First Year Engineering Department

Course Objectives & Outcomes (CO's)

Course Code: BSC-101-BES

Course Name: Engineering Mathematics-I

Course Objectives:

To familiarize the students with concepts and techniques in Calculus, Fourier series and Linear Algebra. The aim is to equip them with the techniques to understand advanced level mathematics and its applications that would enhance analytical thinking power, useful in their disciplines.

Course Outcomes:

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

CO1: Apply mean value theorems and its generalizations leading to Taylors and Maclaurin's series useful in the analysis of engineering problems. **Determine** the Fourier series representation and harmonic analysis of periodic functions in engineering applications.

CO2: Evaluate derivative functions of several variables that are essential in various engineering problems.

CO3: Apply the concept of Jacobian to find partial derivatives of implicit function and functional dependence. Use of partial derivatives in estimating errors & approximations and finding extreme values of the function.

CO4: Apply the essential tool of matrices and linear algebra in a comprehensive manner for analysis of system of linear equations, Linear dependence & Independence, finding linear and orthogonal transformations.

CO5: Determine Eigen values & Eigen vectors. Use it to diagonalize matrix and to reduce quadratic form to canonical form, applicable to engineering problems.

First Year Engineering Department

Course Objectives & Outcomes (CO's)

Course Code: BSC-102-BES

Course Name: Engineering Physics

Course Objectives:

The objective of the course is to impart the knowledge of fundamentals of physics through hands-on experiments and extend it to relevant engineering applications.

Course Outcomes:

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

CO1: Develop the understanding of working principle of lasers, optical fibers and extend it to holography and fiber optic communication.

CO2: Deduce Schrödinger's wave equations and apply it to problems on the bound states by summarizing fundamentals of quantum physics.

CO3: Explain phenomena of interference in thin films, polarization, double refraction and connect to the Anti-Reflection Coating, LCD.

CO4: Develop understanding of Fermi level and Fermi energy in semiconductors on the basis of results of Fermi Dirac statistics and relate them with the working of semiconducting devices. Extend the **understanding** of Ultrasonic to thickness measurement, flaw detection.

CO5: Explain properties of nanoparticles and estimate engineering applications; Explain phenomenon of Superconductivity and estimate engineering applications.

First Year Engineering Department

Course Objectives & Outcomes (CO's)

Course Code: BSC-103-BES

Course Name: Engineering Chemistry

Course Objectives:

To acquire knowledge of water quality analysis technology and electro-analytical techniques for chemical analysis. Learn about specialty polymers and nanomaterials. Study conventional and alternative fuels, and understand corrosion mechanisms and prevention methods.

Course Outcomes:

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

CO1: Understand the practical approaches and techniques required to effectively monitor water quality.

CO2: Select appropriate electro analytical techniques for understanding the materials.

CO3: Demonstrate the structure and properties of advanced engineering materials for various technological applications.

CO4: Analyze different types of conventional and alternative fuels.

CO5: Explain causes of corrosion and methods for minimizing corrosion.

First Year Engineering Department

Course Objectives & Outcomes (CO's)

Course Code: ESC-101-ETC

Course Name: Basic Electronics Engineering

Course Objectives:

1. To **understand** the working principles of PN junction diode and Special purpose diodes.
2. To **study** the operating principle and applications of Bipolar Junction Transistors & MOSFET.
3. To **learn** the concepts of various logic gates, digital circuits, Microprocessor & Controller.
4. To **understand** the concepts of Opamp, its applications and electronic Instruments.
5. To **know** the methods of measurement of physical parameters using sensors and transmission with the help of communication systems.

Course Outcomes:

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

CO1: Know about the working of P-N Junction diode and its application as rectifier & switch, basics of LED & Photodiode.

CO2: Understand the working of BJT & MOSFET, their characteristics & compare.

CO3: Learn logic gates & realization of the digital circuits.

CO4: **Understand** the functioning of Opamp and electronic instruments.

CO5: Select sensors based on their working principle for specific applications and its implementation with Communication system.

First Year Engineering Department

Course Objectives & Outcomes (CO's)

Course Code: ESE-102-ELE

Course Name: Basic Electrical Engineering

Course Objectives:

To impart the fundamental knowledge of electrical engineering to all the students of various disciplines and give comprehensive idea about AC and D C circuit analysis, working principles and applications of basic electric machines. The aim is also to familiarize students with different wiring components, wiring
Schemes and electricity bill.

Course Outcomes:

On completion of this course, learners will be able to:

CO1: Apply Kirchhoff's Laws, Superposition theorem and network simplification techniques for DC circuit analysis.

CO2: Analyze the magnetic circuit parameters, self-Inductance, mutual Inductance and Electromotive Forces (EMF's).

CO3: Calculate AC quantities using mathematical equations, waveforms and phasor diagrams.

CO4: Compute the voltage, current and power of the given 1-phase and 3-phase AC circuits

CO5: Understand the working principle of 1-Phase Transformer, Motors (DC, Induction) and their practical applications.

