COURSE OUTCOMES (COs)

First Year (2019 Pattern)

107001: Engineering Mathematics-I	
Students shall be able to	
C107001.1	**Use** MVT's and their generalization leading to Taylor's and Maclaurin's series useful in the analysis of engineering problems. (BL- 1,2,3)
C107001.2	**Express** periodic functions in terms of Fourier series which will be useful for design and analysis of continuous and discrete systems. (BL- 1,2,3)
C107001.3	**Determine** the partial derivatives of functions of several variables. (BL- 1,2,3)
C107001.4	**Examine** the function of several variables for extreme values using partial derivatives. **Use** the concept of Jacobians to **find** partial derivatives of implicit functions and to **infer** about functional dependence. (BL- 1,2,3)
C107001.5	**Solve** system of linear equations. **Examine** linear dependence of vectors. **Express** linear and orthogonal transformations in matrix form and **discuss** its nature. (BL- 1,2,3)
C107001.6	**Find** eigenvalues and eigenvectors which are useful in the study of diagonalization. **Classify** quadratic forms as definite, semi-definite and indefinite. (BL- 1,2,3)

107002: Engineering Physics	
Students shall be able to	
107002.1	**Evaluate** *the* thickness of coating on a thin film to act as anti-reflecting or reflecting surface using principles of optics.
107002.2	**Apply** basics of lasers and optical fibers and their practical application in fiber optic communication.
107002.3	**Evaluate** wavelength associated with moving object and energy of allowed states of microscopic particle tapped in potential well by applying quantum mechanics.
107002.4	**Apply** the theory of semiconductors for understanding working of semiconductor devices.
107002.5	**Understand** latest technological developments in magnetism and superconductors and its emerging applications.
107002.6	**Comprehend** use of concepts of physics for non-destructive testing and learn various properties of nanomaterials and their applications

107008: Engineering Mathematics-II	
Students shall be able to	
107008.1	**Solve** first order and first-degree differential equations and model and interpret various physical systems such as L-C-R circuits, rectilinear motion, Newton's law of cooling, heat flow etc.
107008.2	**Evaluate** integrals by using advanced techniques such as Reduction formulae, Beta & Gamma function, and Differentiation under integral sign (DUIS).
107008.3	**Sketch** a given curve and find its arc length.

107008.4	**Formulate** equation of sphere, cone and cylinder satisfying given conditions.
107008.5	**Evaluate** multiple integrals and apply it to find area, volume, moment of inertia, center of gravity, mean and RMS values.

107009: Engineering Chemistry	
Students shall be able to	
107009.1	**Apply** the water softening techniques based on testing parameters such as hardness, alkalinity, and use of water. (L3)
107009.2	**Analyze** the acid-base sample based on the electroanalytical techniques like pH-metry and conductometry (L4)
107009.3	**Demonstrate** structure, properties, and applications of Advanced Engineering materials like specialty polymers and nanomaterials. (L3)
107009.4	**Analyze** different types of conventional and alternative fuels. (L4)
107009.5	**Apply** the concepts of UV visible and IR spectroscopy based on principle, instrumentation, and applications for quantitative and qualitative analysis. (L3)
107009.6	**Illustrate** the mechanisms of corrosion, factors affecting rate of corrosion and methods of corrosion prevention (L3)

102003: Systems in Mechanical Engineering	
Students shall be able to	
102003.1	**Describe** Various Energy Conversion Processes and **Differentiate** Renewable and Non-Renewable Energy Sources. (BTL1 Remember and BTL2 Understand)
102003.2	**Solve** Problems using Required Knowledge of Basic Laws of Thermodynamics, Heat Transfer and **List** Their Applications. (BTL3 Apply and BTL1 Remember)
102003.3	**Demonstrate** the Type of Road Vehicles and **Discuss** their Specifications. (BTL3 Apply and BTL2 Understand)
102003.4	**Illustrate** Various Basic Parts and Transmission System of a Road Vehicle. (BTL3 Apply)
102003.5	**Discuss** Several Manufacturing Processes and **Identify** the Suitable Process. (BTL2 Understand and BTL1 Remember)
102003.6	**Identify** Various Types of Mechanism used in Domestic Appliances and its Application. (BTL1 Remember)

