify the methodology of logical model.
- Identify the methodology of physical model.
- Develop an understanding of the differences between OODBMS, ORDBMS and RDBMS and the practical implications of each approach.
- Analyze and design a real database application.

Course Code:2TDCS-302
Course Name: Programming with C

Course Objectives

- To impart adequate knowledge on the need of programming languages and problem solving techniques.
- To develop programming skills using the fundamentals and basics of C Language.
- To enable effective usage of arrays, structures, functions, pointers and to implement the memory management concepts.
- To teach the issues in file organization and the usage of file systems

Course Outcomes

- Understand the fundamentals of C programming.
- Choose the loops and decision making statements to solve the problem.
- Implement different Operations on arrays.
- Use functions to solve the given problem.
- Understand pointers, structures and unions.
- Implement file Operations in C programming for a given application.

Course Code: 2TDCS-303
Course Name: Computer Network Essentials

Course Objectives

- Students are familiar with the basics of data communication.
- Students are familiar with various types of computer networks.
- Students have experience in designing communication protocols. be exposed to the TCP/IP protocol suite

Course Outcomes

- Master the terminology and concepts of the OSI reference model and the TCP-IP reference model.
- To master the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks.
- To be familiar with wireless networking concepts.
- To be familiar with contemporary issues in networking technologies. To be familiar with network tools and network programming

Course Code: 2T0DCS-304
Course Name: Digital Techniques

Course objectives

- To know the concepts of Combinational circuits.
- To understand the concepts of flipflops, registers and counters
- Understand how logic circuits are used to solve engineering problems.
- Understand how logic circuits are analyzed, designed, verified, and tested.
- Understand the relationship between abstract logic characterizations and practical electrical implementations.

Course Outcomes

After successful completion of the course student will be able to

- Develop a digital logic and apply it to solve real life problems.
- Analyze, design and implement combinational logic circuits.
- Classify different semiconductor memories.
- Analyze, design and implement sequential logic circuits.

Course Code: 2TDCS-305
Course Name: Operating System .

Course Objectives

- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporary OS
- To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
- To know the components and management aspects of concurrency management
- To learn programmatically to implement simple OS mechanisms

Course Outcomes

- To learn the fundamentals of Operating Systems.
- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporary OS

Course Code: 2TDCS-401
Course Name: R programming

Course Objectives:

- In this course you will learn how to program in R and how to use R for effective data analysis. You will learn how to install and configure software necessary for a statistical programming environment and describe generic programming language concepts as they are implemented in a high-level statistical language. The course covers practical issues in statistical computing which includes programming in R, reading data into R, accessing R packages, writing R functions, debugging, profiling R code, and organizing and commenting R code. Topics in statistical data analysis will provide working examples.

Course Outcomes

- List motivation for learning a programming language
- Access online resources for R and import new function packages into the R workspace
- Import, review, manipulate and summarize data-sets in R
- Explore data-sets to create testable hypotheses and identify appropriate statistical test
- Perform appropriate statistical tests using R
- Create and edit visualizations with R Requirements/Prerequisites: This course is aimed

Course Code: 2TDCS-402
Course Name: Data Structures

Course Objectives

- Data structures play a central role in modern computer science. In addition, data structures are essential building blocks in obtaining efficient algorithms. The objective of the course is to teach students how to design, write, and analyze the performance of programs that handle structured data and perform more complex tasks, typical of larger software projects. Students should acquire skills in using generic principles for data representation & manipulation with a view for efficiency, maintainability, and code reuse. Another goal of the course is to teach advance data structures concepts, which allow one to store collections of data with fast updates and queries.

Course Outcomes

On completion of the course:

- For a given search problem (linear search and binary search) student will be able to implement it.
- For a given problem of stacks, queues and link lists, students will be able to implement it and analyze the same to determine the time and computation complexity
- Students will be able to write an algorithm for selection sort, insertion sort, quick sort, merge sort, heap sort, bubble sort and compare their performance
- Students will be able to implement tree, graph search and traversal algorithms

Course Code: 2TDCS-403
Course Name: Computer Architecture

Course Objectives

- Broad understanding of the design of computer systems, including modern architectures and alternatives.
- Understanding of the interaction amongst architecture, applications and technology.
- Understanding of a framework for evaluating design decisions in terms of application requirements and performance measurements.

Course Outcomes

- Ability to understand basic structure of computer.
- Ability to perform computer arithmetic operations.
- Ability to understand control unit operations.
- Ability to design memory organization that uses banks for different word size operations.
- Ability to understand the concept of cache mapping techniques.

Course Code: 2TDCS-404
Course Name: Multimedia and Web Technology

Course Objectives

- To identify a range of concepts, techniques and tools for creating and editing the interactive multimedia applications.
- To identify the current and future issues related to multimedia technology.

- To identify both theoretical and practical aspects in designing multimedia systems surrounding the emergence of multimedia technologies using contemporary hardware and software technologies.

Course Outcomes

- Ability to develop proficiency in Webpage Development and website management
- Ability to develop proficiency in creating dynamic Web Interface
- Ability to write server and client sides scripts and manage websites
- Ability to design a web page using Image, Audio and Video editing tools
- Ability to understand the basic concepts of Open Source Standards and Open Source softwares
- Ability to understand the basic concepts of networking

Course Code: 2TDCS-405
Course Name: IT Trends and Technologies

Course Objectives

- This course will introduce students to new directions in information systems and effective approaches for evaluating their relevance and applicability to their business environments as well as the new challenges and problems that they present. They will learn about emerging technologies and the latest design trends in data and knowledge, networks and applications in terms of what issues they address and in particular, how organizations can exploit them for competitive advantage

Course Outcomes

- Student will understand about parallel computing
- Student will understand about mobile computing
- Student will understand about data warehousing
- Student will understand about software agents

Course Code: 2TDCS-501
Course Name: Software Engineering

Course Objectives

- The basic objective of software engineering is to develop methods and procedures for software development that can scale up for large systems and that can be used consistently to produce high-quality software at low cost and with a small cycle of time.

Course Outcomes

Graduates of the program are expected to demonstrate:

- An Ability To apply knowledge of mathematics, science, and engineering.
- An Ability to design and conduct experiments, as well as to analyze and interpret data.

- An Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- An ability to function on multi-disciplinary teams.
- An Ability to identify, formulate, and solve engineering problems.
- An understanding of professional and ethical responsibility.
- An ability to communicate effectively.

Course Code: 2TDCS-502
Course Name: Introduction to JAVA

Course Objectives

- This course provides an introduction to object oriented programming (OOP) using the Java programming language.
- Its main objective is to teach the basic concepts and techniques which form the object oriented programming paradigm
- The model of object oriented programming: abstract data types, encapsulation, inheritance and polymorphism
- Fundamental features of an object oriented language like Java: object classes and interfaces, exceptions and libraries of object collections.

Course Outcomes

- Construct problem definition statements for real life applications and implement a database for the same.
- Design conceptual models of a database using ER modeling for real life applications and also construct queries in Relational Algebra
- Create and populate a RDBMS, using SQL.
- Write queries in SQL to retrieve any type of information from a data base.
- Analyze and apply concepts of normalization to design an optimal

Course Code: 2TDCS-503
Course Name: PHP and MYSQL

Course Objectives

- The PHP programming skills needed to successfully build interactive, data-driven sites. Work with regular expressions, handle exceptions, and validate data.

Course Outcomes
Student will able to do

- Implement interactive web page(s) using HTML, CSS and JavaScript.
- Design a responsive web site using HTML5 and CSS
- Build Dynamic web site using server side PHP Programming and Database connectivity
- Describe and differentiate different Web Extensions and Web Services.

- Demonstrate web application using Python web Framework-Django

Course Code: 2TDCS-504
Course Name: Microprocessor and its Interfacing

Course Objectives

- To understand interfacing of 16 bit microprocessor with memory and peripheral chips involving system design.
- To understand techniques for faster execution of instructions and improve speed of operation and performance of microprocessors.

Course Outcomes

Students will be able to:

- Apply the fundamentals of assembly level programming of microprocessors.
- Build a program on a microprocessor using arithmetic & logical instruction set of 8086.
- Develop the assembly level programming using 8086 loop instruction set.
- Write programs based on string and procedure for 8086 microprocessor.
- Analyze abstract problems and apply a combination of hardware and software to address the problem

Course Code: 2TDCS-504
Course Name: Data Communication

Course Objectives

The students will be able to:

- Build an understanding of the fundamental concepts of computer networking.
- Familiarize the student with the basic taxonomy and terminology of the computer networking area.
- Introduce the student to advanced networking concepts, preparing the student forestry Advanced courses in computer networking.
- Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

Course Outcomes

After completing this course the student must demonstrate the knowledge and ability to:

- Independently understand basic computer network technology.
- Understand and explain Data Communications System and its components.
- Identify the different types of network topologies and protocols.
- Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of eachlayer.
- Identify the different types of network devices and their functions within a network
- Understand and building the skills of subnetting and routing mechanisms.
- Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Course Code: 2TDCS-601
Course Name: UNIX and Shell programming

Course Objectives

- This course will prepare students to develop software in and for Linux/UNIX environments. Topics to be covered include basic operating system concepts, effective command line usage, shell programming, the C language, programming development tools, system programming, network programming (client-server model and sockets), and GUI programming.

Course Outcomes

- Understanding the basic set of commands and utilities in Linux/UNIX systems.
- To learn to develop software for Linux/UNIX systems.
- To learn the C language and get experience programming in C.
- To learn the important Linux/UNIX library functions and system calls.
- To understand the inner workings of UNIX-like operating systems.
- To obtain a foundation for an advanced course in operating systems.

Course Code: 2TDCS-602
Course Name: E-Commerce and ERP

Course Objectives

- The objectives of the course are to introduce the concept of electronic commerce, and to understand how electronic commerce is affecting business enterprises, governments, consumers and people in general. In addition, we will study the development of websites using relevant software tools.
- Acquaint students with a fundamental understanding of the environment and strategies in the New Economy.
- Provide analytical tools to understand opportunities in unserved or underserved New Economy markets.
- Provide a fundamental understanding of the different types and key components on business models in the New Economy.
- Provide guiding principles behind the design and strategy of the customer web interface.

Course Outcomes

- At the end of the course, the students is expected to realise the problems involved in designing and building e-commerce systems; understand the need to design EC systems that fully meet the requirements of the intended users; appreciate the need to ensure that the implementation of a design is adequately tested to ensure that the completed EC system meets the specifications; be fully aware of the principles and practice of an O-O approach to the design and development of EC systems; be able to apply these principles in practice.
- Explain the components and roles of the Electronic Commerce environment.

- Explain how businesses sell products and services on the Web.
- Describe the qualities of an effective Web business presence.
- Describe E-Commerce payment systems.

Course Code: 2TDCS-603
Course Name: Computer Graphics and Multimedia

Course Objectives

- To learn the basic principles of 3-dimensional computer graphics.
- Provide an understanding of how to scan convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition.
- Provide an understanding of mapping from a world coordinates to device coordinates, clipping, and projections.
- To be able to discuss the application of computer graphics concepts in the development of computer games, information visualization, and business applications.
- To comprehend and analyze the fundamentals of animation, virtual reality, underlying technologies, principles.

Course Outcomes

- To implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.
- To describe the importance of viewing and projections.
- To define the fundamentals of animation, virtual reality and its related technologies.
- To understand a typical graphics pipeline 6. To design an application with the principles of the virtual reality.

Course Code: 2TDCS-605
Course Name: Entrepreneurship and innovative Skills

Course Objectives

- The Master of Science in Entrepreneurship programme provides you with cutting-edge knowledge and skills on how to successfully develop captivating products and services to solve challenging problems in a highly uncertain environment, often under considerable time constraints with very limited resources. You will be able to apply these skills in the context of both new ventures as well as in established companies

Course Outcomes

- Entrepreneurship and Innovation minors will be able to sell themselves and their ideas. Students master oral and visual presentation skills and establish a foundation of confidence in the skills necessary to cause others to act.
- Entrepreneurship and Innovation minors will be able to find problems worth solving. Students advance their skills in customer development, customer validation, competitive analysis, and iteration while utilizing design thinking and process tools to evaluate in real-world problems and projects.

- Entrepreneurship and Innovation minors will be able to mobilize people and resources. Students identify and secure customers, stakeholders, and team members through networks, primary customer research, and competitive and industry analyses in order to prioritize and pursue an initial target market in real-world projects.

BACHELOR OF ENGINEERING (CSE)
PROGRAMME CODE-05UGR004

Programme Educational Objectives (PEOs)

- Utilize their education to develop innovative, ethical and socially responsible technological solutions in electronics engineering field.
- Attain professional development through life-long learning.
- Pursue a diverse range of careers in industry and government organizations.
- To demonstrate entrepreneurial skills by setting up business units and consultancies

Program Outcomes (POS)

- **PO1:** Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety**,** cultural, societal and environmental considerations.
- **PO2:** 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.
- **PO3:** Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.
- **PO4:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
- **PO5:** An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- **PO6:**. An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
- **PO9.**Individual and team work: Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO10.**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.
- **PO11.**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 multi-disciplinary environments.
- **PO12.**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 (PSOS)

- **PSO1**: Practice as computing professionals (appropriate to the description of the Computer Science and Engineering program described above), conducting research and/or leading, designing, developing, or maintaining projects in various technical areas;
- **PSO2**: Apply the ethical and social aspects of modern computing technology to the design, development, and usage of computing artifacts; and,
- **PSO3**: Enhance their skills and embrace new computing technologies through self-directed professional development and post-graduate training or education.
- **PSO4**: Possess practical and theoretical knowledge of computer science and software engineering sufficient to earn a living and contribute to the economic development of the region, state and nation.
- **PSO5**: Understand and respect the professional standards of ethics expected of computer scientists and software engineers and appreciate the social impact of computing.

Course Code: 3TBPH101
Course Name: Engineering Physics

Course objective

- The objective of this course is to equip the students with standard concepts and tools or an intermediate to advanced level.

Course outcome

- Gain a knowledge and understanding of fundamental physical concepts in the areas covered in this class.
- Apply an understanding of these concepts to various systems and devises.
- Acquire problem solving skills, mathematical techniques, and the ability to synthesize.
- The ability to formulate, conduct, analyzes and interprets experiments in engineering physics

Course Code: 3TBMA102
Course Name: Mathematics-I

Course objective

- To introduce the idea of applying differential and integral calculus to notions of curvature and to improper integrals.
- Apart from some applications it gives a basic introduction on Beta and Gamma functions.
- To introduce the fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems.
- To develop the tool of ordinary differential equation for learning advanced Engineering Mathematics.
- To familiarize the student with functions of several variables that is essential in most branches of engineering.
- To develop the essential tool of matrices and linear algebra in a comprehensive manner.

Course outcome

- This Syllabus has been designed to equip engineering student s with necessary mathematical tools to handle mathematical problem in their core subjects.
- Through this syllabus they will learn many thing about calculus specially first order differential equation , Roles, Lagrange's concept about existence of derivatives in some interval ,Expansion of a function in an infinite series by Maclaurin's and Taylor theorem , partial derivative of functions through which maxima minima of two variable function application of matrices in solving linear simultaneous equations, Eigen value Eigen vector, Calay-Hamilton theorem to find Inverse of a matrix ,and concept of vector space.

Course Code: 3TBME103
Course Name: Basic Mechanical Engineering

Course objective

- To familiarize with the basic concept of Mechanical Engineering.
- To familiarize with the scope of Mechanical Engineering.
- To familiarize with the job prospects of Mechanical Engineer.

Course outcome

At the end of this course students will able to:

- Identify engineering materials, their properties, testing and manufacturing methods encountered in engineering practice.
- Understand Concept of measurement by using measuring instrument Vernier calliper, Micrometer, Dial gauge, Slip gauge etc.
- Understand basics of thermodynamics and components of a thermal power plant
- Understand the construction, operation and performance of different IC engines.
- Understand basics of fluids, their properties and laws of fluid Mechanics.

Course Code: 3TBCE104
Course Name: Basic Civil & Engineering Mechanics

Course objective

- To introduce to student relevance of civil engineering for various engineering applications.
- To introduce to student various elements of buildings and construction materials.
- To introduce to student various methods of land survey and to make him use surveying equipment
- To make student aware of modern investigation techniques in land survey.
- To introduce to student about the water management and transportation engineering.
- Ability to apply knowledge of mathematics, science, and engineering.
- Solve for the resultants of any force systems.
- Determine equivalent force systems.
- Solve the mechanics problems associated with friction forces.
- Obtain the centroid, first moment and second moment of an area.

Course outcome

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

- Describe the role of civil engineer in the development of the society and explain relationship of civil engineering with other branches of engineering and technology.

- Discuss types of buildings and select materials of construction.
- Explain the elements of water supply such as dam, canal and elements of transportation structures.
- Measure heights, distances and angles on ground using basic surveying instruments and plot them on paper.
- Explain the advantages of advances in civil engineering like remote sensing techniques, GIS and GPS.
- Determine the resultant force and moment for a given system of forces

Course Code: 3TBCS105
Course Name: Communication Skills

Course objective

- The objective of this course is to learn the second language learners ability and to use the four fundamental language skills-reading writing speaking and listening. It will enable the students to speak English correctly and with confidence.

Course outcome

- Student will develop knowledge, skills and judgment around human communication that facilitate their ability to work collaboratively with others. Such skills could include communication competencies such as managing conflict, understanding small group process, active listening, appropriate self disclosure, etc.

Course Code: 3TBHH106
Course Name: Health, Hygiene & Yoga

Course objective

- It is very important for the protection of our health and helps to present the spread of communicable diseases personal hygiene has social and aesthetic values.
- The provision of hygiene information first impacts on knowledge and then practice.
- Yoga education helps in self discipline and self control, leading to immense amount of awareness concentration and higher level of consciousness.
- This course can prepare the students physically & mentally for the integration of their physical, mental and spiritual faculties so that the students can become healthier, saner and more integrated members of the society & of the nation.

Course outcome

- The student to have good health.
- Students have good mental hygiene.
- Possess emotional stability.
- Integrated moral values.
- Attain higher level of consciousness.

Course Code: 3TBRO107
Course Name: Rural Outreach

Course objective

- The main objective of introducing this course is to sensitize students about the socio-cultural aspects of the rural areas parochial to their colleges.

- Students are expected to observe, investigate and learn about the following aspects of the rural region:

i. Demographics, Literacy, Geographical parameters of the Village.
ii. Schemes of government of India and State of Madhya Pradesh in operation in the villages.
iii. Social/ Cultural aspects ranging from popular dance forms, music and customs of the concerned village.

Course outcomes

- Students would be sensitized about the socio-cultural aspects of the *rural* areas parochial to their colleges.

Course Code: 3TBCH201
Course Name: Engineering Chemistry

Course objective

- The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications.

Course outcome

- The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications.
- Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels.

The course will enable the student to:

- Analyze microscopic chemistry in terms of atomic and molecular orbits and intermolecular forces.
- Rationalize bulk properties and processes using thermodynamic considerations. Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.
- List major chemical reactions that are used in the synthesis of molecules

Course Code: 3TBMA202
Course Name: Mathematics-II

Course objective

- Introduced effective mathematical tools for the solutions of ordinary and partial differential equations that model physical processes.
- Introduced Fourier Series& Fourier Transform. Introduced the tools of differentiation and integration of functions of complex variable that are used in various techniques dealing engineering problems.
- Acquainted the student with mathematical tools available in vector calculus needed various field of science and engineering.

Course outcome

- Today calculus has become the heart of every engineering stream.
- Through this syllabus student will learn different techniques of solving different kind

of higher order ordinary and partial differential equations.
- Expansion of periodic function in an infinite series of sine and cosine function through Fourier series, Function of complex variable's based on complex number and also vector calculus based on vectors.

Course Code: 3TBEG203
Course Name: Engineering Graphics

Course objective
- To familiarize with the construction of geometrical figures.
- To familiarize with the projection of 1D, 2D and 3D elements .
- To familiarize with the sectioning of solids and development of surfaces.
- To familiarize with the Preparation and interpretation of building drawing .

Course outcome
- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to solid modeling
- Exposure to creating working drawings
- Ability to draw projections and analyzing multiple views of object.

Course Code: 3TBEE204
Course Name: Basic Electrical Engineering

Course objective
- To provide knowledge of basic concepts related to electrical engineering.
- To provide knowledge of basic Circuits: 1- phase AC Circuits, 3-phase AC Circuits, Magnetic Circuits, Electrical Machines

Course outcome
After successful completion of course,
- Students are expected to possess an in-depth understanding and Knowledge of 1-phase AC Circuits, 3-phase AC Circuits, Magnetic Circuits, Electrical Machines.
- Develop the concepts of basic electrical engineering for all the undergraduate students of different branches of engineering.

Course Code: 3TBCS205
Course Name: Basic Computer Engineering

Course objective
By the end of this course, the student will be able to:-
- Analyzing problems, and designing and implementing algorithmic solutions.
- Solving problems properly, achieving an implementation that is correct, effective and efficient.
- Using computers at user level, including operative systems and programming

environments.
- Knowledge of computer equipment, including both hardware and software.
- Identifying information needs to solve problems, recovering information and applying it to the resolution.
- Opportunity to learn key concepts of computer, as well as fundamentals and applications of computer.

Course outcome

By the end of this course, the student will

- Analyzing problems, and designing and implementing algorithmic solutions.
- Solving problems properly, achieving an implementation that is correct, effective and efficient.
- Using computers at user level, including operative systems and programming environments.
- Knowledge of computer equipment, including both hardware and software.
- Identifying information needs to solve problems, recovering information and applying it to the resolution.
- Opportunity to learn key concepts of computer, as well as fundamentals and applications of computer.

Course Code: 3TBMP206
Course Name: Manufacturing Practices

Course objective

- To familiarize with the basics of tools and equipments used in fitting, carpentry, sheet metal, welding and smithy.
- To familiarize with the production of simple models in the above trades.

Course outcome

On completion of this course, students will be able to

- Make half lap joint and dovetail joint in carpentry.
- Make welded lap joint, butt joint and T-joint.
- Prepare sand mould for cube, conical bush, pipes and V pulley.
- Fabricate parts like tray, frustum of cone and square box in sheet metal.

Course Code: 3TBED207
Course Name: Entrepreneurship Development

Course objective

- Understanding basic concepts of entrepreneurship and key steps in the elaboration of business ideas, Developing personal creativity and entrepreneurial initiative.

Course outcome

- Understanding basic concepts in the area of entrepreneurship, understanding the stages of the entrepreneurial process, adopting of the key steps in the elaboration of business ideas, Developing personal creativity and entrepreneurial initiative.

Course Code: 3TBBE301

Course Name: Mathematics-III

Course objective

The objective of this course is to fulfill the needs of engineers to understand applications of Numerical Analysis, Transform Calculus and Statistical techniques in order to acquire mathematical knowledge and to solving wide range of practical problems appearing in different sections of science and engineering. More precisely, the objectives are:

- To introduce effective mathematical tools for the Numerical Solutions algebraic and transcendental equations.
- To enable young technocrats to acquire mathematical knowledge to understand Laplace transformation, Inverse Laplace transformation which are used in various branches of engineering?
- To acquaint the student with mathematical tools available in Statistics needed in various field of science and engineering.

Course outcomes

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

- Numerical solutions of non-linear equations: Bisection method, Newton-Raphson method, secant method, convergence.
- Finite difference: Newton's forward and backward formulas. Interpolation: Lagrange, Newton divided difference, Hermit formulas.
- Numerical differentiation: First derivative, higher derivatives. Numerical integration: Trapezoidal rule, Simpson's rule, Gaussian integration. Algorithms and programs.

Course Code: 3TBCS302
Course Name: Discrete Structures

Course objective

- This course introduces the applications of discrete mathematics in the field of computer science. It covers sets, logic, proving techniques, combinatory, functions, relations, Graph theory and algebraic structures. These basic concepts of sets, logic functions and graph theory are applied to Boolean Algebra and logic networks while the advanced concepts of functions and algebraic structures are applied to finite state machines and coding theory.

Course outcome

- After this completion student will be familiar with relational algebra, Functions and graph theory.

Course Code: 3TBCS303
Course Name: Digital System

Course objective

- To understand number representation and conversion between different representation in digital electronic circuits.
- To analyze logic processes and implement logical operations using combinational logic circuits.
- To understand characteristics of memory and their classification.
- To understand concepts of sequential circuits and to analyze sequential systems in

terms of state machines.
- To understand concept of Programmable Device PLA

Course outcomes
- After this completion student will be familiar with Digital circuit systems and its functionality. Students can learn Nyquist sampling theorem, time division multiplexing.

Course Code: 3TBCS304
Course Name: Object Oriented Programming & Methodology

Course objective
- The objective of this course is to understand the advantage of object oriented programming over procedure oriented programming.
- To help students to understand the key features of Object Oriented Programming and Methodology like objects, methods, instance, message passing, encapsulation, polymorphism, data hiding, abstract data and inheritance.
- To develop understanding of pointers and memory management.
- To be able to develop understanding of file input/output and templates

Course outcomes
On the completion of this course students will be able to:
- Recognize attributes and methods for given objects.
- Define data types and also deal with operations applied for data structures.
- Implement algorithms and complex problems.

Course Code: 3TBCS305
Course Name: Data structures

Course objective
The main objectives of this course are:
- To introduce the concepts of linear, non-linear data structures , the operations performed on them and the applications of various data structures.
- To introduce various algorithms of searching and sorting.
- To understand the basic concepts of stacks, queues, linked lists, trees and graphs.
- To enable students to write algorithms for solving various problems using data structures.

Course outcome
On completion of the course:
- For a given search problem (linear search and binary search) student will be able to implement it.
- For a given problem of stacks, queues and link lists, students will be able to implement it and analyze the same to determine the time and computation complexity.
- Students will be able to write an algorithm for selection sort, insertion sort, quick sort, merge sort, heap sort, bubble sort and compare their performance.
- Students will be able to implement tree, graph search and traversal algorithms

Course Code: 3TBCS306
Course Name: Computer Programming & Tools-I

Course objective
Student will learn following things

- Insert a graphic within a web page.
- Create a link within a web page.
- Create a table within a web page.
- Insert heading levels within a web page.
- Insert ordered and unordered lists within a web page.
- Use cascading style sheets.
- Create a web page.

Course outcome

- Ability to insert a graphic within a web page.
- Ability to Ability to create basic web pages.

Course Code: 3STCS-306(A)
Course Name: C

Course objective
The main objectives of this course are:

- To understand various loops.
- To understand the basic concepts of function, structure, data types and programming concepts.
- To enable students to write algorithms for solving various problems.

Course outcome

- Students will be able to develop logics which will help them to create programs, applications in C. Also by learning the basic programming constructs they can easily switch over to any other language in future.

Course Code: 3STCS-306(B)
Course Name: Basic MATLAB Tools

Course objective

- To Impart the Knowledge to the students with MATLAB software.
- To provide a working introduction to the MATLAB technical computing environment.
- To introduce students the use of a high-level programming language, MATLAB.

Course outcome

- Students learned features of *MATLAB* as a programming *tool*. They are fully familiar to all the features of *MATLAB* software and easily handle the software.

Course Code: 3STCS-306(C)
Course Name: PHP

Course objective

- Students will learn how to connect to any ODBC-compliant database, and perform hands on practice with a MySQL database to create database-driven HTML forms and

reports etc.
- Students also learn how to configure PHP and Apache Web Server.

Course outcome
- Write PHP scripts to handle HTML forms.
- Analyze and solve various database tasks using the PHP language.
- Analyze and solve common Web application tasks by writing PHP programs.

Course Code: 3TBBE401
Course Name: Energy & Environmental Engineering

Course objective
- The objective of this Course is to provide an introduction to energy systems and renewable energy resources, with a scientific examination of the energy field and an emphasis on alternative energy sources and their technology and application.

Course outcomes
- After the completion of Course is students will be able to learn energy systems and renewable energy resources, with a scientific examination of the energy field and application.

Course Code: 3TBCS402
Course Name: Computer Organization and Architecture

Course objective
- Students to be familiarize the basic principles of computer architecture, Design and Multi Processing, Types of data transfer, Concept of semi conductor memories which is useful for research work in field Computer System.

Course outcomes
- Ability to understand basic structure of computer.
- Ability to perform computer arithmetic operations.
- Ability to understand control unit operations.
- Ability to design memory organization that uses banks for different word size operations.
- Ability to understand the concept of cache mapping techniques.
- Ability to understand the concept of I/O organization.
- Ability to conceptualize instruction level parallelism.

Course Code: 3TBCS403
Course Name: Analysis & Design of Algorithm

Course objective
- Effective problem solving in computing.
- The use of different paradigms of problem solving will be used to illustrate clever and efficient ways to solve a given problem.
- In each case emphasis will be placed on rigorously proving correctness of the algorithm.
- The analysis of the algorithm will be used to show the efficiency of the algorithm

over the naive techniques.

Course outcomes
Students will be able to:

- Learn good principles of algorithm design;
- Learn how to analyze algorithms and estimate their worst-case and average-case behaviour (in easy cases);
- Become familiar with fundamental data structures and with the manner in which these data structures can best be implemented; become accustomed to the description of algorithms in both functional and procedural styles;
- Learn how to apply their theoretical knowledge in practice (via the practical component of the course).

Course Code: 3TBCS404
Course Name: Software Engineering

Course objective

- Be employed in industry, government, or entrepreneurial endeavors to demonstrate professional advancement through significant technical achievements and expanded leadership responsibility;
- Demonstrate the ability to work effectively as a team member and/or leader in an ever-changing professional environment.
- Progress through advanced degree or certificate programs in computing, science, engineering, business, and other professionally related fields.

Course outcomes

- Understand analysis and design of complex systems.
- Apply software engineering principles and techniques.
- Develop, maintain and evaluate large-scale software systems.
- Produce efficient, reliable, robust and cost-effective software solutions.
- Perform independent research and analysis.
- Communicate and coordinate competently by listening, speaking, reading and writing English for technical and general purposes.
- Work as an effective member or leader of software engineering teams.
- Manage time, processes and resources effectively by prioritizing competing demands to achieve personal and team goals Identify and analyzes the common threats in each domain.
- Understand and meet ethical standards and legal responsibilities.

Course Code: 3TBCS405
Course Name: Operating System

Course objectives

- To learn the fundamentals of Operating Systems.
- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporary OS
- To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and

agreement protocols
- To know the components and management aspects of concurrency management
- To learn programmatically to implement simple OS mechanisms

Course outcomes
- To learn the fundamentals of Operating Systems.
- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporary OS

Course Code: 3TBCS407
Course Name: Computer Programming and Tools-II

Course objective
- This course is designed to provide the knowledge of Dot Net Frameworks along with C#

Course outcomes
A student who successfully completes the course will be able to:
- Build web applications
- Create web forms
- Validate form data using server-side Validation controls
- Create dynamic Web applications that interact with a database using server-side programming.

Course Code: 3STCS406(A)
Course Name: C++

Course objective
- To code, document, test, and implement a well-structured, robust computer program using the C/C++ programming language.
- To understand how ***C++*** improves C with object-oriented features.
- To learn how to write inline functions for efficiency and performance.

Course outcome
- Demonstrate an understanding of algorithms in the problem-solving process.
- Identify the necessary properties of good problem-solving techniques.
- Create and analyze algorithms for solving simple problems.
- Use incremental program development to create, test, and debug algorithms for solving simple problems.

Course Code: 3STCS406(B)
Course Name: Windows Server

Course objective
- The course is designed to provide complete knowledge of Windows Server OS.

Course outcomes
- After the completion of the course, the students will gain knowledge about System Administration or Windows Administration.

Course Code: 3STCS406(C)
Course Name: C#

Course objective

- This course is designed to provide the knowledge of Dot Net Frameworks along with C#

Course outcomes

- After completion of the course the student will be able to use the features of Dot Net Framework along with the features of C#

Course Code: 3TBCS501
Course Name: Data Communication

Course objective

The students will be able to:

- Build an understanding of the fundamental concepts of computer networking.
- Familiarize the student with the basic taxonomy and terminology of the computer networking area.
- Introduce the student to advanced networking concepts, preparing the student forentry Advanced courses in computer networking.
- Allow the student to gain expertise in some specific areas of networking such as thedesign and maintenance of individual networks.

Course outcomes

After completing this course the student must demonstrate the knowledge and ability to:

- Independently understand basic computer network technology.
- Understand and explain Data Communications System and its components.
- Identify the different types of network topologies and protocols.
- Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
- Identify the different types of network devices and their functions within a network
- Understand and building the skills of subnetting and routing mechanisms.
- Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Course Code: 3TBCS502
Course Name: Theory of Computation

Course objective

- Introduction of the mathematical foundations of computation including automata theory; the theory of formal languages and grammars; the notions of algorithm, decidability, complexity, and computability.
- Enhance/develop students' ability to understand and conduct mathematical proofs for computation and algorithms.

Course outcomes

After completing this course, students will be able to:

- Analyze and design finite automata, pushdown automata, Turing machines, formal languages, and grammars.
- Demonstrate their understanding of key notions, such as algorithm, computability, decidability, and complexity through problem solving.
- Prove the basic results of the Theory of Computation.
- State and explain the relevance of the Church-Turing thesis.

Course Code: 3TBCS503
Course Name: Database Management System

Course objective

- To understand the different issues involved in the design and implementation of a database system.
- To study the physical and logical database designs, database modeling, relational, hierarchical, and network models
- To understand and use data manipulation language to query, update, and manage a database
- To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency,
- To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

Course outcome

- Define program-data independence, data models for database systems, database schema and database instances.
- Recall Relational Algebra concepts, and use it to translate queries to Relational Algebra statements and vice versa.
- Identify Structure Query Language statements used in creation and manipulation of Database
- Identify the methodology of conceptual modeling through Entity Relationship model.
- Identify the methodology of logical model.
- Identify the methodology of physical model.
- Develop an understanding of the differences between OODBMS, ORDBMS and RDBMS and the practical implications of each approach.
- Analyze and design a real database application.
- Develop and evaluate a real database application using a database management system.
- Improve teamwork management skills.
- Enhance negotiation and discussion skills.

Course Code: 3TBCS504
Course Name: Computer Graphics and Multimedia

Course objective

- Students will write program functions to implement visibility detection.
- Students will write programs that demonstrate computer graphics animation.

Course outcomes

- Students will have an appreciation of the history and evolution of computer graphics, both hardware and software. Assessed by written homework assignment.
- Students will have an understanding of 2D graphics and algorithms including: line drawing, polygon filling, clipping, and transformations. They will be able to implement these. Assessed by tests and programming assignments.
- Students will understand the concepts of and techniques used in 3D computer graphics, including viewing transformations, hierarchical modelling, colour, lighting and texture mapping. Students will be exposed to current computer graphics research areas. Assessed by tests, homework and programming assignments.
- Students will be able to use graphics in C++. Assessed by programming assignments.

Course Code: 3TBCS505
Course Name: Core JAVA

Course objective

- It will help students to learn the concepts of java Students are given exposure environment of java basic language element object oriented concept, Array and String.

Course outcomes

- Understanding of Basic Concept of java and its environment.
- Learning of Object oriented Programming concept with java.
- Creating understanding of Array & String.

Course Code: 3TBCS506
Course Name: Unix and shell Programming lab

Course objective

- To familiarize students with the concepts, design, and structure of the UNIX operating system.
- To teach students the use of basic UNIX Utilities
- To teach students the principles of UNIX shell programming.

Course outcomes

On completion of this course the student should be able to

- Identify and use UNIX/Linux utilities to create and manage simple file processing operations, organize directory structures with appropriate security, and develop shell scripts to perform more complex tasks.

Course Code: 3STCS-506(A)
Course Name: Oracle

Course objective

- To Understand the SQL query Language.
- Enhance the knowledge and understanding of Database analysis and design.
- Enhance the knowledge of the processes of Database Development and Administration using SQL and PL/SQL.
- Enhance Programming and Software Engineering skills and techniques using SQL

and PL/SQL

Course outcomes

- On completion of this course the student should be able to design, develop, and maintain Oracle Database Objects, Advanced packages, stored procedures, and triggers.

Course Code: 3STCS-506(B)
Course Name: HTML5

Course objective

- Describe introduction to HTML5 and what basic web design is.
- Identify how to create a simple web page.
- Identify how to format your text.
- Identify adding web links and images.
- Demonstrate creating tables.
- Identify forms.
- Identify adding styles and classes to your web pages.

Course outcome

- By the end of this *course*, students will acquire skills at planning, developing, organizing, and managing websites in *HTML5*.

Course Code: 3STCS-506(C)
Course Name: ASP.Net

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

- Understand the Microsoft .NET Framework and ASP.NET page structure
- Design web application with variety of controls
- Access the data using inbuilt data access tools

Course outcomes
Upon the completion of the course students will be able to

- Design web applications using ASP.NET
- Use ASP.NET controls in web applications
- Create database driven ASP.NET web applications and web services•

Course Code: 3TBCS - 601
Course Name: Micro Processor & Interfacing

Course objective

- To understand basic architecture of 16 bit and 32 bit microprocessors.
- To understand interfacing of 16 bit microprocessor with memory and peripheral chips involving system design.
- To understand techniques for faster execution of instructions and improve speed of operation and performance of microprocessors.
- To understand RISC and CISC based microprocessors. To understand concept of multi core processors.

Course outcomes

- Write programs to run on 8086 microprocessor based systems.
- Design system using memory chips and peripheral chips for 16 bit 8086 microprocessor.
- Understand and devise techniques for faster execution of instructions, improve speed of operations and enhance performance of microprocessors.
- Distinguish between RISC and CISC processors.
- Understand multi core processor and its advantages.

Course Code: 3TBCS-602
Course Name: Principles of Programming Languages

Course objective

- To discuss the skills in analyzing and using the features of programming languages.
- To recall the preliminary concepts like context-free grammar, Backus-Naur form, Parse trees.
- To understand the data types of different programming languages. 5. Discuss various logic programming and functional programming languages features.
- To understand the variable declarations in programming languages, in particular to binding, scope, and substitution of variables.
- To introduce the power of Python scripting language.

Course outcomes

- Master syntax related concepts including context - free grammars, parse trees, recursive parsing, printing, and interpretation.
- Master analyzing semantic issues associated with function implementations, including variable binding, scoping rules, parameter passing, and exception handling.
- Be familiar with design issues of object - oriented and functional languages.
- Be familiar with language abstraction constructs of classes, interfaces, packages, and procedures.
- Expose functional and scripting languages..

Course Code: 3TBCS-603(A)
Course Name: Python

Course objective

- The course is designed to provide Basic knowledge of Python. Python programming is intended for software engineers, system analysts, program managers and user support personnel who wish to learn the Python programming language.

Course outcome

- Problem solving and programming capability.
- Master an understanding of scripting and the contributions of scripting languages.
- Master an understanding of Python especially the object-oriented concepts.
- Master an understanding of the built-in objects of Python.

Course Code: 3TBCS-603(B)
Course Name: Java Script and its Framework

Course objective

- To Learn basic JavaScript syntax while creating variables and documenting your code.
- To Optimize for reusable code with JavaScript conditions via control flow and functions
- To Store related groups of data together in arrays and learn more about variables.
- To Harness the power of automation and use your skills to create powerful programs.
- To Learn a problem-solving tool-set to help you tackle debugging in the future.
- will learn the basics of Angular JS: directives, expressions, filters, modules, and controllers. Then you will learn everything else you need to know about Angular JS: Events, DOM, Forms, Input, Validation, Http, and more.

Course outcome

- Student will Learnt JavaScript and its important uses.
- Student will learnt Angular JS framework.
- Ability to create good web pages by using javascripts and its framework Angular JS.

Course Code: 3TBCS-604
Course Name: Computer Networking

Course objective

- Students are familiar with the basics of data communication.
- Students are familiar with various types of computer networks.
- Students have experience in designing communication protocols. be exposed to the TCP/IP protocol suite

Course outcomes

- Master the terminology and concepts of the OSI reference model and the TCP-IPreference model.
- To master the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks.
- To be familiar with wireless networking concepts.
- To be familiar with contemporary issues in networking technologies.
- To be familiar with network tools and network programming .

Course Code: 3TBCS-605
Course Name: Advance Computer Architecture

Course objective

- Broad understanding of the design of computer systems, including modern architectures and alternatives.
- Understanding of the interaction amongst architecture, applications and technology.
- Understanding of a framework for evaluating design decisions in terms of application requirements and performance measurements.
- A historical perspective on computer system design.

Course outcome

- Describe the principles of computer design.

- Classify instruction set architectures.
- Describe the operation of performance enhancements such as pipelines.
- Dynamic scheduling, branch prediction, caches, and vector processors.
- Describe the operation of virtual memory.
- Describe modern architectures such as RISC, Super Scalar, VLIW (very large instruction word), and multi-core and multi-CPU systems.
- Compare the performance of different architectures.
- Improve application performance for different CPU architectures.
- Develop applications for high performance computing systems.

Course Code: 3TBCS-606
Course Name: Report Writing using Latex

Course objective

- To learn about Typesetting of journal articles, technical reports, thesis, books, and slide presentations.
- To learn about Control over large documents containing sectioning, cross-references, tables and figures.
- To learn about Typesetting of complex mathematical formulae.
- To learn about Advanced typesetting of mathematics with AMS-LaTeX.
- To learn about Automatic generation of table of contents, bibliographies and indexes.

Course outcomes

- To use Latex and various templates acquired from the course to compose Mathematical documents, presentations, and reports;
- To access CTAN and other resources to obtain additional LaTeX packages.

Course Code: 3STCS – 606(A)
Course Name: Hardware and Networking

Course objective

- To train the officials to acquire basic knowledge in computer hardware and peripherals for installation, PC assembly, trouble shooting and maintenance including system management and its backup and to undertake disaster prevention, a basic knowledge of TCP/IP networks work group, internet and intranet.

Course outcome

- The student will able to know the Basic of Computer assembling and trouble shooting. This course will provide the brief knowledge of Computer networking and trouble shooting.

Course Code: 3STCS-606(B)
Course Name: MySQL

Course objective

- The objective of this course is to provide the necessary knowledge to design and develop dynamic, database-driven web applications using PHP. Students will learn how to connect to any ODBC-compliant database, and perform hands on practice with

a MySQL database to create database-driven HTML forms and reports etc.

Course outcome:

- After the completion of course, students will get hands on experience on various techniques of web development and will be able to design and develop a complete website.

Course Code: 3STCS-606(C)
Course Name: JSP

Course objective

- This course will try to provide advance knowledge on java script programming. It provides knowledge to develop the website script programming.

Course outcomes

- Students able to develop own websites.
- Students able to understand client server programming.

Course Code: 3TBCS - 701
Course Name: Compiler Design

Course objective

- To describe the steps and algorithms used by language translators.
- To discuss the effectiveness of optimization.
- To explain the machine dependent aspects of Compilation

Course outcome

- Ability to understand the design of a compiler given features of the languages.
- Ability to implement practical aspects of automata theory.
- Gain Knowledge of powerful compiler generation tools.

Course Code: 3TBCS - 702
Course Name: Distributed System

Course objective

- Understand foundation of distributed system.
- Introduce the idea of peer to peer services and file system.
- Understand the detail the system level sand support required for distributed systems.

Course outcome

- Discuss trend in distributed Systems.
- Apply network virtualization
- Apply remote method invocation and objects.

Course Code: 3TBCS- 703
Course Name: Cloud Computing

Course objective

- The course presents a top-down view of cloud computing, from applications and

administration to programming and infrastructure. Its main focus is on parallel programming techniques for cloud computing and large scale distributed systems which form the cloud infrastructure. The topics include: overview of cloud computing, cloud systems, parallel processing in the cloud, distributed storage systems, virtualization, security in the cloud, and multicore operating systems. Students will study state-of-the-art solutions for cloud computing developed by Google, Amazon, Microsoft, Yahoo, VMWare, etc. Students will also apply what they learn in one programming assignment and one project executed over Amazon Web Services

Course outcome

- Analyze the trade-offs between deploying applications in the cloud and over the local infrastructure.
- Compare the advantages and disadvantages of various cloud computing platforms.
- Deploy applications over commercial cloud computing infrastructures such as Amazon Web Services, Windows Azure, and Google App Engine.
- Program data intensive parallel applications in the cloud.
- Analyze the performance, scalability, and availability of the underlying cloud technologies and software.
- Identify security and privacy issues in cloud computing.
- Explain recent research results in cloud computing and identify their pros and cons.
- Solve a real-world problem using cloud computing through group collaboration.

Course Code: 3TBCS - 704
Course Name: Information Storage & Management

Course objective

- After successful completion of the course, the students should be able to • Evaluate storage architectures, including storage subsystems, DAS, SAN, NAS, CAS
- Define backup, recovery, disaster recovery, business continuity, and replication
- Examine emerging technologies including IP-SAN
- Understand logical and physical components of a storage infrastructure
- Identify components of managing and monitoring the data center
- Define information security and identify different storage virtualization technologies

Course outcome

- Ability to identify key challenges in managing information and analyze different storage networking technologies and virtualization
- Ability to understand components and the implementation of NAS
- To understand CAS architecture and types of archives and forms of virtualization To monitor the storage infrastructure and management activities

Course Code: 3TBCS – 705(A)
Course Name: Neural Network and fuzzy Logic

Course objective

- The main objective of this course is to provide the student with the basic understanding of neural networks and fuzzy logic fundamentals, Program the related algorithms and Design the required and related systems.

Course outcome

- This course introduces the basics of Neural Networks and essentials of Artificial Neural Networks with Single Layer and Multilayer Feed Forward Networks. Also deals with Associate Memories and introduces Fuzzy sets and Fuzzy Logic system components. The Neural Network and Fuzzy eful for doing Project Work. Network system application to Electrical Engineering is also presented. This subject is very important and us

Course Code: 3TBCS – 705 (B)
Course Name: Cryptography and network security

Course objective

- This course is designed to cater all student knowledge needs, from elementary networking concepts, to intermediate network monitoring and security techniques.

Course outcome

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

- Understand Network Devices functions and configurations hub, switch, tap and routers
- Understand Network Security Devices (IDS, Firewall..etc)
- Understand and analyze network services.
- Understand and analyze application performance
- Understand and analyze network traffic and protocols
- Understand network-troubleshooting concepts.
- Understand network security concepts.
- Understand network intrusions and how to identify them such as a. Computer Viruses b. Network worms c. Botnets

Course Code: 3TBCS – 705(C)
Course Name: Embedded Computer System

Course objective

- To introduce students to the modern embedded systems and to show how to understand and program such systems using a concrete platform built around A modern embedded processor like the Intel ATOM.

Course outcome

Students are able to

- Describe the differences between the general computing system and the embedded system, also recognize the classification of embedded systems.
- Become aware of the architecture of the ATOM processor and its programming aspects (assembly Level)
- Become aware of interrupts, hyperthreading and software optimization.