First Year Engineering Department

Course Objectives & Outcomes (CO's)

Course Code: ESC-103-MEC

Course Name: Engineering Graphics

Course Objectives:

This course aims to cultivate students' ability to conceptualize physical objects and effectively translate them onto paper for communication in engineering contexts. It focuses on enhancing manual drawing skills, honing drawing interpretation abilities, and fostering a practical understanding of object dimensions. Additionally, the course seeks to introduce students to essential drawing and design software tools for a well-rounded skill set.

Course Outcomes:

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

CO1: Explain the fundamentals of Engineering Graphics and basic principles of geometric construction and apply the knowledge of Projections, Methods to prepare the drawings for points and lines.

CO2: Apply the types of Projections, Methods to prepare the drawings for planes.

CO3: Construct the various engineering curves and illustrate the application of various engineering curves and draw the development of the lateral surface of solid.

CO4: Apply the concept of orthographic projection of an object to draw several 2D views for visualizing the physical state of the object.

CO5: Apply the visualization skill to draw an isometric projection from given orthographic views.

First Year Engineering Department

Course Objectives & Outcomes (CO's)

Course Code: ESC-104-CVL

Course Name: Engineering Mechanics

Course Objectives:

The objectives of this course is to make students to learn basics of engineering Mechanics concepts and its application to the real-world problems, solve problems involving Forces, loads and Moments and know their applications in allied subjects.

Course Outcomes:

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

CO1: Understand basic concept of forces, moments and couples in two-dimension force system.

CO2: Apply concept of free body diagram for static equilibrium in two-dimension force system.

CO3: Analyze the practical example involving friction and application of two force members.

CO4: Analyze rectilinear and curvilinear motion of particle.

CO5: Apply Newton's second law, work energy and impulse momentum principles for particles.

First Year Engineering Department

Course Objectives & Outcomes (CO's)

Course Code: ESC-105-COM

Course Name: Fundamentals of Programming Languages

Course Objectives:

1. To understand the fundamental Concepts of C Programming
2. To acquire knowledge and Compare usage of Operators and Expressions in C Programming
3. To apply Control Flow structures in C Programming for Problem solving
4. To design a solution using Arrays, Character and String Arrays in C programming
5. To design a develop solution for simple computational problems using User Defined Functions and structures in C Programming

Course Outcomes:

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

CO1: To **Design** algorithms for simple computational problems.

CO2: To **Use** mathematical, Logical Operators and Expressions.

CO3: To **apply** Control Flow structures for decision making.

CO4: To **design** a solution using Arrays, Character and String Arrays.

CO5: To **D**esign and apply user defined functions and structures.

First Year Engineering Department

Course Objectives & Outcomes (CO's)

Course Code: VSE-101

Course Name: Manufacturing Practice Workshop

Course Objectives:

1. To acquire the basic knowledge of Machine Tools.
2. To inculcate the basics of various manufacturing processes.
3. To impart practical aspects of Machine Tools and Manufacturing processes used in industrial applications
4. To develop the skill through hands-on practices using hand tools, power tools, machine tools in manufacturing and assembly shop

Course Outcome

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

CO1: Illustrate various sections of a typical workshop and different types of tools and machinery commonly found in a workshop.

CO2: Explain the importance of workshop safety and apply general workshop safety rules and guidelines.

CO3: Demonstrate proficiency in various cutting techniques such as sawing, shearing, and laser cutting.

CO4: Plan and complete a simple sheet metal job from start to finish, incorporating shearing, bending, and joining operations.

CO5: Describe the applications, advantages and operation of advanced computerized machine tools in modern manufacturing.

CO6: Apply 3D Printing Technology including setup, operation

First Year Engineering Department

Course Objectives & Outcomes (CO's)

Course Code: VSE-102

Course Name: Design Thinking and Idea Lab

Course Objectives:

- **Understand** the core principles of design thinking and its role in engineering.
- **Apply** the six hats of design thinking to analyze and solve complex problems.
- **Develop** creative and user-centered solutions to real-world challenges.
- **Demonstrate** effective communication and collaboration in multidisciplinary teams.
- **Evaluate** and analysis design concepts and prototypes.
- **Develop** a mindset for continuous innovation and improvement.

Course Outcomes:

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

CO1: Identify and define problems from a user's perspective and articulate design criteria.

CO2: Apply empathy and observation to gain insights into user needs and behaviors

CO3: Generate innovative ideas and solutions through brainstorming and ideation.

CO4: Prototype and test design solutions to refine and improve them

CO5: Present and communicate design ideas effectively using visual aids and storytelling

CO6: Collaborate with peers and industry professionals to address real-world design challenges.

First Year Engineering Department

Course Objectives & Outcomes (CO's)

Course Code: AEC-101

Course Name: Professional Communication Skills

Course Objectives:

To train the students in acquiring interpersonal communication skills by focusing on language skill acquisition techniques and error feedback.

Course Outcomes:

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

CO1: Recognize, identify, and express advanced skills of Technical Communication in English through Language Laboratory.