- Design real time embedded systems using the concepts of RTOS.
- Analyze various examples of embedded systems based on ATOM processor.

Course Code: 3TBCS – 705 (D)
Course Name: Real Time Fault Tolerant Systems

Course objective

- Fault tolerance is the ability of a system to continue performing its intended function despite of faults. In a broad sense, fault tolerance is associated with reliability, with successful operation, and with the absence of breakdowns.
- The ultimate goal of fault tolerance is the development of a dependable system. As computer systems become relied upon by society more and more, dependability of these systems becomes a critical issue.
- In airplanes, chemical plants, heart pace-makers or other safety critical applications, a system failure can cost people's lives or environmental disaster.

Course outcome

The aims of this course are:

- To create understanding of the fundamental concepts of fault-tolerance to learn basic techniques for achieving fault-tolerance in electronic, communication and software systems to develop skills in modeling and evaluating fault -tolerant architectures in terms of reliability, availability and safety to gain knowledge in sources of faults and means for their prevention and forecasting to understand merits and limitations of fault-tolerant design.

Course Code: 3TBCS - 707
Course Name: Industrial Training

Course objective

- To make students able to communicate efficiently. Knack to be a multi-skilled engineer with good technical knowledge, management, leadership and entrepreneurship skills. Ability to identify, formulate and model problems and find engineering solution based on a systems approach.

Course outcome

At the end of the Industrial Training, students should be able to:

- Improve their knowledge and skills relevant to their areas of specialization.
- Relate, apply and adapt relevant knowledge, concepts and theories within an industrial organization, practice and ethics.
- Acquire knowledge and skills to compete in the job market with this experience and exposure.

Course Code: 3TBCS - 801
Course Name: Soft Computing

Course objective

- Learn about soft computing techniques and their applications.
- Analyze various neural network architectures.
- Understand perceptrons and counter propagation networks.

Course outcome

- Students acquire knowledge of soft computing theories fundamentals and so they will be able to design program systems using approaches of these theories for solving various real-world problems.

Course Code: 3TBCS – 802
Course Name: Web Engineering

Course objective
The Objective of the course are as follows:

- To be able to analyze and design comprehensive systems for the creation, dissemination, storage, retrieval, and use of electronic records and documents.
- To learn and use some of the client-side and server-side languages used to manipulate information on the World Wide Web – i.e. ASP.NET, and Java script.
- To learn techniques and evaluation metrics for ensuring the proper operability, maintenance and security of a web application.

Course outcome
On successful completion of the course students will be able to:

- Develop a web application using server side programming languages and components.
- Apply the web engineering methodologies for Web application development.
- Develop a component based web solution and use UML diagrams to describe such a solution.
- Identify and discuss the security risk of a Web application

Course Code: 3TBCS – 803(A)
Course Name: Cellular & mobile computing

Course objective
The objective of this course is

- To teach basic fundamentals of Cellular Concepts, GSM .
- To study the specifications and functionalities of various protocols/standards of mobile networks, knowledge, skill and awareness in the latest future trends of technologies of modern Mobile Wireless Communication System and services offered have become extremely important for telecom engineers.

Course outcome
On completion of this course you should be able to:

- Describe mobile communications systems and be able to choose an appropriate mobile system from a set of requirements.
- Be able to avoid or work around the weaknesses of mobile computing, or to reject mobile computing as a solution.
- Interface a mobile computing system to hardware and networks.

Course Code: 3TBCS 803 (B)
Course Name: Bioinformatics

Course objective

- The course is designed to introduce the most important and basic concepts, methods, and tools used in Bioinformatics Topics include (but not limited to) bioinformatics databases, sequence and structure alignment protein structure prediction, protein folding, protein-protein interaction, Monte Carlo simulation, and molecular dynamics. Emphasis will be put on the Understanding and utilization of these concepts and algorithms. The objective is to help the students to reach rapidly the frontier of bioinformatics and be able to use the bioinformatics tools to solve the problems on their own research.

Course outcome

A student completing a major in Bioinformatics shall be able to apply:

- knowledge and awareness of the basic principles and concepts of biology, computer science and mathematics
- existing software effectively to extract information from large databases and to use this information in computer modeling
- problem-solving skills, including the ability to develop new algorithms and analysis methods
- An understanding of the intersection of life and information sciences, the core of shared concepts, language and skills the ability to speak the language of structure-function relationships, information theory, gene expression, and database queries

Course Code: 3TBCS – 803 (C)
Course Name: Data Mining and Knowledge Discovery

Course objective

- The Objective of data mining is to discover structure inside unstructured data, extract meaning from noisy data, discover patterns in apparently random data, and use all this information to better understand trends, patterns, correlations, and ultimately predict customer behavior, market and competition trends, so that the company uses its own data more meaningfully to better position itself on the new waves.

Course outcome

- Data mining is the computing process of discovering patterns in large data sets involving methods at the intersection of machine learning, statistics, and database systems.[1] It is an interdisciplinary subfield of computer science. The overall goal of the data mining process is to extract information from a data set and transform it into an understandable structure for further use. Aside from the raw analysis step, it involves database and data management aspects, data pre-processing, model and inference considerations, interestingness metrics, complexity considerations, post-processing of discovered structures, visualization, and online updating. Data mining is the analysis step of the "knowledge discovery in databases" process, or KDD.

Course Code: 3TBCS 803 (D)
Course Name: Digital Image Processing

Course objective

This module aims to:

- Develop a theoretical foundation of fundamental Digital Image Processing concepts.
- Provide mathematical foundations for digital manipulation of images; image

acquisition; preprocessing; segmentation; Fourier domain processing; and compression.
- Gain experience and practical techniques to write programs using MATLAB language for digital manipulation of images; image acquisition; preprocessing; segmentation; Fourier domain processing; and compression.

Course outcome
- Have a clear understanding of the principals the Digital Image Processing terminology used to describe features of images.
- Have a good understanding of the mathematical found actions for digital manipulation of images; image acquisition; preprocessing; segmentation; Fourier domain processing, compression andanalysis.
- Be able to write programs using Matlab language for digital manipulation of images; image acquisition; preprocessing; segmentation; Fourier domain processing; and compression.
- Have knowledge of the Digital Image Processing Systems.
- Be able to understand the documentation for, and make use of, the MATLAB library and MATLAB Digital Image Processing Toolbox (IPT).
- Learn and understand the Image Enhancement in the Spatial Domain.
- Learn and understand the Image Enhancement in the Frequency Domain.
- Understand the Image Restoration, Compression, Segmentation, Recognition, Representation and Description.

Course Code: 3TBCS – 804(A)
Course Name: E-Commerce & Strategic IT

Course objective
At the end of this course, students should be able to:
- Identify and apply relevant problem solving methodologies.
- Design components, systems and/or processes to meet required specifications for a web presence
- Demonstrate research skills
- Communicate effectively in ways appropriate to the discipline, audience and purpose.
- Work as an effective member or leader of diverse teams within a multi-level, multi-disciplinary and multi-cultural setting for the Group Website Research Project
- Appreciate ethical implications of professional practice

Course outcome
- To gain an understanding of the theories and concepts underlying e-commerce
- To apply e-commerce theory and concepts to what e-marketers are doing in "the real world"
- To improve familiarity with current challenges and issues in e-commerce

Course Code: 3TBCS – 804(B)
Course Name: Robotics

Course objective
- To study microcontroller operations for robotics.
- To study how different interfaces are actually implemented in a microcontroller.

- To learn how Microchip PIC micro PIC16F627 can be erased and reprogrammed.
- To learn how different sensors, outputs, and peripherals can be wired to a microcontroller to work cooperatively and create a high-level control program.
- To design robots in a real time environment.

Course outcome

- To understand about robotics, peripheral devices, memory etc.
- To be able to describe the software development .
- Understand the microcontroller and development tools.
- How to use real time operating system in our daily life.

Course Code: 3TBCS – 804(C)
Course Name: Social Network

Course objective

- To study microcontroller operations for robotics.
- To study how different interfaces are actually implemented in a microcontroller.
- To learn how Microchip PIC micro PIC16F627 can be erased and reprogrammed.
- To learn how different sensors, outputs, and peripherals can be wired to a microcontroller to work cooperatively and create a high-level control program.
- To design robots in a real time environment.

Course outcome

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

- Develop semantic web related applications.
- Represent knowledge using ontology.
- Predict human behavior in social web and related communities.
- Visualize social networks.

Course Code: 3TBCS – 804(D)
Course Name: Cyber Crime & Law

Course objective

- Cyber security is the body of technologies, processes and practices designed to protect networks, computers, programs and data from attack, damage or unauthorized access. In a computing context, security includes both cyber security and physical security.

Course outcome

Upon completion of their Cyber security Program will student will able to:

- Identify infrastructure components and the roles they serve, and design infrastructure including devices, topologies, protocols, systems software, management and security.
- Analyze performance of enterprise network systems.
- Effectively communicate technical information verbally, in writing, and in presentations.
- Use appropriate resources to stay abreast of the latest industry tools and techniques analyzing the impact on existing systems and applying to future situations.
- Explain the concepts of confidentiality, availability and integrity in Information Assurance, including physical, software, devices, policies and people. Analyze these

factors in an existing system and design implementations.
- Cite and comply with relevant industry and organizational codes of conduct and ethics.

Course Code: 3TBCS - 806
Course Name: Seminar

Course objective
- Students will develop persuasive speech, present information in a compelling, well-structured, and logical sequence, respond respectfully to opposing ideas, show depth of knowledge of complex subjects, and develop their ability to synthesize, evaluate and reflect on information.

Course outcome
- Presentation Skills. ...
- Discussion Skills. ...
- Listening Skills. ...
- Argumentative Skills and Critical Thinking. ...
- Questioning. ...
- Engaging with Big Questions. ...

MASTER OF TECHNOLOGY (SOFTWARE ENGINEERING)
PROGRAMME CODE-05PGR010

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

- To prepare graduates who will be successful professionals in industry, government, academia, research, entrepreneurial pursuit and consulting firms
- To prepare graduates who will contribute to society as broadly educated, expressive, ethical and responsible citizens with proven expertise
- To prepare graduates who will achieve peer-recognition; as an individual or in a team; through demonstration of good analytical, research, design and implementation skills
- To prepare graduates who will thrive to pursue life-long reflective learning to fulfill their goals.

PROGRAM OUTCOMES (POs)

- **PO1:** Ability to acquire and apply in-depth knowledge in the area of Software Engineering to contribute to the state-of-art.
- **PO2:** An ability to apply knowledge of mathematics, science and engineering in practice.
- **PO3:** An ability to identify, critically analyze, formulate and solve engineering problems with comprehensive knowledge in the area of specialization
- **PO4:** An ability to select modern engineering tools and techniques and use them with dexterity.
- **PO5:** An ability to design a system and process to meet desired needs within realistic constraints such as health, safety, security and manufacturability
- **PO6:** An ability to contribute by research and innovation to solve engineering problems.

PROGRAMME-SPECIFIC OUTCOMES (PSOs)

- **PSO1:** An ability to understand the impact of engineering solutions in a contemporary, global, economical, environmental, and societal context for sustainable development.
- **PSO2:** An ability to appreciate the importance of goal setting and to recognize the need for life-long reflective learning.
- **PSO3:** Exhibit Technical skills necessary to choose careers in the design, installation, testing, management and operation of Software Engineering.

Course Code: 6TMSE101
Course Name: ADVANCED COMPUTATIONAL MATHEMATICS

Course Objectives

- Apply critical thinking and communication skills to solve applied problems.
- Use knowledge and skills necessary for immediate employment or acceptance into a graduate program.
- Maintain a core of mathematical and technical knowledge that is adaptable to changing technologies and provides a solid foundation for future learning.

Course Outcomes

On completion of this course you should be able to:

- Analyse and solve problems relating to a wide range of applications.
- Demonstrate high level knowledge, skills and their application in the selected fields in the course description.
- Apply research methods that are particularly relevant in Computational Mathematics.

Course Code: 6TMSE102
Course Name: MACHINE LEARNING

Course Objectives

- Understand the concepts of machine learning.
- Understand the clustering techniques and their utilization in machine learning.
- Study the neural network systems for machine learning.
- Learn and understand the linear learning models in machine learning.
- Study the tree based machine learning techniques and to appreciate their capability.

Course Outcomes
On completion of the course students will be expected to:

- Have a good understanding of the fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.
- Have an understanding of the strengths and weaknesses of many popular machine learning approaches.

Course Code: 6TMSE103
Course Name: SOFTWARE ARCHITECTURE & DESIGN PATTERN

Course Objectives

- The students get basic knowledge of patterns and description of patterns
- To understand basic architectural patterns
- To get an insight on the design patterns and mining.

Course Outcomes
At the end of the course the student will be able to:

- Understand the architecture, creating it and moving from one to any, different structural patterns.
- Analyze the architecture and build the system from the components.
- Design creational and structural patterns.
- Learn about behavioral patterns.
- Do a case study in utilizing architectural structures.

Course Code: 6TMSE104
Course Name: OBJECT ORIENTED TECHNOLOGY

Course Objective

- Its main objective is to teach the basic concepts and techniques which form the object oriented programming paradigm

Course Outcomes

- Understand the features of C++ supporting object oriented programming.
- Understand the relative merits of C++ as an object oriented programming language.
- Understand how to produce object-oriented software using C++.
- Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism.
- Understand advanced features of C++ specifically stream I/O, templates and operator overloading.

Course Code: 6TMSE105
Course Name: ADVANCED COMPUTER NETWORKING

Course Objectives
At the end of the course, the students will be able to:
- Build an understanding of the fundamental concepts of computer networking.
- Familiarize the student with the basic taxonomy and terminology of the computer networking area.
- Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
- Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

Course Outcomes
After completing this course the student must demonstrate the knowledge and ability to:
- Independently understand basic computer network technology.
- Understand and explain Data Communications System and its components.
- Identify the different types of network topologies and protocols.
- Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer. 5. Identify the different types of network devices and their functions within a network
- Understand and building the skills of subnetting and routing mechanisms.
- Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Course Code: 6TMSE106
Course Name: Audit Course-I ENGLISH FOR RESEARCH PAPER WRITING

Course Objectives
Students will be able to:
- Understand that how to improve your writing skills and level of readability
- Learn about what to write in each section
- Understand the skills needed when writing a Title
- Ensure the good quality of paper at very first-time submission

Course Outcomes
At the end of the course, the student will be able to:
- Understand that how to improve your writing skills and level of readability.
- Learn about what to write in each section.
- Understand the skills needed when writing a Title Ensure the good quality of paper at

very first-time submission.

Course Code: 6TMSE106
Course Name: Audit Course-I PEDAGOGY STUDIES

Course Objective
Students will be able to:

- Review existing evidence on the review topic to inform programme design and policy making undertaken by the DfID, other agencies and researchers.
- Identify critical evidence gaps to guide the development.

Course Outcomes
Students will be able to understand:

- What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
- What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
- How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

Course Code: 6TMSE106
Course Name: Audit Course-I STRESS MANAGEMENT BY YOGA

Course Objectives

- To achieve overall health of body and mind
- To overcome stress

Course Outcomes
Students will be able to:

- Develop healthy mind in a healthy body thus improving social health also
- Improve efficiency

Course Code: 6TMSE201
Course Name: SOFTWARE DESIGN & TESTING

Course Objectives

- To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
- To discuss various software testing issues and solutions in software unit test; integration, regression, and system testing.
- To learn how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report.
- To expose the advanced software testing topics, such as object-oriented software testing methods, and component-based software testing issues, challenges, and solutions.
- To gain software testing experience by applying software testing knowledge and methods to practice-oriented software testing projects.
- To understand software test automation problems and solutions.
- To learn how to write software testing documents, and communicate with engineers in various forms.

- To gain the techniques and skills on how to use modern software testing tools to support software testing projects.

Course Outcomes
At the end of this course attendees will be able to:
- Understand quality management processes
- Distinguish between the various activities of quality assurance, quality planning and quality control.
- Understand the importance of standards in the quality management process and their impact on the final product.

Course Code: 6TMSE202
Course Name: SOFTWARE PROJECT MANAGEMENT

Course Objectives
- To outline the need for Software Project Management
- To highlight different techniques for software cost estimation and activity planning.

Course Outcomes
- At the end of the course the students will be able to practice Project Management principles while developing a software.

Course Code: 6TMSE203
Course Name: ADVANCED CONCEPTS IN DATABASE

Course Objectives
- Learning state-of-art techniques in database systems and information management that students can apply to your future research and/or your practical work.
- Learning how the prepare and present technical papers which is an essential skill for students and researchers.
- Reviewing technical and scientific papers is a skill that you need to develop.

Course Outcomes
By the end of this module, students should be able to:
- explain and evaluate the fundamental theories and requirements that influence the design of modern database systems
- assess and apply database functions and packages suitable for enterprise database development and database management
- critically evaluate alternative designs and architectures for databases and data warehouses
- discuss and evaluate methods of storing, managing and interrogating complex data
- explain and critically evaluate database solutions for data exchange
- analyse the background processes involved in queries and transactions, and explain how these impact on database operation and design

Course Code: 6TMSE204
Course Name: WEB TECHNOLOGY AND E-COMMERCE

Course Objectives

- To prepare graduates who will be successful professionals in industry, government, academia, research, entrepreneurial
- pursuit and consulting firms
- To prepare graduates who will contribute to society as broadly educated, expressive, ethical and responsible citizens with proven expertise
- To prepare graduates who will achieve peer-recognition; as an individual or in a team; through demonstration of good analytical, research, design and implementation skills.
- The objective of this subject is to develop an ability to design and implement static and dynamic website

Course Outcomes
After successful completion of the course students will be able to:

- At the end of the course, students should be able to:
- Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's.
- Have a Good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services.
- Get introduced in the area of Online Game programming.

Course Code: 1TMSE205(A)
Course Name: Elective-1 (Data structure and Algorithm using Python)

Course Objectives

- The course is designed to provide Basic knowledge of Python.
- Python programming is intended for software engineers, system analysts, program managers and user support personnel who wish to learn the Python programming language.

Course Outcomes

- Problem solving and programming capability.
- Master an understanding of scripting and the contributions of scripting languages.
- Master an understanding of Python especially the object-oriented concepts,
- Master an understanding of the built-in objects of Python,

Course Code: 6TMSE205(B)
Course Name: Elective-1 (Information theory coding and Cryptography)

Course Objectives

- This course aims to address the efficient error free and secure delivery of information using binary data streams. For efficiency, the information source is coded to reduce redundancy. To minimise the effects of errors, channel coding is employed and, finally, cryptographic techniques are required to make the data secure. The aim is to present the basic theory and objectives of each of these steps, together with the basics of information theory.

Course Outcomes
After successful completion of the course students will be able to:

- Apply the basics of information theory to calculate channel capacity and other measures
- Design specific data compression techniques and calculate the compression achieved
- Apply and control specific coding methods and be able to calculate the rate and error probabilities achieved
- Understand the basic concepts and complexity of cryptographic security methods and their practical applications.

Course Code: 6TMSE205(C)
Course Name: Elective-1 (Data Analytic using R-Programming)

Course Objectives

- To study the usage and applications of Object Oriented database
- To acquire knowledge on variety of NoSQL databases
- To attain inquisitive attitude towards research topics in NoSQL databases

Course Outcomes
After successful completion of the course students will be able to:

- Recognize and make appropriate use of different types of data structures
- Use R to create sophisticated figures and graphs
- Identify and implement appropriate control structures to solve a particular programming problem
- Design and write functions in R and implement simple iterative algorithms.

Course Code: 6TMSE205(D)
Course Name: Elective-1 (Ad-hoc Network)

Course Objectives

- Explains the constraints of physical layer that affect the design and performance of ad hoc network.
- The Concept of protocols required for wired network may not work for wired network at MAC, Network and Transport Layer.
- Explains the operations and performance of various MAC layer protocols, unicast routing protocols and transport layer protocols proposed for ad hoc networks.

Course Outcomes
After successful completion of the course students will be able to:

- Understand the challenges in design of wireless ad hoc networks.
- Understand and analyze proposed protocols at MAC and routing layers of ad hoc networks.
- Understand and analyze attacks pertaining to network layer.

Course Code: 6TMSE205(E)
Course Name: Elective-1(Image Processing)

Course Objectives

- To prepare graduates who will be successful professionals in industry, government, academia, research, entrepreneurial pursuit and consulting firms
- To prepare graduates who will contribute to society as broadly educated, expressive, ethical and responsible citizens with proven expertise
- To prepare graduates who will achieve peer-recognition; as an individual or in a team; through demonstration of good analytical, research, design and implementation skills
- To prepare graduates who will thrive to pursue life-long reflective learning to fulfil their goals

Course Outcomes
After successful completion of the course students will be able to:

- An understanding of the theoretical foundations and the limits of computing.
- An ability to adapt existing models, techniques, algorithms, data structures, etc. for efficiently solving problems.
- An ability to design, develop and evaluate new computer based systems for novel applications which meet the desired needs of industry and society.
- The course will cover techniques and tools for digital image processing, and finally also introduce image analysis techniques in the form of image segmentation.
- The course is primarily meant to develop on-hand experience in applying these tools to process these images. Hence the programming assignments form a key component of this course.
- The students would be encouraged to develop the image processing tools from scratch, rather than using any image processing library functions.

Course Code: 6TMSE206
Course Name: Audit Course-II DISASTER MANAGEMENT

Course Objectives
Students will be able to:

- Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
- Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
- Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
- Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work

Course Outcomes

- Able to handle critical situation.
- Able to reduce disaster risk.

Course Code: 6TMSE206
Course Name: PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS

Course Objectives

- To learn to achieve the highest goal happily
- To become a person with stable mind, pleasing personality and determination
- To awaken wisdom in students

Course Outcomes
Students will be able to:
- Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life
- The person who has studied Geeta will lead the nation and mankind to peace and prosperity
- Study of Neetishatakam will help in developing versatile personality of students

Course Code: 6TMSE206
Course Name: VALUE EDUCATION

Course Objectives
Students will be able to:
- Understand value of education and self- development
- Imbibe good values in students
- Let the should know about the importance of character

Course Code: 6TMSE206
Course Name: INTERNET OF THINGS

Course Objective
- To assess the vision and introduction of IoT.
- To Understand IoT Market perspective.
- To Implement Data and Knowledge Management and use of Devices in IoT Technology.
- To Understand State of the Art - IoT Architecture.
- To classify Real World IoT Design Constraints, Industrial Automation in IoT.

Course Outcomes
After successful completion of the course students will be able to:
- Able to understand the application areas of IOT
- Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
- Able to understand building blocks of Internet of Things and characteristics

Course Code: 6TMSE207
Course Name: BIG DATA

Course Objective
- To prepare graduates who will be successful professionals in industry, government, academia, research, entrepreneurial pursuit and consulting firms
- To prepare graduates who will contribute to society as broadly educated, expressive, ethical and responsible citizens with proven expertise
- To prepare graduates who will achieve peer-recognition; as an individual or in a team;

through demonstration of good analytical, research, design and implementation skills
- To prepare graduates who will thrive to pursue life-long reflective learning to fulfill their goals

Course Outcomes
After successful completion of the course students will be able to:
- apply the basics of information theory to calculate channel capacity and other measures
- design specific data compression techniques and calculate the compression achieved
- apply and control specific coding methods and be able to calculate the rate and error probabilities achieved
- understand the basic concepts and complexity of cryptographic security methods and their practical applications.

Course Code: 6TMSE301 (A)
Course Name: DATA SCIENCE

Course Objective
- Aim to provide general overview of the principles, concepts, techniques, tools and services for managing, harmonizing, aggregating, preprocessing, modeling, analyzing and interpreting large, multi-source, incomplete, incongruent, and heterogeneous data (Big Data). The focus will be to expose students to common challenges related to handling Big Data and present the enormous opportunities and power associated with our ability to interrogate

Course Outcomes
After competition of upon course students will be able:
- To understand the concept of data mining and data science.
- To implement methods to retrieve information from different web sources.
- To understand the architecture of various search engine.
- To analytics big data using Phython and Hadoop.

Course Code: 6TMSE301 (B)
Course Name: PARALLEL ALGORITHMS

Course Objectives
- To understand different parallel architectures and models of computation.
- To introduce the various classes of parallel algorithms.
- To study parallel algorithms for basic problems.

Course Outcomes
- Upon completion of this course, the students should be able to
- Develop parallel algorithms for standard problems and applications.
- Analyse efficiency of different parallel algorithms.

Course Code: 6TMSE301 (C)
Course Name: REAL TIME OPERATION SYSTEM

Course Objectives

- To learn the fundamentals of Operating Systems.
- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporary OS
- To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
- To know the components and management aspects of concurrency management
- To learn programmatically to implement simple OS mechanisms

Course Outcomes

At the end of this course attendees will be able to:

- Student will be able to summarize the issues in real time computing
- Student will be able to explain and give examples of real time operating systems.
- Student will be able to solve scheduling problems and can apply them in real time applications in industry.

Course Code: 6TMSE302 (A)
Course Name: DEEP LEARNING

Course Objective

This course covers the basics of machine learning, neural networks and deep learning. Model for deep learning technique and the various optimization and generalization mechanisms are included. Major topics in deep learning and dimensionality reduction techniques are covered. The objective of this course is:

- To present the mathematical, statistical and computational challenges of building neural Networks.
- To study the concepts of deep learning
- To introduce dimensionality reduction techniques
- To enable the students to know deep learning techniques to support real-time applications
- To examine the case studies of deep learning techniques

Course Outcomes

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

- To Understand basics of deep learning
- Implement various deep learning models
- Realign high dimensional data using reduction techniques
- Analyze optimization and generalization in deep learning
- Explore the deep learning applications

Course Code: 6TMSE302 (B)
Course Name: PRIVACY & SECURITY IN ONLINE SOCIAL MEDIA

Course Objective

- Privacy and security in online social media are one of the hottest and most serious issues these days. This course will cover a wide range of topics to prepare you for the privacy and security issues and concerns you will face in social professional environments. The goal of this course is not to teach you how to encrypt a message using any particular encryption method, but to teach you to think analytically when you make privacy and security when you are working on social media.

Course Outcomes

After competition of this course students are able:

- To understand how to achieve privacy in online social media.
- To prevent forgury in social media.
- To implement various technique to secure data on social media.

Course Code: 6TMSE302 (C)
Course Name: GRID COMPUTING

Course Objective

- The course will provide an insight for achieving cost efficient high performance system. The course will deal with design and architecture of grid and cluster computing.

Course Outcome

- At the end of the course student will have knowledge of Grid Computing, Web Services, and Service-oriented architecture, Architecture for grid computing, Cluster Computing, process scheduling and load balancing

Course Code:
Course Name: RESEARCH METHODOLOGY AND IPR

Course Objective

- The course has been developed with orientation towards research related activities and recognizing the ensuing knowledge as property. It will create consciousness for Intellectual Property Rights and its constituents. Learners will be able to perform documentation and administrative procedures relating to IPR in India as well as abroad.

Course Outcomes

At the end of the course, students will demonstrate their ability to:

- Understanding and formulation of research problem.
- Analyze research related information.
- Understand plagiarism and follow research ethics
- Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity

MASTER OF TECHNOLOGY (CSE)
PROGRAMME CODE-05PGR004

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

- Analyze, design and create computing solutions for scientific and multidisciplinary engineering challenges.
- Pursue a successful career in industry/academia/research/government driven by strong foundations and in-depth domain knowledge and contribute to the engineering sphere as a competent professional.
- Demonstrate an exceptional involvement and active participation in Research and Development leading to new innovations and optimized solutions.
- Engage in lifelong learning with persistent scientific temper for professional advancement and effective communication of the technical information.
- Work effectively in multi-disciplinary and multi-cultural environments by respecting professionalism and ethical practices within organization and society at national and international level.
- To prepare graduates who will be successful professionals in industry, government, academia, research, entrepreneurial pursuit and consulting firms
- To prepare graduates who will achieve peer-recognition; as an individual or in a team; through demonstration of good analytical, research, design and implementation skills.

PROGRAM OUTCOMES (POs)

- **PO1.** Ability to acquire and apply in-depth knowledge in the area of Computer Science and contribute to the state-of-art.
- **PO2.** Ability to Design & Conduct Experiments, as well as analyze & Interpret Data.
- **PO3.** Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social,
- ethical, manufacturability, and sustainability.
- **PO4.** An ability to function, manage and lead multidisciplinary teams.
- **PO5.** Ability to identify, formulate & solve problems, conduct research and critically examine the outcomes and take corrective actions.
- **PO6.** An understanding of professional and ethical responsibility..
- **PO7.** An ability to communicate effectively.
- **PO8.** To understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- **PO9.** A recognition of the need for, and an ability to engage in life-long learning..
- **PO10.** A knowledge of contemporary issues.
- **PO11.** An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

PROGRAMME-SPECIFIC OUTCOMES (PSO)

- **PSO1:** Apply knowledge of recent computing technologies, skills and current tools of computer science and engineering.
- **PSO2:** Ability to design and conduct experiments, as well as to analyze and interpret data.
- **PSO3:** Knowledge of contemporary research issues in the different areas of computer science and engineering
- **PSO4:** Ability to explore research gaps, analyze and carry out research in the specialized/emerging areas.
- **PSO5:** Design software systems, components, or processes to meet identified needs within economic, environmental and social constraints.
- **PSO6:** Ability to express/present ideas in an impressive and professional manner.
- **PSO7:** Recognize the need to engage in lifelong learning through continuing education and research.
- **PSO8:** Ability to work in multidisciplinary and multicultural environment.
- **PSO9:** Ability to become entrepreneur based upon societal needs.
- **PSO10:** An understanding of professional, social and ethical responsibilities.

Course Code: 6TMMA 101
Course Name: Mathematics

Course Objectives

- Apply critical thinking and communication skills to solve applied problems.
- Use knowledge and skills necessary for immediate employment or acceptance into a graduate program.
- Maintain a core of mathematical and technical knowledge that is adaptable to changing technologies and provide a solid foundation for future learning.

Course Outcomes

- Apply mathematical concepts and principles to perform computations
- Apply mathematics to solve problems
- Create, use and analyze graphical representations of mathematical relationships
- Communicate mathematical knowledge and understanding
- Apply technology tools to solve problems
- Perform abstract mathematical reasoning
- Learn independently

Course Code: 6TMCS 102
Course Name: Advanced Computer Architecture

Course Objectives

- Give students a broad and deep knowledge of contemporary computer architecture issues and techniques.
- Give students knowledge of advanced hardware-based techniques for exploiting instruction level parallelism.
- Give students knowledge of various architectures and techniques used for building high performance scalable multithreaded and multiprocessor systems.

- Give students ability to apply the learned knowledge to conduct computer architecture research using performance simulators.

Course Outcomes

- Identify the factors affecting performance in superscalar processors and the key components, options and tradeoffs that a designer has to consider when designing such processors.
- Identify various simulation techniques used to study superscalar processor performance. Compare a trace cache to conventional instruction cache and explain advantages and disadvantages of each approach.
- Explain advanced branch prediction techniques such as 2-level branch prediction, perception- based branch prediction, combined predictors, indirect branch prediction and branch confidence estimation.
- Describe the hardware needed to properly order loads and stores execution in a superscalar processor, and methods to optimize, predict, and perform load store ordering in large instruction window processors.
- Explain how data speculation and dynamic instruction reuse work, why they work, and compare the two techniques.
- Explain different dynamic optimization techniques and the hardware support needed to perform these optimizations in a superscalar processor.
- Compare checkpoint architectures to conventional speculative execution methods, such as reorder buffer.

Course Code: 6TMCS 103
Course Name: Advanced Data Structures and Algorithm

Course Objectives

- The fundamental design, analysis, and implementation of basic data structures. Basic concepts in the specification and analysis of programs. Principles for good program design, especially the uses of data abstraction. Significance of algorithms in the computer field Various aspects of algorithm development Qualities of a good solution

Course Outcomes

- Students develop knowledge of basic data structures for storage and retrieval of ordered or unordered data. Data structures include: arrays, linked lists, binary trees, heaps, and hash tables.
- Students develop knowledge of applications of data structures including the ability to implement algorithms for the creation, insertion, deletion, searching, and sorting of each data structure.
- Students learn to analyze and compare algorithms for efficiency using Big-O notation. Students implement projects requiring the implementation of the above data structures.

Course Code: 6TMCS 104
Course Name: Object Oriented Technology

Course Objectives

- Its main objective is to teach the basic concepts and techniques which form the object oriented programming paradigm

Course Outcomes

- Understand the features of C++ supporting object oriented programming
- Understand the relative merits of C++ as an object oriented programming language
- Understand how to produce object-oriented software using C++
- Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism
- Understand advanced features of C++ specifically stream I/O, templates and operator overloading

Course Code: 6TMCS 105
Course Name: Advanced Computer Networking

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

- Build an understanding of the fundamental concepts of computer networking.
- Familiarize the student with the basic taxonomy and terminology of the computer networking area.
- Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
- Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

Course Outcomes
After completing this course the student must demonstrate the knowledge and ability to:

- Independently understand basic computer network technology.
- Understand and explain Data Communications System and its components.
- Identify the different types of network topologies and protocols.
- Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
- Identify the different types of network devices and their functions within a network
- Understand and building the skills of subnetting and routing mechanisms.
- Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Course Code: 6TMCS106
Course Name: Audit Course-I ENGLISH FOR RESEARCH PAPER WRITING

Course Objectives
Students will be able to:

- Understand that how to improve your writing skills and level of readability
- Learn about what to write in each section
- Understand the skills needed when writing a Title

Course Outcomes

- Ensure the good quality of paper at very first-time submission.

Course Code: 6TMCS106
Course Name: Audit Course-I PEDAGOGY STUDIES

Course Objectives
Students will be able to:

- Review existing evidence on the review topic to inform programme design and policy making undertaken by the DfID, other agencies and researchers.
- Identify critical evidence gaps to guide the development.

Course Outcomes
Students will be able to understand:

- What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
- What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
- How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

Course Code: 6TMCS106
Course Name: Audit Course-I STRESS MANAGEMENT BY YOGA

Course Objectives

- To achieve overall health of body and mind
- To overcome stress

Course Outcomes
Students will be able to:

- Develop healthy mind in a healthy body thus improving social health also Improve efficiency

Course Code: 6TMCS 201
Course Name: Internet of things

Course Objectives

- To assess the vision and introduction of IoT.
- To Understand IoT Market perspective.
- To Implement Data and Knowledge Management and use of Devices in IoT Technology.
- To Understand State of the Art - IoT Architecture.
- To classify Real World IoT Design Constraints, Industrial Automation in IoT.

Course Outcomes
After successful completion of the course students will be able to:

- Able to understand the application areas of IOT
- Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
- Able to understand building blocks of Internet of Things and characteristics

Course Code:6TMCS 202
Course Name: Big Data

Course Objectives

- To prepare graduates who will be successful professionals in industry, government, academia, research, entrepreneurial pursuit and consulting firms
- To prepare graduates who will contribute to society as broadly educated, expressive, ethical and responsible citizens with proven expertise
- To prepare graduates who will achieve peer-recognition; as an individual or in a team; through demonstration of good analytical, research, design and implementation skills
- To prepare graduates who will thrive to pursue life-long reflective learning to fulfill their goals

Course Outcomes

After successful completion of the course students will be able to:

- apply the basics of information theory to calculate channel capacity and other measures
- design specific data compression techniques and calculate the compression achieved
- apply and control specific coding methods and be able to calculate the rate and error probabilities achieved
- understand the basic concepts and complexity of cryptographic security methods and their practical applications.

Course Code: 6TMCS 203
Course Name: Advanced Concept in Database

Course Objectives

- Learning state-of-art techniques in database systems and information management that students can apply to your future research and/or your practical work.
- Learning how the prepare and present technical papers which is an essential skill for students and researchers.
- Reviewing technical and scientific papers is a skill that you need to develop.

Course Outcomes

By the end of this module, students should be able to:

- explain and evaluate the fundamental theories and requirements that influence the design of modern database systems
- assess and apply database functions and packages suitable for enterprise database development and database management
- critically evaluate alternative designs and architectures for databases and data warehouses
- discuss and evaluate methods of storing, managing and interrogating complex data
- explain and critically evaluate database solutions for data exchange
- analyse the background processes involved in queries and transactions, and explain how these impact on database operation and design

Course Code: 6TMCS 204
Course Name: Web Technology and Commerce

Course Objectives

- To prepare graduates who will be successful professionals in industry, government, academia, research, entrepreneurial pursuit and consulting firms

- To prepare graduates who will contribute to society as broadly educated, expressive, ethical and responsible citizens with proven expertise
- To prepare graduates who will achieve peer-recognition; as an individual or in a team; through demonstration of good analytical, research, design and implementation skills.
- The objective of this subject is to develop an ability to design and implement static and dynamic website

Course Outcomes

After successful completion of the course students will be able to:

- Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's.
- Have a Good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services.
- Get introduced in the area of Online Game programming.

Course Code:6TMCS 205(A)
Course Name: Elective-1 (Data structure and Algorithm using Python)

Course Objectives

- The course is designed to provide Basic knowledge of Python.
- Python programming is intended for software engineers, system analysts, program managers and user support personnel who wish to learn the Python programming language.

Course Outcomes

- Problem solving and programming capability.
- Master an understanding of scripting and the contributions of scripting languages.
- Master an understanding of Python especially the object-oriented concepts,
- Master an understanding of the built-in objects of Python,

Course Code: 6TMCS 205(B)
Course Name: Elective-1 (Information theory coding and Cryptography)

Course Objectives

- This course aims to address the efficient error free and secure delivery of information using binary data streams. For efficiency, the information source is coded to reduce redundancy.
- To minimize the effects of errors, channel coding is employed and, finally, cryptographic techniques are required to make the data secure.
- To present the basic theory and objectives of each of these steps, together with the basics of information theory.

Course Outcomes

After successful completion of the course students will be able to:

- Apply the basics of information theory to calculate channel capacity and other measures
- Design specific data compression techniques and calculate the compression achieved
- Apply and control specific coding methods and be able to calculate the rate and error probabilities achieved
- Understand the basic concepts and complexity of cryptographic security methods and

their practical applications.

Course Code:6TMCS 205(C)
Course Name: Elective-1(Data Analytic using R-Programming)

Course Objectives

- To study the usage and applications of Object Oriented database
- To acquire knowledge on variety of NoSQL databases
- To attain inquisitive attitude towards research topics in NoSQL databases

Course Outcomes
After successful completion of the course students will be able to:

- Recognize and make appropriate use of different types of data structures
- Use R to create sophisticated figures and graphs
- Identify and implement appropriate control structures to solve a particular programming problem 4. Design and write functions in R and implement simple iterative algorithms.

Course Code:6TMCS 205(D)
Course Name: Elective-1(Ad-hoc Network)

Course Objectives

- Explains the constraints of physical layer that affect the design and performance of ad hoc network.
- The Concept of protocols required for wired network may not work for wired network at MAC, Network and Transport Layer.
- Explains the operations and performance of various MAC layer protocols, unicast routing protocols and transport layer protocols proposed for ad hoc networks.

Course Outcomes
After successful completion of the course students will be able to:

- Understand the challenges in design of wireless ad hoc networks.
- Understand and analyze proposed protocols at MAC and routing layers of ad hoc networks.
- Understand and analyze attacks pertaining to network layer.

Course Code: 6TMCS 205(E)
Course Name: Elective-1(Image Processing)

Course Objectives

- To prepare graduates who will be successful professionals in industry, government, academia, research, entrepreneurial pursuit and consulting firms
- To prepare graduates who will contribute to society as broadly educated, expressive, ethical and responsible citizens with proven expertise
- To prepare graduates who will achieve peer-recognition; as an individual or in a team; through demonstration of good analytical, research, design and implementation skills
- To prepare graduates who will thrive to pursue life-long reflective learning to fulfil their goals

Course Outcomes
After successful completion of the course students will be able to:

- An understanding of the theoretical foundations and the limits of computing.
- An ability to adapt existing models, techniques, algorithms, data structures, etc. for efficiently solving problems.
- An ability to design, develop and evaluate new computer based systems for novel applications which meet the desired needs of industry and society.
- The course will cover techniques and tools for digital image processing, and finally also introduce image analysis techniques in the form of image segmentation.
- The course is primarily meant to develop on-hand experience in applying these tools to process these images. Hence the programming assignments form a key component of this course.
- The students would be encouraged to develop the image processing tools from scratch, rather than using any image processing library functions.

Course Code:6TMST206
Course Name: Audit Course-II DISASTER MANAGEMENT

Course Objectives
Students will be able to:

- Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
- Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
- Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
- Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work

Course Objectives

- To get a working knowledge in illustrious Sanskrit, the scientific language in the world
- Learning of Sanskrit to improve brain functioning
- Learning of Sanskrit to develop the logic in mathematics, science & other subjects
- Enhancing the memory power
- The engineering scholars equipped with Sanskrit will be able to explore the huge knowledge from ancient literature

Course Code:6TMST206
Course Name: PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS

Course Objectives

- To learn to achieve the highest goal happily
- To become a person with stable mind, pleasing personality and determination
- To awaken wisdom in students

Course Outcomes

Students will be able to

- Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life
- The person who has studied Geeta will lead the nation and mankind to peace and prosperity
- Study of Neetishatakam will help in developing versatile personality of students

Course Code: 6TMST206
Course Name: VALUE EDUCATION

Course Objectives:
Students will be able to:

- Understand value of education and self- development
- Imbibe good values in students
- Let the should know about the importance of character

Course Outcomes
Students will be able to:

- Knowledge of self-development
- Learn the importance of Human values
- Developing the overall personality

Course Code: 6TMCS 301(A)
Course Name: Data Science

Course Objectives

- Aim to provide general overview of the principles, concepts, techniques, tools and services for managing, harmonizing, aggregating, preprocessing, modeling, analyzing and interpreting large, multi-source, incomplete, incongruent, and heterogeneous data (Big Data).
- The focus will be to expose students to common challenges related to handling Big Data and present the enormous opportunities and power associated with our ability to interrogate

Course Outcomes
After competition of upon course students will be able:

- To understand the concept of data mining and data science
- To implement methods to retrieve information from different web sources.
- To understand the architecture of various search engine.
- To analytics big data using Phython and Hadoop.

Course Code: 6TMCS 301(B)
Course Name: Machine Learning

Course Objectives

- Understand the concepts of machine learning.
- Understand the clustering techniques and their utilization in machine learning.
- Study the neural network systems for machine learning.

- Learn and understand the linear learning models in machine learning.
- Study the tree based machine learning techniques and to appreciate their capability.

Course Outcomes
On completion of the course students will be expected to:
- Have a good understanding of the fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.
- Have an understanding of the strengths and weaknesses of many popular machine learning approaches.

Course Code: 6TMCS301(C)
Course Name: Real Time Operation System

Course Objectives
- To learn the fundamentals of Operating Systems.
- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporary OS
- To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
- To know the components and management aspects of concurrency management
- To learn programmatically to implement simple OS mechanisms

Course Outcomes
At the end of this course attendees will be able to:
- Student will be able to summarize the issues in real time computing
- Student will be able to explain and give examples of real time operating systems.
- Student will be able to solve scheduling problems and can apply them in real time applications in industry.

Course Code: 6TMCS301(D)
Course Name: Parallel Algorithms

Course Objectives
- To understand different parallel architectures and models of computation.
- To introduce the various classes of parallel algorithms.
- To study parallel algorithms for basic problems.

Course Outcomes
Upon completion of this course, the students should be able to
- Develop parallel algorithms for standard problems and applications.
- Analyse efficiency of different parallel algorithms.

Course Code: 6TMCS302(A)
Course Name: Deep Learning

Course Objectives

This course covers the basics of machine learning, neural networks and deep learning. Model for deep learning technique and the various optimization and generalization mechanisms are included. Major topics in deep learning and dimensionality reduction techniques are covered. The objective of this course is:

- To present the mathematical, statistical and computational challenges of building neural Networks.
- To study the concepts of deep learning
- To introduce dimensionality reduction techniques
- To enable the students to know deep learning techniques to support real-time applications
- To examine the case studies of deep learning techniques

Course Outcomes

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

- To Understand basics of deep learning
- Implement various deep learning models
- Realign high dimensional data using reduction techniques
- Analyze optimization and generalization in deep learning
- Explore the deep learning applications

Course Code: 6TMCS302(B)
Course Name: Privacy & Security In Online Social Media

Course Objectives

- Privacy and security in online social media are one of the hottest and most serious issues these days. This course will cover a wide range of topics to prepare you for the privacy and security issues and concerns you will face in social professional environments.
- The goal of this course is not to teach you how to encrypt a message using any particular encryption method, but to teach you to think analytically when you make privacy and security when you are working on social media.

Course Outcomes

After completion of this course students are able:

- To understand how to achieve privacy in online social media.
- To prevent forgery in social media.
- To implement various technique to secure data on social media.

Course Code: 6TMCS302(C)
Subject: Grid Computing

Course Objectives

- The course will provide an insight for achieving cost efficient high performance system.
- The course will deal with design and architecture of grid and cluster computing.

Course Outcomes

- At the end of the course student will have knowledge of Grid Computing, Web Services, and Service-oriented architecture, Architecture for grid computing, Cluster Computing, process scheduling and load balancing.

Course Code: 6TMCS302(D)
Course Name: Software Testing & Quality Assurance

Course Objectives

- To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
- To discuss various software testing issues and solutions in software unit test; integration, regression, and system testing.
- To learn how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report.
- To expose the advanced software testing topics, such as object-oriented software testing methods, and component-based software testing issues, challenges, and solutions.
- To gain software testing experience by applying software testing knowledge and methods to practice-oriented software testing projects.
- To understand software test automation problems and solutions.
- To learn how to write software testing documents, and communicate with engineers in various forms.
- To gain the techniques and skills on how to use modern software testing tools to support software testing projects.

Course Outcomes

At the end of this course attendees will be able to:

- Understand quality management processes
- Distinguish between the various activities of quality assurance, quality planning and quality control.
- Understand the importance of standards in the quality management process and their impact on the final product.

DOCTOR OF PHILOSOPHY (Ph. D - CSE)
PPROGRAMME CODE – PH.D001

PROGRAMME EDUCATIONAL OBJECTIVES(PEOs)

- **[PEOs:1].** Graduates of the PhD program lead software/system research projects in Universities or Research Labs.
- **[PEOs:2].** Graduates of the PhD program produce independent innovative computer science security research results.
- **[PEOs:3].** Graduates of the PhD program produce software packages/tools that significant benefit the society and industry.
- **[PEOs:4].** Graduates of the PhD program practice lifelong learning and keep themselves up to date with emerging computer science security knowledge.

PROGRAM OUTCOMES (POs)

- **POs 1:** An ability to apply knowledge of mathematics, science and engineering in practice.
- **POs 2:** An ability to identify, critically analyze, formulate and solve engineering problems with comprehensive knowledge in the area of specialization.
- **POs 3:** An ability to select modern engineering tools and techniques and use them with dexterity.
- **PO 4:** An ability to contribute by research and innovation to solve engineering problems.

PROGRAMME-SPECIFIC OUTCOMES (PSOs)

- **[PSOs: 1].** Develop knowledge, understanding and expertise in their chosen field of Computer Science and Engineering.
- **[PSOs: 2].** Develop an understanding of eco-friendly software process and impact of ease of work and make eco friendly environment.
- **[PSOs: 3].** Provide opportunities to excel in academics, research or industry expertise in their chosen field of Computer Science and Engineering
- **[PSOs: 4].** Student makes advancement of the state-of-the-art in the field of Computer Science and Engineering by solving an original problem
- **[PSOs: 5].** Contribute to the advancement of knowledge in the field by solving original problems and/or performing insightful analysis of systems or techniques.

Course Code: 5010112801
Course Name: RESEARCH METHODOLOGY

Course Objectives

- The objective of imparting quality and creative research with an in-depth understanding and integrated knowledge of advanced applicable the or in the field of Computer Science and Engineering.

Course Outcomes

- To enable for analyzing and identifying problems and provide the appropriate solution to solve the specific problem. It also provides the educated candidates for employment which require in the academic and non academic file.

Course Code: 5010152101
Course Name: COMPUTATIONAL INTELLIGENCE

Course Objective

- The Computer Science and Engineering undergraduate program educational objectives are that the practice as computing professionals conducting research and/or leading, designing, developing, or maintaining projects in various technical areas.
- Apply the ethical and social aspects of modern computing technology to the design, development, and usage of computing artifacts.

Course Outcome

- An ability to use current techniques, skills and tools necessary for computing practice.
- An ability to identify, formulate and develop solutions to computational challenges.
- An ability to apply design and development principles in the construction of software systems of varying complexity.
- An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.

Course Code: 5010152102
Course Name: ACTIVITIES DETECTION IN SOCIAL NETWORK, USING TEXT MINING TECHNIQUE

Course Objective

- Create effective visuals to maximize readability, comprehension, and understanding of complex datasets
- Analyze and critique examples of visualizations
- Demonstrate understanding of analyzing unstructured data using text mining and web text mining techniques
- Demonstrate understanding of social network analysis.

Course Outcome

- Some common text mining and social network analytics activities in contemporary organizations.
- The complexities of collecting, integrating, processing and managing text and network data from a wide range of internal and external sources.
- How various analytical techniques can be used to uncover the potential of text and network data to gain actionable insights and support marketing decisions.

Course Code: 5010152103
Course Name: ADVANCED TECHNOLOGIES IN IOT

Course Objective

- To assess the vision and introduction of IoT.
- To Understand IoT Market perspective.
- To Implement Data and Knowledge Management and use of Devices in IoT Technology.
- To Understand State of the Art - IoT Architecture.

Course Outcome

- Interpret the vision of IoT from a global context.
- Determine the Market perspective of IoT.
- Compare and Contrast the use of Devices, Gateways and Data Management in IoT.
- Implement state of the art architecture in IoT.
- Illustrate the application of IoT in Industrial Automation and identify Real World Design Constraints.

Course Code: 501015210
Course Name: MACHINE LEARNING

Course Objective

- To provide students with an in-depth introduction to two main areas of Machine Learning: supervised and unsupervised. We will cover some of the main models and algorithms for regression, classification, clustering and Markov decision processes.
- Topics will include linear and logistic regression, regularisation, MLE, probabilistic (Bayesian) inference, SVMs and kernel methods, ANNs, clustering, and dimensionality reduction.
- The module will use primarily the Python programming language and assumes familiarity with linear algebra, probability theory, and programming in Python.

Course Outcome

- Interpret the vision of IoT from a global context.
- Determine the Market perspective of IoT.
- Compare and Contrast the use of Devices, Gateways and Data Management in IoT.
- Implement state of the art architecture in IoT.
- Illustrate the application of IoT in Industrial Automation and identify Real World Design Constraints.

Course Code: 5010152105
Course Name: BIG DATA ANALYTICS

Course Objective

- Understand the Big Data Platform and its Use cases.
- Provide an overview of Apache Hadoop.
- Provide HDFS Concepts and Interfacing with HDFS.
- Understand Map Reduce Jobs.
- Provide hands on Hodoop Eco System.

Course Outcome

- Identify Big Data and its Business Implications.
- List the components of Hadoop and Hadoop Eco-System
- Access and Process Data on Distributed File System
- Manage Job Execution in Hadoop Environment
- Develop Big Data Solutions using Hadoop Eco System
- Analyze InfosphereBigInsights Big Data Recommendations.

Course Code: 5010112802
Course Name: RESEARCH AND PUBLICATION ETHICS

Course Objective

- The objective of the course is to enable M. Phil/Ph.D scholar to understand about the publication ethics and publication misconduct and to create the awareness.

Course Outcome

- After learning this subject scholars will be able to understand the concepts and process of research and aware about the publication ethics and publication misconduct.

BACHELOR OF ENGINEERING ELECTRONICS AND COMMUNICATION (B.E. ECE)

Programme Code - 05UGR001

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- Utilize their education to develop innovative, ethical and socially responsible technological solutions in electronics engineering field.
- Attain professional development through life-long learning.
- Pursue a diverse range of careers in industry and government organizations.
- To demonstrate entrepreneurial skills by setting up business units and consultancies

PROGRAM OUTCOMES (POs)

- **PO1.Engineering knowledge:** Apply the knowledge of mathematics, science, Engineering fundamentals, and Electronics and Communication Engineering to the solution of complex Engineering problems.
- **PO2.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.
- **PO3.Design/development of solutions:** Design & develop systems, formulate (anticipate) Model for problems and obtain engineering solutions.
- **PO4.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.
- **PO5.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.
- **PO6.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.
- **PO7.Environment and sustainability:** Understand the impact of the professional Engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and the need for sustainable developments.
- **PO8.Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the Engineering practice.
- **PO9.Individual and team work:** Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO10.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.

- **PO11.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 multi-disciplinary environments.
- **PO12.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 (PSOs)

- **PSO1.**Apply the knowledge of Mathematics, Physics, Chemistry, Electronics and Communication to solve complex Engineering problems in Electronic Devices and Circuits, VLSI, Embedded Systems, Analog & Digital Communication and other associated topics.
- **PSO2.**Select and apply modern Engineering hardware and software tools to analyze complex Electronics and Communication Engineering problems and develop applications using Electronic Design Automation (EDA) tools.
- **PSO3.**Demonstrate a sense of professional ethics, recognize the importance of continued learning and be able to carry out their professional and entrepreneurial responsibilities in electronics engineering field giving due consideration to environment protection and sustainability.

Course Code:3TBPH101
Course Name: Engineering Physics

Course Objective

- The objective of this course is to equip the students with standard concepts and tools or an intermediate to advanced level.

Course Outcome

- Gain a knowledge and understanding of fundamental physical concepts in the areas covered in this class.
- Apply an understanding of these concepts to various systems and devises.
- Acquire problem solving skills, mathematical techniques, and the ability to synthesize.
- The ability to formulate, conduct, analyzes and interprets experiments in engineering physics

Course Code:3TBMA202
Course Name: Mathematics-I

Course Objective

- To introduce the idea of applying differential and integral calculus to notions of curvature and to improper integrals. Apart from some applications it gives a basic introduction on Beta and Gamma functions. To introduce the fallouts of Rolle's

Theorem that is fundamental to application of analysis to Engineering problems. To develop the tool of ordinary differential equation for learning advanced Engineering Mathematics. To familiarize the student with functions of several variables that is essential in most branches of engineering. To develop the essential tool of matrices and linear algebra in a comprehensive manner.

Course Outcome

- This Syllabus has been designed to equip engineering student s with necessary mathematical tool's to handle mathematical problem in their core subjects. Through this syllabus they will learn many thing about calculus specially first order differential equation , Roles ,Lagrange's concept about existence of derivatives in some interval ,Expansion of a function in an infinite series by Maclaurin's and Taylor theorem , partial derivative of functions through which maxima minima of two variable function application of matrices in solving linear simultaneous equations, Eigen value Eigen vector, Calay-Hamilton theorem to find Inverse of a matrix ,and concept of vector space.

Course Code:3TBME103
Course Name: Basic Mechanical Engineering

Course Objective

- To familiarize with the basic concept of Mechanical Engineering
- To familiarize with the scope of Mechanical Engineering
- To familiarize with the job prospects of Mechanical Engineer.

Course outcome

At the end of this course students will able to:

- Identify engineering materials, their properties, testing and manufacturing methods encountered in engineering practice.
- Understand Concept of measurement by using measuring instrument Vernier caliper, Micrometer, Dial gauge, Slip gauge etc.
- Understand basics of thermodynamics and components of a thermal power plant
- Understand the construction, operation and performance of different IC engines.
- Understand basics of fluids, their properties and laws of fluid Mechanics.

Course Code:3TBCE104
Course Name: Basic Civil & Engg Mechanics

Course Objective

- To introduce to student relevance of civil engineering for various engineering applications.
- To introduce to student various elements of buildings and construction materials.
- To introduce to student various methods of land survey and to make him

use surveying equipment

- To make student aware of modern investigation techniques in land survey.
- To introduce to student about the water management and transportation engineering.
- Ability to apply knowledge of mathematics, science, and engineering.
- Solve for the resultants of any force systems.
- Determine equivalent force systems.
- Solve the mechanics problems associated with friction forces.
- Obtain the centroid, first moment and second moment of an area.

Course outcome

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

- Describe the role of civil engineer in the development of the society and explain relationship of civil engineering with other branches of engineering and technology.
- Discuss types of buildings and select materials of construction.
- Explain the elements of water supply such as dam, canal and elements of transportation structures.
- Measure heights, distances and angles on ground using basic surveying instruments and plot them on paper.
- Explain the advantages of advances in civil engineering like remote sensing techniques, GIS and GPS.
- Determine the resultant force and moment for a given system of forces

Course Code:3TBCS105
Course Name: Communication Skills

Course Objective

The objective of this course is to learn the second language learners ability and to use the four fundamental language skills-reading writing speaking and listening. It will enable the students to speak english correctly and with confidence.

Course outcome

Student will develop knowledge, skills and judgment around human communication that facilitate their ability to work collaboratively with others. Such skills could include communication competencies such as managing conflict, understanding small group process, active listening, appropriate self disclosure, etc.

Course Code:3TBHH106
Course Name: Health, Hygiene & Yoga

Course Objective

- It is very important for the protection of our health and helps to present the spread of

communicable diseases personal hygiene has social and aesthetic values. The provision of hygiene information first impacts on knowledge and then practice. Yoga education helps in self discipline and self control, leading to immense amount of awareness concentration and higher level of consciousness. This course can prepare the students physically & mentally for the integration of their physical, mental and spiritual faculties so that the students can become healthier, saner and more integrated members of the society & of the nation.

Course Outcome:

- The student to have good health.
- Student have good mental hygiene.
- Possess emotional stability.
- Integrated moral values.
- Attain higher level of consciousness.

Course Code:3TBRO107
Course Name: Rural Outreach

Course Objective

The main objective of introducing this course is to sensitize students about the socio-cultural aspects of the rural areas parochial to their colleges. Students are expected to observe, investigate and learn about the following aspects of the rural region:

- Demographics, Literacy, Geographical parameters of the Village
- Schemes of government of India and State of Madhya Pradesh in operation in the village
- Social/ Cultural aspects ranging from popular dance forms, music and customs of the concerned village.

Course Code:3TBCH201
Course Name: Engineering Chemistry

Course Objective

- The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications.

Course Outcome

- The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications. Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels.

Course Code: 3TBMA102
Course Name: Mathematics-II

Course Objective

- Introduced effective mathematical tools for the solutions of ordinary and partial differential equations that model physical processes. Introduced Fourier Series & Fourier Transform. Introduced the tools of differentiation and integration of functions of complex variable that are used in various techniques dealing engineering problems. Acquainted the student with mathematical tools available in vector calculus needed various field of science and engineering.

Course Outcome

- Today calculus has become the heart of every engineering stream. Through this syllabus student will learn different techniques of solving different kind of higher order ordinary and partial differential equations. Expansion of periodic function in an infinite series of sine and cosine function through Fourier series, Function of complex variable's based on complex number and also vector calculus based on vectors.

Course Code:3TBEG203
Course Name: Engineering Graphics

Course Objective

- To familiarize with the construction of geometrical figures.
- To familiarize with the projection of 1D, 2D and 3D elements.
- To familiarize with the sectioning of solids and development of surfaces.
- To familiarize with the Preparation and interpretation of building drawing.

Course outcome

- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to solid modelling
- Exposure to creating working drawings
- Ability to draw projections and analysing multiple views of object.

Course Code:3TBEE204
Course Name: Basic Electrical Engineering

Course Objective

- To provide knowledge of basic concepts related to electrical engineering.
- To provide knowledge of basic Circuits: 1- phase AC Circuits, 3-phase AC Circuits, Magnetic Circuits, Electrical Machines

Course outcome

After successful completion of course,

- Students are expected to possess an in-depth understanding and Knowledge of 1-phase AC Circuits, 3-phase AC Circuits, Magnetic Circuits, Electrical Machines
- Develop the concepts of basic electrical engineering for all the undergraduate students of different branches of engineering.

Course Code:3TBCS205

Course Name: Basic Computer Engineering

Course Objective

By the end of this course, the student will be able to:-

- Analysing problems, and designing and implementing algorithmic solutions.
- Solving problems properly, achieving an implementation that is correct, effective and efficient.
- Using computers at user level, including operative systems and programming environments.
- Knowledge of computer equipment, including both hardware and software.
- Identifying information needs to solve problems, recovering information and applying it to the resolution.
- Opportunity to learn key concepts of computer, as well as fundamentals and applications of computer.

Course outcome

By the end of this course, the student will

- Analysing problems, and designing and implementing algorithmic solutions.
- Solving problems properly, achieving an implementation that is correct, effective and efficient.
- Using computers at user level, including operative systems and programming environments.
- Knowledge of computer equipment, including both hardware and software.
- Identifying information needs to solve problems, recovering information and applying it to the resolution.
- Opportunity to learn key concepts of computer, as well as fundamentals and applications of computer.

Course Code:3TBMP206

Course Name: Manufacturing Practices

Course Objective

- To familiarize with the basics of tool sand equipments used in fitting, carpentry, sheetmetal, welding and smithy

- To familiarize with the production of simple models in the above trades.

Course outcome

- On completion of this course, students will be able to
- Make half lap joint and dovetail joint in carpentry.
- Make welded lap joint, butt joint and T-joint.
- Prepare sand mould for cube, conical bush, pipes and V pulley.
- Fabricate parts like tray, frustum of cone and square box in sheet metal.

Course Code:3TBED207
Course Name: Entrepreneurship Development

Course Objective

- Understanding basic concepts of entrepreneurship and key steps in the elaboration of business ideas, Developing personal creativity and entrepreneurial initiative.

Course Outcome

- Understanding basic concepts in the area of entrepreneurship, understanding the stages of the entrepreneurial process, adopting of the key steps in the elaboration of business ideas, Developing personal creativity and entrepreneurial initiative.

Course Code:3TBBE301
Course Name: Mathematics-III

Course Objective

- The objective of this course is to fulfill the needs of engineers to understand applications of Numerical Analysis, Transform Calculus and Statistical techniques in order to acquire mathematical knowledge and to solving wide range of practical problems appearing in different sections of science and engineering. More precisely, the objectives are:
- To introduce effective mathematical tools for the Numerical Solutions algebraic and transcendental equations.
- To enable young technocrats to acquire mathematical knowledge to understand Laplace transformation, Inverse Laplace transformation which are used in various branches of engineering?
- To acquaint the student with mathematical tools available in Statistics needed in various field of science and engineering.

Course Outcomes

- Ability to explain the differential principles applies to solve engineering problems dealing with force, displacement, velocity and acceleration. Ability to analyze the forces in any structures.
- Ability to solve rigid body subjected to dynamic forces.

Course Code:3TBEC302
Course Name: Digital Circuits & Systems

Course Objective

- To introduce number systems and codes
- To introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions
- To introduce the methods for simplifying Boolean expressions
- To outline the formal procedures for the analysis and design of combinational circuits and sequential circuits
- To introduce the concept of memories, programmable logic devices and digital ICs.

Course outcome

- On completion of this course, the students can design combinational and sequential digital logic circuits. Also they will have knowledge on Programmable Logic devices and its usage.

Course Code:3TBEC303
Course Name: Network Analysis

Course Objective

- To make the students capable of analyzing any given electrical network.
- To make the students learn how to synthesize an electrical network from a given impedance/admittance function.

Course outcome

- Analyze simple DC circuits.
- Find Thevenin's and Norton equivalents of circuits.
- Analyze AC steady-state responses and transient response of resistance, inductance and capacitance in terms of impedance. Analyze two port networks.

Course Code:3TBEC304
Course Name: Electronics Devices & Circuits

Course Objective

- The main objective of this curriculum/course is to make the students well versed with basic electronic components and circuits. The students can
- Understand the nature and scope of modern electronics.
- Describe physical models of basic components.
- Design and construct simple electronic circuits to accomplish a specific function, e.g., designing amplifiers, ADC converters etc.
- Understand their capabilities and limitations and make decisions regarding their best

utilization in a specific situation.

Course outcome

- The combination of lecture and laboratory sessions provides learning opportunities that should enable the student to do the following upon completion of this course:
- Set up a bias point in a transistor.
- Verify the working of diodes, transistors and their applications.
- Build a common emitter/base/collector amplifier and measure its voltage gain.
- Explore the operation and advantages of operational amplifiers.
- Learn to design different types of filters and apply the same to amplifiers.

Course Code:3TBEC305
Course Name: Measurements & Instrumentation

Course Objective

- To introduce students to monitor, analyze and control any physical system
- To understand students how different types of meters work and their construction
- To provide a student a knowledge to design and create novel products and solutions for real life problems.
- To introduce students a knowledge to use modern tools necessary for electrical projects.

Course outcome

The expected outcomes of the Course/Subject are:

- To use the techniques and skills for electrical projects.
- Design a system, component or process to meet desired needs in electrical engineering.
- Measurement of R,L,C ,Voltage, Current, Power factor , Power, Energy.
- Ability to balance Bridges to find unknown values.
- Ability to measure frequency, phase with Oscilloscope.
- Ability to use Digital voltmeters.
- Ability to measure strain, displacement, Velocity, Angular Velocity, temperature, Pressure Vacuum, and Flow.

Course Code:3STEC307
Course Name: Hardware networking

Course Objective

- Mathematics fundamental necessary to formulate, solve and analyze engineering problems.

Course Code:3TBBE401
Course Name: Energy and Environmental Engineering

Course Objective

- The objective of this Course is to provide an introduction to energy systems and renewable energy resources, with a scientific examination of the energy field and an emphasis on alternative energy sources and their technology and application.

Course outcome

- After completion of this course student will able to recognize different energy sources including renewable and non renewable sources of energy. Different types of pollutions in environment there causes and precautions.

Course Code:3TBEC402
Course Name: Signals & Systems

Course Objective

- The focus of this course is to introduce you to the fundamental concepts and tools used in both analogue and digital signal processing (ASP and DSP) which are areas of interest if you are studying any program relating to electronic, communication and/or computer engineering.

Course outcome

As an outcome of completing this course, students should be able to

- Understand the terminology of signals and basic engineering systems.
- Understand the role of signals and systems in engineering design and society.
- Understand signal representation techniques and signal characteristics.
- Understand the difference and the applications of analog versus discrete signals and the Conversion between them.
- Understand the process of sampling &Fourier transforms.

Course Code:3TBEC403
Course Name: Integrated Circuits & its Applications

Course Objective

- The objective of this course is to deal with integrated circuits which are imperative and versatile requirement in today's electronics. Operational amplifier is a device which is used in various electronics application, such as summer, integrator and differentiator and so on. This course comprehends the introduction of various IC's such as IC-741, TL082, and IC- 555 timer. The course also deals with the analysis and design of circuits including analog signal processing using linear ICs.

Course Outcome

- Upon successful completion of this course students will able to understand the working of different integrated circuits, their pin configurations and about their applications. Students will also able to understand the performance of ICs on practical basis.

Course Code:3TBEC404
Course Name: Communication Systems I

Course Objective

- The course is designed to cover the fundamentals, principles, concepts, and techniques of analog communication systems like various modulation techniques, data transmission, communication technologies, time-domain and frequency domain multiplexing technique and noise analysis.

Course outcome

After the completion of the course students will be able to

- Describe different types of noise and predict its effect on various analog communication systems.
- Analyze energy and power spectral density of the signal. Express the basic concepts of analog modulation schemes
- Evaluate analog modulated waveform in time /frequency domain and also find modulation index.
- Develop understanding about performance of analog communication systems Calculate bandwidth and power requirements for analog systems.
- Analyze different characteristics of receiver.

Course Code:3TBEC405
Course Name: Control Systems

Course Objective

- To provide sound knowledge in the basic concepts of linear control theory and design of control system.
- To understand the methods of representation of systems and getting their transfer function models.
- To provide adequate knowledge in the time response of systems and steady state error analysis.
- To give basic knowledge is obtaining the open loop and closed–loop frequency responses of systems.
- To understand the concept of stability of control system and methods of stability analysis.
- To study the various ways of designing compensation for a control system.

Course outcome

Students who are successful in this class will demonstrate at least the abilities to:

- Demonstrate an understanding of the fundamentals of (feedback) control systems.
- Determine and use models of physical systems in forms suitable for use in the analysis and design of control systems.
- Express and solve system equations in state-variable form (state variable models).
- Determine the time and frequency-domain responses of first and second-order systems to step and sinusoidal (and to some extent, ramp) inputs.
- Determine the (absolute) stability of a closed-loop control system
- Apply root-locus technique to analyze and design control system.

Course Code:3TBEC501
Course Name: Solid State Devices

Course Objective

- To understand basics of semiconductor material.
- To understand types of materials and their properties. Types of components.
- Laws related to conduction of electron.

Course outcome

- Understand the nature of semiconducting materials
- Understand the physics that influences the presence of charge carriers in a semiconductor
- Describe the factors that influence the flow of charge in semiconductors
- Describe the operation of semiconductor devices
- Calculate voltage and current changes in semiconductor devices

Course Code:3TBEC502
Course Name: Communication System-II

Course Objective

- The course is designed to cover the fundamentals, principles, concepts, and techniques of Digital communication systems like various modulation techniques, data transmission, communication technologies, time-domain and frequency domain multiplexing technique and noise analysis.

Course outcome

Students who are successful in this class will demonstrate at least the abilities to:

- Solve communication engineering Problems using the knowledge of time domain & frequency domain.
- Analyze various Digital modulation schemes for communication systems.

- Analyze and compare the noise performance of various Digital communication systems.
- Understand the basic of digital transmission system.

Course Code:3TBEC503
Course Name: Microprocessors and Microcontrollers

Course Objective

- To introduce to students the basics of microprocessor and microcontroller Programming and their applications. Developing of assembly level programs and providing the basics of the processors. To provide solid foundation on interfacing the external devices to the processor according to the user requirements to create novel products and solutions for the real time problems. To assist the students with an academic environment aware of excellence guidelines and lifelong learning needed for a successful professional carrier.

Course outcome

- The students will be equipped with the basic knowledge of microprocessor and microcontroller interfacing and their applications.
- To familiarize with the assembly level programming.
- Design circuits for various applications using microcontrollers.
- An in-depth knowledge of applying the concepts on real- time applications

Course Code:3TBEC504
Course Name: Communication Networks and Transmission Lines

Course Objective

- The course gives a strong foundation on the theory of transmission line and networks by highlighting their applications. This course deals with transmission line parameters, lossy and lossless lines, matching of transmission lines to their loads. This course gives idea about Smith Chart, Single and double stub matching and field analysis of transmission lines and waveguides. This course introduces different types of passive filters, Attenuators and Equalizers.

Course outcome

- To become familiar with propagation of signals through lines.
- Calculation of various line parameters by conventional and graphical methods.
- Need for impedance matching and different impedance matching techniques.
- Design of different types of filters, equalizer and attenuators.

Course Code:3TBEC505
Course Name: Electromagnetic Theory

Course Objective

- To provide the basic skills required to understand, develop, and design various engineering applications involving electromagnetic fields. To lay the foundations of electromagnetism and its practice in modern communications such as wireless, guided wave principles such as fiber optics and electronic electromagnetic structures.

Course outcome

After the successful completion of the course student should be able to:

- Apply vector calculus to static electric-magnetic fields in different engineering situations.
- Analyze Maxwell's equation in different forms (differential and integral) and apply them to diverse engineering problems.
- Examine the phenomena of wave propagation in different media and its interfaces and in applications of microwave engineering.
- Analyze the nature of electromagnetic wave propagation in guided medium which are used in microwave applications.

Course Code:3TBEC601
Course Name: Industrial Electronics

Course Objective

The aim is to build on the information provide in Electronics systems and power electronics courses to provide an application perspective. The objective is to increase the understanding of power electronic fundamentals, applications and recent developments in the power electronics field.

Course outcome

By the end of this course, the student will

- Learn about the latest electronic devices available in industry.
- Be able to effectively provide detailed explanation to the structure and operation of common linear components.
- Learn about the digital ICs and sensory electronic devices
- Use tools/test equipment to analyze electronic components
- Perform basic electronics troubleshooting
- Apply critical thinking in solving industrial electronic problems
- Perform electronics calculation
- Design basic electronic circuits
- Learn about industrial control devices
- Be able to understand the functions of transducer
- Gain some experience with operational amplifiers

Course Code:3TBEC602
Course Name: Digital Signal Processing

Course Objective

- This course will introduce the basic concepts and techniques for processing signals on a computer. By the end of the course, you be familiar with the most important methods in DSP, including digital filter design, transform-domain processing and importance of Signal Processors. The course emphasizes intuitive understanding and practical implementations of the theoretical concepts.

Course outcome

By the end of the course the student will be able to:

- Represent discrete-time signals analytically and visualize them in the time domain.
- Understand the meaning and implications of the properties of systems and signals.
- Understand the Transform domain and its significance and problems related tom computational complexity.
- Be able to specify and design any digital filters using MATLAB.

Course Code:3TBEC603
Course Name: Antenna and Wave Propagation

Course Objective

- To study various antennas, arrays and radiation patterns of antennas.
- To learn the basic working of antennas.
- To understand various techniques involved in various antenna parameter measurements.
- To understand the radio wave propagation in the atmosphere.

Course outcome

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

- To analyze the fundamentals of antenna theory.
- Understand the different types of antennas and the radiation mechanism.
- Frequencies from LF to Microwave applications.
- To expose students to examples of applications and various antenna types.
- Identify the atmospheric and terrestrial effects on radio wave propagation

Course Code:3TBEC604
Course Name: VLSI Circuits and Systems

Course Objective

- To bring both Circuits and System views on design together.
- It offers a profound understanding of the design of complex digital VLSI circuits, computer aided simulation and synthesis tool for hardware design.

Course outcome

After studying this course the students would gain enough knowledge.

- To be aware about the trends in semiconductor technology, and how it impacts scaling and performance. Able to learn Layout, Stick diagrams, Fabrication steps, Static and Switching characteristics of inverters. Synthesis of digital VLSI systems from register-transfer or higher level descriptions in hardware design languages. To understand MOS transistor as a switch and its capacitance. Student will be able to design digital systems using MOS circuits.

Course Code:3TBEC605
Course Name: Cellular Mobile Communication

Course Objective

- To have an overview of wireless and mobile communications in different generations.
- To study the operation of basic cellular system and performance criterion, handoff mechanism.
- To study the design of cellular mobile system.
- To develop the ability to search, select, organize and present information on new technologies in mobile and cellular communication.

Course outcome

- Students are capable to analyze and solve problems in the field of telecommunications.
- Students will have the understanding of different generations, operations and design of wireless and mobile communications.

Course Code:3STEC607
Course Name: Python or App Development

Course Objective

- Mathematics fundamental necessary to formulate, solve and analyze engineering problems.

Course Code:3STEC607
Course Name: App Development

Course Objective

- Mathematics fundamental necessary to formulate, solve and analyze engineering problems.

Course Code:3TBEC701
Course Name: Wireless Communication

Course Objective

- To provide an overview of Wireless Communication networks area and its applications in communication engineering.
- To appreciate the contribution of Wireless Communication networks to overall technological growth.
- To understand the various terminology, principles, devices, schemes, concepts, algorithms and different methodologies used in Wireless Communication Networks.

Course outcome

- To understand the basics of Wireless Communication Networks.
- To motivate the students to pursue research in the area of wireless communication.

Course Code:3TBEC701
Course Name: Information Theory & Coding

Course Objective

- To study the several source coding techniques.
- To study the channel coding theorem & various codes.
- To study about Block control coding.

Course outcome

- After completion of this course student will be able to analyze the process of coding for analog and discrete sources and the mathematical model for information sources. Solve problems on error detection and error correction for various types of codes. Understand the principles of Huffman codes and to solve problems therein. Learn the concepts of mutual information, channel capacity, and Shannon's Main Theorem.

Course Code:3TBEC701
Course Name: Nano Technology

Course Objective

- To introduce and provide a broad view of the nascent field of nanotechnology to Undergraduates.
- To introduce students to inter- and multi-disciplinary science and engineering.

Course outcome

- After completion of this course student will be able to familiar with the important

concepts applicable to small electronic devices, their fabrication, characterization and application.

Course Code:3TBEC702
Course Name: Optical Communication

Course Objective

- To learn the basic elements of optical fiber transmission link, fiber modes configurations and structures.
- To understand the different kind of losses, signal distortion in optical wave guides and other signal degradation factors.
- To learn the various optical source materials, LED structures, quantum efficiency, Laser diodes.
- To learn the fiber optical receivers such as PIN APD diodes, noise performance in photo detector, receiver operation and configuration.
- To learn the fiber optical network components, variety of networking aspects, FDDI, SONET/SDH and operational principles WDM.

Course outcome

Students are able to

- Recognize and classify the structures of Optical fiber and types.
- Discuss the channel impairments like losses and dispersion
- Analyze various coupling losses.
- Classify the Optical sources and detectors and to discuss their principle.
- Familiar with Design considerations of fiber optic systems.
- To perform characteristics of optical fiber, sources and detectors, design as well as conduct experiments in software and hardware, analyze the results to provide valid conclusions.

Course Code:3TBEC703
Course Name: Microwave Engineering

Course Objective

- To understand and gain complete knowledge about Microwave devices such as amplifiers, oscillators.
- To understand and gain complete knowledge about microwave components
- To understand and gain complete knowledge about microwave measurements.
- To understand and gain complete knowledge about RF basic concepts, RF filters design.
- To understand and gain complete knowledge about RF amplifier design.

Course outcome

- Gain knowledge and understanding of microwave analysis methods.

- Be able to apply analysis methods to determine circuit properties of passive/active microwave devices.
- Know how to model and determine the performance characteristics of a microwave circuit or system using computer aided design methods.
- Have knowledge of basic communication link design; signal power budget, noise evaluation and link carrier to noise ratio.
- Have knowledge of how transmission and waveguide structures and how they are used as elements in impedance matching and filter circuits.

Course Code:3TBEC704
Course Name: Digital Image Processing

Course Objective

- The fundamentals of digital image processing.
- Image transform used in digital image processing.
- Image enhancement techniques used in digital image processing.
- Image restoration techniques and methods used in digital image processing.
- Image compression and Segmentation used in digital image processing.

Course outcome

- An ability to apply knowledge of mathematics, science, and engineering
- An ability to design and conduct experiments, as well as to analyze and interpret data
- An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- An ability to function on multidisciplinary teams e. an ability to identify, formulate, and solve engineering problems
- An understanding of professional and ethical responsibility
- An ability to communicate effectively
- The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- A recognition of the need for, and an ability to engage in life-long learning j
- A knowledge of contemporary issues
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Course Code:3TBEC705
Course Name: Satellite Communication

Course Objective

- To make the students understand the basic concept in the field of Satellite Communication and to know how to place a satellite in an orbit.

- To calculate the link power budget.
- To get a complete knowledge about the earth and space subsystems.
- To gain knowledge about the Satellite Access schemes.
- To gain knowledge about the Satellite system and mobile services provided.

Course outcome

The students will be:

- Able to learn the dynamics of the satellite.
- Able to understand the communication satellite design.
- Able to understand how analog and digital technologies are used for satellite communication networks.
- Able to learn the design of satellite links.
- Able to study the design of Earth station and tracking of the satellites.

Course Code:3TBEC706
Course Name: Minor Project & Seminar

Course Objective

- Mathematics fundamental necessary to formulate, solve and analyze engineering problems.

Course Code:3TBEC801
Course Name: Adhoc & Sensor Networks

Course Objective

- This course deals with the comprehensive knowledge of various techniques in mobile networks/Adhoc networks and sensor based networks. The objective of this course is to facilitate the understanding of Infrastructure less networks and their importance in the future directions for wireless communications.

Course Outcome

- Upon completion of the course, the student should be able to: 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.

Course Code:3TBEC801
Course Name: Principle of Biomedical Instrumentation

Course Objective

- To understand the Origin of Bioelectric potential and their measurements using

appropriate electrodes and Transducers.

- To understand how to measure various biochemical and nonelectrical parameters of human system.
- To understand the Electro-physiology of various systems and recording of the bioelectric signals.
- To understand the working principles of various Imaging techniques.
- To understand the design aspects of various Assist and Therapeutic Devices.

Course outcome

- After completion of this course student will understand the Origin of Bioelectric potential and their measurements using appropriate electrodes and Transducers, how to measure various biochemical and nonelectrical parameters of human system, Electro-physiology of various systems and recording of the bioelectric signals.
- They also understand the working principles of various Imaging techniques and the design aspects of various Assist and Therapeutic Devices.

Course Code:3TBEC801
Course Name: Communication Switching Techniques

Course Objective

- To study the concepts of message switching, circuit switching, stronger switching, crossbar switching, electronic switching, and digital switching. To understand the problems of congestion, queuing, and to study methods like Grade of Service, and Blocking Probability to provide an estimate of the amount of traffic present in various systems. To solve problems in single-stage networks, strict-sense non-blocking networks, and sectionalized switching networks. To study concepts like Reliability, Availability, and Security in various types of switching systems. To learn the different kinds of signaling, circuit and packet switching techniques.

Course outcome

- After completion of this course student will understand the concepts of message switching, circuit switching, strowger switching, crossbar switching, electronic switching, and digital switching. They also understand the problems of congestion, queuing, and to study methods like Grade of Service, and Blocking Probability to provide an estimate of the amount of traffic present in various systems. problems in single-stage networks, strict-sense non-blocking networks, and sectionalized switching networks. They also understand the concepts like Reliability, Availability, and Security in various types of switching systems.

Course Code:3TBEC802
Course Name: Computer Networks

Course Objective

- To develop an understanding of modern network architectures from a design and performance perspective. To introduce the student to the major concepts involved in wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs). To clarify network terminology. To provide an opportunity to do network programming using TCP/IP. To give the students experience working in programming teams. To provide a WLAN measurement experience. To expose students to emerging technologies and their potential impact.

Course outcome

- After completing this course the student must demonstrate the knowledge and ability to:
- Independently understand basic computer network technology.
- Understand and explain Data Communications System and its components.
- Identify the different types of network topologies and protocols.
- Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
- Identify the different types of network devices and their functions within a network
- Understand and building the skills of sub netting and routing mechanisms.
- Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Course Code:3TBEC803
Course Name: TV & Radar Engineering

Course Objective

- To study the analysis and synthesis of TV Pictures, Composite Video Signal, Receiver Picture tubes and Television Camera Tubes.
- To study the various Color Television systems with a greater emphasis on television standards.
- To study the advanced topics in digital television and High-definition television.

Course outcome

- The learners will be able to understand the transmission of video signals and importance of television standards to effectively work with broadcasting applications. Also he acquires sound knowledge of latest topics in digital video transmission.

Course Code:3TBEC804
Course Name: Principles of Management and Managerial Economics

Course Objective

- The purpose of this course is to expose the student to the basic concepts of management in order to aid the student in understanding how an organization functions, and in understanding the complexity and wide variety of issues managers

face in today's business firms. This is an introductory level management course that deals with the basic tenets of organization and management theory and practice. The course attempts to familiarize the student with the various functions, processes, and activities of management and to help the student appreciate the underlying theories that constitute the discipline of management. The is not intended to turn students into managers but it is expected that students successfully completing this course will be knowledgeable as to the historical, current, and future issues in management.

Course Outcome

After the completion of the course, students will be able to –

- Understand the roles of managers in firms
- Understand the internal and external decisions to be made by managers
- Analyze the demand and supply conditions and assess the position of a company
- Design competition strategies, including costing, pricing, product differentiation, and market environment according to the natures of products and the structures of the markets.
- Analyze real-world business problems with a systematic theoretical framework.
- Make optimal business decisions by integrating the concepts of economics, mathematics and statistics.

Course Code:3TBEC804
Course Name: Soft Computing

Course Objective

- To give knowledge of soft computing theories fundamentals, i.e. of fundamentals of non-traditional technologies and approaches to solving hard real-world problems, namely of fundamentals of artificial neural networks, fuzzy sets and fuzzy logic and genetic algorithms.

Course outcome

- Students acquire knowledge of soft computing theories fundamentals and so they will be able to design program systems using approaches of these theories for solving various real-world problems. Students awake the importance of tolerance of imprecision and uncertainty for design of robust and low-cost intelligent machines.

Course Code:3TBEC804
Course Name: Web Engineering

Course Objective

The Objective of the course are as follows:

- To be able to analyze and design comprehensive systems for the creation, dissemination, storage, retrieval, and use of electronic records and documents
- To learn and use some of the client-side and server-side languages used to manipulate

information on the World Wide Web – i.e. ASP.NET, and Javascript.

- To learn techniques and evaluation metrics for ensuring the proper operability, maintenance and security of a web application.

Course outcome

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

- Develop a web application using server side programming languages and components.
- Apply the web engineering methodologies for Web application development.
- Develop a component based web solution and use UML diagrams to describe such a solution.
- Identify and discuss the security risk of a Web application

Course Code:3TBEC804
Course Name: Industrial Robotics

Course Objective

- To acquire the knowledge of basics of robotics and their importance.
- Understand fundamental theory of robot design.
- To acquire the knowledge on advanced algebraic tools for the description of motion.
- To develop the ability to analyze and design the motion for articulated systems.
- To acquire the knowledge of sensors, actuators and vision system used in robotics.

Course outcome

- Apply knowledge of robotics for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts in the design and development robots
- Demonstrate creativeness in designing and development of robotics.
- Identify, analyze and design of robots useful to the society.

MASTER OF TECHNOLOGY (VLSI)
Programme Code -05PGR003

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- Pursue a successful career in the field of VLSI or related field and contribute to profession in Industry /Research/ Academia.
- Continuously learn, engage and update themselves in technical areas that are relevant to their career and handle constantly evolving multidisciplinary technological challenges.
- Understand the values and demands of the human, social and environmental aspects of their profession and contribute positively to the needs of the society

PROGRAM OUTCOMES (POs)

- **PO1.** Ability to acquire and apply in-depth knowledge in the area of VLSI Design and contribute to the state-of-art.
- **PO2.** Ability to Design & Conduct Experiments, as well as analyze & Interpret Data.
- **PO3.** Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, ethical, manufacturability, and sustainability.
- **PO4.** An ability to function, manage and lead multidisciplinary teams.
- **PO5.** Ability to identify, formulate & solve problems, conduct research and critically examine the outcomes and take corrective actions.
- **PO6.** An understanding of professional and ethical responsibility..
- **PO7.** An ability to communicate effectively.
- **PO8.** To understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- **PO9.** A recognition of the need for, and an ability to engage in life-long learning..
- **PO10.** A knowledge of contemporary issues.
- **PO11.** An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

PROGRAMME-SPECIFIC OUTCOMES (PSOs)

- **PSO1.** Analyze, design and implement emerging Digital communications systems using devices, sub-systems, propagation models, networking of Wireless and Wire line communication systems.
- **PSO2.** Exhibit Technical skills necessary to choose careers in the design, installation, testing, management and operation of Digital Communication systems.

Course Code: 6TMVD 101
Course Name: Ad Mathematics

Course Objective

- To provide the student with the concept and the understanding of basics in partial differential equations and transform. The objective of this course is to fulfill the needs of Engineers to understand the Applications of probability, stochastic process, Queuing system, fuzzy sets and reliability Techniques in order to acquire Mathematical knowledge and to Solving a wide range of Practical Problems.

Course Outcome

- Knowledge in the technical, methodology of solving Partial Differential Equations. A basic understanding in the Transforms which are useful in solving engineering problems. The curriculum of the Department is designed to satisfy the diverse needs of students. Coursework is designed to provide students the opportunity to learn key concept of Applications of probability, stochastic process, Queuing system, fuzzy sets and reliability.

Course Code: 6TMVD 102
Course Name: CMOS VLSI Design

Course Objective

- Introduce the technology, design concepts, electrical properties and modelling of Very Large-Scale Integrated circuits.
- Basics of MOS Circuit Design & modelling
- Basics of MOS process Technology
- Understand the concepts of modelling a digital system using Hardware Description Language.

Course Outcome

- Students will demonstrate knowledge of mathematics, science and engineering
- Students will demonstrate the ability to identify, formulate and solve engineering problems.
- Students will demonstrate the ability to design and conduct experiments, analyze and interpret data
- Students will demonstrate the ability to design a system, component or process as per needs and specifications.
- Students will show the understanding of impact of engineering solutions on the society and also will be aware of contemporary issues.

Course Code: 6TMVD 103
Course Name: Advances Logic Design

Course Objective

- Advanced techniques in the design of digital systems. Hardware description languages, combinational and sequential logic synthesis and optimization methods, partitioning, mapping to regular structures. Emphasis on reconfigurable logic as an implementation medium. Memory system design. Digital communication including serial/parallel and synchronous/asynchronous methods.

Course Outcome

- An ability to apply knowledge of mathematics, science, and engineering
- An ability to design and conduct experiments, as well as to analyze and interpret data
- An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- An ability to identify, formulate, and solve engineering problems
- An ability to use the techniques, skills, and modern engineering tools a recognition of the need for, and an ability to engage in life-long learning.

Course Code: 6TMVD 104
Course Name: Digital Signal Processing

Course Objective

- This course will introduce the basic concepts and techniques for processing signals on a computer. By the end of the course, you be familiar with the most important methods in DSP, including digital filter design, transform-domain processing and importance of Signal Processors. The course emphasizes intuitive understanding and practical implementations of the theoretical concepts.

Course Outcome

By the end of the course the student will be able to:

- Represent discrete-time signals analytically and visualize them in the time domain.
- Understand the meaning and implications of the properties of systems and signals.
- Understand the Transform domain and its significance and problems related tom computational complexity.
- Be able to specify and design any digital filters using MATLAB.

Course Code: 6TMVD 105
Course Name: Embedded Microcontroller Programming

Course Objective

- Recognize and identify the constraints facing embedded system designers, and determine How to assess them.
- Program a modern microcontroller in assembly language and operate its peripheral devices.
- Interpret how the assembly code generated by a compiler relates to the original C code.
- Practice thread-based program design.
- Develop programs controlling embedded systems using quick and efficient methods.
- Predict measure and manipulate a program's execution time.

Course Outcome

- Understand what is a microcontroller, microcomputer, embedded system.
- Understand different components of a micro-controller and their interactions. Become familiar with programming environment used to develop bedded systems
- Understand key concepts of embedded systems like IO, timers, interrupts, interaction with peripheral device
- Learn debugging techniques for an embedded system.

Course Code: 6TMVD 106
Course Name: English paper for Research Writing

Course Objective

- Understand that how to improve your writing skills and level of readability.
- Learn about what to write in each section.
- Understand the skills needed when writing a title.
- Ensure the good quality of paper at very first-time submission.

Course Code: 6TMVD 106
Course Name: Stress Management by Yoga

Course Objective

- To achieve overall health of body and mind.
- To overcome stress.

Course Outcome

Students will be able to:

- Develop healthy mind in a healthy body thus improving social health also
- Improve efficiency

Course Code: 6TMVD 201
Course Name: VLSI Technology

Course Objective

- The course is designed to give the student an understanding of the different design steps required to carry out a complete digital VLSI (Very-Large-Scale Integration) design in silicon.

Course Outcome

- Be able to use mathematical methods and circuit analysis models in analysis of CMOS digital electronics circuits, including logic components and their interconnect.
- Be able to create models of moderately sized CMOS circuits that realize specified digital functions.
- Be able to apply CMOS technology-specific layout rules in the placement and routing of transistors and interconnect, and to verify the functionality, timing, power, and parasitic effects.
- Have an understanding of the characteristics of CMOS circuit construction and the comparison between different state-of-the-art CMOS technologies and processes.
- Be able to complete a significant VLSI design project having a set of objective criteria and design constraints.

Course Code: 6TMVD 202
Course Name: Real Time Operating System

Course Objective

- To introduce the basic concepts of Embedded Systems and the various techniques used for Embedded Systems with real time examples.

Course Outcome

- To discuss the basics o embedded systems and the interface issues related to it.
- To learn the different techniques on embedded systems.
- To discuss the real time models, languages and operating systems.
- To analyze real time examples.

Course Code: 6TMVD 203
Course Name: VLSI Test & Testability

Course Objective

The objective of this course is to provide students with a sound knowledge of VLSI systems covering the following:

- Processor architectures, memory organization and performance analysis, and concepts and techniques for parallel processing and pipeline processing.
- High-speed synchronization design and system noise consideration.

- VLSI system design verification and testability, and system reliability.

Course Outcome

After the completion of this course, the students are able to:

- Acquire knowledge about fault modeling and collapsing.
- Learn about various combinational atpg.
- Understand sequential test pattern generation.
- Use various verification techniques.

Course Code: 6TMVD 204
Course Name: Embedded Computing System Design

Course Objective

Main objectives of the course are:

- Introduction of the real-time systems.
- Computing required for the real-time embedded systems.
- Communication required for the real-time embedded systems.
- Present an overview of the real-time embedded systems in practice.

Course Outcome

After completing these course students shall be able:

- To present the mathematical model of the system.
- To develop real-time algorithm for task scheduling.
- To understand the working of real-time operating systems and real-time database.
- To work on design and development of protocols related to real-time communication.