CO2: Understand, categorize, differentiate, and infer listening, speaking, reading, and writing skills in societal and professional life.

CO3: Articulate and present the skills necessary to be a competent Interpersonal communicator.

CO4: Deconstruct, appraise, and critique communication behaviors.

CO5: Adapt, negotiate, and facilitate with multifarious socio-economical and professional arenas with effective communication and interpersonal skills.

First Year Engineering Department

Course Objectives & Outcomes (CO's)

Course Code: CCC-101

Course Name Co-Curricular Course – I

Objectives:

Students are required to go through the list of following Co-curricular Courses and select any one of their interests. They will be allocated one course from the list. Experts from respective course will conduct classes on campus/Online through activities, discussions, presentations, and lecture methods. Students are required to **submit hard copy of a report along with certificate on the activities performed** related to topics of opted Co-curricular Course.

Evaluation will be done based on the report of activities submitted by student. Faculty members will be allotted for mentoring the activities related to Co-curricular Course topic. Faculty members will frame the **list activities to be performed by students** with the help of experts in respective course.

Selecting co-curricular courses that align with your interests and goals can significantly enrich your educational journey. Remember to maintain a balance and choose courses that you are genuinely

Excited about. This approach will help you gain the most from your co-curricular activities.

First Year Engineering Department

Course Objectives & Outcomes (CO's)

Course Code: BSC-151-BES

Course Name: Engineering Mathematics – II

Course Objectives:

To familiarize the students with Advanced techniques of integration, Tracing of curve, Solid geometry, Multiple integrals and their applications, Mathematical modeling of physical systems using differential equations. The aim is to equip them with the concept and tools to understand advanced level mathematics and its applications, that would enhance thinking power, useful in their disciplines.

Course Outcomes:

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

CO1: Apply advanced integration techniques such as Reduction formulae, Beta functions, Gamma functions, Differentiation under integral sign and Error functions useful in evaluating multiple integrals and their applications.

CO2: Trace the curve for a given equation and measure arc length of various curves. **Apply** the concepts of solid geometry to solve problems on sphere, cone and cylinder in a comprehensive manner.

CO3: Evaluate multiple integrals and its application to find area bounded by curves, volume bounded by surfaces, Centre of gravity and Moment of inertia.

CO4: Apply the effective mathematical tools for solving first order ordinary differential equations such as Exact and Reducible to exact Linear and reducible to Linear.

CO5: Model physical systems using ordinary differential equations, **solve and analyze** the solutions

apply to Newton's law of cooling, electrical circuit, rectilinear motion, mass spring systems, heat transfer etc.

First Year Engineering Department

Course Objectives & Outcomes (CO's)

Course Code: PCC-151-ITT

Course Name: Programming and Problem Solving

Course Objectives:

To understand problem solving aspects and to know python programming with learning data types, decision control statements, function, strings, file handling in Python. To learn features of object oriented programming concepts using python.

Course Outcomes:

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

CO1: Inculcate and **apply** various skills in problem solving.

CO2: Choose appropriate programming constructs and features to **solve** the problems in diversified domains.

CO3: Exhibit the programming skills for the problem-solving using functions and string manipulations.

CO4: Demonstrate File handling and dictionaries in Python.

CO5: Apply Object Oriented concepts in Python.

First Year Engineering Department

Course Objectives & Outcomes (CO's)

Course Code: IKS-151

Course Name: Indian Knowledge System

Course Objectives:

1. To introduce students to the foundational concepts of Indian knowledge systems and their significance.
2. To familiarize students with key dates in Indian history and the historical timeline.
3. To provide an overview of Indian philosophical systems and their relevance.
4. To explore significant scientific achievements in ancient India and analyze scientific texts and inventions.
5. To examine the role of engineering in ancient India and its contributions to metallurgy, materials science, and architectural techniques.

Course Outcomes:

On completion of this course, learners will be able to:

CO1: Understand the significance and historical context of Indian knowledge systems.

CO2: Comprehend Indian philosophical concepts, scientific achievements, and their interplay.

CO3: Recognize the role of engineering in ancient India and its impact on architecture and materials.

CO4: Apply ancient Indian engineering principles in modern practices while considering cultural and environmental aspects.

First Year Engineering Department

Course Objectives & Outcomes (CO's)

Course Code: CCC-151

Course Name: Co-Curricular Courses - II

Course Objectives:

Students are required to go through the list of following Co-curricular Courses and select any one of their interests. They will be allocated one course from the list. Experts from respective course will conduct classes on campus/Online through activities, discussions, presentations, and lecture methods.

Students are required to **submit hard copy of a report along with certificate** on the activities performed related to topics of opted Co-curricular Course. Evaluation will be done based on the report of activities submitted by student.

Faculty members will be allotted for mentoring the activities related to Co-curricular Course topic. Faculty members will frame the list activities to be performed by students with the help of experts in respective course.

Selecting co-curricular courses that align with your interests and goals can significantly enrich your educational journey. Remember to maintain a balance and choose courses that you are genuinely excited about. This approach will help you gain the most from your co-curricular activities.