Course Code: 6TMVD 205
Course Name: Micro Electronics

Course Objective

- Understand how to approach analysis and design of circuits with nonlinear elements, including diodes, BJTs & MOSFETs with an emphasis on design-oriented analysis techniques.
- Understand the principles of operation for pn junctions, semiconductor diodes, MOSFETs and BJTs, including intuition behind the physical meaning of device model parameters and limitations of models.
- Understand how to analyze and design basic amplifier gain stages and digital logic gates using MOSFETs and BJTs.

Course Outcome

After taking this course students will be able to recognize and use the following concepts, ideas, and/or tools:

- Small-signal analysis of circuits with diodes, and BJT
- Large-signal analysis of circuits with diodes, and BJTs

- Design oriented analysis of microelectronic electronic circuit.

Course Code: 6TMVD 206
Course Name: Disaster Management

Course Objective
Students will be able to:

- Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
- Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
- Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
- Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in.

Course Outcome

- To get a working knowledge in illustrious Sanskrit, the scientific language in the world
- Learning of Sanskrit to improve brain functioning
- Learning of Sanskrit to develop the logic in mathematics, science & other subjects
- Enhancing the memory power
- The engineering scholars equipped with Sanskrit will be able to explore the huge knowledge from ancient literature

Course Code: 6TMVD 206
Course Name: Personality Development through life enlightenment skills

Course Objective

- To learn to achieve the highest goal happily.
- To become a person with stable mind, pleasing personality and determination.
- To awaken wisdom in students.

Course Outcome
Students will be able to

- Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life
- The person who has studied Geeta will lead the nation and mankind to peace and prosperity
- Study of Neetishatakam will help in developing versatile personality of students.

Course Code: 6TMVD 206
Course Name: Value Education

Course Objective
Students will be able to

- Understand value of education and self- development.
- Imbibe good values in students.
- Let the should know about the importance of character.

Course Outcome
Students will be able to:

- Knowledge of self-development.
- Learn the importance of Human values.
- Developing the overall personality.

Course Code: 6 TMVD301
Course Name: Opto-Electronics Integrated Circuits

Course Objective

- This course provides a complete overview of the wide variety of different semiconductor optoelectronic devices employed in light wave systems and networks. Topics include a variety of different subjects including a detailed discussion of the design and operation of optical LEDs, the basic physics and operation of lasers and photo detectors, details of the basic physics and operation of solar cells, the operation of quantum well electro-absorption modulators and electro- optic modulators, and the design and operation of optoelectronic integrated circuits. Emphasis is on the underlying device physics behind the operation and design of optoelectronic devices.

Course Outcome

- Acquire fundamental understanding of the basic physics behind optoelectronic devices.
- Develop basic understanding of light emitting diodes.
- Develop detailed knowledge of laser operating principles and structures.
- Acquire in depth understanding of photo detectors.
- Acquire detailed knowledge of solar cells and optoelectronic modulation and switching devices.
- Develop basic understanding of optoelectronic integrated circuits.

Course Code: 6 TMVD301
Course Name: System on Chip (SOC) Design

Course Objective

- To design combinational logic functions and analyze delay and testability properties of interconnect and gates.
- To learn optimization of power in sequential logic machines
- To study the design principles of FPGA and PLA.
- To learn various floor planning methods for system design.

Course Outcome

- To design, logic gates with minimum size, spacing, and parasitic values.
- To design combinational logic machines with optimum power
- To design sequential logic machines with optimum power
- To study the design principles of FPGA and PLA.
- To learn various floor planning methods for system design.

Course Code: 6 TMVD301
Course Name: Fundamentals and Applications of MEMS

Course Objective

- To introduce MEMS and micro fabrication
- To study the essential electrical and mechanical concepts of MEMS
- To study various sensing and actuating technique.
- To know about the polymer and optical MEMS.

Course Outcome

This course provides the foundation of MEMS by principle, design, analysis, and fabrication technique. Through lecture and out-of- class assignments, students are provided learning experiences that enable them to:

- Familiarized on MEMS and micro fabrication, \and various potential application area.
- Understand the electrical, mechanical, thermal, magnetic, piezoelectric, piezoresistive concepts used in analyze and deign of MEMS sensors and Actuators.
- Understand the application of polymer material for MEMS and also understand the application of optical MEMS sensor.

Course Code: 6 TMVD302
Course Name: Communication RF IC Design

Course Objective

- The objective of this course is to present the concepts of design and analysis of modern RF and wireless communication integrated circuits. Topics covered are: basic concepts in RF design, scattering parameters, modern integrated circuit technologies, fundamental limitations of speed of operation of transistors, physics of noise, impedance matching, low-noise amplifiers, mixers, oscillators, phase noise, and phase locked loops.

Course Outcome

- It is expected that the students be able to apply the concepts and design techniques presented in this course to a wide range of applications including high-speed wireless communications and biomedical electronics.

Course Code: 6 TMVD302
Course Name: Embedded System Programming

Course Objective

- To understand the basic concepts of embedded system, understanding of different types of programming languages used for embedded systems. Study of ARM based processors: architecture, programming and interfacing of ARM processor with memory & I/O devices. To discuss the features, Architecture and programming of Arduino Microcontroller, Architecture of Arduino. To study of RTOS.

Course Outcome

- Understanding of Embedded system, programming, Embedded Systems on a Chip (SoC) and the use of VLSI designed circuits.
- Understanding of internal Architecture and programming of ARM processor.
- Programming concepts of Arduino Microcontroller with various interfaces like memory & I/O devices and Raspberry Pi based embedded platform.
- Need of Real Time Operating System (RTOS) in embedded systems.
- Study of Real Time Operating system with Task scheduling and Kernel Objectives.

Course Code: 6 TMVD302
Course Name: Digital HDL Design and Verification

Course Objective

- HDL programming is fundamental for VLSI design and hence this course is given.
- To gain knowledge on VHDL.
- To get an insight on Advanced VHDL.
- To understand the System C

MASTER OF TECHNOLOGY
(DIGITAL COMMUNICATION)
Programme Code -05PGR009

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- Pursue a successful career in the field of Digital Communication or related field and contribute to profession in Industry /Research/ Academia.
- Continuously learn, engage and update themselves in technical areas that are relevant to their career and handle constantly evolving multidisciplinary technological challenges.
- Understand the values and demands of the human, social and environmental aspects of their profession and contribute positively to the needs of the society

PROGRAM OUTCOMES (POs)

- **PO1.** Ability to acquire and apply in-depth knowledge in the area of Digital Communication and contribute to the state-of-art.
- **PO2.** Ability to Design & Conduct Experiments, as well as analyze & Interpret Data.
- **PO3.** Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, ethical, manufacturability, and sustainability.
- **PO4.** An ability to function, manage and lead multidisciplinary teams.
- **PO5.** Ability to identify, formulate & solve problems, conduct research and critically examine the outcomes and take corrective actions.
- **PO6.** An understanding of professional and ethical responsibility.
- **PO7.** An ability to communicate effectively.
- **PO8.** To understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- **PO9.** A recognition of the need for, and an ability to engage in life-long learning.
- **PO10.** A knowledge of contemporary issues.
- **PO11.** An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

PROGRAMME-SPECIFIC OUTCOMES (PSOs)

- **PSO1.** Analyze, design and implement emerging Digital communications systems using devices, sub-systems, propagation models, networking of Wireless and Wire line communication systems.
- **PSO2.** Exhibit Technical skills necessary to choose careers in the design, installation, testing, management and operation of Digital Communication systems.

Course Code: 6TMDC101
Course Name: Ad Mathematics

Course Objective

- To provide the student with the concept and the understanding of basics in partial differential equations and transform. The objective of this course is to fulfil the needs of Engineers to understand the Applications of probability, stochastic process, Queuing system, fuzzy sets and reliability Techniques in order to acquire Mathematical knowledge and to Solving a wide range of Practical Problems.

Course Outcome

- Knowledge in the technical, methodology of solving Partial Differential Equations. A basic understanding in the Transforms which are useful in solving engineering problems. The curriculum of the Department is designed to satisfy the diverse needs of students. Coursework is designed to provide students the opportunity to learn key concept of Applications of probability, stochastic process, Queuing system, fuzzy sets and reliability.

Course Code: 6TMDC102
Course Name: Embedded Technology in Communication System

Course Objective

- To make students familiar with the basic blocks of microcontroller device and embedded system in general
- To provide comprehensive knowledge of the architecture, features and interfacing with 8051 microcontrollers.
- To use assembly and high-level languages to interface the microcontrollers to various applications
- To understand the various real time operating system and inter-process communication.

Course Outcome

- To understand Microcontroller 8051 its architecture and its instruction set.
- Gain knowledge about Counter/timer and interrupts in 8051 Microcontroller and Programming concepts.
- Students will be able to do serial communication programming and gain knowledge of serial communication.
- Students will be able to understand interfacing Microcontrollers & processors with devices.

Course Code: 6TMDC103
Course Name: Communication Hardware Design Using VHDL

Course Objective

- To understand the IC design aspects, basic fabrication steps
- To study the design rules & representation of circuits at lower level of abstraction.
- To understand the layout design of few combinational and sequential circuits.
- To study one of the HDL (hardware description language) for front end design.
- To study internal structure of programmable logic devices

Course Outcome

- Students are expected to understand CMOS fabrication details.
- Students are expected to understand schematic, layout of combinational circuits.
- Students are expected to understand schematic, layout of sequential circuits.
- Students are expected to understand VHDL programming concepts.

Course Code: 6TMDC104
Course Name: Microwave and Radar Communication

Course Objective

- Learn about wave propagation through waveguide
- Learn about transmission in rectangular waveguide
- Learn about microwave tubes
- Learn about transferred electron device.

Course Outcome

By the end of the course the student will be able to:

- Understand the reason why TEM wave are impossible in a Waveguide.
- Understand the working of Microwave Tubes.
- Understand the different modes of operation of Gunn Diodes.
- Understand microwave components such as Tee Junction and Directional Couplers.
- Understand designing and transformation of Microwave Filters.

Course Code: 6TMDC105
Course Name: Data Communication & Computer Network

Course Objective

- To understand the concepts of Synchronous & Asynchronous Transmission.

- To learn Data Link Control.

Course Outcome

- Able to understand the concepts of data link control.
- Student gains knowledge of communication network

Course Code: 6TMDC106
Course Name: English paper for Research Writing

Course Objective

- Understand that how to improve your writing skills and level of readability.
- Learn about what to write in each section.
- Understand the skills needed when writing a title.
- Ensure the good quality of paper at very first-time submission.

Course Code: 6TMDC106
Course Name: Stress Management by Yoga

Course Objective

- To achieve overall health of body and mind.
- To overcome stress.

Course Outcome

Students will be able to:

- Develop healthy mind in a healthy body thus improving social health also
- Improve efficiency

Course Code: 6TMDC201
Course Name: Advanced Digital Signal Processing

Course Objective

- To study the basic mathematical techniques needed for analysis of discrete time signals and systems.
- To study the various digital filter design techniques.
- To study the multirate digital signal processing techniques

Course Outcome

- Synthesize discrete time signals from analog signals.
- Use time domain and frequency domain analysis tools.
- Apply forward and reverse transformations.
- Visualize various applications of DSP and explore further possibilities.
- Design various filters.

Course Code: 6TMDC202
Course Name: Optical Communication

Course Objective

- To understand the concepts of Optical communication
- To learn about optical transmitters and receivers
- To know about the operations of LED, LASER, PIN diode, Avalanche Photo diode
- To get the knowledge about SONET/SDH

Course Outcome

- Able to understand the concepts of optical fiber communication.
- Student gains knowledge how optical signal is transmitted and received
- Student gets an insight into SONET/SDH networks
- Students gain the knowledge about LED, LASER, PIN diode and Avalanche Photo Diode

Course Code: 6TMDC203
Course Name: Modern Digital Communication Techniques

Course Objective

- To understand the concepts of Digital Modulations.
- To learn about Coherent and Non-Coherent Communication With Waveforms.
- To know about the operations of Band Limited Channels.
- To get the knowledge about Coded digital communication

Course Outcome

- Able to understand the concepts of Digital Modulations.
- Student gains knowledge of Coherent And Non-Coherent Communication With Waveforms.
- Student gets an insight into Band Limited Channels.
- Students gain the knowledge about Coded digital communication..

Course Code: 6TMDC204
Course Name: Secure Communication

Course Objective

- To emphasize students the importance of modular arithmetic, and some algorithms required in cryptography
- To make students understand the symmetric and asymmetric cryptosystem.

- To provide a broad overview of the requirements of authentication, digital signature, algorithms to achieve this aim.
- To teach the students about IP-level security, its architecture and about the threats to computer system and its countermeasures
- To get students idea about general requirements for web security and focus on two standard schemes for web commerce
- SSL/TLS and SET

Course Outcome

- The students will be able to calculate gcd, discrete logarithm, exponents etc. on the basis of discrete mathematics used in cryptography.
- The students will be able apply the knowledge of symmetric and asymmetric ciphers for encryption and decryption.
- The students will be able to understand the practical use of authentication and various algorithms for producing hash and MAC.
- The students will be able to see the need of IP Security, malicious software's, their countermeasures and also briefly understand the use of Firewall
- The students will be able to see the need of IP Security, malicious software's, their countermeasures and also briefly understand the use of Firewall

Course Code: 6TMDC205
Course Name: Wireless Adhoc & Sensor Networks

Course Objective

- To emphasize students the importance of Adhoc Network.
- To make students understand the multicast routing & security.

Course Outcome

- The students will be able to understand sensor network.
- The students will be able apply the knowledge of QOS & energy management

Course Code: 6TMDC206
Course Name: Disaster Management

Course Objective

Students will be able to:

- Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
- Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
- Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.

- Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in.

Course Outcome

- To get a working knowledge in illustrious Sanskrit, the scientific language in the world
- Learning of Sanskrit to improve brain functioning
- Learning of Sanskrit to develop the logic in mathematics, science & other subjects
- Enhancing the memory power
- The engineering scholars equipped with Sanskrit will be able to explore the huge knowledge from ancient literature

Course Code: 6TMDC206
Course Name: Personality Development through life enlightenment skills

Course Objective

- To learn to achieve the highest goal happily.
- To become a person with stable mind, pleasing personality and determination.
- To awaken wisdom in students.

Course Outcome

Students will be able to

- Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life
- The person who has studied Geeta will lead the nation and mankind to peace and prosperity
- Study of Neetishatakam will help in developing versatile personality of students.

Course Code: 6TMDC206
Course Name: Value Education

Course Objective

Students will be able to

- Understand value of education and self- development.
- Imbibe good values in students
- Let the should know about the importance of character.

Course Outcome

Students will be able to:

- Knowledge of self-development.
- Learn the importance of Human values.

- Developing the overall personality.

Course Code: 6TMDC301
Course Name: Satellite Communication

Course Objective

- To gain the knowledge about the Geo synchronous orbit, use of satellite
- To get the knowledge about of link design and the different parameters.
- To provide comprehensive knowledge about multiple access techniques.
- To have the knowledge about communication satellite subsystem.
- To know about the earth station requirements.

Course Outcome

- Students get the knowledge about Geo synchronous orbit and satellite.
- Obtain the knowledge about the link design and multiple access techniques
- Gets the knowledge about satellite working of different subsystem of satellite.
- Students gain the idea about the requirement of earth station

Course Code: 6TMDC301
Course Name: Optical Instrumentation & Measurement

Course Objective

- To gain the knowledge about the optical instrument.
- To get the knowledge about fiber optics components
- To provide comprehensive knowledge about multiple access techniques.

Course Outcome

- Students get the knowledge about fiber optics sensors.
- Obtain the knowledge about the fiber optics measurement.

Course Code: 6TMDC301
Course Name: Ultra-Wideband Communication System

Course Objective

- To gain the knowledge about the UWB signals
- To get the knowledge about signal processing techniques for UWB.
- To provide comprehensive knowledge about UWB antenna.

Course Outcome

- Students get the knowledge about UWB communication standard.
- Obtain the knowledge about the UWB antenna sensor.

Course Code: 6TMDC302
Course Name: Advanced Mobile Communication

Course Objective

- To give students brief history of the evolution of mobile communications throughout the world
- To give knowledge of cellular concepts and its designing aspects.
- To give students a detailed overview of GSM, its architecture, interfaces, frames etc.
- To familiarize students about advanced modulation techniques used in mobile communications
- To teach students about the practical limitations on the performance of wireless communication systems

Course Outcome

- Students will have idea about the growth in mobile communications that gives rise to technological improvements.
- Students will be able to visualize the use of frequency reuse to increase the system's capacity and also other designing aspects.
- Students will be able to understand the architecture of the GSM and mechanism to support mobility of the GSM terminals.
- Students will see how modulation techniques are used to transport the message signal via a radio channel with best possible quality with minimum radio spectrum.
- Students will be able to understand various transmission problems and their counter measures.

Course Code: 6TMDC302
Course Name: Global Tracking & Positioning System

Course Objective

- To gain the knowledge about the Geo synchronous orbit.
- To get the knowledge about of orbits and reference systems.
- To provide comprehensive knowledge about GPS measurements.
- To have the knowledge about processing techniques.
- To know about GPS applications

Course Outcome

- Students get the knowledge about Geo synchronous orbit.

- Obtain the knowledge about orbits and reference systems.
- Gets the knowledge about GPS measurements and processing techniques.
- Students gain the idea about GPS applications.

Course Code: 6TMDC302
Course Name: Broadband Communication

Course Objective

- To gain the knowledge about broadband communication frame relays.
- To get the knowledge about of ISDN
- To provide comprehensive knowledge about ISDN interface and Functions.
- To have the knowledge about B-ISDN Services.
- To know about ATM

Course Outcomes

- Students get the knowledge about broadband communication frame relays
- Obtain the knowledge about ISDN
- Gets the knowledge about ISDN interface and Functions
- Students gain the idea about B-ISDN Services and ATM

DOCTOR OF PHYLOSOPHY (Ph.D. - ECE)
Programme Code -PH.D001

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

The structure of the Ph. D. (ECE) course is designed to produce post graduates with rigorous research and analytical skills, who are exceptionally well-equipped to go onto post-doctoral research, or employment in industry and the public service.

The Ph. D. (ECE) course provides:

- Skills to enable the student to critically examine the background literature relevant to their specific research area.
- An environment that encourages the student's originality and creativity in their research.
- A period of sustained in-depth study of a specific topic.
- Publishing the results of their research in high-profile scientific journals, through constructive feedback of written work and oral presentations.

PROGRAM OUTCOMES (POs)

- This programme has a thorough knowledge of the literature and a comprehensive understanding of scientific methods and techniques applicable to their own research.
- This programme develops the ability to critically evaluate current research and research techniques and methodologies.
- This programme opens the opportunity for the post-graduation students in respective stream to start research work in the interesting area which will be helpful for society.
- This programme creates self-direction and originality in tackling and solving problems.

PROGRAMME-SPECIFIC OUTCOMES (PSOs)

- This programme is able to demonstrate originality in the application of knowledge, together with a practical understanding of how research and enquiry are used to create and interpret knowledge in their field.
- This programme is an achievement and a significant for students' piece of research.
- This programme is able to act autonomously in the planning and implementation of research.
- This programme has gained oral presentation and scientific writing skills.

Course Code: 5010112301
Course Name: Research Methodology

Course Objectives

- The objective of imparting quality and creative research with an in-depth understanding and integrated knowledge of advanced applicable theory in the field of Electronics & Communication Engg.
- It also provides the knowledge of new methodology and tools to develop the innovative models which will beneficial for academic, industries and society

Course Outcomes
To enable for analyzing and identifying problems and provide the appropriate solution to solve the specific problem. It also provides the educated candidates for employment which require in the academic and non academic field.

Course Code: 5010112301
Course Name: Research Publication and Ethics

Course Objective
The objective of the course is to enable the Ph.D. scholar to understand about the publication ethics and publication misconduct and to create the awareness.

Course Outcome
After learning this subject scholar will be able to understand the concepts and process of research and aware about the publication ethics and publication misconduct.

Course Code: 5010152301
Course Name: Advanced Electronics

Course Objectives
- To provide knowledge of MOS transistor theory.
- To provide knowledge of basic of digital CMOS design.
- To provide a sound background of CMOS analog design.

Course outcomes
- Students will be able to understand dynamic CMOS clocking
- Student will be able to understand CMOS process technology.

Course Code: 5010152302
Course Name: Wireless Networking

Course Objectives
- To provide knowledge of LAN WAN & MAN.
- To provide knowledge of IP addressing.
- To provide a sound background of network security issues.

Course Outcomes
- Students will be able to understand internetworking.
- Student will be able to understand functional elements.

Course Code: 5010152303
Course Name: Communication System Engineering

Course Objectives

- To give students brief history of the evolution of mobile communications throughout the world.
- To give knowledge of cellular concepts and its designing aspects.
- To give students a detailed overview of GSM, its architecture, interfaces, frames etc

Course Outcomes

- Students will have idea about the growth in mobile communications that gives rise to technological improvements.
- Students will be able to visualize the use of frequency reuse to increase the systems capacity and also other designing aspects.
- Students will be able to understand the architecture of the GSM and mechanism to support mobility of the GSM terminals.

Course Code: 5010152304
Course Name: Digital Electronics

Course Objectives

- To give students brief introduction of digital system design using VHDL.
- To give knowledge of combinational logic circuit design.
- To give students a detailed overview of logic simulation.

Course Outcomes

- Students will have idea about the logic simulation.
- Students will be able to visualize the use of frequency reuse to increase the systems capacity and also other designing aspects.
- Students will be able to understand the architecture of the GSM and mechanism to support mobility of the GSM terminals.

Course Code: 5010152305
Course Name: Advance Electronics & Communication Engineering

Course Objectives

- To provide knowledge of MOS transistor theory.
- To provide knowledge of basic of digital CMOS design.
- To provide a sound background of CMOS analog design.

Course Outcomes

- Students will be able to understand dynamic CMOS clocking

- Student will be able to understand CMOS process technology.

Course Code: 5010152305
Course Name: Research and Publication Ethics

Course Objectives
The objective of the course is to enable M. Phil/Ph.D scholar to understand about the publication ethics and publication misconduct and to create the awareness.

Course Outcome
After learning this subject scholar will be able to understand the concepts and process of research and aware about the publication ethics and publication misconduct.

Course Code: 5010122302
Course Name: Research and Publication Ethics (Practical)

Course Outcome
After learning this subject scholar will be able to understand the concepts and process of research and aware about the publication ethics and publication misconduct.

DIPLOMA IN ENGINEERING (EE)
PPROGRAMME CODE – 05DIP005

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

The five broad EEE Program Educational Goals (Objectives) are

- **PEO1**. Have the laboratory skills and the ability to use modern analysis and design techniques and state-of-the-art equipment to solve practical engineering problems
- **PEO2**. Have the professional skills to function effectively in the work environment as well as in the community.
- **PEO3**. Have a solid understanding of professional and ethical responsibility
- **PEO4**. Have a broad education in order to understand contemporary issues and the impacts of technology on society and the environment
- **PEO5.** Have the ability to engage in life-long learning and recognize its importance

PROGRAM OUTCOMES (POs)

- **PO1**. The ability to apply science, engineering science, and mathematics to solve engineering problems.
- **PO2**. The ability to put their engineering and design skills into practice.
- **PO3.** The ability to use industrial-quality laboratory equipment and engineering software for analysis, testing, design, and communication.
- **PO4**. The ability to design systems, components, and processes that satisfy predetermined constraints.
- **PO5**. The ability to put engineering problems, put them in solvable form, and develops and evaluates alternative solutions.
- **PO6**. The ability to communicate their ideas and designs clearly orally, in written form, and graphically.
- **PO7**. The ability to work as members of a team.
- **PO8**. Had the opportunity to develop leadership skills
- **PO9**. Understand ethical principles and their role in the engineering profession.
- **PO10**. Have sufficient knowledge of the humanities and social sciences to understand contemporary issues concerning the interaction between technology and society.
- **PO11.**Understand that the products they develop and the methods used to manufacture them can affect the environment.
- **PO12**. Realize that the practice of electrical engineering is constantly evolving and that engineers must have the ability to acquire new knowledge and skills on their own.
- **PO13**. Have the ability to earn graduate degrees or pursue other continuing education opportunities

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1. Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PSO2. 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
- **PSO3. 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.
- **PSO4. 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.
- **PSO5. Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PSO6. 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.
- **PSO7. 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.
- **PSO8. 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
- **PSO9. 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.
- **PS10. 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

Course Name: Mathematics-I
Course Code: 2TDDE 101

Course Objective

- Mathematics forms backbone for all technologies and hence occupies an important place in the curriculum of polytechnic education. The subject is equally important for the future self-development of Polytechnic students. In designing the curriculum for

foundation course, the admission level to Polytechnics has been considered as 10th Board examination and mathematical needs of Technical subject have been given due consideration.

Course Outcome

- Through this syllabus the diploma student will learn the basic concepts of counting principle through permutation and combination, expansion of a binomial function, breaking up a complex fraction into simpler partial fractions, trigonometric ratio and concept of matrix

Course Name: Applied Mechanics
Course Code: 2TDDE 102

Course Objective

- Ability to apply knowledge of mathematics, science, and engineering.
- Solve for the resultants of any force systems.
- Determine equivalent force systems.
- Determine the internal forces in plane frames, simple span trusses and beams.
- Solve the mechanics problems associated with friction forces.
- Obtain the centroid, first moment and second moment of an area.

Course outcome

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

- Determine the resultant force and moment for a given system of forces
- Analyze planar and spatial systems to determine the forces in members of trusses, frames and problems related to friction
- Calculate the motion characteristics of a body subjected to a given force system.
- Determine the deformation of a shaft and understand the relationship between different material constants.

Course Name: Physics
Course Code: 2TDDE 103

Course Objective

- The development of various diploma engineering topics is primarily based on the fundamental principles. The different principles of physics have a wide range of applications in all the branches of engineering. A reasonably good level of knowledge of physics, therefore, forms sound base for engineering students. Physics can be considered as a basic tool in the hands of an engineer through which he can pure his studies and research work in technical field. The foundation level of the subject acquired by the student is kept in mind for selection of the topics. To create interest in the students more stress is given on the applications, in engineering field

Course outcome

- The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competencies *Select proper measuring instrument on the basis of range, least count & precision required for measurement.
- Analyze properties of material & their use for the selection of material mostly applicable for engineering users.
- Identify good & bad conductors of heat and proper temperature scale for temperature measurement Identify.
- Analyze, discriminate and interpret logical sequence of field problems with the study of physics.
- Analyze variation of sound intensity with respect to distance and follow the principles used in the physical properties, its measurement and selections.

Course Name: Environmental Engineering & Safety
Course Code: 2TDDE 104

Course Objective

- To improve the quality of life of the local community through management and conservation of natural resources.
- To ensure that the natural environment is used wisely as well as judiciously. The natural resources are continuously available for the benefit and enjoyment of future generations.
- To decrease vulnerability and improve adaptation capacity among poor local communities associated with Climate Change.

Course Outcome

- After successful completion of this course students will able to
- Enhance the use of recycled material for construction work and optimize the use of conventional energy sources.
- Take care of issues related to Conservation & Hazard Management while working as chemical engineer
- Assess the effects of pollution on resources.
- Justify need of renewable energy for sustainable development.
- Identify concept of waste management and methods of recycling.
- Prepare list of use of do's and don'ts applicable during disasters.

Course Name: Communication Skill-I
Course Code: 2TDDE 105

Course Objective

- The main aim of communicating is to pass information so that other people may know about what you are talking off. This can be through facts or even feelings.

Course Outcome

- Through this syllabus the diploma students will learn the basic concept of English. Student should gain the ability to read understand, analyze, intercept and extrapolate from the complex texts that are at the heart of the diver's traditions of the English language.

Course Name: Mathematics-II
Course Code: 2TDDE 201

Course Objective

- The main of teaching mathematics is to provide students with an adequate knowledge on the subject to serve as a tool in the learning of various engineering subjects and to solve technical problems encountered during the course of study. It can also serve as a foundation for their future work involving computation.

Course Outcome

- Here in this syllabus student will learn some concept of co-ordinate geometry, some part of statistics viz. mean, median, mode, deviation etc., and of course a brand new concept of differential calculus and integral calculus which play an important role in technical subjects then concept of vector number, how they are added subtracted and multiplied etc.

Course Name: Engineering Graphics
Course Code: 2TDDE 202

Course Objective

- To familiarize with the construction of geometrical figures.
- To familiarize with the projection of 1D, 2D and 3D elements.
- To familiarize with the sectioning of solids and development of surfaces.
- To familiarize with the Preparation and interpretation of building drawing.

Course outcome

- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to solid modelling
- Exposure to creating working drawings
- Ability to draw projections and analysing multiple views of object.

Course Name: Chemistry
Course Code: 2TDDE 203

Course Objective

- The objective of the Chemistry in poly technique courses is to acquaint the students with the basic phenomenon/ concepts of chemistry, the student face during course of their studying the industry. The student with the knowledge of the basic chemistry will understand and explain scientifically the various chemistry related problems in the industry/engineering field. The student will able to understand the new developments and break through sufficient lying engineering and technology.
- To appreciate the need and importance of chemistry for industrial and domestic use.
- To gain the knowledge on existing and future upcoming materials used in device fabrication.
- To impart basic knowledge related to material selection and the techniques for material analysis.
- To impart knowledge of green chemical technology and its applications.
- Demonstrate knowledge of science behind common impurities in water and methods to treat them.
- Knowledge of methods to determine the calorific value of fuels.
- Apply the science for understanding corrosion and its prevention.

Course Outcome

After the completion of the course, the learner will be able to:

- Analyze the need, design and perform a set of experiments.
- Differentiate hard and soft water, solve the related numerical problems on water purification and its significance in industry and daily life.
- Apply the principles of green chemistry in designing alternative reaction methodologies to minimize hazards and environmental degradation.
- Understand the causes of corrosion, its consequences and methods to minimize corrosion to improve industrial designs.
- Explain the properties, separation techniques of natural gas and crude oil along with potential applications and role of petrochemicals in national economy.
- Equipped with basic knowledge of polymers and its application.

Course Name: Fundamentals Computer & IT
Course Code: 2TDDE 204

Course Objective

- Learn basic principles of using Windows operation system.
- Learn and practice basic keyboarding and mouse use.
- Be able to access the Internet, Worldwide Web, as well as use Internet directories and search engines, and locate www addresses.
- Be able to find and evaluate information on the Web (learn how to be critical and

evaluate what is valid and reliable).

- Learn basic computer and keyboarding related vocabulary in English.
- Learn the basics of e-mail, such as sending, forwarding and receiving mail, attaching documents, creating mailboxes, filters, and address books.
- Learn basic word processing skills with Microsoft Word, such as text input and formatting, editing, cut, copy and paste, spell check, margin and tab controls, keyboard shortcuts, printing, as well as how to include some graphics such as pictures and charts.
- In general, develop an intuitive sense of how computers work and how they can be used to make your academic work more efficient.

Course Outcomes

- Demonstrate a basic understanding of computer hardware and software.
- Demonstrate problem-solving skills.
- Apply logical skills to programming in a variety of languages.
- Utilize web technologies.
- Demonstrate basic understanding of network principles.
- Working effectively in teams.
- Apply the skills that are the focus of this program to business scenarios.

Course Name: Communication Skills-II
Course Code: 2TDDE 205

Course Objective

- The students, after completing the course, will be able to use general purpose words of English to express himself in speaking reasonably clearly and correctly on routine matters. Develop a habit of reading with comprehension to achieve an optimum speed of 75 wpm Write reasonably and grammatically correct English

Course outcome

- Seeks to develop the students' abilities in grammar, oral skills, reading, writing and study skills. students should improve their speaking ability in English both in terms of fluency and comprehensibility

Course Name: Elements of Electrical Engineering
Course Code: 2TDEE301

Course Objective

- To provide knowledge of basic concepts related to electrical engineering.
- To provide knowledge of electrical engineering materials.
- To provide knowledge of capacitors, inductors and magnetic circuits.

Course Outcome

- This course enables the student to understand the very basic facts, concepts and principles of electricity so that student will be able to apply the same for solving simple electric and magnetic circuit and which is the basic requirement to understand many other courses in this discipline.

Course Name: Electric Circuits
Course Code: 2TDEE302

Course Objectives

- To provide knowledge of Basic Electric Circuit Concepts.
- To provide the concept of conversion of electrical circuits to graphs for determination of current and voltages.
- To provide Knowledge of various theorems and its applications to circuits.
- To give the knowledge of analysis of network reduction and calculation of various parameters.
- To know the basic concepts of coupled circuits and network performance under resonance condition.
- To provide knowledge of three phases balanced and unbalanced Poly phase Circuits and measurement of three phase power.
- To provide the concept of non-sinusoidal waveforms and its impact on electrical circuits

Course Outcomes

- Students will learn about the different types of electrical sources and networks
- Students will have knowledge of converting an electrical circuit into graph and will be able to analyze the circuit graphically.
- Student will analyse circuits with ideal, independent, and controlled voltage and current sources
- Student will be able to find out current through or voltage across any branch of a given Electrical network using theorems.
- Students will learn about series and parallel resonance conditions in series and parallel circuits and its impact on network voltage and current magnitudes.
- Students will have knowledge of balanced and unbalanced poly phase circuits.
- Students will be able to analyze the behaviour of non-sinusoidal waveforms.

Course Name: Basic Electronics
Course Code: 2TDEE303

Course Objective

- The objective of this course is to provide knowledge about the fundamental of magnetic circuits, energy, force and torque of singly and multi-excited systems.
- This course is also to expose the students to basic principles, construction and working of synchronous and three –phase induction machines.

- The aim of this course is to give the knowledge of the equivalent circuits, parameter determination, operational constraints, starting mechanisms, conventional speed control methods, various tests and applications of synchronous and induction machines.

Course Outcomes

After completing syllabus student will be able to:

- Identify and explain the working principles of various semiconductor devices, relate their characteristics and applications
- Explain the characteristics of CB, CE and CC configuration circuits.
- Identify and explain the working of transistors in various configurations.
- Explain operation and function of large and small signal amplifiers with applications.
- Make simple power supplies and amplifiers and test related circuits.

Course Name: Electrical Drawing
Course Code: 2TDEE304

Course Objectives

- Increase ability to communicate with people
- Learn to sketch and take field dimensions.
- Learn to take data and transform it into graphic drawings.
- Learn basic electrical symbols use for electric circuits.
- Learn engineering drawing formats for electric panels and boards.
- Prepare the student for future engineering positions.

Course Outcome

- Student's ability to perform basic sketching techniques will improve.
- Students will be able to draw orthographic projections and sections.
- Student's ability to use architectural and engineering scales will increase.
- Students ability to produce engineered drawings will improve
- Student's ability to convert sketches to electric circuits.
- Students will become familiar with electric symbols and standards.
- Students will become familiar with electric panels and circuit boards drawings

Course Name: Renewable Energy Sources
Course Code: 2TDEE305

Course Objectives

The objective of the courses is to develop in-depth knowledge for the following:

- Various renewable energy resources available at a location and assessments of its potential, using tools and techniques.
- Solar energy radiation, its interactions, measurement and estimation.

- Site selection for wind turbines, wind systems, measurements and instruments.
- Develop and read hydrographs, estimate flow, head, and power.
- Geothermal, wave, tidal and OTEC resources, site selection
- Properties critical for Bio-energy resource assessment, pathway selection, biomass supply.

Course Outcomes

- After completing syllabus student will be able to use the tools and techniques used to assess the various renewable energy resources and its potential at any location across the globe, so that a student is able analyze a case quantitatively at the end of the term.

Course Name: Electrical Machines I
Course Code: 2TDEE401

Course Objectives

- This course is classified under basic technology group is intended to enable the student understand the facts, concepts, principles, procedures for the operations, testing and maintenance of electric machines such as D.C. motors and transformers.
- To provide a comprehensive knowledge of various types of transformers, its construction, working principle and its testing.
- To provide a comprehensive knowledge of various types D.C. motors and generator.

Course Outcome

- At the closing stage of the course, the students will be able to know the fundamental laws of electrical transformers.
- At the closing stage of the course, the students will be able to know the various types of operational characteristics and applications of DC motors and generators.
- This course will help the student to function confidently when he enters the world of work.

Course Name: Electrical Measurement And Measuring Instruments
Course Code: 2TDEE402

Course Objectives

- This course enable the student to understand the facts, concepts, principles and test procedure of the measurement of electrical quantities and circuit parameters and also the circuits analysis.
- To acquaint with the fundamental concepts of electrical measurements and instrumentation.
- To provide practical, hands-on experience about how measure displacement, strain, inductance, capacitance using trainer kits.

Course Outcome

- At the closing stage of the course, the students will be able to know the fundaments of electrical measurements.
- This course will also help to build in the student the analytical skills that will enable him/her in doing and guiding, estimating investigation which in turn will help him/her to discharge the role as a supervisor or as a entrepreneur.

Course Name: Digital Electronics
Course Code: 2TDEE403

Course Objectives

- This course is to enable the student understand the facts, concepts, principles and procedures of digital techniques and their application used in digital circuits & systems.
- To acquaint with the fundamental concepts of Digital Electronics and Digital Instruments.
- To make them understand concepts of different types of analog and digital circuits.

Course Outcome

- Able to understand basic concepts of digital electronics, sequential and combinational circuits.
- Able to implement the concepts of digital electronics in electronic measuring instruments.
- This understanding will help in prototype testing and thereby the investigation skills, which in turn, will help him/her in performing the role of a supervisor in all technology areas and also assist those working under him.

Course Name: Generation Transmission and Distribution
Course Code: 2TDEE404

Course Objectives

- To under the concepts of various methods electrical energy generation
- To learn the usage of passive elements in various power transmission system
- To understand the factors affecting insulators and also in underground cables
- To calculate the various parameters in distribution system
- Suggest methods for power factors improvement

Course Outcome

- Analyze the performance of various units involved in the power plants
- Apply power system fundamental s to the design of a system that meets specific needs

- Design a power system solution based on the problem requirements and realistic constraints
- Develop a major design experience in power system that prepares engineering practices.

Course Name: Industrial Management
Course Code: 2TDEE405

Course Objectives

- To provide an understanding of the theories and principles of modern management and encourage the course participants to make an appreciation of these principles in relation to their own experiences and selected managerial case studies.
- To understand the basic principles of management, and the four major functions of managers e.g. planning, organizing, leading and controlling and how managers actually operate.
- Students will be required to think critically and strategically about management theories and issues which will enable them to develop their decision-making and analytical skills.
- They will be involved in application exercises and case studies which will assist them to develop graduate attributes.

Course Outcome

- Students will be able to perform the Management Functions.
- Students will be able to compare selected Theories of Management.
- Students will be able to perform the functions in the Marketing Mix.
- Students will be able to assess ethical issues in Business situations.

Course Name: Instrumentation and Control
Course Code: 2TDEE501

Course Objective

- The course focuses on imparting the principles of measurement which includes the working mechanism of various sensors and devices, that are in use to measure the important physical variables.
- To give the knowledge about the various components analog signal conditioning
- To make students understand the construction, working principle and application of various transducers used for flow measurement, strain measurement, pressure and vacuum measurement, force, torque and power measurement.

Course Outcomes

- After undergoing the course the student can select appropriate device for the measurement of parameters like temperature, pressure, speed, stress, humidity, flow velocity etc., and justify its use through characteristics and performance.
- The course would enable the students to explain principle of analog signal conditioning circuits
- Explain working principle of strain gauges.

- Explain working principle of pressure transducers
- Learn transducers for vacuum measurement.
- Identify types of flow and use different transducers for flow measurement.
- Explain the terminologies of electrochemical sensors and their applications in industry.

Course Name: Power Electronics
Course Code: 2TDEE502

Course Objectives

- To understand and develop the firing circuit requirement for different power semiconductor devices used as switches.
- To understand the concepts of different types of AC-DC, DC-DC & DC-AC controlled converters for Industrial applications.
- To analyze the effect of controlled and uncontrolled converters in Power system and their mitigation
- To design and develop the commutation circuits for semi controlled power semiconductor devices.
- To understand the rating specification for design and development of the protection circuits for Semiconductor devices.

Course Outcomes

- To gain knowledge of various application of semiconductor switches by understanding their static and dynamic characteristics.
- To understand the performance characteristics of controlled AC-DC converters for R, RL & RLE loads.
- To gain knowledge on basic DC-DC converters and their operation under continuous /discontinuous mode of conduction for RLE loads
- To identify and formulate the requirements for four quadrant operation of DC motor.
- To differentiate and understand the significance of various commutation circuits and their consequence on device stress
- To understand the principle of DC-AC conversion and the different topology for three phase to three phase and single phase to single phase DC-AC conversion.

Course Name: Electrical Machines II
Course Code: 2TDEE503

Course Objective

- To provide a comprehensive knowledge of various types induction machines, alternators, synchronous machines.
- To make them understand concepts of different types of AC machine.

Course Outcomes

- At the closing stage of the course, the students will be able to know the fundamental laws of electromechanical energy conversion.

Course Name: Estimation and Coasting
Course Code: 2TDEE504

Course Objective

- The course focuses on imparting the principles of measurement which includes the working mechanism of various sensors and devices that are in use to measure the important physical variables.
- To give the knowledge about the various components analog signal conditioning
- To make students understand the construction, working principle and application of various transducers used for flow measurement, strain measurement, pressure and vacuum measurement, force, torque and power measurement.

Course Outcome

- At the closing stage of the course, the students will be able to know the fundaments of different electrical wiring.
- They will be able to understand the estimating and costing of electrical equipment, contracting procedure in electrical engineering etc.

Course Name: Power System Operation and Control
Course Code: 2TDEE505

Course Objectives

- To understand the electrical power plant operation and control with respect to its economic aspect.
- To know the importance of power system parameters and their solution techniques.
- Study about different faults and their protection those are introduced in power System.
- To study the protection required against line transients and determine the appropriate methods of Compensation required for operational stability

Course Outcome

After completion of syllabus students will be able to :

- Identify and explain the different methods of generation, distribution, control and Compensation involved in the operation of power systems.
- Design the mathematical models of the mechanical and electrical components Involved in the operation of power systems.
- Specify the equivalent electrical parameters of transmission line to prepare and analyze models to predict the range and ratings of the equipments to be used.

Course Name: Elective (A)- Switch Gear and Protection
Course Code: 2TDEE601-A

Course Objectives

- To acquaint with the knowledge of basic elements of power system protection.

Course Outcomes

- At the closing stage of the course, the students will be able to understand the different protective systems like relays, transformers and their working.

Course Name: Elective (b)-Electric Traction
Course Code: 2TDEE601-B

Course Objective

- To provide the students the fundamental concepts of drives and types of drives used in traction.
- To train the students with a good engineering breadth so as to analyze the accessing techniques for braking system implementation in traction.

Course Outcome

After successful completion of course, Students are expected to possess an in-depth understanding and Knowledge of the concepts and principles of measurement

- General Description of Electric Traction system in India, Power Supply Arrangements, A.C. Electric Locomotive, Train
- Signalling System of train lighting, Traction Mechanics.

Course Name: Utilization of Electrical Power
Course Code: 2TDEE602

Course Objectives

- The objective of the course is to operate and maintain main electrical utilities for their efficient operations.
- To make them understand concepts of utilization of Electrical Energy

Course Outcome

- At the closing stage of the course, the students will be able to maintain electric drives used in industries, also identify a heating/welding scheme for a given application.
- To figure-out the different schemes of traction schemes and its main components and identify the job/higher education/research opportunities in Electric Utilization industry.

Course Name: Electrical Installation Maintenance and Testing
Course Code: 2TDEE603

Course Objectives

- To gain knowledge of testing, installation and maintenance of electrical appliances, their trouble shooting and electrical safety.

Course Outcomes

- At the closing stage of the course, the students will be able to know the installation, commissioning and maintenance of different electrical components.
- They will be able to understand concepts of commissioning, maintenance, electrical safety, installation and maintenance of domestic appliances

Course Name: Professional Activity
Course Code: 2TDEE605

Course Objective

- Professional Activities is not a descriptive course, as per conventional norms; therefore specific content for this course cannot be prescribed. It is a group of open-ended activities; where in variety of tasks are to be performed, to achieve objectives. However general guidelines for achieving the target and procedure for its assessment are given under the course content.
- As the student has to practice this course in all the six semesters, the guidelines Given therein are common and applicable to each semester.

Course Objectives

- To allow for professional development of students as per the demand of engineering profession.
- To provide time for organization of student chapter activities of professional bodies) i.e. Institute of engineers, ISTE or Computer Society of India etc.)
- TO allow for development of abilities in students for leadership and public speaking through organization of student's seminar etc.
- To provide time for organization of guest lectures by expert engineers/eminent professionals of industry.
- To provide time for organization of technical quiz or group discussion or any other group activity.
- To provide time for visiting library or using Internet.
- To provide time for group discussion or solving case studies.
- To provide time for personality development of students.
- To provide time for working for social cause like awareness for environmental and ecology etc.

BACHELOR OF ENGINEERING (EEE)
PROGRAMME CODE -05UGR005

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

The five broad EEE Program Educational Goals (Objectives) are

- **PEO1**. Have the laboratory skills and the ability to use modern analysis and design techniques and state-of-the-art equipment to solve practical engineering problems
- **PEO2**. Have the professional skills to function effectively in the work environment as well as in the community.
- **PEO3**. Have a solid understanding of professional and ethical responsibility
- **PEO4**. Have a broad education in order to understand contemporary issues and the impacts of technology on society and the environment
- **PEO5.** Have the ability to engage in life-long learning and recognize its importance

PROGRAM OUTCOMES (POs)

- **PO1**. The ability to apply science, engineering science, and mathematics to solve engineering problems.
- **PO2**. The ability to put their engineering and design skills into practice.
- **PO3.**The ability to use industrial-quality laboratory equipment and engineering software for analysis, testing, design, and communication.
- **PO4**. The ability to design systems, components, and processes that satisfy predetermined constraints.
- **PO5**. The ability to put engineering problems, put them in solvable form, and develops and evaluates alternative solutions.
- **PO6**. The ability to communicate their ideas and designs clearly orally, in written form, and graphically.
- **PO7**. The ability to work as members of a team.
- **PO8**. Had the opportunity to develop leadership skills
- **PO9**. Understand ethical principles and their role in the engineering profession.
- **PO10**. Have sufficient knowledge of the humanities and social sciences to understand contemporary issues concerning the interaction between technology and society.
- **PO11.**Understand that the products they develop and the methods used to manufacture them can affect the environment.
- **PO12**. Realize that the practice of electrical engineering is constantly evolving and that engineers must have the ability to acquire new knowledge and skills on their own.
- **PO13**. Have the ability to earn graduate degrees or pursue other continuing education opportunities

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1. Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

- **PSO2. 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
- **PSO3. 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.
- **PSO4. 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.
- **PSO5. Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PSO6. 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.
- **PSO7. 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.
- **PSO8. 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
- **PSO9. 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.
- **PS10. 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.

Course Name: ENGINEERING CHEMISTRY
Course Code: 3TBCH201

Course Objective

- Apply the electrochemical principles in batteries, understand the fundamentals of corrosion.
- Analysis of water for its various parameters and its significance in industrial and domestic Applications.
- Analyze microscopic chemistry in terms of atomic, molecular orbitals and Intermolecular forces
- Analysis of major chemical reactions that are used in the synthesis of molecules.
- Understand the chemistry of various fuels and their combustion

Course Outcome

- Describe and understand the operation of electrochemical systems for the production of electric energy, i.e., batteries. Explain the mode by which potable water is produced through the processes of screening, micro-Straining, aeration, coagulation and flocculation, sedimentation, flotation, filtration and disinfection.
- Recognize that molecular orbital theory is a method used by chemists to determine the energy of the electron in a molecule as well as its geometry.
- Demonstrate an ability to design, implement, and evaluate the results of experimentation using standard scientific methodologies such as hypothesis formulation and testing.
- Analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
- Rationalize bulk properties and processes using thermodynamic considerations.
- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
- List major chemical reactions that are used in the synthesis of molecules

Course Name: MATHEMATICS-I
Course Code: 3TBMA102

Course Objective

- To introduce the idea of applying differential and integral calculus to notions of curvature and to improper integrals. Apart from some applications it gives a basic introduction on Beta and Gamma functions.
- To introduce the fallouts of Role's. Theorem that is fundamental to application of analysis to Engineering problems.
- To develop the tool of ordinary differential equation for learning advanced Engineering Mathematics.
- To familiarize the student with functions of several variables that is essential in most branches of engineering. To develop the essential tool of matrices and linear algebra in a comprehensive manner.

Course Outcome

- This Syllabus has been designed to equip engineering student s with necessary mathematical tool's to handle mathematical problem in their core subjects.
- Through this syllabus they will learn many thing about calculus specially first order differential equation , Roles ,Lagrange's concept about existence of derivatives in some interval
- Expansion of function in an infinite series by Maclaurin's and Taylor theorem
- Partial derivative off unction's through which maxima minima of two variable function application of matrices in solving linear simultaneous equations, Eigen value Eigen vector, Calay-Hamilton theorem to find Inverse of a matrix, and concept of vector space.

Course Name: ENGINEERING GRAPHICS
Course Code: 3TBEG203

Course Objective

- To familiarize with the construction of geometrical figures.
- To familiarize with the projection of 1D, 1st and 3D elements.
- To familiarize with the sectioning of solids and development of surfaces.
- To familiarize with the Preparation and interpretation of building drawing.

Course outcome

- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to solid modeling
- Exposure to creating working drawings
- Ability to draw projections and analyzing multiple views of object.

Course Name: BASIC ELECTRICAL ENGINEERING
Course Code: 3TBEE204

Course Objective

- To provide knowledge of basic concepts related to electrical engineering.
- To provide knowledge of basic Circuits: 1- phase AC Circuits, 3-phase AC Circuits, Magnetic Circuits, Electrical Machines

Course outcome

After successful completion of course,

- Students are expected to possess an in-depth understanding and Knowledge of 1-phase A Circuits, 3-phase AC Circuits, Magnetic Circuits, Electrical Machines
- Develop the concepts of basic electrical engineering for all the undergraduate students of different branches of engineering.

Course Name: BASIC COMPUTER ENGINEERING
Course Code: 3TBCS205

Course Objective

By the end of this course, the student will be able to:

- Analyzing problems, and designing and implementing algorithmic solutions.
- Solving problems properly, achieving an implementation that is correct, effective and efficient.
- Using computers at user level, including operative systems and programming environments.
- Knowledge of computer equipment, including both hardware and software.

- Identifying information needs to solve problems, recovering information and applying it to the resolution.
- Opportunity to learn key concepts of computer, as well as fundamentals and applications of computer.

Course outcome

By the end of this course, the student will

- Analyzing problems and designing and implementing algorithmic solutions.
- Solving problems properly, achieving an implementation that is correct, effective and efficient.
- Using computers at user level, including operative systems and programming environments.
- Knowledge of computer equipment, including both hardware and software.
- Identifying information needs to solve problems, recovering information and applying it to the resolution.
- Opportunity to learn key concepts of computer, as well as fundamentals and applications of computer.

Course Name: MANUFACTURING PRACTICES
Course Code: 3TBMP206

Course Objective

- To familiarize with the basic soft tools and equipments used in fitting , carpentry ,sheet metal ,welding and smithy
- To familiarize with the production of simple models in the above trades.

Course outcome

- On completion of this course, students will be able to
- Make half lap joint and dovetail joint in carpentry.
- Make welded lap joint, butt joint and T-joint.
- Prepare sand mould for cube, conical bush, pipes and V pulley.
- Fabricate parts like tray, frustum of cone and square box in sheet metal.

Course Name: ENTREPRENEURSHIP DEVELOPMENT
Course Code: 3TBED207

Course Objective

- Understanding basic concepts of entrepreneurship and key steps in the elaboration of business ideas,
- Developing personal creativity and entrepreneurial initiative.

Course Outcome

- Understanding basic concepts in the area of entrepreneurship,

- Understanding the stages of the entrepreneurial process, adopting of the key steps in the elaboration of business ideas, Developing personal creativity and entrepreneurial initiative.

Course Name: ENGINEERING PHYSIC
Course Code: 3TBPH101

Course Objective

- To understand the basic laws of physics and their applications in engineering and technology.
- To develop scientific temper and analytical capability.
- To solve various engineering problems.

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Course Outcome

- Gain a knowledge and understanding of fundamental physical concepts in the areas covered in this class.
- Apply an understanding of these concepts to various systems and devises.
- Acquire problem solving skills, mathematical techniques, and the ability to synthesize.
- The ability to formulate, conduct, analyzes and interprets experiments in engineering physics

Course Name: MATHEMATICS-II
Course Code: 3TBMA202

Course Objective

- Students will demonstrate the ability to formulate, interpret and draw inferences from mathematical models.
- Students will demonstrate competence with a wide variety of mathematical tools and techniques.
- Students will demonstrate the ability to assess the accuracy, implications and limitations of their mathematical results.
- Students will demonstrate a breadth of general mathematical knowledge as well as depth in at least one area.

Course Outcome

- Today calculus has become the heart of every engineering stream.
- Through this syllabus student will learn different techniques of solving different kind of higher order ordinary and partial differential equations.
- Expansion of periodic function in an infinite series of sine and cosine function through Fourier series, Function of complex variable's based on complex number and also vector calculus based on vectors.

Course Name: BASIC MECHANICAL ENGINEERING
Course Code: 3TBME103

Course Objective

- To familiarize with the basic concept of Mechanical Engineering
- To familiarize with the scope of Mechanical Engineering
- To familiarize with the job prospects of Mechanical Engineer.

Course outcome

At the end of this course students will able to:

- Identify engineering materials, their properties, testing and manufacturing methods encountered in engineering practice.
- Understand Concept of measurement by using measuring instrument Verniercalliper, Micrometer, Dial gauge, Slip gauge etc.
- Understand basics of thermodynamics and components of a thermal power plant
- Understand the construction, operation and performance of different IC engines.
- Understand basics of fluids, their properties and laws of fluid Mechanics.

Course Name: BASIC CIVIL & ENGG MECHANICS
Course Code: 3TBCE104

Course Objective

- To introduce to student relevance of civil engineering for various engineering applications.
- To introduce to student various elements of buildings and construction materials.
- To introduce to student various methods of land survey and to make him use surveying equipment
- To make student aware of modern investigation techniques in land survey.
- To introduce to student about the water management and transportation engineering.
- Ability to apply knowledge of mathematics, science, and engineering.
- Solve for the resultants of any force systems.

Course outcome

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

- Describe the role of civil engineer in the development of the society and explain relationship of civil engineering with other branches of engineering and technology.
- Discuss types of buildings and select materials of construction.
- Explain the elements of water supply such as dam, canal and elements of transportation structures.
- Measure heights, distances and angles on ground using basic surveying instruments and plot them on paper.

- Explain the advantages of advances in civil engineering like remote sensing techniques, GIS and GPS.
- Determine the resultant force and moment for a given system of forces

Course Name: COMMUNICATION SKILLS
Course Code: 3TBCS105

Course Objective

- The objective of this course is to learn the second language learners' ability and to use the four fundamental language skills-reading writing speaking and listening.
- It will enable the students to speak English correctly and with confidence.

Course outcome

- Student will develop knowledge, skills and judgment around human communication that facilitate their ability to work collaboratively with others.
- Such skills could include communication competencies such as managing conflict, understanding small group process, active listening, appropriate self disclosure, etc.

Course Name: HEALTH, HYGIENE & YOGA
Course Code: 3TBHH106

Course Objective

- It is very important for the protection of our health and helps to present the spread of communicable diseases personal hygiene has social and aesthetic values.
- The provision of hygiene information first impacts on knowledge and then practice.
- Yoga education helps in self discipline and self control, leading to immense amount of awareness concentration and higher level of consciousness.
- This course can prepare the students physically & mentally for the integration of their physical, mental and spiritual faculties so that the students can become healthier, saner and more integrated members of the society & of the nation.

Course Outcome

- The student to have good health.
- Student have good mental hygiene.
- Possess emotional stability.
- Integrated moral values.
- Attain higher level of consciousness.

Course Name: RURAL OUTREACH
Course Code: 3TBRO107

Course Objective

- The main objective of introducing this course is to sensitize students about the socio-

cultural aspects of the rural areas parochial to their colleges.

- Students are expected to observe, investigate and learn about the following aspects of the rural region:
- Demographics, Literacy, Geographical parameters of the Village
- Schemes of government of India and State of Madhya Pradesh in operation in the villages
- Social/ Cultural aspects ranging from popular dance forms, music and customs of the concerned village.

Course Name: MATHEMATICS-III
Course Code: 3TBBE- 301

Course Objective

- To introduce effective mathematical tools for the Numerical Solutions algebraic and transcendental equations.
- To enable young technocrats to acquire mathematical knowledge to understand Laplace transformation, Inverse Laplace transformation which are used in various branches of engineering?
- To acquaint the student with mathematical tools available in Statistics needed in various field of science and engineering.

Course Outcomes

- The curriculum of the Department is designed to satisfy the diverse needs of students.
- Coursework is designed to provide students the opportunity to learn key concepts of Transforms, Numerical Methods for Solving Ordinary Differential Equations of First Order & Concept of Probability.

Course Name: Electrical Machine-I
Course Code: 3TBEX 302

Course Objective

- To prepare the students to have a basic knowledge of transformers.
- To prepare the students to have a basic knowledge of induction motors.
- The objective of this course is to fulfil the needs of Engineers to understand the Transformer-I, Transformer-II,
- To prepare the students to have a basic knowledge of alternators &Induction Motor.

Course Outcome

- Understand electrical principle, laws, and working of DC machines.
- Analyze the construction and characteristics and application of various types of DC generators.
- Analyze the construction and characteristics and application of various type of DC motors and

- Testing of motors according to Indian standard.
- Understand electrical principle, laws, and working of 1 phase transformer and losses. And also
- Conduct various tests on the transformer.
- Understand electrical principle, laws, and working of 3 phase transformer and losses. and also
- Conduct various test on the transformer.
- Analyze the transformer and convert 3 phase transformer to multiphase transformer.

Course Name: Network Analysis
Course Code: 3TBEX 303

Course Objective

- This Course introduces examination of electrical &electronic circuit ‘
- This course analysis & synthesis tools & techniques such as the Laplace transform,
- To prepare the students to have nodal analysis & two port network theory.

Course Outcome

- To analyze behaviour of basic circuit elements and to apply concept of mesh and node analysis in Circuit theory.
- Apply various network theorems to determine the circuit response / behaviour.
- To apply transformation of a network to analyze time domain, differential eq.
- To study necessary conditions for driving point functions, transfer function for their application to a Given network for analyzing circuit design.
- To analyze the sinusoidal steady state for different electric network and apply concepts of Fourier series for analyzing non sinusoidal periodic waveforms.

Course Name: Analog Electronics
Course Code: 3TBEX 304

Course Objective

- To give the idea about fundamental properties of semiconductors.
- To prepare students to perform the analysis of any Analog electronics circuit.
- To empower students to understand the design and working of BJT / FET amplifiers, oscillators and Operational Amplifier.
- To prepare the students for advanced courses in Communication system Circuit Design.

Course Outcome

- Acquire basic knowledge of physical and electrical conducting properties of semiconductors.
- Develop the Ability to understand the design and working of BJT / FET amplifiers.

- Able to design amplifier circuits using BJT s and FET's. And observe the amplitude and Frequency Responses of common amplifier circuits
- Observe the effect of negative feedback on different parameters of an Amplifier and different types of Negative feedback topologies.

Course Name: Power System-I
Course Code: 3TBEX 305

Course Objective

- To introduce the concepts and phenomenon of different sources of Power Generation.
- To give an idea about the fundamental concepts of electrical power distribution, both AC & DC.
- To familiarize the students with the Tariff methods for electrical energy consumption in the prospect of optimum utilization of electrical energy.

Course Outcome

- Students will be able to learn the basics of various fundamentals of electrical power generation, Transmission & distribution.
- Students will be able to learn transmission line parameters, the calculations also the effects on Transmission lines & its effects on the communication system.
- Students will be able to learn electrical characteristics of transmission line such as types of Transmission lines, various effects on transmission & per unit representation of power system.
- Students will be able to learn load flow studies and its equation, Comparison of various methods like GS & NR
- Students will be able to learn Mechanical design along with the types of insulators also the Knowledge of voltage distribution across the string and introduction to HV, LV and EHV.
- Students will be able to learn information regarding conductors and insulation, different types of underground cable parameters.

Course Name: LT Maintenance
Course Code: 3STEX 307A

Course Objective

- The objective of this course is to get an overview of Basic electronics and component Identification,
- The Importance of alignment and balancing, basic programming, Insulating Materials, Transformers and windings Transformers.

Course Outcome

- After successful completion of course, Students are expected to possess an in-depth understanding and Knowledge of the concepts and principles of Basic electronics and

component identification, Importance of alignment and balancing, basic programming, Insulating Materials, Transformers and windings Transformers.

Course Name: Solar Technician
Course Code: 3STEX 307B

Course Objective

The objective of this course is to get an overview of –

- Fundamentals of renewable energy, Basic of electrical energy, Basic components of solar photovoltaic,
- Basic solar power plant designing and power engineering, Operation and maintenance of solar plant.

Course Outcome

After successful completion of course,

- Students are expected to possess an in-depth understanding and Knowledge of the concepts and principles of Fundamentals of renewable energy,
- Basic of electrical energy, Basic components of solar photovoltaic, Basic solar power plant designing and power engineering,
- Operation and maintenance of solar plant.

Course Name: Energy, Ecology & Society
Subject Code: 3TBEX 401

Course Objective

- This course introduces students to environment concerns. Students are expected to learn about environment, factors affecting it, environmental Ethics.
- its protection through lectures, presentations, documentaries and field Visits.

Course Name: Electrical Measurement and Instrumentation
Course Code: 3TBEX 402

Course Objective

- To provide students with a fundamental knowledge of low, medium & high resistance and there measuring technique with the help of D.C. bridges
- To provide students with a fundamental knowledge of Inductor and capacitor and there measuring technique with the help of various A.C. bridges.
- To provide students with a fundamental knowledge of galvanometer construction and working.
- To provide students with a fundamental knowledge of wattmeter & Energy meter and there testing.

Course Outcome

- To use the techniques and skills for electrical projects.

- Design a system, component or process to meet desired needs in electrical engineering.
- Measurement of R, L, C, Voltage, Current, Power factor, Power, Energy
- Ability to balance Bridges to find unknown values.
- Ability to measure frequency, phase with Oscilloscope
- Ability to use Digital voltmeters 7. Ability to measure strain, displacement, Velocity, Angular Velocity, temperature, Pressure, Vacuum, and Flow

Course Name: Electromagnetic FIELDS
Course Code: 3TBEX 403

Course Objective

- The objective of this course is to introduce the concepts of electric field and magnetic fields and their applications
- Which will be utilized in the development of the theory for power transmission lines and electrical machines.

Course Outcome

- Apply vector calculus to understand the behaviour of static electric fields in standard configurations.
- Apply vector calculus to understand the behaviour of static magnetic fields in standard configurations.
- Describe and analyze electromagnetic wave propagation in free-space.
- Describe and analyze transmission lines.
- Work in a small team using a cooperative learning rules.
- Communicate electromagnetic concepts both orally and in writing.

Course Name: Digital Electronics
Course Code: 3TBEX 404

Course Objective

- To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.
- To prepare students to perform the analysis and design of various digital electronic Circuits.

Course Outcome

- Have a thorough understanding of the fundamental concepts and techniques used in digital Electronics.
- To understand and examine the structure of various number systems and its application in digital Design.
- The ability to understand, analyze and design various combinational and sequential circuits.

- Ability to identify basic requirements for a design application and propose a cost effective Solution.
- The ability to identify and prevent various hazards and timing problems in a digital design.
- To develop skill to build, and troubleshoot digital circuit

Course Name: Power Electronics
Course Code: 3TBEX 405

Course Objective

- To provide the students a deep insight in to the working of different switching devices with respect to their characteristics
- To analyze different converters and control with them applications.
- To study advanced converters and switching techniques implemented in resent Technology.

Course Outcome

At the end of the course student will have ability to

- Articulate the basics of power electronic devices
- Express the design and control of rectifiers, inverters.
- Design of power electronic converters in power control applications
- Ability to express characteristics of SCR, BJT, MOSFET and IGBT.
- Ability to express communication methods.
- Ability design AC voltage controller and Cyclo Converter.
- Ability to design Chopper circuit, Inverter circuit.

Course Name: HT Maintenance
Course Code: 3STEX 407A

Course Outcome

- After successful completion of course, Students are expected to possess an in-depth understandings
- And Knowledge of the concepts and principles of measurement of Three – Phase motor winding a 2 pole, 3HP, 5HP, three phase Transformer, Tap changing Transformers, Maintenance of Circuit Breaker

Course Name: Electrical House Wiring
Course Code: 3STEX 407B

Course Objective

- The objective of this course is to get knowledge of Joints and Accessories Terminators and joints,

- Wiring Cleat wiring, testing of domestic wiring Polarity test, and Safety Precautions Earthling electrodes and earth wire to Electrical House wiring.

Course Outcome

After successful completion of course-

- Students are expected to possess an in-depth understanding and Knowledge of the theory and applications of Joints and Accessories Terminators and joints,
- Wiring Cleat wiring, testing of domestic wiring Polarity test, and Safety Precautions Earthling electrodes and earth wire.

Course Name: Control System
Course Code: 3TBEX 501

Course Objective

- Identify the basic elements and structures of feedback control systems.
- Apply final value theorem to determine the steady state response of stable control system.
- Use root locus method for design of feedback control systems.
- Construct Bode, Polar and Nyquist plots for rational transfer function.
- Understand the fundamentals of modern control theory

Course Outcome

- Ability to acquire and apply fundamental principles of science and technology.
- Analyse continuous systems mathematically through the use of Laplace functions and state equations form.
- Represent any physical system in both transfer functions and state equations form.
- Apply classical design methods to improve the performance of continuous controlled system.

Course Name: Electrical Machine-II
Course Code: 3TBEX 502

Course Objective

- The objective of this course is to provide knowledge about the basic principles, construction and working of synchronous, single and three-phase induction machines.
- The aim of this course is to give the knowledge of the equivalent circuits, parameter determination, and operational constraints.
- To give the knowledge of starting mechanisms, conventional speed control methods, various tests and applications of synchronous and induction machines.

Course Outcome

- To impart the knowledge on fundamental of AC rotating machine

- To impart the knowledge on constructional details, principle of operation of 3 phase Alternator and synchronous motor
- To impart the knowledge on constructional details, principle of operation, performance, Starter, speed control and braking of 3 phase induction motor.
- To impart the knowledge on constructional details, principle of operation, type of 1 phase Induction motor and special machine.

Course Name: Microprocessors and Microcontrollers
Course Code: 3TBEX 503

Course Objective

- The objective of this course is to provide knowledge about the fundamentals of Microprocessors
- To provide their evolution internal architecture and construction.
- This course is also useful to provide the knowledge of various supporting chips provided with the Microprocessor 8085.
- The aim of this course is to give the knowledge of various instructions, basic programming with Microprocessors 8085, data transfer schemes, Instruction format and addressing modes.

Course Outcome

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

- Understand the basic architecture of Microprocessor 8085.
- Understand various instructions and their application in programming.
- Understand memory organization and mapping

Course Name: SWITCH GEAR
Course Code: 3TBEX 504

Course Objective

- To introduce students to power system protection and switchgear.
- To teach students theory and applications of the main components used in power system protection for electric machines, transformers, bus bars, overhead and underground feeders.
- To teach students the theory, construction, applications of main types Circuit breakers, Relays for protection of generators, transformers and protection of feeders from over- voltages and other hazards. It emphasis on neutral grounding for overall protection
- To develop an ability and skill to design the feasible protection systems needed for each main part of a power system in students.

Course Outcome

Students shall be able to understand

- Student gains knowledge on different Protective Equipment's or Power Systems
- Know about various protective systems- how it works and where it works?
- Different applications of the relays, circuit breakers, grounding for different elements of power system is also discussed in the subject.
- Ability to discuss Recovery and Restricting.
- Ability to express Oil Circuit Breaker, Air Blast Circuit Breakers, SF6 Circuit Breaker.
- Abiity to identify DMT, IDMT type relays
- Ability to identify Rotor, Stator Faults, interterm faults and their protection.

Course Name: Electrical & Electronics Material
Course Code: 3TBEX 505

Course Objective

- To review physics and chemistry in the context of materials science & engineering.
- To describe the different types of bonding in solids, and the physical ramifications of these differences.
- Give an introduction to metals, ceramics, polymers, and electronic materials in the context of a molecular level understanding of bonding.
- Give an introduction to the relation between processing, structure, and physical properties.
- Give the beginning student an appreciation of rEEnt developments in materials science & engineering within the framework of this class

Course Outcome

After successful completion of course, Students are expected to

- Possess an in-depth understanding and Knowledge
- Given a type of material, be able to qualitatively describe the bonding scheme and its general physical properties, as well as possible applications.
- Given a type of bond, be able to describe its physical origin, as well as strength. Be able to qualitatively derive a material's Young's modulus from a potential energy curve.
- Given the structure of a metal, be able to describe resultant elastic properties in terms of its 1D and 2D defects. 4.Given a simple set of diffraction data, be able to index the peaks and infer the structure.
- Be able to describe a polymer's elastic behaviour above and below the glass transition. Be able to do simple diffusion problems.

Course Name: Skill Elective-III Electrical Load Management
Course Code: 3STEX 507A

Course Objective

- The objective of the course is to make the student familiar with the production of electrical Load management, Different electricity tariffs-flat rate, , monitoring and controlling y in regard to the needs of specific consumer areas in order to be able to appreciate the relative procedures from the technical, economic and social point of view.

Course Outcome

- To understand the relationship between the electrical loads and the respective power production installations on the base of economic and technological criteria, to use the methods and criteria of forming the selling price list of electrical energy.

Course Name: Skill Elective-III PLC & SCADA Systems and Applications
Course Code: 3STEX 507B

Course Objective

- The objective of this course is to get knowledge of Introduction to SCADA and PLC, SCADA system components, SCADA Architecture,
- SCADA Communication in SCADA Systems and Applications.

Course Outcome

- Student after successful completion of course must possess an understanding of Introduction to SCADA and PLC, SCADA system components, SCADA Architecture,
- SCADA Communication in SCADA Systems and Applications.

Course Name: Power Systems-II
Course Code: 3TBEX 601

Course Objective

The primary objective of the course is to introduce

- The fault conditions and protective system of power system and how to protect our system to teach students the theory, construction,
- Applications of main types Circuit breakers, Relays for protection of generators, transformers and protection of feeders from over- voltages and other hazards. It emphasis on neutral grounding for overall protection.
- To understand the need of protection of electric equipment and their protection schemes.

Course Outcome

After learning the course, the students should be able to:

- Analyze the performance of Short and Medium transmission line.

- Describe the symmetrical components and its applications.
- Analyze Symmetrical and Unsymmetrical faults in power systems.
- Describe transients in power systems.
- Describe corona effect.

Course Name: Digital Signal Processing
Course Code: 3TBEX 602

Course Objective

- To determine the zero-input and zero-state responses of system described by constant-coefficient difference equations, and determining the complete response of such systems.
- To determine the linear and circular convolutions of discrete-time systems.
- To evaluate the Discrete-Time Fourier Transform.
- To evaluate and plot the frequency (magnitude and phase) of linear-time invariant systems.
- To determine the Discrete-Fourier transform of a sequence.

Course Outcome

- Design digital IIR filters by designing prototypical analog filters and then applying analog to digital conversion techniques such as the bilinear transformation.
- Design digital FIR filters using the window method.
- Use a computer to design digital filters via the frequency sampling approach and the Remez exchange Algorithm.
- Implement digital filters in a variety of forms: direct form I and II, parallel, and cascade, and then analyze their sensitivity to finite precision effects such as input quantization, coefficient quantization, and multiplication round-off.
- Analyze signals using the discrete Fourier transform (DFT).
- Understand circular convolution, its relationship to linear convolution.

Course Name: Electronics Devices & Circuits
Course Code: 3TBEX 603

Course Objective

The objective of this course is to get an overview of –

- To understand the operation of the various bias circuits of MOSFET and Analyze and de MOSFET bias circuits.
- To understand the operation and design of multistage amplifier for a given specification.

- To understand the operation and design of transformer coupled Various types of power amplifier circuits.
- To understand the effects of negative feedback on amplifier Circuits.
- To analyze the different RC and LC oscillator circuits to determine the frequency of oscillation

Course Outcome

After successful completion of the course student will be able to

- Design and analyze the basic operations of MOSFET.
- Know about the multistage amplifier using BJT and FET in various configuration to determine frequency response and concept of voltage gain.
- Know about different power amplifier circuits, their design and use in electronics and communication circuits.
- Know the concept of feedback amplifier and their characteristics.
- Design the different oscillator circuits for various frequencies.

Course Name: COMMUNICATION ENGINEERING
Course Code: 3TBEX 604

Course Objective

The objective of this course is to get knowledge of

- Fourier series, Need of modulation in a communication system, TRF rEEEiver & its limitations Satellite system block diagram in Communication Engineering.

Course Outcome

Student after successful completion of course must possess an understanding of –

- Student understand the basic signals and systems
- Student understand Fourier transform and its properties
- Student can design band pass, low pass, and high pass filter. Assignments that demonstrate accomplishment of this outcome:

Course Name: Facts Devices
Course Code: 3TBEX 605

Course Objective

The objective of this course is to get knowledge of

- Basic Issues Involved in Bulk Power Transmission, Static Var Compensator (Svc) And Purpose,
- Thyristor and Gto Thyristor Controlled Series Capacitors (Tcsc and Gcsc),
- Voltage Source Converter Based Facts Controllers and Controllers and Their Co-Ordination in Facts. Transforms,

Course Outcome

- Express different types of FACTS controllers and their role in improving power system performance.
- Understand the operating principles of various FACTS devices.
- Relate the performance and applications of VSI & CSI.
- Know the importance of compensation methods in power system network.
- Extend the knowledge of active & reactive power and voltage control with FACTS devices.
- Analyze role of SVC&STATCOM in improving the power system dynamics.
- Analyze the use of control schemes of TCSC, TSSC, GSC in improving the power qualit

Course Name: Electrical Machine Maintenance
Course Code: 3STEX 607A

Course Objective
The primary objective of the course is to introduce operation principles of –

- Three – Phase motor winding a 2 pole, 3HP, 5HP, three phase Transformer, Tap changing Transformers,
- Maintenance of Circuit Breaker, Commissioning and Recharging of Transformers.

Course Outcome

- After successful completion of course, Comprehend the basics of Electrical
- Engineering and practical implementation of Electrical fundamentals.
- Develop numerical solutions to fundamental electrical engineering
- Make use of basic principles involved in electrical engineering concepts.
- Examine the methods to solve AC circuits.
- Analyze various circuits using network theorems.
- Know the basics of electric machines used in industries.
- Summarize the different applications of commonly used electric machinery.

Course Name: Mobile Repairing
Course Code: 3STEX 607B

Course Objective

- The Course has been designed to provide knowledge on Mobile Repair & Maintenance.

Course Outcome
At the end of the training, the trainee will be able to

- Appreciate the importance of embarking on self-employment and has developed the confidence Identify business opportunities in chosen sector / sub-sector and plan and market and sell
- Start a small business enterprise by liaising with different stake holders

- Effectively manage small business enterprise
- Establish and run a Mobile Handset Repairing unit

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Course Name: Power Quality
Course Code: 3TBEX 701

Course Objective

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

- Understand the various power quality phenomenon, their Origin and monitoring and mitigation methods.
- Understand the effects of various power quality phenomenons in various equipment's.

Course Outcome

- Graduates will demonstrate knowledge of mathematics, science and engineering.
- A knowledge contemporary issue
- Graduates will show the ability to participate and try to succeed in competitive examinations.
- Identify the harmonic sources and the effects of harmonic distortion
- Analyze voltage sag problems and suggest preventive techniques

Course Name: Power System Protection
Course Code: 3TBEX 702

Course Objective

- To understand the principle of protective schemes and various faults in the Power System Scenario.
- To study the various types of the circuit breakers, the arc quenching phenomena and the protection against over voltages.
- Teach students the protection systems used for electric machines, transformers, bus bars, overhead and underground feeders.

Course Outcomes

At the end of the course, students:

- Design the relevant protection systems for the main elements of a power system
- Analyze with over current, differential, and ratio protection devices and their application in a coordinated protection scheme.
- Do the stability problems and clearing of faults to mitigate these problems

Course Name: Electrical Drives
Course Code: 3TBEX 703

Course Objective

- The objective of this course is to get knowledge of To provide students with a strong back ground in different types of electrical drives.
- To train the students to have the solid foundation in mathematical and technical concepts required to engineering problems.
- To prepare the students to excel in post graduate programs or to succeed in industry.

Course Outcomes

- Student after successful completion of course -To apply solid foundation in controlling method of different electrical appliances.
- Interpret power electronics applications in control of speed, torque and other components.
- Develop control Dc motor by Single phase converters.
- Construct control DC Motor by Three Phase Converters
- Able to solve four quadrant operation of DC drives.
- Able to build control DC motors by Choppers
- Able to model the control of Induction motor through system voltage.

Course Name: COMPUTER NETWORKS
Course Code: 3TBEX 704

Course Objective

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

- Describe the general principles of data communication.
- Describe how computer networks are organized with the concept of layered approach.
- Describe how signals are used to transfer data between nodes.
- Implement a simple LAN with hubs, bridges and switches.
- Describe how packets in the Internet are delivered.

Course Outcome

- To master the terminology and concepts of the OSI reference model and the TCP-IP reference model.
- To master the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks,
- To be familiar with wireless networking concepts,
- To be familiar with contemporary issues in networking technologies
- To be familiar with network tools and network programming

Course Name: Elective-I EHV AC/DC TRANSMISSION
Course Code: 3TBEX 7101A

Course Objective

- The objective of this course is to get knowledge of the extra high voltages, AC & DC transmission line. Constitution of EHV a.c. and d.c. links, Kind of d.c. links, Limitations and Advantages of a.c. and d.c. transmission, Principal application of a.c. and d.c. transmission, Trends in EHV a.c. and transmission, Power handling capacity, different types of FACTs, EHV AC DC controls, Harmonics, Travelling waves on transmission systems. etc.

Course Outcome

- Student after successful completion of course - Understand the importance of estimating the line parameters of EHV AC transmission lines.
- Does the calculation of electrostatic field of AC lines and able to understand their effect on voltage gradients?
- Identify the impact of over voltages on transmission lines.
- Get the knowledge of energized & un-energized lines and able to understand the requirement of VAR compensation.
- Emphasize on the effect of corona with respect to its characteristics, properties and losses.
- Understand the information of radio noise generation in transmission lines.
- Get the awareness of the design of EHV lines with respect to steady & transient limits

Course Name: Elective-I Advanced Communication Systems
Course Code: 3TBEX 7102B

Course Objective

- To introduce students to various modulation and demodulation techniques of analogy communication.
- To analyze different parameters of analogy communication techniques.
- It also focuses on pulse modulation and demodulation.

Course Outcome

Student after successful completion of course-

- Use of different modulation and demodulation techniques used in analog communication
- Identify and solve basic communication problems
- Analyze transmitter and rEEiver circuits
- Compare and contrast design issues, advantages, disadvantages and limitations of analog communication systems

Course Name: Power Apparatus System
Course Code: 3TBEX 7103C

Course Objective

- Impart theoretical knowledge of design of electrical transmission line, different types of substation, bus-bar arrangement.
- Introduce the concept of Different types of earthling system.
- To provide the theoretical insights overvoltage production and protection from these.
- Deliberate & discuss the concept of reliability of transmission line.

Course Outcome

- To facilitate students understand the practical application of different types of apparatus used in power stations.
- Graduates opting for C.S.E.B., NHPC, NTPC, and other industry as a career are likely to come across substations and shall be able to deliver more efficiently with their prior knowledge & by co-relating the concepts of substation, bus-bar scheme, earthling, protection introduced to them during engineering.
- Students will gain the knowledge of different substation , mechanism of lightning, reliability of transmission line. This shall also impart them the understanding & importance of conducting these tests in real-life situations.
- Apart from gaining the knowledge of above topics, students would develop analytical ability to understand the system dynamics and become capable of applying analytical approach to engineering challenges ahead.

Course Name: Industrial training/internship/IPR
Course Code: 3TBEE 707

Course Objective

- Entrepreneurship education is a kind of education that aims at cultivating the comprehensive qualities of entrepreneurship, the value of innovatory spirit and entrepreneurship abilities. The objectives of entrepreneurship education in university are in the following four aspects.
    - Cultivating the spirit of entrepreneurship
    - Leadership
    - Teamwork
    - Bearing a part of quality-oriented education Managing relationships

Course Outcome

- Entrepreneurial behaviour, attitudes and skill development
- Creating empathy with the entrepreneurial life world
- Key entrepreneurial values
- Motivation and entrepreneurship career
- Understanding of process of business entry and tasks
- Generic entrepreneurship competences
- Key minimum business how-to

Course Name: Computer Application to Power System

Course Code: 3TBEX 801

Course Objective

The objective of this course is to get knowledge of Models of power system components

- Control of load bus voltage using reactive power control variable, Sensitivity analysis,
- Power system security, and Voltage stability in Computer Applications to Power Systems.

Course Outcome

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

- Analyze a control problem and suggest appropriate system architecture.
- Analyze the need for information exchange and suggest appropriate information models and protocols.
- Develop simple software for a controller.
- Analyze the information needed for a given automation and control function for power systems.

Course Name: SMART GRID
Course Code: 3TBEX 802

Course Objective

- The objective of this course is to get knowledge of the extra high voltages, AC & DC transmission line. Constitution of EHV a.c. and d.c. links, Kind of d.c. links, Limitations and Advantages of a.c. and d.c. transmission, Principal application of a.c. and d.c. transmission, Trends in EHV a.c. and transmission, Power handling capacity, different types of FACTs, EHV AC DC controls, Harmonics, Travelling waves on transmission systems. etc.

Course Outcome

- Student after successful completion of course - Understand the importance of estimating the line parameters of EHV AC transmission lines.
- Does the calculation of electrostatic field of AC lines and able to understand their effect on voltage gradients?
- Identify the impact of over voltages on transmission lines.
- Get the knowledge of energized & un-energized lines and able to understand the requirement of VAR compensation.
- Emphasize on the effect of corona with respect to its characteristics, properties and losses.
- Understand the information of radio noise generation in transmission lines.
- Get the awareness of the design of EHV lines with respect to steady & transient limits

Course Name: Principle of Management & Managerial Economics
Course Code: 3TBEC 803A

Course Objective

To integrate the basic concepts of economics with the tools of mathematics and statistics in order to analyze and make optimal business decisions.

Course Outcome

After learning the course the students should be able to:

- Understand the roles of managers in firms
- Understand the internal and external decisions to be made by Managers.
- Analyze the demand and supply conditions and assess the position of a company
- Design competition strategies, including costing, pricing, product differentiation, and market environment according to the natures Of Products and the structures of the markets.
- Analyze real-world business problems with a systematic Theoretical Framework.
- Make optimal business decisions by integrating the concepts of Economics, Mathematics and statistics.

Course Name: Electrical Installation Maintenance & Training
Course Code: 3TBEX 803B

Course Objective

- To learn the industrial standards in testing and commissioning of electrical equipments.
- To understand the common problems in installing and commissioning of electrical equipments.
- To learn about safety measures and maintenance procedures for various electrical equipments.

Course Outcomes

- After studying the subject students will be able to understand the common problems arising while commissioning of electric Equipment's.
- They will also be able to learn about the routine tests to be performed and maintenance measures for various equipment's

Course Name: High Voltage
Course Code: 3TBEX 8201A

Course Objective

The objective of this course is to get knowledge of Introduction to HV technology,

- Breakdown phenomena, Generation of HV AC DC and Impulse Voltage and current,
- Measurement of high voltages and High voltage tests on electrical apparatus in High Voltage Engineering.

Course Outcome

Student after successful completion of course:

- Understand the importance of Transmission power through HVDC.
- Analyse the HVDC Converter operation.
- Discuss firing angle control of 6 pulse,12 pulse circuits.
- Discuss harmonics in
- Identify the importance of filters for HVDC system.
- Analyse the impact of AC system faults on DC system operation.
- Identify the need for proper grounding for HVDC operation.

Course Name: Computer-Aided Electrical Machine Design
Course Code: 3TBEX 8202B

Course Objective

The objective of this course is to get knowledge of

- All electrical machines design for computer based analysis.
- Including Design problem, Design problem,
- Optimal design of power transformer, optimal design of 3-phase induction motor

Course Outcome

- Students will be able to understand complete structure of Power System and working of steam power plant.
- Students will learn the total working principle and various procedures involved in Gas Turbine and Nuclear Power plants.
- Students will get proficient knowledge about Hydroelectric stations. Students will also be able to learn coordination of different power plants to increase the efficiency of plants.
- Students will get acquainted with all technical knowledge of Electrical Substations
- Student will be able to design economical feeders for electrical distribution systems.
- Students will get acquainted with the installation of Electrical wiring in domestic, commercial and industrial areas.

BACHELOR OF ENGINEERING (EE)
PROGRAMME CODE -05UGR007

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

The five broad EE Program Educational Goals (Objectives) are

- **PEO**1. Have the laboratory skills and the ability to use modern analysis and design techniques and state-of-the-art equipment to solve practical engineering problems
- **PEO**2. Have the professional skills to function effectively in the work environment as well as in the community.
- **PEO**3. Have a solid understanding of professional and ethical responsibility
- **PEO**4. Have a broad education in order to understand contemporary issues and the impacts of technology on society and the environment
- **PEO**5. Have the ability to engage in life-long learning and recognize its importance

PROGRAM OUTCOMES (POs)

- **PO1.** The ability to apply science, engineering science, and mathematics to solve engineering problems.
- **PO2**. The ability to put their engineering and design skills into practice.
- **PO3**. The ability to use industrial-quality laboratory equipment and engineering software for analysis, testing, design, and communication.
- **PO4**. The ability to design systems, components, and processes that satisfy predetermined constraints.
- **PO5**. The ability to put engineering problems, put them in solvable form, and develops and evaluates alternative solutions.
- **PO6**. The ability to communicate their ideas and designs clearly orally, in written form, and graphically.
- **PO7**. The ability to work as members of a team.
- **PO8**. Had the opportunity to develop leadership skills
- **PO9**. Understand ethical principles and their role in the engineering profession.
- **PO10**. Have sufficient knowledge of the humanities and social sciences to understand contemporary issues concerning the interaction between technology and society.
- **PO11**. Understand that the products they develop and the methods used to manufacture them can affect the environment.
- **PO12**. Realize that the practice of electrical engineering is constantly evolving and that engineers must have the ability to acquire new knowledge and skills on their own.
- **PO13**. Have the ability to earn graduate degrees or pursue other continuing education opportunities

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO1. Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PSO2. 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
- **PSO3. 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.
- **PSO4. 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.
- **PSO5. Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PSO6. 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.
- **PSO7. 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.
- **PSO8. 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
- **PSO9. 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.
- **PSO10. 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.

Course Name: ENGINEERING CHEMISTRY
Course Code: 3TBCH201

Course Objective

- Apply the electrochemical principles in batteries, understand the fundamentals of corrosion.
- Analysis of water for its various parameters and its significance in industrial and domestic Applications.

- Analyze microscopic chemistry in terms of atomic, molecular orbitals and Intermolecular forces
- Analysis of major chemical reactions that are used in the synthesis of molecules.
- Understand the chemistry of various fuels and their combustion

Course Outcome

- Describe and understand the operation of electrochemical systems for the production of electric energy, i.e., batteries. Explain the mode by which potable water is produced through the processes of screening, micro-Straining, aeration, coagulation and flocculation, sedimentation, flotation, filtration and disinfection.
- Recognize that molecular orbital theory is a method used by chemists to determine the energy of the electron in a molecule as well as its geometry.
- Demonstrate an ability to design, implement, and evaluate the results of experimentation using standard scientific methodologies such as hypothesis formulation and testing.
- Analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
- Rationalize bulk properties and processes using thermodynamic considerations.
- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
- List major chemical reactions that are used in the synthesis of molecules

Course Name: MATHEMATICS-I
Course Code: 3TBMA102

Course Objective

- To introduce the idea of applying differential and integral calculus to notions of curvature and to improper integrals. Apart from some applications it gives a basic introduction on Beta and Gamma functions.
- To introduce the fallouts of Role's. Theorem that is fundamental to application of analysis to Engineering problems.
- To develop the tool of ordinary differential equation for learning advanced Engineering Mathematics.
- To familiarize the student with functions of several variables that is essential in most branches of engineering.
- To develop the essential tool of matrices and linear algebra in a comprehensive manner.

Course Outcome

- This Syllabus has been designed to equip engineering student s with necessary mathematical tool's to handle mathematical problem in their core subjects.

- Through this syllabus they will learn many thing about calculus specially first order differential equation, Roles ,Lagrange's concept about existence of derivatives in some interval
- Expansion of function in an infinite series by Maclaurin's and Taylor theorem
- Partial derivative off unction's through which maxima minima of two variable function application of matrices in solving linear simultaneous equations, Eigen value Eigen vector, Calay-Hamilton theorem to find Inverse of a matrix, and concept of vector space.

Course Name: ENGINEERING GRAPHICS
Course Code: 3TBEG203

Course Objective

- To familiarize with the construction of geometrical figures.
- To familiarize with the projection of 1D, 1st and 3D elements.
- To familiarize with the sectioning of solids and development of surfaces.
- To familiarize with the Preparation and interpretation of building drawing.

Course outcome

- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to solid modeling
- Exposure to creating working drawings
- Ability to draw projections and analyzing multiple views of object.

Course Name: BASIC ELECTRICAL ENGINEERING
Course Code: 3TBEE204

Course Objective

- To provide knowledge of basic concepts related to electrical engineering.
- To provide knowledge of basic Circuits: 1- phase AC Circuits, 3-phase AC Circuits, Magnetic Circuits, Electrical Machines

Course outcome

After successful completion of course,

- Students are expected to possess an in-depth understanding and Knowledge of 1-phase A Circuits, 3-phase AC Circuits, Magnetic Circuits, Electrical Machines
- Develop the concepts of basic electrical engineering for all the undergraduate students of different branches of engineering.

Course Name: BASIC COMPUTER ENGINEERING
Course Code: 3TBCS205

Course Objective

By the end of this course, the student will be able to:

- Analyzing problems, and designing and implementing algorithmic solutions.
- Solving problems properly, achieving an implementation that is correct, effective and efficient.
- Using computers at user level, including operative systems and programming environments.
- Knowledge of computer equipment, including both hardware and software.
- Identifying information needs to solve problems, recovering information and applying it to the resolution.
- Opportunity to learn key concepts of computer, as well as fundamentals and applications of computer.

Course outcome

By the end of this course, the student will

- Analyzing problems and designing and implementing algorithmic solutions.
- Solving problems properly, achieving an implementation that is correct, effective and efficient.
- Using computers at user level, including operative systems and programming environments.
- Knowledge of computer equipment, including both hardware and software.
- Identifying information needs to solve problems, recovering information and applying it to the resolution.
- Opportunity to learn key concepts of computer, as well as fundamentals and applications of computer.

Course Name: ENGINEERING PHYSICS
Course Code: 3TBPH101

Course Objective

- To understand the basic laws of physics and their applications in engineering and technology.
- To develop scientific temper and analytical capability.
- To solve various engineering problems.

Course Outcome

- Gain a knowledge and understanding of fundamental physical concepts in the areas covered in this class.
- Apply an understanding of these concepts to various systems and devises.

- Acquire problem solving skills, mathematical techniques, and the ability to synthesize.
- The ability to formulate, conduct, analyzes and interprets experiments in engineering physics

Course Name: MATHEMATICS-II
Course Code: 3TBMA202

Course Objective

- Students will demonstrate the ability to formulate, interpret and draw inferences from mathematical models.
- Students will demonstrate competence with a wide variety of mathematical tools and techniques.
- Students will demonstrate the ability to assess the accuracy, implications and limitations of their mathematical results.
- Students will demonstrate a breadth of general mathematical knowledge as well as depth in at least one area.

Course Outcome

- Today calculus has become the heart of every engineering stream.
- Through this syllabus student will learn different techniques of solving different kind of higher order ordinary and partial differential equations.
- Expansion of periodic function in an infinite series of sine and cosine function through Fourier series, Function of complex variable's based on complex number and also vector calculus based on vectors.

Course Name: BASIC MECHANICAL ENGINEERING
Course Code: 3TBME103

Course Objective

- To familiarize with the basic concept of Mechanical Engineering
- To familiarize with the scope of Mechanical Engineering
- To familiarize with the job prospects of Mechanical Engineer.

Course outcome

At the end of this course students will able to:

- Identify engineering materials, their properties, testing and manufacturing methods encountered in engineering practice.
- Understand Concept of measurement by using measuring instrument Verniercalliper, Micrometer, Dial gauge, Slip gauge etc.
- Understand basics of thermodynamics and components of a thermal power plant
- Understand the construction, operation and performance of different IC engines.
- Understand basics of fluids, their properties and laws of fluid Mechanics.

Course Name: BASIC CIVIL & ENGG MECHANICS
Course Code: 3TBCE104

Course Objective

- To introduce to student relevance of civil engineering for various engineering applications.
- To introduce to student various elements of buildings and construction materials.
- To introduce to student various methods of land survey and to make him use surveying equipment
- To make student aware of modern investigation techniques in land survey.
- To introduce to student about the water management and transportation engineering.
- Ability to apply knowledge of mathematics, science, and engineering.
- Solve for the resultants of any force systems.

Course outcome

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

- Describe the role of civil engineer in the development of the society and explain relationship of civil engineering with other branches of engineering and technology.
- Discuss types of buildings and select materials of construction.
- Explain the elements of water supply such as dam, canal and elements of transportation structures.
- Measure heights, distances and angles on ground using basic surveying instruments and plot them on paper.
- Explain the advantages of advances in civil engineering like remote sensing techniques, GIS and GPS.
- Determine the resultant force and moment for a given system of forces

Course Name: COMMUNICATION SKILLS
Course Code: 3TBCS105

Course Objective

- The objective of this course is to learn the second language learners' ability and to use the four fundamental language skills-reading writing speaking and listening.
- It will enable the students to speak English correctly and with confidence.

Course outcome

- Student will develop knowledge, skills and judgment around human communication that facilitate their ability to work collaboratively with others.
- Such skills could include communication competencies such as managing conflict, understanding small group process, active listening, appropriate self disclosure, etc.

Course Name: MATHEMATICS-III
Course Code: 3TBBE- 301

Course Objective

- To introduce effective mathematical tools for the Numerical Solutions algebraic and transcendental equations.
- To enable young technocrats to acquire mathematical knowledge to understand Laplace transformation, Inverse Laplace transformation which are used in various branches of engineering?
- To acquaint the student with mathematical tools available in Statistics needed in various field of science and engineering.

Course Outcomes

- The curriculum of the Department is designed to satisfy the diverse needs of students.
- Coursework is designed to provide students the opportunity to learn key concepts of Transforms, Numerical Methods for Solving Ordinary Differential Equations of First Order & Concept of Probability.

Course Name: Electrical Machine-I
Course Code: 3TBEX 302

Course Objective

- To prepare the students to have a basic knowledge of transformers.
- To prepare the students to have a basic knowledge of induction motors.
- The objective of this course is to fulfil the needs of Engineers to understand the Transformer-I, Transformer-II,
- To prepare the students to have a basic knowledge of alternators &Induction Motor.

Course Outcome

- Understand electrical principle, laws, and working of DC machines.
- Analyze the construction and characteristics and application of various types of DC generators.
- Analyze the construction and characteristics and application of various type of DC motors and
- Testing of motors according to Indian standard.
- Understand electrical principle, laws, and working of 1 phase transformer and losses. And also
- Conduct various tests on the transformer.
- Understand electrical principle, laws, and working of 3 phase transformer and losses. and also
- Conduct various test on the transformer.
- Analyze the transformer and convert 3 phase transformer to multiphase transformer.

Course Name: Network Analysis
Course Code: 3TBEE 303

Course Objective

- This Course introduces examination of electrical &electronic circuit ‘
- This course analysis & synthesis tools & techniques such as the Laplace transform,
- To prepare the students to have nodal analysis & two port network theory.

Course Outcome

- To analyze behaviour of basic circuit elements and to apply concept of mesh and node analysis in Circuit theory.
- Apply various network theorems to determine the circuit response / behaviour.
- To apply transformation of a network to analyze time domain, differential eq.
- To study nEEssary conditions for driving point functions, transfer function for their application to a Given network for analyzing circuit design
- To analyze the sinusoidal steady state for different electric network and apply concepts of Fourier series for analyzing non sinusoidal periodic waveforms.

Course Name: Analog Electronics
Course Code: 3TBEX 304

Course Objective

- To give the idea about fundamental properties of semiconductors.
- To prepare students to perform the analysis of any Analog electronics circuit.
- To empower students to understand the design and working of BJT / FET amplifiers, oscillators and Operational Amplifier.
- To prepare the students for advanced courses in Communication system Circuit Design.

Course Outcome

- Acquire basic knowledge of physical and electrical conducting properties of semiconductors.
- Develop the Ability to understand the design and working of BJT / FET amplifiers.
- Able to design amplifier circuits using BJT s and FET’s. And observe the amplitude and Frequency Responses of common amplifier circuits
- Observe the effect of negative feedback on different parameters of an Amplifier and different types of Negative feedback topologies.

Course Name: Power System-I
Course Code: 3TBEX 305

Course Objective

- To introduce the concepts and phenomenon of different sources of Power Generation.
- To give an idea about the fundamental concepts of electrical power distribution, both AC & DC.
- To familiarize the students with the Tariff methods for electrical energy consumption in the prospect of optimum utilization of electrical energy.

Course Outcome

- Students will be able to learn the basics of various fundamentals of electrical power generation, Transmission & distribution.
- Students will be able to learn transmission line parameters, the calculations also the effects on Transmission lines & its effects on the communication system.
- Students will be able to learn electrical characteristics of transmission line such as types of Transmission lines, various effects on transmission & per unit representation of power system.
- Students will be able to learn load flow studies and its equation, Comparison of various methods like GS & NR
- Students will be able to learn Mechanical design along with the types of insulators also the Knowledge of voltage distribution across the string and introduction to HV, LV and EHV.
- Students will be able to learn information regarding conductors and insulation, different types of underground cable parameters.

Course Name: LT Maintenance
Course Code: 3STEX 307A

Course Objective

- The objective of this course is to get an overview of Basic electronics and component Identification,
- The Importance of alignment and balancing, basic programming, Insulating Materials, Transformers and windings Transformers.

Course Outcome

- After successful completion of course, Students are expected to possess an in-depth understanding and Knowledge of the concepts and principles of Basic electronics and component identification, Importance of alignment and balancing, basic programming, Insulating Materials, Transformers and windings Transformers.

Course Name: Solar Technician
Course Code: 3STEX 307B

COURSE OBJECTIVE

The objective of this course is to get an overview of –

- Fundamentals of renewable energy, Basic of electrical energy, Basic components of solar photovoltaic,
- Basic solar power plant designing and power engineering, Operation and maintenance of solar plant.

Course Outcome

After successful completion of course,

- Students are expected to possess an in-depth understanding and Knowledge of the concepts and principles of Fundamentals of renewable energy,
- Basic of electrical energy, Basic components of solar photovoltaic, Basic solar power plant designing and power engineering,
- Operation and maintenance of solar plant.

Course Name: Energy, Ecology & Society
Course Code: 3TBEX 401

Course Objective

- This course introduces students to environment concerns. Students are expected to learn about environment, factors affecting it, environmental Ethics.
- its protection through lectures, presentations, documentaries and field Visits.

Course Name: Electrical Measurement and Instrumentation
Course Code: 3TBEX 402

Course Objective

- To provide students with a fundamental knowledge of low, medium & high resistance and there measuring technique with the help of D.C. bridges
- To provide students with a fundamental knowledge of Inductor and capacitor and there measuring technique with the help of various A.C. bridges.
- To provide students with a fundamental knowledge of galvanometer construction and working.
- To provide students with a fundamental knowledge of wattmeter & Energy meter and there testing.

Course Outcome

- To use the techniques and skills for electrical projects.

- Design a system, component or process to meet desired needs in electrical engineering.
- Measurement of R, L, C, Voltage, Current, Power factor, Power, Energy
- Ability to balance Bridges to find unknown values.
- Ability to measure frequency, phase with Oscilloscope
- Ability to use Digital voltmeters 7. Ability to measure strain, displacement, Velocity, Angular Velocity, temperature, Pressure, Vacuum, and Flow

Course Name: Electromagnetic FIELDS
Course Code: 3TBEX 403

Course Objective

- The objective of this course is to introduce the concepts of electric field and magnetic fields and their applications
- Which will be utilized in the development of the theory for power transmission lines and electrical machines.

Course Outcome

- Apply vector calculus to understand the behaviour of static electric fields in standard configurations.
- Apply vector calculus to understand the behaviour of static magnetic fields in standard configurations.
- Describe and analyze electromagnetic wave propagation in free-space.
- Describe and analyze transmission lines.
- Work in a small team using a cooperative learning rules.
- Communicate electromagnetic concepts both orally and in writing.

Course Name: Digital Electronics
Course Code: 3TBEX 404

Course Objective

- To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.
- To prepare students to perform the analysis and design of various digital electronic Circuits.

Course Outcome

- Have a thorough understanding of the fundamental concepts and techniques used in digital Electronics.
- To understand and examine the structure of various number systems and its application in digital Design.
- The ability to understand, analyze and design various combinational and sequential circuits.

- Ability to identify basic requirements for a design application and propose a cost effective Solution.
- The ability to identify and prevent various hazards and timing problems in a digital design.
- To develop skill to build, and troubleshoot digital circuit

Course Name: Power Electronics
Course Code: 3TBEX 405

Course Objective
To provide the students a deep insight in to the working of different switching devices with respect to their characteristics
To analyze different converters and control with them applications.
To study advanced converters and switching techniques implemented in resent Technology.

Course Outcome
At the end of the course student will have ability to
- Articulate the basics of power electronic devices
- Express the design and control of rectifiers, inverters.
- Design of power electronic converters in power control application
- Ability to express characteristics of SCR, BJT, MOSFET and IGBT
- Ability to express communication methods.
- Ability design AC voltage controller and Cyclo Converter.
- Ability to design Chopper circuit, Inverter circuit.

Course Name: HT Maintenance
Course Code: 3STEX 407A

Course Objective
- The primary objective of the course is to introduce operation principles of Three – Phase motor winding a 2 pole, 3HP, 5HP, three phase Transformer,
- Tap changing Transformers, Maintenance of Circuit Breaker, Commissioning and Recharging of Transformers.

Course Outcome
- After successful completion of course, Students are expected to possess an in-depth understandings
- And Knowledge of the concepts and principles of measurement of Three – Phase motor winding a 2 pole, 3HP, 5HP, three phase Transformer, Tap changing Transformers, Maintenance of Circuit Breaker

Course Name: Electrical House Wiring
Course Code: 3STEX 407B

Course Objective

- The objective of this course is to get knowledge of Joints and Accessories Terminators and joints,
- Wiring Cleat wiring, testing of domestic wiring Polarity test, and Safety Precautions Earthling electrodes and earth wire to Electrical House wiring.

Course Outcome

After successful completion of course-

- Students are expected to possess an in-depth understanding and Knowledge of the theory and applications of Joints and Accessories Terminators and joints,
- Wiring Cleat wiring, testing of domestic wiring Polarity test, and Safety Precautions Earthling electrodes and earth wire.

Course Name: Control System SEMESTER
Course Code: 3TBEX 501

Course Objective

- Identify the basic elements and structures of feedback control systems.
- Apply final value theorem to determine the steady state response of stable control system.
- Use root locus method for design of feedback control systems.
- Construct Bode, Polar and Nyquist plots for rational transfer function.
- Understand the fundamentals of modern control theory

Course Outcome

- Ability to acquire and apply fundamental principles of science and technology
- Analyse continuous systems mathematically through the use of Laplace functions and state equations form.
- Represent any physical system in both transfer functions and state equations form.
- Apply classical design methods to improve the performance of continuous controlled system.

Course Name: Electrical Machine-II
Course Code: 3TBEX 502

Course Objective

- The objective of this course is to provide knowledge about the basic principles, construction and working of synchronous, single and three-phase induction machines.

- The aim of this course is to give the knowledge of the equivalent circuits, parameter determination, and operational constraints.
- To give the knowledge of starting mechanisms, conventional speed control methods, various tests and applications of synchronous and induction machines.

Course Outcome

- To impart the knowledge on fundamental of AC rotating machine
- To impart the knowledge on constructional details, principle of operation of 3 phase Alternator and synchronous motor
- To impart the knowledge on constructional details, principle of operation, performance, Starter, speed control and braking of 3 phase induction motor.
- To impart the knowledge on constructional details, principle of operation, type of 1 phase Induction motor and special machine.

Course Name: Microprocessors and Microcontrollers
Course Code: 3TBEX 503

Course Objective

- The objective of this course is to provide knowledge about the fundamentals of Microprocessors
- To provide their evolution internal architecture and construction.
- This course is also useful to provide the knowledge of various supporting chips provided with the Microprocessor 8085.
- The aim of this course is to give the knowledge of various instructions, basic programming with Microprocessors 8085, data transfer schemes, Instruction format and addressing modes.

Course Outcome

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

- Understand the basic architecture of Microprocessor 8085.
- Understand various instructions and their application in programming.
- Understand memory organization and mapping

Course Name: ANALOG AND DIGITAL COMMUNICATION
Course Code: 3TBEE 504

Course Objective

- The course provides an introduction to analog and digital communication systems.
- This course responds to the needs of the engineering and technological paraphenia.

Course Outcome

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

- Acquire the generalize knowledge of communication system in the present scenario.

- Develop problem solving skills in complex communication networking.

Course Name: Electrical & Electronics Material
Course Code: 3TBEX 505

Course Objective

- To review physics and chemistry in the context of materials science & engineering.
- To describe the different types of bonding in solids, and the physical ramifications of these differences.
- Give an introduction to metals, ceramics, polymers, and electronic materials in the context of a molecular level understanding of bonding.
- Give an introduction to the relation between processing, structure, and physical properties.
- Give the beginning student an appreciation of rEEnt developments in materials science & engineering within the framework of this class

Course Outcome

After successful completion of course, Students are expected to Possess an in-depth understanding and Knowledge

- Given a type of material, be able to qualitatively describe the bonding scheme and its general physical properties, as well as possible applications.
- Given a type of bond, be able to describe its physical origin, as well as strength. Be able to qualitatively derive a material's Young's modulus from a potential energy curve.
- Given the structure of a metal, be able to describe resultant elastic properties in terms of its 1D and 2D defects. 4.Given a simple set of diffraction data, be able to index the peaks and infer the structure.
- Be able to describe a polymer's elastic behaviour above and below the glass transition. Be able to do simple diffusion problems.

Course Name: Skill Elective-III Electrical Load Management
Course Code: 3STEX 507A

Course Objective

- The objective of the course is to make the student familiar with the production of electrical Load management, Different electricity tariffs-flat rate, , monitoring and controlling y in regard to the needs of specific consumer areas in order to be able to appreciate the relative procedures from the technical, economic and social point of view.

Course Outcome

- To understand the relationship between the electrical loads and the respective power production installations on the base of economic and technological criteria, to use the methods and criteria of forming the selling price list of electrical energy.

Course Name: Skill Elective-III - PLC & SCADA Systems and Applications
Course Code: 3STEX 507B

Course Objective

- The objective of this course is to get knowledge of Introduction to SCADA and PLC, SCADA system components, SCADA Architecture,
- SCADA Communication in SCADA Systems and Applications.

Course Outcome

- Student after successful completion of course must possess an understanding of Introduction to SCADA and PLC, SCADA system components, SCADA Architecture,
- SCADA Communication in SCADA Systems and Applications.

Course Name: Power Systems-II
Course Code: 3TBEX 601

Course Objective

- The primary objective of the course is to introduce
- The fault conditions and protective system of power system and how to protect our system to teach students the theory, construction,
- Applications of main types Circuit breakers, Relays for protection of generators, transformers and protection of feeders from over- voltages and other hazards. It emphasis on neutral grounding for overall protection.
- To understand the need of protection of electric equipment and their protection schemes.

Course Outcome

After learning the course, the students should be able to:

- Analyze the performance of Short and Medium transmission line.
- Describe the symmetrical components and its applications.
- Analyze Symmetrical and Unsymmetrical faults in power systems.
- Describe transients in power systems.
- Describe corona effect.

Course Name: Digital Signal Processing
Course Code: 3TBEX 602

Course Objective

- To determine the zero-input and zero-state responses of system described by constant-coefficient difference equations, and determining the complete response of such systems.
- To determine the linear and circular convolutions of discrete-time systems.
- To evaluate the Discrete-Time Fourier Transform.
- To evaluate and plot the frequency (magnitude and phase) of linear-time invariant systems.
- To determine the Discrete-Fourier transform of a sequence.

Course Outcome

- Design digital IIR filters by designing prototypical analog
- filters and then applying analog to digital conversion techniques such as the bilinear transformation.
- Design digital FIR filters using the window method.
- Use a computer to design digital filters via the frequency sampling approach and the Remez exchange Algorithm.
- Implement digital filters in a variety of forms: direct form I and II, parallel, and cascade, and then analyze their sensitivity to finite precision effects such as input quantization, coefficient quantization, and multiplication round-off.
- Analyze signals using the discrete Fourier transform (DFT).
- Understand circular convolution, its relationship to linear convolution.

Course Name: Electronics Devices & Circuits
Course Code: 3TBEX 603

Course Objective

The objective of this course is to get an overview of –

- To understand the operation of the various bias circuits of MOSFET and Analyze and de MOSFET bias circuits.
- To understand the operation and design of multistage amplifier for a given specification.
- To understand the operation and design of transformer coupled Various types of power amplifier circuits.
- To understand the effects of negative feedback on amplifier Circuits.
- To analyze the different RC and LC oscillator circuits to determine the frequency of oscillation

Course Outcome

After successful completion of the course student will be able to

- Design and analyze the basic operations of MOSFET.
- Know about the multistage amplifier using BJT and FET in various configuration to determine frequency response and concept of voltage gain.

- Know about different power amplifier circuits, their design and use in electronics and communication circuits.
- Know the concept of feedback amplifier and their characteristics.
- Design the different oscillator circuits for various frequencies.

Course Name: NON CONVENCTIONAL ENERGY SOURCES
Course Code: 3TBEE 604

Course Objective

- This course is an extension of Electrical Power systems-I course. It deals with basic theory of transmission line modelling and their performance analysis.
- To understand one line diagram of a power system.
- To provide knowledge of faults occurs in a power system and their calculations.
- A detailed study of Power System stability, Load flow studies and economic power dispatch is part of the curriculum for students.

COURSE OUTCOME

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

- Address smart energy and green infrastructure
- Build models that simulate sustainable and renewable green technology systems
- Understand the history, global, environmental and economical impacts of green technology
- Address non renewable energy challenges

Course Name: Facts Devices
Course Code: 3TBEX 605

Course Objective

The objective of this course is to get knowledge of-

- Basic Issues Involved in Bulk Power Transmission, Static Var Compensator (Svc) And Purpose,
- Thyristor and Gto Thyristor Controlled Series Capacitors (Tcsc and Gcsc),
- Voltage Source Converter Based Facts Controllers and Controllers and Their Co-Ordination in Facts. Transforms,

Course Outcome

- Express different types of FACTS controllers and their role in improving power system performance.
- Understand the operating principles of various FACTS devices.
- Relate the performance and applications of VSI & CSI.
- Know the importance of compensation methods in power system network.
- Extend the knowledge of active & reactive power and voltage control with FACTS devices.

- Analyze role of SVC&STATCOM in improving the power system dynamics.
- Analyze the use of control schemes of TCSC, TSSC, GSC in improving the power quality

Course Name: Electrical Machine Maintenance
Course Code: 3STEX 607A

Course Objective
The primary objective of the course is to introduce operation principles of –

- Three – Phase motor winding a 2 pole, 3HP, 5HP, three phase Transformer, Tap changing Transformers,
- Maintenance of Circuit Breaker, Commissioning and Recharging of Transformers.

Course Outcome
After successful completion of course, Comprehend the basics of Electrical

- Engineering and practical implementation of Electrical fundamentals.
- Develop numerical solutions to fundamental electrical engineering
- Make use of basic principles involved in electrical engineering concepts.
- Examine the methods to solve AC circuits.
- Analyze various circuits using network theorems.
- Know the basics of electric machines used in industries.
- Summarize the different applications of commonly used electric machinery.

Course Name: Mobile Repairing
Course Code: 3STEX 607B

Course Objective

- The Course has been designed to provide knowledge on Mobile Repair & Maintenance.

Course Outcome
At the end of the training, the trainee will be able to

- Appreciate the importance of embarking on self-employment and has developed the confidence Identify business opportunities in chosen sector / sub-sector and plan and market and sell
- Start a small business enterprise by liaising with different stake holders
- Effectively manage small business enterprise
- Establish and run a Mobile Handset Repairing unit

Course Name: Power Quality
Course Code: 3TBEX 701

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

- Understand the various power quality phenomenon, their Origin and monitoring and mitigation methods.
- Understand the effects of various power quality phenomenons in various equipment's.

Course Outcome

- Graduates will demonstrate knowledge of mathematics, science and engineering.
- A knowledge contemporary issues
- Graduates will show the ability to participate and try to succeed in competitive examinations.
- Identify the harmonic sources and the effects of harmonic distortion
- Analyze voltage sag problems and suggest preventive techniques

Course Name: Power System Protection
Course Code: 3TBEX 702

Course Objective

- To understand the principle of protective schemes and various faults in the Power System Scenario.
- To study the various types of the circuit breakers, the arc quenching phenomena and the protection against over voltages.
- Teach students the protection systems used for electric machines, transformers, bus bars, overhead and underground feeders.

Course Outcomes

At the end of the course, students:

- Design the relevant protection systems for the main elements of a power system
- Analyze with over current, differential, and ratio protection devices and their application in a coordinated protection scheme.
- Do the stability problems and clearing of faults to mitigate these problems

Course Name: Electrical Drives
Course Code: 3TBEX 703

Course Objective

The objective of this course is to get knowledge of –

- To provide students with a strong back ground in different types of electrical drives.
- To train the students to have the solid foundation in mathematical and technical concepts required to engineering problems.
- To prepare the students to excel in post graduate programs or to succeed in industry.

Course Outcomes

Student after successful completion of course –

- To apply solid foundation in controlling method of different electrical appliances.

- Interpret power electronics applications in control of speed, torque and other components.
- Develop control Dc motor by Single phase converters.
- Construct control DC Motor by Three Phase Converters
- Able to solve four quadrant operation of DC drives.
- Able to build control DC motors by Choppers
- Able to model the control of Induction motor through system voltage.

Course Name: Electrical MACHINE III
Course Code: 3TBEE 704

Course Objective

- To study the importance of transformation of variables in three phase AC machines.
- To study the construction and operation of single phase induction motor.
- To study the construction and operation of ac commutator motors.

Course Outcome

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

- Transform three phase variables to two axis variables.
- Analyze the performance of single phase induction motor with the help of its equivalent circuit
- Understand the construction and principles of operation of different types of special motors.

Course Name: Elective-I Computer Network
Course Code: 3TBEE 7101A

Course Objective

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

- Describe the general principles of data communication.
- Describe how computer networks are organized with the concept of layered approach.
- Describe how signals are used to transfer data between nodes.
- Implement a simple LAN with hubs, bridges and switches.
- Describe how packets in the Internet are delivered.

Course Outcome

- To master the terminology and concepts of the OSI reference model and the TCP-IP reference model.
- To master the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks,
- To be familiar with wireless networking concepts,
- To be familiar with contemporary issues in networking technologies,

- To be familiar with network tools and network programming

Course Name: Elective-I Advanced Communication Systems
Course Code: 3TBEX 7102B

Course Objective

- To introduce students to various modulation and demodulation techniques of analogy communication.
- To analyze different parameters of analogy communication techniques.
- It also focuses on pulse modulation and demodulation.

Course Outcome

Student after successful completion of course-

- Use of different modulation and demodulation techniques used in analog communication
- Identify and solve basic communication problems
- Analyze transmitter and rEEiver circuits
- Compare and contrast design issues, advantages, disadvantages and limitations of analog communication systems

SUBJECT: Power Apparatus System
Course Code: 3TBEX 7103C

Course Objective

- Impart theoretical knowledge of design of electrical transmission line, different types of substation, bus-bar arrangement.
- Introduce the concept of Different types of earthling system.
- To provide the theoretical insights overvoltage production and protection from these.
- Deliberate & discuss the concept of reliability of transmission line.

Course Outcome

- To facilitate students understand the practical application of different types of apparatus used in power stations.
- Graduates opting for C.S.E.B., NHPC, NTPC, and other industry as a career are likely to come across substations and shall be able to deliver more efficiently with their prior knowledge & by co-relating the concepts of substation, bus-bar scheme, earthling, protection introduced to them during engineering
- Students will gain the knowledge of different substation , mechanism of lightning, reliability of transmission line. This shall also impart them the understanding & importance of conducting these tests in real-life situations.

- Apart from gaining the knowledge of above topics, students would develop analytical ability to understand the system dynamics and become capable of applying analytical approach to engineering challenges ahead.

Course Name: Industrial training/internship/IPR
Course Code: 3TBEE 707

Course Objective
Entrepreneurship education is a kind of education that aims at cultivating the comprehensive qualities of entrepreneurship, the value of innovatory spirit and entrepreneurship abilities. The objectives of entrepreneurship education in university are in the following four aspects.

- Cultivating the spirit of entrepreneurship
- Leadership
- Teamwork
- Bearing a part of quality-oriented education Managing relationships

Course Outcome

- Entrepreneurial behaviour, attitudes and skill development
- Creating empathy with the entrepreneurial life world
- Key entrepreneurial values
- Motivation and entrepreneurship career
- Understanding of process of business entry and tasks
- Generic entrepreneurship competences
- Key minimum business how-to

Course Name: Computer Application to Power System
Course Code: 3TBEX 801

Course Objective

- The objective of this course is to get knowledge of Models of power system components,
- Control of load bus voltage using reactive power control variable, Sensitivity analysis,
- Power system security, and Voltage stability in Computer Applications to Power Systems.

Course Outcome
On completion of the course, the student will be able to:

- Analyze a control problem and suggest appropriate system architecture.
- Analyze the need for information exchange and suggest appropriate information models and protocols.
- Develop simple software for a controller.
- Analyze the information needed for a given automation and control function for

power systems.

Course Name: EHV AC & dc
Course Code: 3TBEE-802

Course Objective

- The objective of this course is to get knowledge of the extra high voltages, AC & DC transmission line. Constitution of EHV a.c. and d.c. links, Kind of d.c. links, Limitations and Advantages of a.c. and d.c. transmission, Principal application of a.c. and d.c. transmission, Trends in EHV a.c. and transmission, Power handling capacity, different types of FACTs ,EHV AC DC controls, Harmonics, Travelling waves on transmission systems. etc.

Course Outcome

Student after successful completion of course –

- Understand the importance of estimating the line parameters of EHV AC transmission lines.
- Does the calculation of electrostatic field of AC lines and able to understand their effect on voltage gradients?
- Identify the impact of over voltages on transmission lines.
- Get the knowledge of energized & un-energized lines and able to understand the requirement of VAR compensation.
- Emphasize on the effect of corona with respect to its characteristics, properties and losses.
- Understand the information of radio noise generation in transmission lines.
- Get the awareness of the design of EHV lines with respect to steady & transient limits

Course Name: Principle of Management & Managerial Economics
Course Code: 3TBEC 803A

Course Objective

- To integrate the basic concepts of economics with the tools of mathematics and statistics in order to analyze and make optimal business decisions.

Course Outcome

After learning the course the students should be able to:

- Understand the roles of managers in firms
- Understand the internal and external decisions to be made by Managers.
- Analyze the demand and supply conditions and assess the position of a company
- Design competition strategies, including costing, pricing, product differentiation, and

market environment according to the natures Of Products and the structures of the markets.

- Analyze real-world business problems with a systematic Theoretical Framework.
- Make optimal business decisions by integrating the concepts of Economics, Mathematics and statistics.

Course Name: Electrical Installation Maintenance & TRAINING
Course Code: 3TBEX 803B

Course Objective

- To learn the industrial standards in testing and commissioning of electrical equipments.
- To understand the common problems in installing and commissioning of electrical equipments.
- To learn about safety measures and maintenance procedures for various electrical equipments.

Course Outcomes

- After studying the subject students will be able to understand the common problems arising while commissioning of electric Equipment's.
- They will also be able to learn about the routine tests to be performed and maintenance measures for various equipment's

Course Name: High Voltage
Course Code: 3TBEX 8201A

Course Objective

- The objective of this course is to get knowledge of Introduction to HV technology,
- Breakdown phenomena, Generation of HV AC DC and Impulse Voltage and current,
- Measurement of high voltages and High voltage tests on electrical apparatus in High Voltage Engineering.

Course Outcome

Student after successful completion of course:

- Understand the importance of Transmission power through HVDC.
- Analyse the HVDC Converter operation.
- Discuss firing angle control of 6 pulse,12 pulse circuits.
- Discuss harmonics in
- Identify the importance of filters for HVDC system.
- Analyse the impact of AC system faults on DC system operation.
- Identify the need for proper grounding for HVDC operation.

Course Name: Computer-Aided Electrical Machine Design
Course Code: 3TBEX 8202B

Course Objective

The objective of this course is to get knowledge of

- All electrical machines design for computer based analysis.
- Including Design problem, Design problem,
- Optimal design of power transformer, optimal design of 3-phase induction motor

Course Outcome

- Students will be able to understand complete structure of Power System and working of steam power plant.
- Students will learn the total working principle and various procedures involved in Gas Turbine and Nuclear Power plants.
- Students will get proficient knowledge about Hydroelectric stations. Students will also be able to learn coordination of different power plants to increase the efficiency of plants.
- Students will get acquainted with all technical knowledge of Electrical Substations
- Student will be able to design economical feeders for electrical distribution systems.
- Students will get acquainted with the installation of Electrical wiring in domestic, commercial and industrial areas.

MASTER OF TECHNOLOGY
(POWER SYSTEM ENGINEERING)
PROGRAMME CODE –05PGR006

PROGRAMME EDUCATIONAL OBJECTIVE (PEO'S)

The objectives of the undergraduate program are to provide students an excellent academic experience and to equip graduates with the ability to solve a broad range of problems in our rapidly changing technological, economic and social environment. To this end, the Faculty is committed to educate graduates who have:

- **PEO1**. A strong foundation and knowledge in engineering fundamentals with a capacity to know how, when and where to use the knowledge in specific ways;
- **PEO2**. An ability to identify, formulate, analyze and solve engineering problems and a capacity to integrate material from more than one subject and to apply appropriate engineering principles to arrive at correct and effective solutions;
- **PEO3.** A comprehensive knowledge in the fundamentals of engineering practice, including an ability to use analytical techniques, experimental and laboratory skills and modern engineering simulation and design software tools;
- **PEO4.** A broad knowledge of the principles and skills in engineering design, development and management in global, cultural and business contexts;
- **PEO5.** A multidisciplinary view with an ability to work effectively as members of teams, composed of individuals from different disciplines and different professional cultures;
- **PEO6.** strong oral and written communication skills with a capacity to produce effective technical documents and to use current communication techniques and tools;
- **PEO7.** A culture of life-long learning with a capacity to engage in continuous self-improvement, personal enrichment and professional development; and
- **PEO8.** A broad sense of social, ethical and professional responsibility with a capacity to demonstrate an understanding and appreciation of the human dimension of technology and its impact on mankind.

PROGRAM OUTCOMES(POs)

- **PO1**. Prepare students for careers in industry, academia, and government organizations by fostering in them the technical capabilities pertinent to power system and allied engineering and interpersonal skills necessary to succeeding in their fields, as well as the foundation for lifelong learning.
- **PO2**. Lead the way in power system engineering based research and other scholarly activities.
- **PO3.**Provide technical knowledge, leadership, guidance, and support to industry, the government establishments, and the general public

PROGRAM SPECIFIC OUTCOMES(PSOs):

- **PSO1.Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PSO2.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
- **PSO3.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.
- **PSO4.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.
- **PSO5.Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PSO6.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.
- **PSO7.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.
- **PSO8.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
- **PSO9.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.
- **PSO10.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.

Course Name: Advance Mathematics
Course Code: 6TMTE-101

Course Objective

- The primary objective of the course is to introduce operation principles of Advance Mathematics related to Solution.

- The Partial Differential Equation and to have an adequate knowledge in Mathematics techniques for FT, DFT, WFT Stochastic process, Introduction and definition of reliability.

Course Outcome

After successful completion of course, Students are expected to –

- Demonstrate familiarity with engineering mathematical techniques appropriate in banks and other financial institutions.
- Demonstrate an ability to select and apply numerical methods appropriate for the solution of financial problems.
- Construct rigorous mathematical proofs of basic results in real analysis.
- The study of Differential focuses on the existence and uniqueness of solutions and also emphasizes the rigorous justification of methods for approximating solutions in pure and applied mathematics.

Course Name: Power system dynamics analysis & control
Course Code: 6TMPS-102

Course Objective

- The primary objective of the course is to introduce operation principles of Power system dynamics analysis &control
- The Power System Stability Problem and to have an adequate knowledge in Review of Classical Method.
- The different techniques for Modelling of Synchronous Machine Transmission Line, Svc and Loads.

Course Outcome

After successful completion of course, Students are expected to possess an in-depth understanding and Knowledge of

- Comprehend concepts in the dynamic phenomena and stability of power systems.
- Demonstrate understanding the theory and practice of modelling power system components, such as synchronous machines, excitation systems and governors, power system stabilizers.
- Analyze dynamic and oscillatory behaviour of power systems and to alleviate the same.
- Interpret results of system stability studies.

Course Name: Advance Power System Protection
Course Code: 6TMPS-103

Course Objective

- The Primary Objective of The Course is To Introduce Operation Principles Of Protective Relays,

- The Static Relays, Comparators Related To Generator And Transformer Protection, Modern Trends In Power System Protection.

Course Outcome

After successful completion of course, Students are expected to-

- Analyze the tripping characteristics of various relays and its applications. Design inductors and transformers for power electronic converters
- To operate various static relays, set their parameters and also to confirm its operations.
- To operate various Numeric relays, set their parameters and also to confirm its operations.

Course Name: Power Electronics

Course Code: 6TMPS-104

Course Objective

- The primary objective of the course is to introduce operation principles of Sensitivity analysis &Voltage stability.
- The flexible ac transmission system Thyristor controlled series capacitor (TCSC) Advantages of the TCSC.

Course Outcome

After successful completion of course, the students will be able to

- Classify and explain the functioning of FACTS devices.
- Model FACTS devices to control the power flow and optimize transmission capacity.
- Identify the need for HVDC systems.
- Identify converters for HVDC application and discuss their control characteristics.
- Compare the HVAC and HVDC systems.

Course Name: Renewable Energy System

Course Code: 6TMPS-105

Course Objective

- The objective of the lesson is to familiarize the student with the utilization methods of the renewable energy resources.
- Which are existing in the natural world, so that the student will able to assess the related procedures?
- The terms of technical, financial and social, in the context of training as an Electrical Engineer of highest Technological Education.

Course Outcome

After successful completion of course, the students will be able to .

- In each of the two design modules, theoretical concepts on clean and renewable energy sources are first discussed.
- This is then followed by a first pass overall system-level design to assess the performance of energy production.
- The students shall then have hands-on design and analysis opportunities on critical sub- systems, for example, the induction generator for a wind energy system,

Course Name: Elective -I Audit Course –I English for Research paper writing
Course Code: 6TMST 106

Course Objective

Students will be able to:

- Understand that how to improve your writing skills and level of readability
- Learn about what to write in each section
- Understand the skills needed when writing a Title Ensure the good quality of paper at very first-time submission

Course Outcomes:

Students will be able to understand:

- Contribute as an active participant in the campus community.
- Summarize and respond to oral presentations, academic lectures, and written texts of a variety of rhetorical patterns.
- Complete research using primary and secondary sources. Share results through documented research papers and presentations.

Course Name: Audit Course –I Pedagogy studies
Course Code: 6TMST 106

Course Objective

Students will be able to:

- Review existing evidence on the review topic to inform programme design and policy making undertaken by the DID, other agencies and researchers.
- Identify critical evidence gaps to guide the development.

Course Outcomes

Students will be able to understand:

- What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
- What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?

- How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

Course Name: Audit Course –I Stress Management by Yoga
Course Code: 6TMST 106

Course Objective

- To achieve overall health of body and mind
- To overcome stress

Course Outcomes

Students will be able to:

- Develop healthy mind in a healthy body thus improving social health also
- Improve efficiency

Course Name: Reactive Power Control & Facts
Course Code: 6TMPS-201

Course Objective

- The primary objective of the course is to introduce operation principles of Reactive Power Control & Facts terminology.
- To Description and definition of Introduction to FACTS, Oscillation Stability Analysis and Control and to have an adequate knowledge.
- The transient Stability control with FACTS techniques for Control of FACTS devices for transient stability improvement.
- Transient Stability control with FACTS.

Course Outcome

After successful completion of course, Students are expected to

- Classify and explain the functioning of FACTS devices.
- Model FACTS devices to control the power flow and optimize transmission capacity.
- Identify the need for HVDC systems.
- Identify converters for HVDC application and discuss their control characteristics.
- Compare the HVAC and HVDC systems.

Course Name: Energy Conservation and Management
Course Code: 6TMPS-202

Course Objective

- The primary objective of the course is to introduce operation principles of Energy Conservation terminology related to Management.
- To the adequate knowledge in General energy problem techniques for Energy efficient electric drives, thermodynamics of Energy conservation.

Course Outcome

After successful completion of course, Students are expected to possess an in-depth understanding and Knowledge of -

- The concepts and principles of Becoming aware of the energy crisis, and of environmental and sustainability concerns associated with the energy management.
- Appreciating the importance of energy conservation and having the knowledge of energy conservation strategies and methods.
- Understanding the Energy Management Systems and their essential elements.

Course Name: Power Quality and Conditioning

Course Code: 6TMPS-203

Course Objective

- The primary objective of the course is to introduce operation principles of Power Quality terminology related to Conditioning.
- Understanding Power quality and to have an adequate knowledge in Radio interference.
- The techniques for Radio interference, supply standards Active wave shaping of input line current.

Course Outcome

After successful completion of course, students should be able to.-

- Understand various power line disturbances and how the quality of the power gets deteriorated.
- Identify the sources of each type of power line.
- Find out the remedies for each type of disturbance.
- Identify and use various equipment for measuring these disturbances.

Course Name: Restructured Power Systems

Course Code: 6TMPS-204

Course Objective

- The primary objective of the course is to introduce operation principles of Restructured Power Systems
- The terminology related to Fundamentals of restructured system and to have an adequate knowledge in Social welfare maximization techniques for Congestion Management.
- Distributed Generation in restructured markets.

Course Outcome

After completion of the course students will acquire the skill to-

- Describe various types of regulations in power systems.
- Identify the need of regulation and deregulation.
- Define and describe the Technical and Non-technical issues in Deregulated Power Industry.
- Identify and give examples of existing electricity markets.
- Classify different market mechanisms and to summarize the role of various entities in the market.
- Define and describe various pricing mechanisms in the Generation, Transmission and Distribution sector.

Course Name: Power Systems Transients

Course Code: 6TMPS-205

Course Objective

- The primary objective of the course is to introduce operation principles of Power System Transients terminology.
- The terminology related to Origin and nature of transients and surges and to have an adequate knowledge.
- The Current chopping in circuit breakers techniques for Lightning phenomena.

Course Outcome

After successful completion of this course, the students will be able to-

- Define, classify, interpret and model the transient phenomena in power system.
- Simulate the transients using EMTP/ATP software.
- Analyze transient phenomena and develop the strategies to mitigate associated problems.
- Evaluate the transient process due to lightning.

Course Name: Elective -II Audit Course –II

Course Code: 6TMPS-206

Course Objective

Students will be able to:

- Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
- critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.

- Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.

Course Outcomes

- To get a working knowledge in illustrious Sanskrit, the scientific language in the world
- Learning of Sanskrit to improve brain functioning
- Learning of Sanskrit to develop the logic in mathematics, science & other subjects
- enhancing the memory power
- The engineering scholars equipped with Sanskrit will be able to explore the huge knowledge from ancient literature

Course Name: Audit Course –II
Course Code: 6TMPS-206

Course Objective

- To learn to achieve the highest goal happily
- To become a person with stable mind, pleasing personality and determination
- To awaken wisdom in students

Course Outcomes

Students will be able to

- Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality andachievE the highest goal in life
- The person who has studied Geeta will lead the nation and mankind to peace and prosperity
- Study of Neetishatakam will help in developing versatile personality of students

Course Name: Audit Course –II
Course Code: 6TMPS-206

Course Objective

Students will be able to

- Understand value of education and self- development
- Imbibe good values in students
- Let the should know about the importance of character

Course outcomes:

Students will be able to

- Knowledge of self-development
- Learn the importance of Human values
- Developing the overall personality

Course Name: Elective –III Power System Instrumentation
Course Code: 6TMPS-301A

Course Objective

- The primary objective of the course is to introduce operation principles of Power System.
- The instrumentation terminology related to Introduction to Transducers, sensors and to have an adequate knowledge in measurement.
- The measurement techniques for Gas analyzers, power plants Signal conditioning of inputs.

Course Outcome

After successful completion of course, Students are expected to possess an in-depth understanding and Knowledge of

- The concepts and principles of Power System Instrumentation terminology related to Introduction to Transducers.
- The sensors and to have an adequate knowledge in measurement techniques for Gas analyzers, power plants Signal conditioning of inputs.

Course Name: Elective -III
Course Code: 6TMPS-301B

Course Objective

- To explore objectives of national and regional planning of electricity
- To understand criteria of generation planning
- To impart learning about optimal power system expansion and its planning.
- To learn about un integrated and bundled power systems.
- To acquire skills in planning and building reliable power system.

Course Outcome

- The scope of employability in power utilities will increase.
- The management skills required in the field of power system engineering is enhanced

Course Name: Elective -III Research Methodology and IPR
Course Code: 6TMPS-301C

Course Objectives

- The course has been developed with orientation towards research related activities and recognizing the ensuing knowledge as property.
- It will create consciousness for Intellectual Property Rights and its constituents.
- Learners will be able to perform documentation and administrative procedures relating to IPR in India as well as abroad.

Course Outcomes

- At the end of the course, students will demonstrate their ability to:. Understanding and formulation of research problem.
- Analyze research related information.
- Understand plagiarism and follow research ethics
- Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.

Course Name: Elective -IV Special Machines
Course Code: 6TMPS-302 A

Course Objective

- The primary objective of the course is to introduce operation principles of Special Machines terminology related to Square wave permanent magnet.
- The brushless dc motor and to have an adequate knowledge in Sine wave permanent magnet brushless dc motor techniques for Switched reluctance motor, Linear Induction Motors, Stepper motor.

Course Outcome

After successful completion of course, students will be able to,

- Analyze electromechanical devices and machines
- Use reference frame theory to study and analyze the behavior of induction and synchronous machines.
- Calculate the machine inductances for use in machine analysis
- Model the electrical machine from the terminal junction with transmission systems

Course Name: Elective -IV Advanced Electrical Drives
Course Code: 6TMPS-302 B

Course Objective

- The primary objective of the course is to introduce operation principles of Electrical drives.
- The Electrical drives play an important part as electromechanical energy converters in transportation, materials handling and most production processes.
- The course tries to give unified treatment of complete electrical drive systems, including the mechanical parts, electrical machines, and power converters and control.

Course Outcome

After successful completion of course, Students are expected to-

- Select a drive for a particular application based on power rating
- Select a drive based on mechanical characteristics for a particular drive application
- Operate and maintain solid state drives for speed control of DC machines.

- Operate and maintain solid state drives for speed control 3 phase induction motor
- Operate and maintain solid state drives for speed control of 3 phase Synchronous motor.
- Operate and maintain solid state drives for speed control of various special electrical machines.

Course Name: Elective –IV
Course Code: 6TMPS-302 C

Course Objective

- Learning about power distribution system
- Learning of SCADA System
- Understanding Distribution Load Modelling

Course Outcome

After successful completion of course, Students are expected to-

- Understand power industry practices for design, operation, and planning.
- Use mathematical tools that are essential for system analysis and design.
- Use commercial software packages in designing solutions to problems.
- Have group participation in design and problem solving.
- Analyse the performance of synchronous machine.
- Apply knowledge of load flows for planning and future expansion of existing as well as non-existing power systems.

DOCTOR OF PHILOSOPHY (Ph. D – EE)
PROGRAMME CODE –PH.D001

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

The structure of the Ph. D. (EE) course is designed to produce post graduates with rigorous research and analytical skills, who are exceptionally well-equipped to go onto post doctoral research, or employment in industry and the public service. The Ph. D. (EE) course provides:

- **PEO1.** Skills to enable the student to critically examine the background literature relevant to their specific research area.
- **PEO2**. An environment that encourages the students originality and creativity in their research.
- **PEO3.** A period of sustained in-depth study of a specific topic.
- **PEO4.** Publishing the results of their research in high-profile scientific journals, through constructive feedback of written work and oral presentations.

PROGRAM OUTCOMES (POs)

- **PO1.** This programme has a thorough knowledge of the literature and a comprehensive understanding of scientific methods and techniques applicable to their own research.
- **PO2.** This programme develops the ability to critically evaluate current research and research techniques and methodologies.
- **PO3.** This programme opens the opportunity for the post graduation students in respective stream to start research work in the interesting area which will be helpful for society.
- **PO4.** This programme creates self-direction and originality in tackling and solving problems.

PROGRAMME-SPECIFIC OUTCOMES (PSOs)

- **PSO1.** This programme is able to demonstrate originality in the application of knowledge, together with a practical understanding of how research and enquiry are used to create and interpret knowledge in their field.
- **PSO2**. This programme is an achievement and a significant for students piece of research.
- **PSO3**. This programme is able to act autonomously in the planning and implementation of research.
- **PSO4.** This programme has gained oral presentation and scientific writing skills.

Course Name: Research Methodology
Course Code: 5010112801

Course Objectives

- The objective of imparting quality and creative research with an in-depth understanding and integrated knowledge of advanced applicable theory in the field of Computer Science and Engineering.

Course outcomes

- To enable for analyzing and identifying problems and provide the appropriate solution to solve the specific problem. It also provides the educated candidates for employment which require in the academic and non academic file.

Course Name: Electrical Engineering
Course Code: 5010152201

Course Objectives

- To study transient stability.

- To understand the various power quality phenomenon.
- To understand different power semiconductor devices used as switches
- To understand and analyze control systems and develop their performance specification.
- To study non conventional energy sources and their uses.

Course outcomes

- Knowledge of modelling and steady sate and transient analysis of power system.
- To differentiate and understand the significance of various commutation circuits.
- To test the controllability and observability of a system.
- To understand different non conventional sources and techniques.

Course Name: ANN & Fuzzy Techniques
Course Code: 5010152202

Course Objectives

- To provide understand on the structure and functioning of neural network learning rules.
- To train students about the designing of single layer perception layer and single layer feedback networks.
- To train students on the basic concepts of Fuzzy sets

Course outcomes

- Carry out development, implementation of neural network learning rules.
- Utilize the techniques of single layer perception classifier and feedback networks.
- Utilize the techniques of fuzzy sets and fuzzy rules.

Course Name: High Voltage Engineering
Course Code: 5010152203

Course Objectives

- The course is an advanced course in high voltage technology and electrical insulating materials. It deals with basic gaseous, liquid and solid dielectric breakdown theories. It also contains important experimental methods of high voltage generation

Course outcomes

- Electric drive systems for different mode of operations.
- Operation of tractions.
- Speed control of DC basis of heating and cooling and AC machines using Power Electronics.
- Design of ratings on the

Course Name: Advanced Engineering Mathematics
Course Code: 5010152204

Course Objectives

- Introduce students to ordinary differential equations and the methods for solving these equations.
- Use differential equations as models for real world phenomena.
- Integrate the knowledge accumulated in the calculus sequence to solve applied problems.
- Introduce the fundamentals of Linear Algebra and Complex Analysis

Course outcomes

- Understand vector spaces, basis, linear transformations and the process of obtaining matrix of linear transformations arising in magnification and rotation of images.
- Apply the techniques of QR and singular value decomposition for data compression, least square approximation in solving inconsistent linear systems.
- Utilize the concepts of functionals and their variations in the applications of communication systems, decision theory, synthesis and optimization of digital circuits.
- Learn the idea of random variables (discrete/continuous) and probability distributions in analyzing the probability models arising in control systems and system communications.
- Apply the idea of joint probability distributions and the role of parameter dependent random variables in random process

Course Name: Restructuring Power system
Course Code: 5010152205

Course Objectives

- This course is an extension of Electrical Power systems-I course. It deals with basic theory of transmission line modelling and their performance analysis.
- To understand one line diagram of a power system.
- To provide knowledge of faults occurs in a power system and their calculations.
- A detailed study of Power System stability, Load flow studies and economic power dispatch is part of the curriculum for students

Course outcomes

- Design the relevant protection systems for the main elements of a power system
- Analyze with over current, differential, and ratio protection devices and their application in a coordinated protection scheme.
- Do the stability problems and clearing of faults to mitigate these problems

Course Name: Power Electronics in wind & Solar Power Converters

Course Code: 5010152206

Course Objectives

- Various renewable energy resources available at a location and assessments of its potential, using tools and techniques.
- Solar energy radiation, its interactions, measurement and estimation.
- Site selection for wind turbines, wind systems, measurements and instruments.
- The course will provide knowledge of different solar modules and their interfacing with grid-systems. Students will learn to integrate solar cells to the real time world by implementing various Solar PV systems

Course outcomes

- After completing syllabus student will be able to use the tools and techniques used to assess the various renewable energy resources and its potential at any location across the globe, so that a student is able analyze a case quantitatively at the end of the term.

Course Name: Research And Publication Ethics
Course Code: 5010112802

Course Objective

- The objective of the course is to enable M. Phil/Ph.D scholar to understand about the publication ethics and publication misconduct and to create the awareness.

Course Outcome

- After learning this subject scholars would understand the concepts and process of research and aware about the publication ethics and publication misconduct.

DIPLOMA IN MECHANICAL ENGINEERING
PROGRAMME CODE: 05DIP002

PROGRAMME OBJECTIVES (POs)

- **PO1:** Practice engineering in a broad range of industrial, societal and real world applications.
- **PO2:** Pursue advanced education, research and development, and other creative and innovative efforts in science, engineering, and technology, as well as other professional careers.
- **PO3:** Conduct themselves in a responsible, professional, and ethical manner.
- **PO4:** Participate as leaders in their fields of expertise and in activities that support service and economic development throughout the world.

PROGRAMME SPECIFIC OUTCOMES (PSOs

- **PSO1.**Apply their knowledge in the domain of Engineering Mechanics, Thermal and Fluid Sciences to solve engineering problems utilizing advanced technology.
- **PSO2.**Ability to implement the learned principles of Mechanical Engineering to analyze, evaluate and create more advanced Mechanical Systems or Processes.
- **PSO3.** Develop and implement new ideas on product design and development with the help of Modern CAD/CAM tools, while ensuring best manufacturing practice.

Course Name: Mathematics-I
Course Code: 2TDDE101

Course objective

- To develop the basic Mathematical skills of engineering students that are imperative for effective understanding of engineering subjects.
- To provide detailed of matrices which is applied for solving system of linear equations and useful in various fields of technology.
- To provide an overview of partial derivatives and its applications which is used for solving the optimization problems and concept?
- This course enables the students to learn the concept of imaginary numbers and gives awareness about algebra of complex numbers which helps in understanding of engineering subjects like electrical circuits, Electromagnetic wave theory, and complex analysis etc.

Course Outcomes

- At the end of this course, students will be able to
- Apply the knowledge of matrices to solve the problems.
- Know and to understand various types of numerical methods.
- Ability to interpret the mathematical results in physical or practical terms for complex numbers.
- Inculcate the Habit of Mathematical Thinking through Indeterminate forms and Taylor series expansion.

Course Name: Applied Mechanics
Course Code: 2TDDE102

Course Objectives

- Ability to apply knowledge of mathematics, science, and engineering.
- Solve for the resultants of any force systems.
- Determine equivalent force systems.
- Determine the internal forces in plane frames, simple span trusses and beams.
- Solve the mechanics problems associated with friction forces.
- Obtain the first moment and second moment of an area.

Course Outcomes

- Through this syllabus the diploma student will learn the basic concepts of counting principle through permutation and combination.

- Expansion of a binomial function.
- Breaking up a complex fraction into simpler partial fractions, trigonometric ratio and concept of matrix.

Course Name: Physics
Course Code: 2TDDE103

Course Objectives

- The course aims at making students to understand the basic concepts of Principles of Physics in a broader sense with a view to lay foundation for the various engineering courses.
- Students will be able to demonstrate competency and understanding of the concepts found in Mechanics, Harmonic Oscillations, Waves in one dimension, wave Optics, Lasers, Fiber Optics and a broad base of knowledge in physics.
- The main purpose of this course is to equip engineering undergraduates with an understanding of the scientific method, so that they may use the training beneficially in their higher pursuits.
- Today the need is to stress principles rather than specific procedures, to select areas of contemporary interest rather than of past interest, and to condition the student to the atmosphere of change he will encounter during his career.

Course Outcomes

- The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competencies *Select proper measuring instrument on the basis of range, least count & precision required for measurement.
- Analyze properties of material & their use for the selection of material mostly applicable for engineering users.
- Identify good & bad conductors of heat and proper temperature scale for temperature measurement Identify.
- Analyze, discriminate and interpret logical sequence of field problems with the study of physics.
- Analyze variation of sound intensity with respect to distance and follow the principles used in the physical properties, its measurement and selections.

Course Name: Environmental Engineering & Safety
Subject Code: 2TDDE104

Course Objectives

- To improve the quality of life of the local community through management and conservation of natural resources.

- To ensure that the natural environment is used wisely as well as judiciously. The natural resources are continuously available for the benefit and enjoyment of future generations.
- To decrease vulnerability and improve adaptation capacity among poor local communities associated with Climate Change.

Course Outcomes

- After successful completion of this course students will able to
- Enhance the use of recycled material for construction work and optimize the use of conventional energy sources.
- Take care of issues related to Conservation & Hazard Management while working as chemical engineer.
- Assess the effects of pollution on resources.
- Justify need of renewable energy for sustainable development.
- Identify concept of waste management and methods of recycling.
- Prepare list of use of do's and don'ts applicable during disasters.

Course Name: Communication Skill-I
Course Code: 2TDDE105

Course Objectives

- The main aim of communicating is to pass information so that other people may know about what you are talking off. This can be through facts or even feelings.
- To apply knowledge of human communication and language processes as they occur across various contexts.
- To understand and evaluate key theoretical approaches used in the interdisciplinary field of communication.

Course Outcomes

- Through this syllabus the diploma students will learn the basic concept of English. Student should gain the ability to read understand, analyze, intercept and extrapolate from the complex texts that are at the heart of the diver's traditions of the English language.
- Students will be able to understand the research methods associated with the study of human communication, and apply at least one of those approaches to the analysis and evaluation of human communication.

Course Name: Mathematics-II
Course Code: 2TDDE201

Course Objectives

- To understand the foundations of mathematics
- To be able to perform basic computations in higher mathematics
- To be able to read and understand middle-level proofs
- To be able to write and understand basic proofs.

Course Outcomes:

- Develop and maintain problem-solving skills.
- Use mathematical ideas to model real-world problems.
- Be able to communicate mathematical ideas with others.
- Have experience using technology to address mathematical ideas.

Course Name: Engineering Graphics
Course Code: 2TDDE202

Course Objectives

- To familiarize with the construction of geometrical figures.
- To familiarize with the projection of 1D, 2D and 3D elements.
- To familiarize with the sectioning of solids and development of surfaces.
- To familiarize with the Preparation and interpretation of building drawing.

Course Outcomes

- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to solid modeling.
- Exposure to creating working drawings
- Ability to draw projections and analyzing multiple views of object.

Course Name: Chemistry
Course Code: 2TDDE203

Course Objectives

- The objective of the Chemistry in polytechnique courses is to acquaint the students with the basic phenomenon/ concepts of chemistry, the student face during course of their studying the industry.
- The student with the knowledge of the basic chemistry will understand and explain scientifically the various chemistry related problems in the industry/engineering field.
- To appreciate the need and importance of chemistry for industrial and domestic use.
- To gain the knowledge on existing and future upcoming materials used in device fabrication.

- To impart basic knowledge related to material selection and the techniques for material analysis.
- To impart knowledge of green chemical technology and its applications.
- Demonstrate knowledge of science behind common impurities in water and methods to treat them.
- Knowledge of methods to determine the calorific value of fuels.
- Apply the science for understanding corrosion and its prevention.

Course Outcomes

- Analyze the need, design and perform a set of experiments.
- Differentiate hard and soft water, solve the related numerical problems on water purification and its significance in industry and daily life.
- Apply the principles of green chemistry in designing alternative reaction methodologies to minimize hazards and environmental degradation.
- Understand the causes of corrosion, its consequences and methods to minimize corrosion to improve industrial designs.
- Explain the properties, separation techniques of natural gas and crude oil along with potential applications and role of petrochemicals in national economy.
- Equipped with basic knowledge of polymers and its application.

Course Name: Fundamentals Computer & IT
Course Code: 2TDDE204

Course Objectives

- Learn basic principles of using windows operation system.
- Learn and practice basic keyboarding and mouse use.
- Be able to access the Internet, Worldwide Web, as well as use Internet directories and search engines, and locate www addresses.
- Be able to find and evaluate information on the Web (learn how to be critical and evaluate what is valid and reliable).
- Learn basic computer and keyboarding related vocabulary in English.
- Learn the basics of e-mail, such as sending, forwarding and receiving mail, attaching documents, creating mailboxes, filters, and address books.
- Learn basic word processing skills with Microsoft Word, such as text input and formatting, editing, cut, copy and paste, spell check, margin and tab controls, keyboard shortcuts, printing, as well as how to include some graphics such as pictures and charts.
- In general, develop an intuitive sense of how computers work and how they can be used to make your academic work more efficient.

Course Outcomes

- Demonstrate a basic understanding of computer hardware and software.
- Demonstrate problem-solving skills.
- Apply logical skills to programming in a variety of languages.

- Utilize web technologies.
- Demonstrate basic understanding of network principles.
- Working effectively in teams.
- Apply the skills that are the focus of this program to business scenarios.

Course Name: Communication Skills-II
Course Code: 2TDDE205

Course Objectives

- The students, after completing the course ,will be able to use general purpose words of English to express himself in speaking reasonably clearly and correctly on routine matters .Develop a habit of reading with comprehension to achieve an optimum speed of 75 wpm Write reasonably and grammatically correct English
- The students, after completing the course, will be able to
- Understand slowly delivered spoken material in Indian English.
- Understand general purpose words of English.
- Use general purpose words of English to express himself in speaking reasonably clearly and correctly on routine matters.
- Write reasonably and grammatically correct English.
- Develop a habit of reading with comprehension to achieve an optimum speed of 75 WPM.
- Communicate effectively in a professional environment through speaking and writing to achieve desired objectives.

Course Outcomes

- Seeks to develop the students' abilities in grammar, oral skills, reading, writing and study skills.
- Students should improve their speaking ability in English both in terms of fluency and comprehensibility.

Course Name: Material Technology
Course Code: 2TDDE301

Course Objective

- To understand the fundamental structure and properties of metals, ceramics, polymers and composites,
- To understand the relationships between structures and properties,
- To understand manufacturing, processing and fabrication of materials,
- To understand properties and performance of materials in different environments.

Course Outcomes

- The students shall be able to do materials selection for specific applications,

- The students shall be able to describe microstructures and corresponding properties for selected materials,
- The students shall be able to solve basic engineering problems related to materials selection and components

Course Name: Strength of Materials
Course Code: 2TDDE302

Course Objective

- To understand the stresses developed in bars, compound bars, beams, shafts, cylinders and spheres.
- To provide the basic concepts and principles of strength of materials.
- To give an ability to calculate stresses and deformations of objects under external loadings.
- To give an ability to apply the knowledge of strength of materials on engineering applications and design problems.

Course Outcomes

- Upon completion of this course, the students will be able to apply mathematical knowledge to calculate the deformation behavior of simple structures.
- Critically analyze problems and solve the problems related to mechanical elements and analyze the deformation behavior for different types of loads.

Course Name: Basic Electrical and Electronics
Course Code: 2TDDE303

Course Objective

- To explain the basic theorems used in Electrical circuits and the different components and functions of electrical machines.
- To explain the fundamentals of semiconductor and applications.
- To explain the principles of digital electronics

Course Outcomes

- Ability to identify the electrical components explain the characteristics of electrical machines.
- Ability to identify electronics components and use them to design circuits.

Course Name: Manufacturing Process
Course Code: 2TDDE304

Course Objective

- To make the students aware of different manufacturing processes like casting, metal forming, metal cutting and gear manufacturing.

- Impart knowledge to students in the latest technological topics on Production and Industrial Engineering and to provide them with opportunities in taking up advanced topics in the field of study.
- Create a congenial environment that promotes learning, growth and imparts ability to work with multi-disciplinary groups in professional, industry and research organizations.
- Broaden and deepen their capabilities in analytical and experimental research methods, analysis of data and drawing relevant conclusions for scholarly writing and presentation

Course Outcomes

- Students will learn concepts of casting Technology.
- Students will learn mechanical working of metals.
- Students will learn concepts of welding process
- Students will learn concept of forging methods

Course Name: Industrial Engineering
Course Code: 2TDDE305

Course Objective

- To gain an understanding and appreciation of the principles and applications relevant to the planning, design, and operations of manufacturing/service firms.
- To gain some ability to recognize situations in a production system environment that suggests the use of certain quantitative methods to assist in decision making on operations management and strategy

Course Outcomes

- Upon completion of this course, the students can able to use the optimization techniques for use engineering and Business problems
- Understand the concepts of operations research modeling approaches.

Course Name: Fluid Mechanics and Hydraulic Machines
Course Code: 2TDME 401

Course Objective

- The applications of the conservation laws to flow through pipes and hydraulic machines are studied.
- To understand the importance of dimensional analysis.
- To understand the importance of various types of flow in pumps and turbines.

Course Outcomes

- The students can able to apply mathematical knowledge to predict the properties and characteristics of a fluid.
- Can critically analyze the performance of pumps and turbines.

Course Name: Thermal Engineering
Course Code: 2TDME402

Course Objective

- Know various sources of energy & their applications.
- Apply fundamental concepts of thermodynamics to thermodynamic systems.
- Understand various laws of thermodynamics.
- Apply various gas laws & ideal gas processes to various thermodynamic systems.
- Calculate properties of two-phase system by using steam tables/ Mollier charts.
- Explain construction & working of boilers, mountings & accessories.
- Understand the working of I. C. Engines and its components.
- Understand the working of steam turbine and use of nozzles and condensers.

Course Outcomes

- The students can able to apply the Thermodynamic Principles to Mechanical Engineering Application.
- Apply mathematical fundamentals to study the properties of steam, gas and gas mixtures.
- have knowledge of advanced features of fluid mechanics, thermodynamics, heat and momentum transfer pertaining to thermo-fluid problem,
- Understand the significance of course content for thermo-fluid problems

Course Name: Theory of Machines
Course Code: 2TDME403

Course Objectives

- To understand the basic components and layout of linkages in the assembly of a system /machine.
- To understand the principles in analyzing the assembly with respect to the displacement, velocity and acceleration at any point in a link of a mechanism.
- To introduce the approaches and mathematical models used in kinematic and dynamic analysis of machinery.
- To give basic knowledge on kinematic and dynamic design of machinery.
- To give basic knowledge on mechanical vibrations.

Course Outcomes

- The students can able to apply fundamentals of mechanism for the design of new mechanisms and analyze them for optimum design.
- Students should be able to draw the profile of cams and its analysis.
- The student can identify different areas of Theory of Machines.
- Can find the applications of all the areas in day-to-day life.

Course Name: Machine Tool Technology

Course Code: 2TDME404

Course Objectives

- Upon completion, students should be able to explain operator safety, machine protection, data input, program preparation, and program storage.
- The course provides students with fundamental knowledge and principles in material removal processes.
- In this course, the students apply the fundamentals and principles of metal cutting to practical applications through multiple labs using lathes, milling machines, grinding machines, and drill presses, Computer Numerical Control etc.
- To demonstrate the fundamentals of machining processes and machine tools.
- To develop knowledge and importance of metal cutting parameters.

Course Outcomes

- Understand ASA and ORS systems of tool geometry and their inter-relations.
- Develop relations for chip reduction coefficient, shear angle, shear strain, forces, power, specific energy and temperature in orthogonal cutting.
- Select cutting fluids, tool materials and coatings to control tool wear and temperature.
- Understand the cutting tool geometry, mechanism of chip formation and mechanics of orthogonal cutting.
- Identify basic parts and operations of machine tools including lathe, shaper, planer, drilling, boring, milling and grinding machine.
- Design locating and clamping devices to produce a component

Course Name: Entrepreneurship
Course Code: 2TDME405

Course Objective:

- Removing unemployment.
- Enhancing industrial development.
- Developing industrially backward region.
- Select a project/product.
- Formulate the project
- Understand the process and procedure involved in setting up small units.
- Know the sources of help and support available for starting a small-scale industry.

Course Outcomes

- Entrepreneurship will be able to sell themselves and their ideas. Students master oral and visual presentation skills and establish a foundation of confidence in the skills necessary to cause others to act.
- Entrepreneurship will be able to find problems worth solving. Students advance their skills in customer development, customer validation, competitive analysis, and

iteration while utilizing design thinking and process tools to evaluate in real-world problems and projects.

- Entrepreneurship will be able to mobilize people and resources. Students identify and secure customers, stakeholders, and team members through networks, primary customer research, and competitive and industry analyses in order to prioritize and pursue an initial target market in real-world projects.

Course Name: Engineering measurements and maintenance practices
Course Code: 2TDME501

Course Objective

- To the use of various electrical/electronic instruments, their construction, applications, principles of operation, standards and units of measurements.
- To make the student able for rating instrument devices including dynamic range, resolution, accuracy and precision.
- To provide students with opportunities to develop basic skills in the design of electronic equipment.

Course Outcomes

- After completing the course, student will be able to identify electronics/ electrical instruments, their use, peculiar errors associated with the instruments and how to minimize such errors.
- Understand working principles in the measurement of field quantities.
- Explain the industrial and laboratory applications of such instruments.
- Service and maintain such instruments in case of damage or misuses and oil. Methods of preserving lubricants, handling of lubricants.

Course Name: Power Plant Engineering
Course Code: 2TDME502

Course Objectives

- Basic knowledge of Different types of Power Plants, site selection criteria of each one of them.
- Understanding of Thermal Power Plant Operation, turbine governing, different types of high-pressure boilers including supercritical and supercharged boilers, Fluidized bed combustion systems.
- Design of chimney in thermal power plants, knowledge of cooling tower operation, numerical on surface condenser design.

- Basic knowledge of Different types of Nuclear power plants including Pressurized water reactor, Boiling water reactor, gas cooled reactor, liquid metal fast breeder reactor.
- Understanding of Power Plant Economics, Energy Storage including compressed air energy and pumped hydro etc.
- Discussing environmental and safety aspects of power plant operation.

Course Outcomes

- Select the suitability of site for a power plant.
- Calculate performance of thermal power plant.
- Propose ash handling, coal handling method in a thermal power plant.

Course Name: Internal Combustion Engine
Course Code: 2TDME503

Course Objective

- The main objective of the course is to give the students an introduction to reciprocating internal combustion engines with emphasis on marine and stationary applications.
- The focus is on explaining engine performance in terms of power, energy utilization and exhaust emissions, its relation to internal processes like combustion and gas exchange, and varying engine operating conditions.

Course Outcomes

- To teach students the operating characteristics and thermodynamic analysis of common internal combustion engine cycles.
- To teach students to analyze the combustion process of common fuels.
- To make students aware of the roles of fluid flow and heat transfer in engine operation.
- To teach students methods to mitigate engine vibration, friction, and wear.

Course Name: Mechanical Drafting and AUTOCAD
Course Code: 2TDME504

Course Objective

- To enable the students to prepare a detailed assembly drawing for machine components.
- To understand Indian standards for machine drawing.
- To understand Fits and Tolerances in technical drawing.
- To prepare assembly drawing of joints, couplings and machine elements.
- To design and prepare Jigs and fixtures for given components

Course Outcomes

- Understand Indian standards for machine drawing.
- Understand Fits and Tolerances in technical drawing.
- Prepare assembly drawing of joints, couplings and machine elements.
- Design and prepare Jigs and fixtures for given components.

Course Name: Modern practices in manufacturing and management
Course Code: 2TDME505

Course Objective

- To improving quality, reducing costs, speeding throughput and increasing production flexibility help companies compete more effectively and meet their customers' price, quality and delivery requirements.
- Management model that aims to improve the performance of an organization by clearly defining objectives that are agreed to by both management and employees.
- To impart knowledge to students in the latest technological topics on Production and Industrial Engineering and to provide them with opportunities in taking up advanced topics of the field of study.
- To create a congenial environment that promotes learning, growth and imparts ability to work with inter-disciplinary groups in professional, industry and research organizations.

Course Outcomes

- Explain the difference between industrial and engineering design with reference to familiar products; and for specific products explain whether it is the product's form or its function that enhances its value in the marketplace
- Understand the concept of a product design specification (PDS), and be able to indicate some to the factors which should be included in producing one
- Management is a client-centric approach to service delivery which focuses on the results a client is trying to achieve rather than focusing only on the services available. A collaborative approach is encouraged which allows agencies to utilize the expertise of individuals within the agency and outside of it. Traditional approaches have meant that clients have not received the right help at the right.

Course Name: Professional Elective (Automobile Engineering)
Course Code: 2TDME601(A)

Course Objective

- The anatomy of the automobile in general.
- The location and importance of each part.
- The functioning of the engine and its accessories, gear box, clutch, brakes, steering, axles and wheels.

Course Outcomes

- Identify and distinguish different systems and components in an automobile. repair, troubleshoot and maintain an automobile.
- Recognize the role of forces, pressure and friction in vehicles, and their operations.
- Understand the engine auxiliary systems such as fuel injection system, electrical system and ignition system.
- Explain the working principles of different types of transmission system and suspension systems.

Course Name: Professional Elective (CAD/CAM)
Course Code: 2TDME601(B)

Course Objective

- Understand the basic fundamentals of computer aided design and manufacturing.
- To learn 2D & 3D transformations of the basic entities like line, circle, ellipse etc.
- To understand the different geometric modeling techniques like solid modeling, surface modeling, feature based modeling etc. and to visualize how the components look like before its manufacturing or fabrication.

Course Outcomes

- Draw two-dimensional sketches, views in CAD environment (particularly in AutoCAD and Autodesk Inventor)
- Create solid models of objects; objects in basic shapes, composite bodies, custom built machine parts, building modules etc.
- Draw the orthographic views of an object in CAD environment (particularly in Autodesk AutoCAD environment).
- Create the orthographic views of an object from the solid model (particularly in Autodesk Inventor environment).
- Dimension the views, show some annotations, provide the size tolerance of functional features, and general tolerances.
- Explain and interpret the dimensions and the associated tolerances, some annotations.
- Read the given orthographic views; i.e. visualize the 3- Dimensional model of the object shown to its orthographic views and create its CAD model.

Course Name: Design of machine elements
Course Code: 2TDME602

Course Objective

- To teach students how to apply the concepts of stress analysis, theories of failure and material science to analyze, design and/or select commonly used machine components.
- To illustrate to students the variety of mechanical components available and emphasize the need to continue learning.

- To teach students how to apply mechanical engineering design theory to identify and quantify machine elements in the design of commonly used mechanical systems.
- To teach students how to apply computer-based techniques in the analysis, design and/or
- selection of machine components.

Course Outcomes

- Understand the customers' need, formulate the problem and draw the design specifications.
- Understand component behaviour subjected to loads and identify the failure criteria.
- Analyze the stresses and strains induced in a machine element.
- Design a machine component using theories of failure.

Course Name: Project
Course Code: 2TDME604

Course Objective

- To develop competency of applying engineering knowledge to real life problems.
- to carry out the project work related to Mechanical Engineering, under the guidance of a faculty member.
- To identify an open-ended problem in area of mechanical engineering which requires further investigation.
- To identify the methods and materials required for the project work.

Course Name: Refrigeration and Air Conditioning
Course Code: 2TDME605

Course Objectives

- Acquire information from different sources.
- Prepare notes for given topic.
- Present given topic in a seminar.
- Interact with peers to share thoughts.
- Prepare a report on industrial visit, expert lecture.

Course Outcomes

- Understand the customers' need, formulate the problem and draw the design specifications.
- Understand component behavior subjected to loads and identify the failure criteria.
- Analyze the stresses and strains induced in a machine element.
- Design a machine component using theories of failure.

BECHALOR OF ENGINEERING (MECHANICAL)
PROGRAMME CODE: 05UGR002

PROGRAMME OBJECTIVE (POs)

- **PEO1:** Practice engineering in a broad range of industrial, societal and real-world applications.
- **PEO2:** Pursue advanced education, research and development, and other creative and innovative efforts in science, engineering, and technology, as well as other professional careers.
- **PEO3:** Conduct them in a responsible, professional, and ethical manner.
- **PEO4:** Participate as leaders in their fields of expertise and in activities that support service and economic development throughout the world.

PROGRAMME-SPECIFIC OUTCOMES (PSOs)

- **PSO1.** Apply their knowledge in the domain of Engineering Mechanics, Thermal and Fluid Sciences to solve Engineering problems utilizing advanced technology.
- **PSO2.** Ability to implement the learned principles of Mechanical Engineering to analyse, evaluate and create more advanced Mechanical Systems or Processes.
- **PSO3.** Develop and implement new ideas on product design and development with the help of Modern CAD/CAM tools, while ensuring best manufacturing practices.

Course Name: Engineering Physics
Course Code: 3TBPH101

Course Objective

- To understand the basic laws of physics and their applications in engineering and technology.
- To develop scientific temper and analytical capability.
- To solve various engineering problems.

Course Outcome

- Gain a knowledge and understanding of fundamental physical concepts in the areas covered in this class.
- Apply an understanding of these concepts to various systems and devises.
- Acquire problem solving skills, mathematical techniques, and the ability to synthesize.
- The ability to formulate, conduct, analyzes and interprets experiments in engineering physics

Course Name: MATHAMATICS -I
Course Code: 3TBMA102

Course Objective

- To introduce the idea of applying differential and integral calculus to notions of curvature and to improper integrals. Apart from some applications it gives a basic introduction on Beta and Gamma functions.
- To introduce the fallouts of Role's Theorem that is fundamental to application of analysis to Engineering problems.
- To develop the tool of ordinary differential equation for learning advanced Engineering Mathematics.
- To familiarize the student with functions of several variables that is essential in most branches of engineering.

Course Outcome

- This Syllabus has been designed to equip engineering student s with necessary mathematical tool's to handle mathematical problem in their core subjects.
- Through this syllabus they will learn many thing about calculus specially first order differential equation , Roles ,Lagrange's concept about existence of derivatives in some interval
- Expansion of function in an infinite series by Maclaurin's and Taylor theorem
- Partial derivative off unction's through which maxima minima of two variable function application of matrices in solving linear simultaneous equations, Eigen value Eigen vector,Calay-Hamilton theoremto find Inverse of a matrix ,and concept of vector space.

Course Name: BASIC MECHANICAL ENGINEERING
Course Code: 3TBME103

Course Objective

- To familiarize with the basic concept of Mechanical Engineering
- To familiarize with the scope of Mechanical Engineering
- To familiarize with the job prospects of Mechanical Engineer.

Course outcome

At the end of this course students will able to:

- Identify engineering materials, their properties, testing and manufacturing methods encountered in engineering practice.
- Understand Concept of measurement by using measuring instrument Vernier calliper, Micrometer, Dial gauge, Slip gauge etc.
- Understand basics of thermodynamics and components of a thermal power plant
- Understand the construction, operation and performance of different IC engines.
- Understand basics of fluids, their properties and laws of fluid Mechanics.

Course Name: BASIC CIVIL & ENGINEERING MECHANICS
Course Code: 3TBCE104

Course Objective

- To introduce to student relevance of civil engineering for various engineering applications.
- To introduce to student various elements of buildings and construction materials.
- To introduce to student various methods of land survey and to make him use surveying equipment
- To make student aware of modern investigation techniques in land survey.
- To introduce to student about the water management and transportation engineering.
- Ability to apply knowledge of mathematics, science, and engineering.
- Solve for the resultants of any force systems.
- Determine equivalent force systems.
- Solve the mechanics problems associated with friction forces.
- Obtain the centroid, first moment and second moment of an area.

Course outcome

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

- Describe the role of civil engineer in the development of the society and explain relationship of civil engineering with other branches of engineering and technology.
- Discuss types of buildings and select materials of construction.
- Explain the elements of water supply such as dam, canal and elements of transportation structures.
- Measure heights, distances and angles on ground using basic surveying instruments and plot them on paper.
- Explain the advantages of advances in civil engineering like remote sensing techniques, GIS and GPS.
- Determine the resultant force and moment for a given system of forces.

Course Name: Communication skill -I
Course Code: 3TBCS105

Course Objective

- The objective of this course is to learn the second language learner's ability and to use the four fundamental language skills-reading writing speaking and listening.
- It will enable the students to speak English correctly and with confidence.

Course outcome

- Student will develop knowledge, skills and judgment around human communication that facilitate their ability to work collaboratively with others.
- Such skills could include communication competencies such as managing conflict, understanding small group process, active listening, appropriate self disclosure, etc.

Course Name: HEALTH, HYGIENE & YOGA
Course Code: 3TBHH106

Course Objective

- It is very important for the protection of our health and helps to present the spread of communicable diseases personal hygiene has social and aesthetic values.
- The provision of hygiene information first impacts on knowledge and then practice.
- Yoga education helps in self discipline and self control, leading to immense amount of awareness concentration and higher level of consciousness.
- This course can prepare the students physically & mentally for the integration of their physical, mental and spiritual faculties so that the students can become healthier, saner and more integrated members of the society & of the nation.

Course Outcome

- The student to have good health.
- Student has good mental hygiene.
- Possess emotional stability
- Integrated moral values.
- Attain higher level of consciousness.

Course Name: RURAL OUTREACH
Course Code: 3TBRO107

Course Objective

- The main objective of introducing this course is to sensitize students about the socio-cultural aspects of the rural areas parochial to their colleges.
- Students are expected to observe, investigate and learn about the following aspects of the rural region.
- Demographics, Literacy, Geographical parameters of the village.
- Schemes of government of India and State of Madhya Pradesh in operation in the villages.
- Social/ Cultural aspects ranging from popular dance forms, music and customs of the concerned village.

Course Name: ENGINEERING CHEMISTRY
Course Code: 3TBCH201

Course Objective

- Apply the electrochemical principles in batteries, understand the fundamentals of corrosion.
- Analysis of water for its various parameters and its significance in industrial and domestic Applications.
- Analyze microscopic chemistry in terms of atomic, molecular orbital and

Intermolecular forces
- Analysis of major chemical reactions that are used in the synthesis of molecules.
- Understand the chemistry of various fuels and their combustion

Course Outcome
- Describe and understand the operation of electrochemical systems for the production of electric energy, i.e. batteries. Explain the mode by which potable water is produced through the processes of screening, micro Straining, aeration, coagulation and flocculation, sedimentation, flotation, filtration and disinfection.
- Recognize that molecular orbital theory is a method used by chemists to determine the energy of the electron in a molecule as well as its geometry.
- Demonstrate an ability to design, implement, and evaluate the results of experimentation using standard scientific methodologies such as hypothesis formulation and testing.
- Analyze microscopic chemistry in terms of atomic and molecular orbital's and intermolecular forces.
- Rationalize bulk properties and processes using thermodynamic considerations.
- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.
- List major chemical reactions that are used in the synthesis of molecules.

Course Name: MATHEMATICS-II
Course Code: 3TBMA202

Course Objective
- Students will demonstrate the ability to formulate, interpret and draw inferences from mathematical models.
- Students will demonstrate competence with a wide variety of mathematical tools and techniques.
- Students will demonstrate the ability to assess the accuracy, implications and limitations of their mathematical results.
- Students will demonstrate a breadth of general mathematical knowledge as well as depth in at least one area.

Course Outcome
- Today calculus has become the heart of every engineering stream.
- Through this syllabus student will learn different techniques of solving different kind of higher order ordinary and partial differential equations.
- Expansion of periodic function in an infinite series of sine and cosine function through Fourier series, Function of complex variable's based on complex number and also vector calculus based on vectors.

Course Name: ENGINEERING GRAPHICS
Course Code: 3TBEG203

Course Objective

- To familiarize with the construction of geometrical figures.
- To familiarize with the projection of 1D, 2D and 3D elements.
- To familiarize with the sectioning of solids and development of surfaces.
- To familiarize with the Preparation and interpretation of building drawing .

Course outcome

- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to solid modeling
- Exposure to creating working drawings
- Ability to draw projections and analyzing multiple views of object.

Course Name: BASIC ELECTRICAL ENGINEERING
Course Code: 3TBEE204

Course Objective

- To provide knowledge of basic concepts related to electrical engineering.
- To provide knowledge of basic Circuits: 1- phase AC Circuits, 3-phase AC Circuits, Magnetic Circuits, Electrical Machines

Course outcome

After successful completion of course,

- •Students are expected to possess an in-depth understanding and Knowledge of 1-phase AC Circuits, 3-phase AC Circuits, Magnetic Circuits, Electrical Machines
- Develop the concepts of basic electrical engineering for all the undergraduate students of different branches of engineering.

Course Name: BASIC COMPUTER ENGINEERING
Course Code: 3TBCS205

Course Objective

By the end of this course, the student will be able to:-

- Analyzing problems, and designing and implementing algorithmic solutions.
- Solving problems properly, achieving an implementation that is correct, effective and efficient.
- Using computers at user level, including operative systems and programming environments.
- Knowledge of computer equipment, including both hardware and software.

- Identifying information needs to solve problems, recovering information and applying it to the resolution.
- Opportunity to learn key concepts of computer, as well as fundamentals and applications of computer.

Course outcome

By the end of this course, the student will

- Analysing problems, and designing and implementing algorithmic solutions.
- Solving problems properly, achieving an implementation that is correct, effective and efficient.
- Using computers at user level, including operative systems and programming environments.
- Knowledge of computer equipment, including both hardware and software.
- Identifying information needs to solve problems, recovering information and applying it to the resolution.
- Opportunity to learn key concepts of computer, as well as fundamentals and applications of computer.

Course Name: MANUFACTURING PRACTICES
Course Code: 3TBMP206

Course Objective

- To familiarize with the basic soft tools and equipments used in fitting , carpentry ,sheet metal ,welding and smithy
- To familiarize with the production of simple models in the above trades.

Course outcome:

On completion of this course, students will be able to

- Make half lap joint and dovetail joint in carpentry.
- Make welded lap joint, butt joint and T-joint.
- Prepare sand mould for cube, conical bush, pipes and V pulley.
- Fabricate parts like tray, frustum of cone and square box in sheet metal.

Course Name: ENTREPRENEURSHIP DEVELOPMENT
Course Code: 3TBED207

Course Objective

- Understanding basic concepts of entrepreneurship and key steps in the elaboration of business ideas,
- Developing personal creativity and entrepreneurial initiative.

Course Outcome

- Understanding basic concepts in the area of entrepreneurship,

- Understanding the stages of the entrepreneurial process, adopting of the key steps in the elaboration of business ideas, Developing personal creativity and entrepreneurial initiative.

Course Name: MATHEMATICS-III
Course Code: 3TBBE 301

Course Objective

- To introduce effective mathematical tools for the Numerical Solutions algebraic and transcendental equations.
- To enable young technocrats to acquire mathematical knowledge to understand Laplace transformation, Inverse Laplace transformation which are used in various branches of engineering?
- To acquaint the student with mathematical tools available in Statistics needed in various field of science and engineering.

Course Outcomes

- The curriculum of the Department is designed to satisfy the diverse needs of students.
- Coursework is designed to provide students the opportunity to learn key concepts of Transforms, Numerical Methods for Solving Ordinary Differential Equations of First Order & Concept of Probability.

Course Name: MATERIALS TECHNOLOGY
Course Code: 3TBME- 302

Course Objective

- The course introduces several advanced concepts and topics in the rapidly evolving field of material science.
- Students are expected to develop comprehension of the subject and to gain scientific understanding regarding the choice and manipulation of materials for engineering applications.

COURSE OUTCOME

- To acquire basic understanding of advanced materials, their functions and properties for technological applications.
- To emphasize the significance of materials selection in the design process
- To understand the principal classes of bio-materials and their functionalities in modern medical science
- To get familiarize with the new concepts of Nano Science and Technology
- To educate the students in the basics of instrumentation, measurement, data acquisition, interpretation and analysis

Course Name: STRENGTH OF MATERIAL
Course Code: 3TBME 303

Course Objective

- To familiarize the students with the fundamentals of deformation, stresses, strains machine elements.
- To teach students how to apply the concepts of stress analyst theories of failure and material science to analyze, design and/or select common used machine components.

Course Outcome

At the completion of this course, students should be able to

- Know the concepts of stress and strain.
- Analyze the beam of different cross sections for shear force, bending moment, slope and deflection.
- Understand the concepts necessary to design the structural elements and pressure vessels.

Course Name: APPLIED THERMODYNAMICS
Course Code: 3TBME-304

Course Objective

To develop ability and gain insight into the process of problem-solving, with emphasis on thermodynamics. Specially in following manner:

- Apply conservation principles (mass and energy) to evaluate the performance of simple engineering systems and cycles.
- Evaluate thermodynamic properties of simple homogeneous substances,
- Analyze processes and cycles using the second law of thermodynamics to determine maximum efficiency and performance.
- Discuss the physical relevance of the numerical values for the solutions to specific engineering problems and the physical relevance of the problems in general, and Critically evaluate the validity of the numerical solutions for specific engineering problems.

Course Outcome

At the completion of this course, students should be able to

- Find values of thermodynamic properties in tables;
- Draw thermodynamic processes on pressure-temperature, pressure- volume, or temperature volume diagrams;
- Use compressibility charts;
- Calculate expansion or compression work in a closed system;
- Use conservation of mass to determine the change in mass of a system

Course Name: MANUFACTURING PROCESS
Course Code: 3TBME- 305

Course Objective

- To make the students aware of different manufacturing processes like casting, metal forming, metal cutting and gear manufacturing.

Course Outcome

- Concepts of casting Technology.
- Mechanical working of metals.
- Concepts of welding process.
- Concept of forging methods.
- Understanding press working.

Course Name: Software Lab-I (C++)
Course Code: 3TBME- 306

Course Objective

- The objective of this course is to understand the advantage of C++ programming. It helps to understand the key features of C++ Programming and Methodology.

Course Outcome

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

- Define data types but also deals with operations applied for data structures.
- Implement algorithms and complex problems

Course Name: SKILL ELECTIVE-I AUTOMOBILE MAINTENANCE
Course Code: 3STME-307

Course Objective

- On completion of this course, the students are expected to understand the various repair activities, fundamental principle, operation, performance of IC Engines and its auxiliary systems.

Course Outcome

- Acquire the knowledge of engine components and other systems like steering, brake, transmission, electrical etc
- Understand the working and repair of engine auxiliary systems.
- Understand the various maintenance activities of four wheeler Understand the combustion aspects of CI Engines

Course Name: WATER HARVESTING & MANAGEMENT
Course Code: 3STCE 307

Course Objective
The objectives of the rain water harvesting are:

- To meet the increasing demand of water.
- To reduce run off.
- To avoid flooding of roads.
- To augment the groundwater storage and to raise the water table.
- To reduce groundwater pollution.

Course Outcome

- Discuss basic concepts of "Rain Water Harvesting"
- Estimate the surface runoff from given precipitation data.
- Describe various types of survey investigations for reservoir planning
- Design the appropriate rain water harvesting scheme and required structures for given conditions.

Course Name: ENERGY & ENVIRONMENTAL ENGINEERING
Course Code: 3TBBE 401

Course Objective

- The objective of this Course is to provide an introduction to energy systems and renewable energy resources, with a scientific examination of the energy field and an emphasis on alternative energy sources and their technology and application.

Course Outcome
On completion of this course, students will be able to

- Describe a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- Critically analyze technical subject matter (written or oral) for scientific merit apply learned environmental knowledge and understanding to solve technical/research problems in new contexts

Course Name: INSTRUMENTATION & CONTROL
Course Code: 3TBME 402

Course Objective

- Develop ability to set up measurement systems with a control environment
- Develop an ability to design and utilize advanced control systems.
- To Estimate errors and uncertainty in measurements using statistical analysis.

Course Outcome

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

- Be competent in performing mechanical measurements using various sensors and transducers.
- Understand working principles in the measurement of field quantities
- Understand the conceptual development of zero, first and second order systems.

Course Name: THEORY OF MACHINES
Course Code: 3TBME 403

Course Objective

- To expose the students to learn the fundamentals of various laws governing rigid Bodies and its motions also expose the various motion of the machine elements.

Course Outcome

At the completion of this course, students should be able to know

- Basic mechanisms, velocity and acceleration of simple mechanisms
- Drawing the profile of cams and its analysis
- Gear train calculations, Gyroscopes
- Inertia force analysis and flywheels
- Balancing of rotating and reciprocating masses

Course Name: FLUID MACHINES-I
Course Code: 3TBME 404

Course Objective

- To be familiar with all the basic concepts of fluids and fluid flow phenomenon, conservation equations and their applications to fluid flow problems.

Course Outcome

At the completion of this course, students should be able to

- Understand the properties of the fluid.
- Understand and solve the fluid flow problems.
- Understand the mathematical techniques of practical flow problems.
- Understand the energy exchange process in fluid machines.

Course Name: MACHINE DRAWING & CAD
Course Code: 3TBME 405

Course Objective

- To enable the students to prepare a detailed assembly drawing for machine components.
- Provide the fundamental concepts of machine drawing elaborating on how to

concretize the idea of new structure such as a machine element

- The objective of the AutoCAD Fundamentals Course is to enable students to create a basic 2D & 3D drawing in the AutoCAD software

Course Outcome

- Understand Indian standards for machine drawing.
- Understand Fits and Tolerances in technical drawing.
- Prepare assembly drawing of joints, couplings and machine elements.
- Design and prepare Jigs and fixtures for given components

Course Name: Software Lab-II AUTO-CAD
Course Code: 3TBME 406

Course Objective

- Learn to sketch and take field dimensions.
- Learn to take data and transform it into graphic drawings.
- Learn to draw simple components by using Auto Cad.
- Learn basic engineering drawing formats

Course Outcome

- Student's ability to use architectural and engineering scales will increase.
- Students ability to produce engineered drawings will improve
- Student's ability to convert sketches to engineered drawings will increase.
- Students will become familiar with office practice and standards.
- Students will become familiar with Auto Cad two dimensional drawings.
- Students will develop good communication skills and team work.

Course Name: SKILL ELECTIVE-II
Course Code: 3STME 407

Course Objective

- To repair and service in refrigerator, water cooler, bottle cooler, deep freezer, Cooler, Walk in Cooler, Ice candy plant, Cold storage, Ice plant, Split Air Conditioner, Package Air Conditioner, Central Air Conditioner

Course Outcome

- Acquire the knowledge of various Refrigeration and Air-conditioning systems like evaporator,
- Condenser, Expansion Valve, compressor etc.
- Able to diagnose and repair the faults in the Refrigeration systems.
- Understand the various maintenance activities of Air-Conditioning systems.
- Understand the Performance aspects of Refrigerator and Air-conditioner.

Course Name: Skill Elective-I ELECTRICAL HOUSE WIRING
Course Code: 3STEX-407

Course Objective

Upon successful completion of the Residential Wiring/HTI program the student should be able to:

- Demonstrate proper safety practices and procedures.
- Understand the proper function of tools and testing equipment.
- Rough in and wire residential rooms following the National Electrical Code.
- Install, trouble-shoot and service Home Technology Integration Equipment

Course Outcome

- These courses aim to provide trainees with knowledge and skills in electrical wiring installation.
- They will be trained to install metal conduit and trunking, Installation of PVC trunking complete with correct size, wirings, terminating at light fittings, switches, terminal block.
- They will also be taught to practice good electrical wiring installation habits and worksite safety relating to electrical activities.

Course Name: MANUFACTURING TECHNOLOGY
Course Code: 3TBME 501

Course Objective

- The course provides students with fundamental knowledge and principles in material removal processes.
- In this course, the students apply the fundamentals and principles of metal cutting to practical applications through multiple labs using lathes, milling machines, grinding machines, and drill presses, Computer Numerical Control etc.
- To demonstrate the fundamentals of machining processes and machine tools.
- To develop fundamental knowledge on tool materials, cutting fluids and tool wear mechanisms.
- To apply knowledge of basic mathematics to calculate the machining parameters for different machining processes.

Course Outcome

- Understand ASA and ORS systems of tool geometry and their inter-relations.
- Develop relations for chip reduction coefficient, shear angle, shear strain, forces, power, specific energy and temperature in orthogonal cutting.
- Select cutting fluids, tool materials and coatings to control tool wear and temperature.
- Evaluate cutting speed to minimize production cost and maximize production rate.
- Understand the working principles, applications and importance of modern machining processes.

Course Name: FLUID MECHANICS-II
Course Code: 3TBME 502

Course Objective

- To understand boundary layer theory
- To formulate basic equations for impact of free jets
- To understand construction and working and performance of various Turbines
- To understand construction and working & performance of various Pumps
- To solve and analyze a variety of fluid mechanics and fluid machinery related problems

Course Outcome

- Apply knowledge of fluid mechanics and fluid machinery for understanding, formulating and solving engineering problems
- Acquire knowledge and hands-on competence in applying the concepts of fluid mechanics and fluid machinery in the design and development of mechanical systems.
- Identify, analyze and solve mechanical engineering problems useful to the society.
- Work effectively with engineering and science teams as well as with multidisciplinary designs.
- Skillful use modern engineering tools and techniques for mechanical engineering design, analysis and application

Course Name: INTERNAL COMBUSTION ENGINE
Course Code: 3TBME 503

Course Objective

- On completion of this course, the students are expected to understand the fundamental principle, operation, performance of IC Engines, auxiliary systems, combustion of SI & CI engines, various fuels used and engine emissions.

Course Outcome

- Acquire the knowledge of engine components and fuel air cycles.
- Understand the working of engine auxiliary systems.
- Understand the combustion aspects of SI Engines
- Understand the combustion aspects of CI Engines.

Course Name: DESIGN OF MACHINE ELEMENT
Course Code: 3TBME 504

Course Objective

- To teach students how to apply the concepts of stress analysis, theories failure and material science to analyze, design and/or select commonly us machine components.
- To illustrate to students the variety of mechanical components available a emphasize

the need to continue learning.

- To teach students how to apply mechanical engineering design theory identify and quantify machine elements in the design of commonly us mechanical systems.
- To teach students how to apply computer based techniques in the analyst design and/or selection of machine components.

Course Outcome

- Understand the customers' need, formulate the problem and draw the design specifications.
- Understand component behavior subjected to loads and identify the failure criteria.
- Analyze the stresses and strains induced in a machine element.
- Design a machine component using theories of failure.

Course Name: Dynamics of Machine
Course Code: 3TBME 505

Course Objective

- Develop an ability to apply knowledge of mathematics, science, and engineering
- To develop an ability to design a system, component, or process to meet desired needs within realistic constraints.
- To develop an ability to identify, formulate, and solve engineering problems
- To develop an ability to use the techniques, skills, and modern engineering to necessary for engineering practice

Course Outcome

- Understand and conduct static and dynamic force analysis of Mechanisms.
- Apply the concept of balancing and use it for reducing the unbalanced forces in rotating masses and reciprocating engines under operating conditions exposure to IS standards.
- Acquire knowledge on types of vibrations in different systems.
- Apply different damping methods to minimize vibrations using IS standards.
- Understand, apply and analyze the control mechanisms in Governors and Gyroscopes.

Course Name: Software Lab- III (COMPUTER AIDED ENGINEERING LAB)
Course Code: 3TBME 506

Course Objective

- Course Objective In this course, mainly it is aimed to provide students with the writing and reading principles of "Engineering Drawing"
- Graphical universal language used in technical world for describing the shape and size of an object via supplying orthographic views and/ or solid models associated with all the necessary dimensions, associated tolerances and annotations created in a CAD environment

Course Outcome

Learning Outcomes Having successfully completed this course; the student will be able to:

- Draw two-dimensional sketches, views in CAD environment (particularly in AutoCAD and Autodesk Inventor)
- Create solid models of objects; objects in basic shapes, composite bodies, custom built machine parts, building modules etc.
- Draw the orthographic views of an object in CAD environment (particularly in Autodesk AutoCAD environment).
- Create the orthographic views of an object from the solid model (particularly in Autodesk Inventor environment).
- Dimension the views, show some annotations, provide the size tolerance of functional features, and general tolerances
- Explain and interpret the dimensions and the associated tolerances, some annotations
- Read the given orthographic views; i.e. visualize the 3- Dimensional model of the object shown to its orthographic views and create its CAD model.

Course Name: Skill Elective- III (CNC PROGRAMMING & MACHINING)
Course Code: 3STME 507

Course Objective

- This course introduces the concepts and capabilities of computer numerical cont machine tools.
- Topics include setup, operation, and basic applications.
- Up completion, students should be able to explain operator safety, machine protection data input, program preparation, and program storage.

Course Outcome

- Understand ASA and ORS systems of tool geometry and their inter-relations.
- Develop relations for chip reduction coefficient, shear angle, shear strain, forces, power, specific energy and temperature in orthogonal cutting.
- Select cutting fluids, tool materials and coatings to control tool wear and temperature.
- Evaluate cutting speed to minimize production cost and maximize production rate.
- Understand the working principles, applications and importance of modern machining processes

Course Name: Skill Elective- I (WASTE MANAGEMENT)
Course Code: 3STCE507

Course Objective

- Understanding of problems of municipal waste, biomedical waste, hazardous waste, ewaste, industrial waste etc.
- Knowledge of legal, institutional and financial aspects of management of solid wastes.\

- Become aware of Environment and health impacts solid waste mismanagement\Understand engineering, financial and technical options for waste management

Course Outcome

- After completion of the course students should be able to-do sampling and characterization of solid waste; analysis of hazardous waste constituents including QA/QC issues;
- Understand health and environmental issues related to solid waste management; apply steps in solid waste management-waste reduction at source, collection techniques, materials and resource recovery/recycling, transport.
- Optimization of solid waste transport, treatment and disposal techniques; economics of the onsite vs. offsite waste management options

Course Name: TURBO MACHINERY
Course Code: 3TBME601

Course Objective

- The course aims at giving an overview of different types of turbo machinery used for energy transformation, such as pumps, fans, compressors, as well as hydraulic, steam and gas-turbines.
- It will focus on applications in power generation, transport, refrigeration and the built environment

Course Outcome

- Describe turbo machines and their differences with positive displacement machines.
- Review of dimensional analysis and laws of thermodynamics
- Discuss effect of thermodynamics on turbo machines.
- Explain reheat, preheat, and polytrophic efficiencies for turbines and compressors
- Describe the Euler turbine equation and its application with degree of reaction for different turbo machines
- Describe velocity triangles and general analysis of pumps and compressors
- Describe different hydraulic turbines, steam turbines and solve problems
- Describe working of centrifugal pumps, compressors and solve problems

Course Name: ENTREPRENEURSHIP AND MANAGEMENT CONCEPTS
Course Code: 3TBME 602

Course Objective

- The Management Entrepreneurship/Small Business Management
- Option is a challenging, applicable degree program that integrates management concepts in a technical and innovative setting as required by today's dynamic business environment

- The program develops graduates with relevant skills preparing students for entry into management careers in business, government, public, or social service organizations.
- Industry-trained faculty translate theory to practice; advising students through the diversity of the curriculum, project-based learning, and internships.
- The degree serves those students that seek a personal, hands-on learning experience and the needs of the businesses that employ them.

Course Outcome

- Describe the basic principles and concepts of management.
- Distinguish different plans and list steps in planning.
- Discuss the concepts of organizing and staffing.
- Interpret the concepts of directing and controlling.
- Demonstrate the meaning, functions, types and roles of an entrepreneur and describe various institutional support.
- Explain in detail about the small scale industries and prepare the project report.

Course Name: RENEWABLE ENERGY
Course Code: 3TBME 603

Course Objective

The course should enable the students to

- Understand the various forms of conventional energy resources.
- Learn the present energy scenario and the need for energy conservation
- Explain the concept of various forms of renewable energy
- Outline division aspects and utilization of renewable energy sources for both domestics and industrial application
- Analyze the environmental aspects of renewable energy resources.

Course Outcome

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

- Describe the environmental aspects of non-conventional energy resources. In Comparison with various conventional energy systems, their prospects and limitations.
- Know the need of renewable energy resources, historical and latest developments.
- Describe the use of solar energy and the various components used in the energy production with respect to applications like - heating, cooling, desalination, power generation, drying, cooking etc.
- Appreciate the need of Wind Energy and the various components used in energy generation and know the classifications.
- Understand the concept of Biomass energy resources and their classification, types of biogas Plants- applications
- Compare Solar, Wind and bio energy systems, their prospects, Advantages and limitations.

- Acquire the knowledge of fuel cells, wave power, tidal power and geothermal principles and applications.

Course Name: INDUSTRIAL ENGINEERING
Course Code: 3TBME 604

Course Objective

- To impart capability of successfully planning, controlling, and implementing projects.
- Understand and apply the principles of maths , science, technology and engineering, involving industry relevant problems.
- Contribute to the profitable growth of industrial economic sectors by using IE analytical tools, effective computational approaches, and systems thinking methodologies.
- Maintain high standards of professional and ethical responsibility.
- Flourish and work effectively in diverse, multicultural environments emphasizing the application of teamwork and communication skills.
- Practice life-long learning to sustain technical currency and excellence throughout one's career.

Course Outcome

- Ability to apply mathematics and science in Industrial engineering.
- Ability to design and conduct experiments, as well as to analyze and interpret data.
- Ability to identify, formulate and solve engineering problems.
- Ability to use the techniques, skills, and modern engineering tools necessary for industrial engineering practice.
- Ability to design, develop, implement and improve integrated systems that include people, materials, information, equipment, and people.

Course Name: HEAT AND MASS TRANSFER
Course Code: 3TBME 605

Course Objective

- This course is designed to introduce a basic study of the phenomena of heat and mass transfer, to develop methodologies for solving a wide variety of practical engineering problems, and to provide useful information concerning the performance and design of particular systems and processes.
- The objective of this course is to impart knowledge on design of heat and mass transfer equipments . In addition, it also imparts knowledge on optimization of the cost of heat transfer operations used in bioprocess industries.
- A knowledge-based design problem requiring the formulations of solid conduction and fluid convection and the technique of numerical computation progressively elucidated in different chapters will be assigned and studied in detail.
- As well, to gain experience in designing experiments for thermal systems, the design,

fabrication, and experimentation of a thin film heat flux gage will be attempted as part of laboratory requirements.

Course Outcome

- Apply the concepts of heat transfer in three modes to real problems
- Design heat exchangers and mass transfer systems
- Understand the basic laws of heat transfer.
- Account for the consequence of heat transfer in thermal analyses of engineering systems.
- Analyze problems involving steady state heat conduction in simple geometries.
- Develop solutions for transient heat conduction in simple geometries.
- Obtain numerical solutions for conduction and radiation heat transfer problems.
- Understand the fundamentals of convective heat transfer process.
- Evaluate heat transfer coefficients for natural convection.
- Evaluate heat transfer coefficients for forced convection inside ducts.
- Evaluate heat transfer coefficients for forced convection over exterior surfaces.
- Analyze heat exchanger performance by using the method of log mean temperature difference.
- Analyze heat exchanger performance by using the method of heat exchanger effectiveness.
- Calculate radiation heat transfer between black body surfaces.

Course Name: Software Lab-IV(CATIA)
Course Code: 3TBME 606

Course Objective

- Parametric solid modeling, free-form surface modeling, reverse engineering, styling, and computer aided industrial design, engineering drawing and drafting,
- Product and manufacturing information, reporting and analytics, verification and validation,
- Knowledge based engineering, reuse, sheet metal design, assembly modeling, digital mock ups, simulation, stress analysis, finite element method, kinematics, complete fluid dynamics, thermal analysis.

Course Outcome

- Student will have advanced solutions for conceptual design, 3D modeling, and documentation.
- Student will learn product designing, industrial designing and styling (optimize form, fit, & function and user experience), streamline 2D design, drafting, and documentation with powerful tools for layout, drawing, and 3D annotation.
- Student will do assembly designing, sheet metal designing, and template based designing.
- Student will have the knowledge to perform CAE geometry editing, comprehensive

meshing, multi-CAE environments, fine element assembly management.

- Student can perform visual analysis and validation which will give them high quality performance insights for product decisions.

Course Name: Skill Elective-IV (ANSYS Work bench)
Course Code: 3STME 607

Course Objective

- The primary objective of this Ansys Workbench Mechanical Training class is to teach participants Finite Element Analysis using the Ansys Workbench platform.
- Thus, upon completion of this course, participants will be able to setup, solve, and diagnose their own Structural and Thermal Analyses in the Ansys Mechanical Workbench

Course Outcome

- You will be know how to simulate and validate the performance of products of all manufacturing sectors including automotive, power electronic products, electronic equipment, electromechanical devices, and electrical systems.
- You will know how to simulate every structural aspect, including linear static analysis, of a single part of a complex assembly with hundreds of components interacting through contacts or relative motions.
- You will know how to perform fluid flow analysis to know the impact of fluid flows on your product while manufacturing and when used by customers in real world applications.
- With your mastery in simulation, you will contribute not only to success of products but also cost management, product integrity, designing smart products, and reduced time-to-market.

Course Name: Skill Elective-IV (Quantity Estimation & Bill Preparation)
Course Code: 3STCE 607

Course Objective

- Familiarize the student with the various parts and aspects of a complete set of Construction Documents.
- To familiarize the student with the methods used to obtain a reasonable cost estimate and be aware of some current cost figures.
- To sensitize the student to the cost of construction to become aware and more critical of methods and materials used in his designs.

Course Outcome

- Arrange and prepare, from material and labor take-off list, a complete estimate.
- Explain responsibilities and ethics of an estimator.
- Demonstrate, define and explain the use of a construction spread sheet for estimating.

- Understand and relate the theory of estimating for building construction as related to the structure of plans and specifications estimates.
- Demonstrate, define and explain quantity surveying, unit cost synthesis and analysis, bid organization and preparation

Course Name: Professional Elective-I (MACHINE TOOL DESIGN)
Course Code: 3TBME 701 (A)

Course Objective

- To impart knowledge about cutting tool geometry, tool material, mechanics of metal cutting, match inability and importance of cutting fluid.
- To understand the kinematics drive of machine tool.
- To design speed gear box and feed gear box
- To understand the procedure of acceptance test of machine tool

Course Outcome

- Acquire knowledge and hands-on competence in the design and development of various machine tools used in manufacturing operations.

Course Name: ENERGY MANAGEMENT & AUDIT
Code: 3TBME-701(B)

Course Objective

- The use of energy falls under this definition.
- The primary objective of energy management is to maximize profit and minimize costs by optimizing energy procurement and utilization, throughout the organization.
- To minimize energy costs without affecting production and quality and to minimize environmental effects.

Course Outcome

- Understood and acquired fundamental knowledge on the science of energy and on both the conventional and non-conventional energy technologies
- Acquired the expertise and skills needed for the energy monitoring, auditing and management, and for the development, implementation, maintenance and auditing of Energy Management Systems
- Become capable of analysis and design of energy conversion systems
- Acquired skills in the scientific and technological communications, and in the preparation, planning and implementation of energy projects

Course Name: RELIABILITY & MAINTENANCE
Course Code: 3TBME701(C)

Course Objective

- The objective of the course is to provide the students with the fundamental concepts, the necessary knowledge and the basic skills related to systems reliability and systems maintenance function.
- The course intends to expose the students to the concept of reliability and to help them learn the techniques of estimating reliability and related characteristics of components/ systems.
- Moreover, it exposes them to the necessary engineering techniques used for analyzing, planning and controlling maintenance systems

Course Outcome

- Understand the concepts of reliability, availability and maintainability
- Implement strategies for improving reliability of repairable and non-repairable systems

Course Name: SIMULATION & PROCESS MODELING
Course Code: 3TBME701(D)

Course Objective

The objectives of this course are-

- Introduce students to the simulation and modeling techniques
- To provide students with opportunities to develop basic simulation and modeling skills with respect to carrying out research projects using any simulation method on the computer. (Skills)

Course Outcome

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

- Understand fundamental concepts of computer simulation and its role in engineering problem solving.
- Develop and model engineering problems and apply procedures for modeling systems using ARENA framework.
- Appreciate the advantages of using simulation and modeling for taking decision in engineering problems.
- Understand the need to incorporate simulation and modeling considerations throughout the design and execution of a project aiming at understanding its limitations and ways of improvement.

Course Name: OPERATION RESEARCH
Course Code: 3TBME 702

Course Objective

- To formulate and solve problems as networks and graphs.
- To develop linear programming (LP) models for shortest path, maximum flow, minimal spanning tree, critical path, minimum cost flow, and transshipment problems.
- To solve the problems using special solution algorithms.
- To use CPM and PERT techniques, to plan, schedule, and control project activities.
- To construct linear integer programming models and discuss the solution techniques.
- To formulate pure, mixed, and binary integer programming models.
- To solve the integer programming models using branch-and-bound method.
- To explain why heuristics are used to solve some large-sacle integer programming problems.

Course Outcome

- Evaluate the requirements for on-time delivery and manage logistics at optimum cost
- Design and evaluate supply chain network and procurement management in supply chain using information technology.

Course Name: REFRIGERATION & AIR CONDITIONING
Course Code: 3TBME 703

Course Objective

The objectives of this course are to:

- Introduce students to basic use of Psychometrics chart for Refrigerating and Air-Conditioning systems
- Provide students with opportunities to develop their knowledge of Refrigerating and Air-Conditioning systems design.

Course Outcome

- Work on various refrigeration cycles and refrigeration components
- design air distribution systems and estimate cooling load for air conditioning

Course Name: AUTOMOBILE ENGINEERING
Course Code: 3TBME 704

Course Objective

The student will be made to learn

- The anatomy of the automobile in general
- The location and importance of each part
- The functioning of the engine and its accessories, gear box, clutch, brakes, steering, axles and wheels

- Suspension, frame, springs and other connections
- Emissions, ignition, controls, electrical systems and ventilation

Course Outcome

- Identify and distinguish different systems and components in an automobile. repair, troubleshoot and maintain an automobile.
- Recognize the role of forces, pressure and friction in vehicles, and their operations.
- Understand the engine auxiliary systems such as fuel injection system, electrical system and ignition system.
- Explain the working principles of different types of transmission system and suspension systems.
- Design and make an automotive device that addresses technological issues such as Hybrid, electric and alternative fuel

Course Name: MECHANICAL VIBRATIONS AND NOISE ENGINEERING
Course Code: 3TBME 705

Course Objective

- To familiarize the students with the sources of vibration and concept of noise and make design modifications to reduce the vibration and noise and improve the life of the components.

Course Outcome

- Understanding causes, source and types of vibrations in machineries
- Gaining knowledge in sources and measurement standard of noise
- Ability to design and develop vibrations and noise control systems.

Course Name: MINOR PROJECT
Course Code: 3TBME 706

Course Objective

- To provide students with a comprehensive experience for applying the knowledge gained so far by studying various courses.
- To develop an inquiring aptitude and build confidence among students by working on solutions of small industrial problems.
- To give students an opportunity to do something creative and to assimilate real life work situation in institution.
- To develop good expressions power and presentation abilities in students.

Course Outcome

- To expose students to a minor problem (academic) related any one of the following components viz. design of machine or machine component.
- To develop acumen for higher education and research.

- To master the art of working in group, and develop understanding of technical dissertation presentation and writing.

Course Name: INDUSTRIAL TRAINING /INTERNSHIP/IPR
Course Code: 3TBME 707

Course Objective

- The objective of undertaking industrial training is to provide work experience so that student's engineering knowledge is enhanced and employment prospects are improved.
- The student should take this course as a window to the real World and should try to learn as much as possible from real life experiences by involving and interacting with industry staff.
- Industrial training also provides an opportunity to students to select an engineering problem and possibly an industry guide for their Major Project in final semester.

Course Outcome

- To have extensive on-site exposure to various mechanical engineering aspects.
- To develop managerial skills of the students.
- To expose students to practical problems and learn troubleshooting methods.
- To develop an understanding of modern construction materials and techniques.
- To expose students to take up complex structural design and construction challenges.
- To develop confidence to take up a project activity independently.

Course Name: OPEN ELECTIVE (POWER PLANT ENGINEERING)
Course Code: 3TBME801 (A)

Course Objective

- Describe sources of energy and types of power plants
- Analyze different types of steam cycles and estimate efficiencies in a steam power plant.
- Describe basic working principles of gas turbine and diesel engine power plants.
- Define the performance characteristics and components of such power plants.
- List the principal components and types of nuclear reactors.
- Evaluate cycle efficiency and performance of a gas cooled reactor power plant.
- Classify different types of coupled vapor cycles and list the advantages of combined cycles power plant.

Course Outcome

- Various components and operations of different types of power plants will be understood.
- The applications of different types of power plants will be studied.

Course Name: OPEN ELECTIVE WORK STUDY & ERGONOMICS
Course Code: 3TBME801 (B)

Course Objective

- To provide basic understanding to the students exactly the concept and significance of work study and ergonomics.
- To inculcate analyzing skills among the students with respect to work place design, working postures and lifting tasks.

Course Outcome

- Identify the appropriate type of plant location, layout and material handling techniques
- Apply and implement the manufacturing planning and control strategies in industry

Course Name: CONSTRUCTION PLANNING & MANAGEMENT
Course Code: 3TBCE8101(C)

Course Objective

- Identify the key activities in the project life cycle.
- Recognize the components of a project charter and how to be appropriately scale them based on the size of a project.
- Understand the role of the "triple constraint" in project management and apply it in determining project scope.
- Keep projects on track by managing project risks and effectively using a communication plan.

Course Outcome

- Following this course, students will be able to describe a project life cycle, and can skillfully map each stage in the cycle
- Students will identify the resources needed for each stage, including involved stakeholders, tools and supplementary materials
- Students will describe the time needed to successfully complete a project, considering factors such as task dependencies and task lengths
- Students will be able to provide internal stakeholders with information regarding project costs by considering factors such as estimated cost, variances and profits
- Students will be able to develop a project scope while considering factors such as customer requirements and internal/external goals

Course Name: PRINCIPLES OF MANAGEMENT AND MANAGERIAL ECONOMICS
Course Code: 3TBME-801 (D)

Course Objective

- The purpose of this course is to expose the student to the basic concepts of

management in order to aid the student in understanding how an organization functions

- Understanding the complexity and wide variety of issues managers face in today's business firms.
- This is an introductory level management course that deals with the basic tenets of organization and management theory and practice.
- The course attempts to familiarize the student with the various functions, processes, and activities of management and to help the student appreciate the underlying theories that constitute the discipline of management.
- This is not intended to turn students into managers but it is expected that students successfully completing this course will be knowledgeable as to the historical, current, and future issues in management.

Course Outcome

After the completion of the course, students will be able to –

- Understand the roles of managers in firms
- Understand the internal and external decisions to be made by managers
- Analyze the demand and supply conditions and assess the position of a company
- Design competition strategies, including costing, pricing, product differentiation, and market environment according to the natures of products and the structures of the markets.
- Analyze real-world business problems with a systematic theoretical framework.
- Make optimal business decisions by integrating the concepts of economics, mathematics and statistics.

Course Name: Professional Elective-II (MACHINE DESIGN-II)
Course Code: 3 TBME802 (A)

Course Objective

- Applying scientific principles and concepts to the design of basic mechanical components and systems; improving problem solving and decision making abilities
- Obtaining design solutions to open-ended problems through a systematic design process.

Course Outcome

- Upon completion of this course, the students can able to successfully design machine components.

Course Name: MANAGEMENT INFORMATION SYSTEMS
Course Code: 3TBME802(B)

Course Objective

- At the end of the course, it is expected that students are able to understand the usage

of Information Systems in management.

- The students also would understand the activities that are undertaken in acquiring an Information System in an organization.
- Further the student would be aware of various Information System solutions like ERP, CRM, Data warehouses and the issues in successful implementation of these technology solutions in any organization.

Course Outcome

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

- Explain basic concepts for IT/IS management
- Discuss organizational, business and strategic issues surrounding IT/IS, and
- Analyze and evaluate uses of strategic IT/IS in practice.

Course Name: DESIGN OF HEAT EXCHANGER
Course Code: 3TBME802 (C)

Course Objective

- The objective of this course is to fulfill the needs of engineers to understand applications of Numerical Analysis,
- Transform Calculus and Statistical techniques in order to acquire mathematical knowledge and to solving wide range of practical problems

Course Outcome

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

- Understand the basic laws of heat transfer.
- Account for the consequence of heat transfer in thermal analyses of engineering systems.
- Understand the fundamentals of convective heat transfer process.
- Analyze heat exchanger performance by using the method of log mean temperature difference.
- Analyze heat exchanger performance by using the method of heat exchanger effectiveness.

Course Name: TOTAL QUALITY MANAGEMENT AND SQC
Course Code: 3TBME802(D)

Course Objective

- To understand the Total Quality Management concept and principles and the various tools available to achieve Total Quality Management.
- To understand the statistical approach for Quality Control.
- To create an awareness about ISO certification process and need for the industries.

Course Outcome

After studying this course, students shall be able to:

- Understand the meaning of total quality management.
- Understand the meaning of quality and industrial applications of total quality control.
- Apply the various quality control tools.
- Get the knowledge about different quality standards and their applications.

Course Name: CAD/CAM
Course Code: 3TBME 803

Course Objective

The general objectives of the course are to enable the students to-

- Understand the basic fundamentals of computer aided design and manufacturing.
- To learn 2D & 3D transformations of the basic entities like line, circle, ellipse etc.
- To understand the different geometric modeling techniques like solid modeling, surface modeling, feature based modeling etc. and to visualize how the components look like before its manufacturing or fabrication.
- To learn the part programming, importance of group technology, computer aided process planning, computer aided quality control.
- To learn the overall configuration and elements of computer integrated manufacturing systems.

Course Outcome

- To introduce a computer aided inspection and manufacturing systems.
- To apply the principles of operation of automated shop floor control and manufacturing process.
- To reduce manual processing and linking computers to all the manufacturing machines.
- To analyze, design, and build manufacturing and automation systems.
- Implement group technology concepts in production to facilitate cellular and flexible manufacturing.
- While implementing these designs, students will continually hone their interpersonal skills, creative abilities and understanding of the design process.
- Develop automated process plans using variant and generative approaches.
- Take appropriate strategy to gradually migrate from conventional manufacturing to FMS and CIM.

Course Name: INDUSTRIAL ROBOTICS
Course Code: 3TBME 804

Course Objective

- To acquire the knowledge of basics of robotics and their importance.
- Understand fundamental theory of robot design.

- To acquire the knowledge on advanced algebraic tools for the description of motion.
- To develop the ability to analyze and design the motion for articulated systems.
- To acquire the knowledge of sensors, actuators and vision system used in robotics

Course Outcome

- Apply knowledge of robotics for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts in the design and development robots
- Demonstrate creativeness in designing and development of robotics.
- Identify, analyze and design of robots useful to the society.
- Work effectively with multidisciplinary robots

Course Name: MAJOR PROJECT
Course Code: 3TBME 805

Course Objective

- To provide students with a comprehensive experience for applying the knowledge gained so far by studying various courses.
- To develop an inquiring aptitude and build confidence among students by working on solutions of small industrial problems.
- To give students an opportunity to do something creative and to assimilate real life work situation in institution.
- To adapt students for latest development and to handle independently new situations.
- To develop good expressions power and presentation abilities in students.

Course Outcomes

- The Project Work is start in this semester and should preferably be a problem with research potential and should involve scientific research, design, generation/collection and analysis of data, and must preferably bring out the individual contribution.
- The Report should be presented in standard format as provided by the department.
- The candidate has to prepare a project report consisting of introduction of the problem, problem statement, literature review, objectives of the work, proposed methodology of solution and expected results.
- The work has to be presented in front of the examiners panel consisting of an approved external examiner.

Course Name: EDUCATIONAL TOUR/ SEMINAR
Course Code: 3TBME 806

Course Objective

- Course Objective of GD and seminar is to improve the COMMUNICATION and CONVINCING/ understanding skills of students and providing an opportunity to exercise their rights to express themselves.

MASTER OF TECHNOLOGY (M. Tech - PE)
PROGRAMME CODE: 05PGR001

PROGRAMME OBJECTIVES (POs)

- **PEO1:** Practice engineering in a broad range of industrial, societal and real world applications.
- **PEO2:** Pursue advanced education, research and development, and other creative and innovative efforts in science, engineering, and technology, as well as other professional careers.
- **PEO3:** Conduct themselves in a responsible, professional, and ethical manner.
- **PEO4:** Participate as leaders in their fields of expertise and in activities that support service and economic development throughout the world.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

- **PSO1.**Apply their knowledge in the domain of Engineering Mechanics, Thermal and Fluid Sciences to solve Engineering problems utilizing advanced technology.
- **PSO2.**Ability to implement the learned principles of Mechanical Engineering to analyze, evaluate and create more advanced Mechanical Systems or Processes.
- **PSO3.** Develop and implement new ideas on product design and development with the help of Modern CAD/CAM tools, while ensuring best manufacturing practices.

Course Name: Advanced Mathematics
Course Code: 6TMMA101

Course Objective

The general objective of the course is to introduce-

- The concept of Tensor analysis and their applications in engineering
- The concept of calculus of variation of functions (one and several variables) and their applications.
- The concept of numerical solution of partial differential equations.
- The concept of conformal mapping and the applications of complex analysis.

Course Outcomes

- Students will be able to analyze and develop the mathematical model of thermal system.
- Student should able analyze the reliability and maintainability of the series and parallel thermal system.
- Students will be able to solve differential equations using numerical techniques.

Course Name: Advances in Manufacturing Technology
Course Code: 6TMPE102

Course Objective

- To understand the basic laws of physics and their applications in engineering and technology
- To develop scientific temper and analytical capability.
- To solve various engineering problems.

Course Outcomes

- An appropriate degree of competency in the evaluation of various additive and rapid manufacturing technologies and their application in modern manufacturing processes.
- Appropriate levels of understanding of the principles of additive manufacturing from CAD design to part manufacture, particularly in-so-far as how that understanding is used in practical applications.
- Competency in specification and use of materials, both metal and polymer, in additive manufacturing processes.

Course Name: Computer Integrated Manufacturing
Course Code: 6TMPE103

Course Objective

- This course aims to acquaint the students with principles, concepts and techniques that are essential in Computer Integrated Manufacturing.

Course Outcomes

- Students will develop an understanding of CAD systems and graphical modeling.
- Students will get acquainted with data bases and numerical analysis related to CIM
- Students will have understanding of Computer Aided Manufacturing (CAM) systems
- Students will have an introduction to Computer Aided Process Planning (CAPP) Systems, Robotic Systems, Group Technology and Cellular Manufacturing Systems
- Students will cultivate understanding about Automated Material Handling Systems, Automated Inspection Systems, Flexible Manufacturing Systems (FMS)

Course Name: Computer aided process planning
Course Code: 6TMPE104

Course Objective

After studying this unit, you should be able to –

- Understand what is process planning and CAPP.
- Know the various steps involved in CAPP.
- Classify the various methods of CAPP,
- Understand the feature recognition in CAPP

Course Outcomes

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

- Generate the structure of automated process planning system and uses the principle of generative and retrieval CAPP systems for automation.
- Select the manufacturing sequence and explains the reduction of total set up cost for a particular sequence.
- Predict the effect of machining parameters on production rate, cost and surface quality and determines the manufacturing tolerances.
- Explain the generation of tool path and solve optimization models of machining processes.
- Create awareness about the implementation techniques for CAPP

Course Name: Manufacturing Automation and Mechatronics
Course Code: 6TMPE105

Course Objective

- To develop an ability to identify, formulate, and solve engineering problems.
- To develop an ability to design a system, component, or process to meet desired needs within realistic constraints.
- To develop an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Course Outcomes

- Awareness about automation, types, line balancing, FMS and cellular manufacturing.
- Applying computing tool for CNC programming and simulation.
- Exposure to control strategies adopted in CNC and automation.

Course Name: Audit Course-I 1: ENGLISH FOR RESEARCH PAPER WRITING
Course Code: 6TMST106

Course Objective

Students will be able to:

- Understand that how to improve your writing skills and level of readability
- Learn about what to write in each section
- Understand the skills needed when writing a Title
- Ensure the good quality of paper at very first-time submission

Course Name: Audit Course-I 2: PEDAGOGY STUDIES
Course Code: 6TMST106

Course Objective

Students will be able to:

- Review existing evidence on the review topic to inform programme designand policy making undertaken by the DFID, other agencies and researchers.

- Identify critical evidence gaps to guide the development.

Course Outcomes
Students will be able to understand:
- What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
- What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
- How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

Course Name: Audit Course-I 3: STRESS MANAGEMENT BY YOG
Course Code: 6TMST 106

Course Objective
- To achieve overall health of body and mind
- To overcome stress

Course Outcomes
Students will be able to:
- Develop healthy mind in a healthy body thus improving social health also
- Improve efficiency.

Course Name: Supply Chain Management
Course Code: 6TMPE 201

Course Objective
- Course Objectives Supply Chain Management involves the flows of materials and information among all of the firms that contribute value to a product, from the source of raw materials to end customers.
- We will integrate issues from finance (investments in productive assets), marketing (channels of distribution), logistics, and operations management to develop a broad understanding of a supply chain
- By taking a strategic perspective, we will focus on relatively long term decisions involving the investment in productive resources, configuration of processes, product designs, and development of partnerships with suppliers and channels of distribution.

Course Outcomes
- This will course will enhance the knowledge and understanding of supply chain issues and appropriate approaches to analyzing and responding to them.
- This course will enhance your communication and collaboration skills.
- This should enhance your worldview of business and society.
- In addition, several of the cases and one of the experiential learning exercises provide opportunities to discuss the role of responsibility and integrity in supply chain management.

Course Name: FMS AND FEA
Course Code: 6TMPE 202

Course Objectives

- To learn basic principles of finite element analysis procedure.
- To learn the theory and characteristics of finite elements that represent engineering structures.
- To learn and apply finite element solutions to structural, thermal, dynamic problem to develop the knowledge and skills needed to effectively evaluate finite element analyses performed by others.
- Learn to model complex geometry problems and solution techniques.

Course Outcomes

- Upon successful completion of this course you should be able to:
- Understand the concepts behind variation methods and weighted residual methods in FEM.
- Identify the application and characteristics of FEA elements such as bars, beams, plane and is parametric elements, and 3-D element.
- Develop element characteristic equation procedure and generation of global stiffness equation will be applied.
- Able to apply Suitable boundary conditions to a global structural equation, and reduce it to a solvable form.
- Able to identify how the finite element method expands beyond the structural domain, for problems involving dynamics, heat transfer, and fluid flow

Course Name: Operation Management
Course Code: 6TMPE 203

Course Objective

Upon course completion, the participants will be able to:

- To gain an understanding and appreciation of the principles and applications relevant to the planning, design, and operations of manufacturing/service firms.
- To develop skills necessary to effectively analyze and synthesize the many inter-relationships inherent in complex socio-economic productive systems.
- To reinforce analytical skills already learned, and build on these skills to further increase your "portfolio" of useful analytical tools for operations tasks.
- To gain some ability to recognize situations in a production system environment that suggests the use of certain quantitative methods to assist in decision making on operations management and strategy.
- To understand how Enterprise Resource Planning and MRPII systems are used in managing operations.
- To increase the knowledge, and broaden the perspective of the world in which you will contribute your talents and leadership in business operations.

- To understand the managerial responsibility for Operations, even when production is outsourced, or performed in regions far from corporate headquarters.

Course Outcomes

- Understand the core features of the operations and production management function at the operational and strategic levels, specifically the relationships between people, process, technology, productivity and quality and how it contributes to the competitiveness of firms.
- Explain the various parts of the operations and production management processes and their interaction with other business functions (strategy, engineering, finance, marketing, HRM, project management and innovation)

Course Name: Robotics and Automated Material Handling
Course Code: 6TMPE 204

Course Objective

After studying this unit, you should be able to understand the

- Importance of AGV in a computer-integrated manufacturing system,
- Role of industrial robots in a computer-integrated manufacturing systems, and
- Alternative for automated material handling system.

Course Outcome

After the successful completion of this course, the student will be able:

- To explain the basic principles of Robotic technology, configurations, control and programming of Robots.
- Design an industrial robot which can meet kinematic and dynamic constraints.
- To describe the concept of Robot kinematics and dynamics, latest algorithms & analytical approaches.
- To discuss and apply the concepts of dynamics for a typical Pick and Place robot.
- To choose the appropriate Sensor and Machine vision system for a given application.
- To explain the basic principles of programming and apply it for typical Pick & place, loading & unloading and palletizing applications.

Course Name: Reliability and Total Productive Maintenance
Course Code: 6TMPE 205

Course Objective

- One of the main objectives of RPM is to increase the productivity of a factory and its equipment with a modest investment in maintenance.
- Reliability and total productive maintenance (TPM) are considered as the key operational activities of the quality management system.
- In order for TPM to be effective, the full support of the total workforce is required.

- This should result in accomplishing the goal of TPM: "Enhance the volume of the production, employee morale and job satisfaction.
- The main objective of TPM is to increase the Overall Equipment Effectiveness of plant equipment.
- TPM addresses the causes for accelerated deterioration while creating the correct environment between operators and equipment to create ownership.

Course Outcomes

On completion, you will be able to:

- Understand the relationship of key concepts in reliability engineering and application to maintenance strategies in a manufacturing environment.
- Establish maintenance strategies according to system characteristics and design transition programs to implement these strategies.
- Manage the manufacturing organization with highest possible availability.

Course Name: Audit Course-II 1: DISASTER MANAGEMENT
Course Code: 6TMST206

Course Objective

Students will be able to:

- Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
- Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
- Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
- Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work.

Course Objectives

- To get a working knowledge in illustrious Sanskrit, the scientific language in the world
- Learning of Sanskrit to improve brain functioning
- Learning of Sanskrit to develop the logic in mathematics, science & other subjects
- Enhancing the memory power
- The engineering scholars equipped with Sanskrit will be able to explore the huge knowledge from ancient literature

Course Name: Audit Course-II 2: PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS
Course Code: 6TMST206

Course Objective
Students will be able to

- Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life.
- The person who has studied Geeta will lead the nation and mankind to peace and prosperity
- Study of Neetishatakam will help in developing versatile personality of students

Course Outcomes

- To learn to achieve the highest goal happily
- To become a person with stable mind, pleasing personality and determination
- To awaken wisdom in students

Course Name: Audit Course-II 3: VALUE EDUCATION
Course Code: 6TMST 206

Course Objective
Students will be able to

- Understand value of education and self- development
- Imbibe good values in students
- Let the should know about the importance of character

Course Outcomes
Students will be able to

- Knowledge of self-development
- Learn the importance of Human values
- Developing the overall personality

Course Name: CNC Machines
Course Code: 6TMPE 301(A)

Course Objective

- This course introduces the concepts and capabilities of computer numerical control machine tools.
- Topics include setup, operation, and basic applications.
- Upon completion, students should be able to explain operator safety, machine protection, data input, program preparation, and program storage.

Course Outcomes

- Understand ASA and ORS systems of tool geometry and their inter-relations.

- Develop relations for chip reduction coefficient, shear angle, shear strain, forces, power, specific energy and temperature in orthogonal cutting.
- Select cutting fluids, tool materials and coatings to control tool wear and temperature.
- Evaluate cutting speed to minimize production cost and maximize production rate.
- Understand the working principles, applications and importance of modern machining processes.

Course Name: MIS and ERP
Subject Code: 6TMPE 301(B)

Course Objective

- At the end of the course, it is expected that students are able to understand the usage of Information Systems in management.
- The students also would understand the activities that are undertaken in acquiring an Information System in an organization.
- Further the student would be aware of various Information System solutions like ERP, CRM, Data warehouses and the issues in successful implementation of these technology solutions in any organization.

Course Outcome

- The student is able to understand an MIS in real-life situation, identify the need of MIS, implementation issues in MIS in that organization and future trends in that system.
- Output is expected in form of a term paper.

Course Name: Flexible competitive mfg. Systems
Course Code: 6TMPE 302(A)

Course Objective

The course serves as an introduction to the modern methods of manufacturing. It so objectives are:

- To expose the student to the different types of manufacturing available today such as the Special Manufacturing System, the Manufacturing Cell, and the Flexible Manufacturing System (FMS).
- To learn the fundamentals of computer assisted numerical control programming and programming languages.
- The automated flow lines.
- The common CAD/CAM data base organized to serve both design and manufacturing.
- To practice the PLC control devices and CNC operation skills.

Course Outcomes

- At the end of the course, the student will be able to:

- Apply the concepts of PPC and GT to the development of FMS.
- Discuss the planning and scheduling methods used in manufacturing systems.
- Identify various workstations, system support equipments and hardware components of FMS.
- Select suitable database and software required for FMS.
- Summarize the concepts of modern manufacturing such as JIT, supply chain management and lean manufacturing etc.

Course Name: Total Quality Management
Course Code: 6TMPE 302(B)

Course Objective
This subject provides students with the knowledge to

- Understand the philosophy and core values of Total Quality Management (TQM).
- Determine the voice of the customer and the impact of quality on economic performance and long-term business success of an organization; apply and evaluate best practices for the attainment of total quality.

Course Outcomes
Upon completion of the subject, students will be able to

- Select and apply appropriate techniques in identifying customer needs, as well as the quality impact that will be used as inputs in TQM methodologies.
- Measure the cost of poor quality and process effectiveness and efficiency to track performance quality and to identify areas for improvement.
- Understand proven methodologies to enhance management processes, such as benchmarking and business process reengineering.
- Choose a framework to evaluate the performance excellence of an organization, and determine the set of performance indicators that will align people with the objectives of the organization.

Course Name: CI process inventory system
Course Code: 6TMPE 302(C)

Course Objective

- This course aims to introduce the students to the fundamental nature of inventory from a financial, physical, forecasting, and operational standpoint.
- The ultimate goal of this course is to present immediately usable information in the areas of forecasting, physical control and layout, and problem recognition and resolution.

Course Outcomes

- Understand that modern practice discourages holding large quantities of inventory.
- Grasp the significance of controlling actual, on-hand inventory as both a physical object (shelf count) and as an intangible object (record count and monetary worth).

- Understand the fundamental differences between finished goods inventories in the retail/distribution sectors and raw materials and work-in-process inventories found in the manufacturing environment.
- Understand basic formulas to calculate inventory quantities.
- Employ basic problem-solving techniques toward issue resolution.

Course Name: Research Methodology and IPR
Course Code: 6TMPE 303

Course Objective

- The course has been developed with orientation towards research related activities and recognizing the ensuing knowledge as property.
- It will create consciousness for Intellectual Property Rights and its constituents.
- Learners will be able to perform documentation and administrative procedures relating to IPR in India as well as abroad.

Course Outcomes

- At the end of the course, students will demonstrate their ability to:
- Understanding and formulation of research problem.
- Analyze research related information.
- Understand plagiarism and follow research ethics
- Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.

Course Name: Dissertation Part-I
Subject Code: 6TMPE 304

Course Outcomes

- The Project Work is start in this semester and should preferably be a problem with research potential and should involve scientific research, design, generation/collection and analysis of data, and must preferably bring out the individual contribution.
- The dissertation part-I should be presented in standard format as provided by the department.
- The candidate has to prepare a project report consisting of introduction of the problem, problem statement, literature review, objectives of the work, proposed methodology of solution and expected results.
- The work has to be presented in front of the examiners panel consisting of an approved external examiner and an internal examiner as decided by the Head and PG coordinator.

Course Name: Dissertation Part-II
Course Code: 6TMPE 401

Course Outcomes

- The Project Work will start in semester III and should preferably be a problem with research potential and should involve scientific research, design, generation/collection and analysis of data, determining solution and must preferably bring out the individual contribution.
- The dissertation should be presented in standard format as provided by the department.
- The candidate has to prepare a detailed project report consisting of introduction of the problem, problem statement, literature review, objectives of the work, methodology (experimental set up or numerical details as the case may be) of solution and results and discussion.
- The report must bring out the conclusions of the work and future scope for the study. .
- The work has to be presented in front of the examiners panel consisting of an approved external examiner, an internal examiner and a guide, co-guide etc. as decided by the Head and PG coordinator.
- The candidate has to be in regular contact with his guide.

DOCTOR OF PHYLOSOPHY (Ph. D – ME)
PROGRAM CODE:PH.D001

PROGRAM OBJECTIVES (POs)

The structure of the Ph. D. (ME) course is designed to produce post graduate with rigorous research and analytical skills, who are exceptionally well-equipped to go onto post doctoral research, or employment in industry and the public service. The Ph. D. (ME) course provides:

- Skills to enable the student to critically examine the background literature relevant to their specific research area.
- An environment that encourages the student's originality and creativity in their research.
- A period of sustained in-depth study of a specific topic.
- Publishing the results of their research in high-profile scientific journals, through constructive feedback of written work and oral presentations.

PROGRAMME-SPECIFIC OUTCOMES (PSOs)

- This program is able to demonstrate originality in the application of knowledge, together with a practical understanding of how research and enquiry are used to create and interpret knowledge in their field.
- This program is an achievement and a significant for student piece of research.
- This program is able to act autonomously in the planning and implementation of research.
- This program has gained oral presentation and scientific writing skills.

Course Name: Research Methodology
Course Code: 5010112801

Course Objectives

- The objective of imparting quality and creative research with an in-depth understanding and integrated knowledge of advanced applicable theory in the field of Electronics & Communication Engg.
- It also provides the knowledge of new methodology and tools to develop the innovative models which will beneficial for academic, industries and society.

Course Outcomes

- To enable for analyzing and identifying problems and provide the appropriate solution to solve the specific problem. It also provides the educated candidates for employment which require in the academic and non academic field.

Course Name: Mechanical engineering
Course Code: 5010152401

Course Objectives

- To acquire the basics knowledge of mathematics, science and Engineering.
- Understand fundamental theory and application approaches, an ability to design and conduct experiments as well as to analyze and interpret data.
- An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

Course Outcomes

- An ability to function on multidisciplinary teams.
- An ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social ,political, ethical, health and safety, manufacturability.

Course Name: Production Engineering
Course Code: 5010152402

Course Objectives

- To acquire the basics knowledge of mathematics, science and Engineering.
- Understand fundamental theory and application approaches, an ability to design and conduct experiments as well as to analyze and interpret data.
- An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

Course Outcomes

- An ability to function on multidisciplinary teams.
- An ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability Products.

Course Name: Applied Mechanics and Design
Course Code: 5010152403

Course Objectives

- To design and analyze helical and multi-leaf springs.
- To design and analyze rolling contact and journal bearings.
- To design and analyze spur, helical and bevel gears.

Course Outcomes

- Determine various forces acting on machine components and their strength.

- Utilize scientific principles, technical information and imagination to design efficient economic and relevant mechanical systems.

Course Name: Fluid Mechanics and Thermal Sciences
Course Code: 5010152304

Course Objectives

- To acquire the basics knowledge of mathematics, science and Engineering.
- Understand fundamental theory and application approaches, an ability to design and conduct experiments as well as to analyze and interpret data.
- An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

Course Outcomes

- An ability to function on multidisciplinary teams.
- An ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability Products.

Course Name: FINITE ELEMENT
Course Code: 5010152405

Course Objectives

- Understand the fundamental concepts of FEM.
- Understanding the use and knowledge of fundamental stiffness matrix.
- Know the behaviour and usage of each type of elements covered in this course.

Course Outcomes

- Apply knowledge of finite element method for understanding, formulating and solving engineering problems.
- Acquire knowledge and hands-on competence in applying the concepts finite element method in the analysis of structural and thermal systems.
- Demonstrate creativeness in designing new systems components and processes in the field of engineering.