102012: Engineering Graphics	
Students shall be able to	
102012.1	**Draw** the fundamental engineering objects using basic rules and able to **construct** the simple geometries.
102012.2	**Construct** the various engineering curves using the drawing instruments.
102012.3	**Apply** the concept of orthographic projection of an object to **draw** several 2D views and its sectional views for visualizing the physical state of the object.
102012.4	**Apply** the visualization skill to **draw** a simple isometric projection from given orthographic views precisely using drawing equipment.
102012.5	**Draw** the development of lateral surfaces for cut section of geometrical solids.
102012.6	**Draw** fully dimensioned 2D, 3D drawings using computer aided drafting tools.

103004: Basic Electrical Engineering	
Students shall be able to	
103004.1	**Imbibe** electromagnetism concepts and its comparison with electric circuit
103004.2	**Summarize** the concept of electrostatics and fundamentals of AC quantities.
103004.3	**Implement** concepts of the fundamentals of AC quantities for pure R, L, and C elements and their series and parallel combinations.
103004.4	**Explain** the implementation of poly phase networks and concept of single-phase transformer.
103004.5	**Analyze** the resistive circuits using star-delta conversion KVL, KCL and different network theorems under DC supply.
103004.6	**Explain** work, power, and energy relations and usage of various batteries for different applications.

104010: Basic Electronics Engineering	
Students shall be able to	
104010.1.	**Explain** the construction and working principle of P-N junction, Zener, LED, Photo Diode, and Applications of PN junction diode as half wave, full wave, and bridge rectifiers.
104010.2	**Explain** the working principle and **plot** the characteristics of BJT, MOSFET. **Compare** BJT and MOSFET in terms of various parameters, applications as switch and amplifier.
104010.3	**Build and test** analog circuits using OPAMP and digital circuits using universal/basic gates and flip flops.
104010.4	**Identify** a suitable electronic instrument and **measure** various electrical parameters.
104010.5	**Classify and select** a suitable sensor for a given specific application.
104010.6	**Describe** basic principles of communication systems including AM, FM and GSM.

101011: Engineering Mechanics	
Students shall be able to	
101011.1	**Determine** the resultant, moment of various 2-D force system.
101011.2	**Determine** centroid of plane figures and lines, Moment of area, Moment of Inertia and **solve** problems on friction.
101011.3	**Draw** free body diagram for various systems in equilibrium, determine the resultant of 3-D concurrent and parallel force systems and analyze the force systems in equilibrium
101011.4	**Analyze** 2-D structures such as Trusses, Frames and Cables using equations of equilibrium.
101011.5	**Solve** the problems based on rectilinear and curvilinear motion of particles in 2-D plane using equations of kinematics
101011.6	**Apply** Newton's second law of motion, Work-Energy Principle, Impulse-Momentum Principle for rectilinear and curvilinear motion of particles in 2-D plane to solve problems of practical significance

110005: Programming and Problem Solving	
Students shall be able to	
110005.1	**Demonstrate** problem solving methods, skill to solve complex problems, applying mathematical foundations, problem analysis and design.
110005.2	**Write** programming **construct** (data type, control, and decision statement, etc.) **demonstrate** sustainable development using problem solving in engineering and social domains concerning environmental issues.
110005.3	**Write** functions to **demonstrate** Python programming skills and ethics, teamwork using open-source documentation reporting and presentation tools
110005.4	**Demonstrate** teamwork by writing test cases using string manipulation operation and file handling operations in python.
110005.5	**Use** lifelong learning to **apply** programming paradigm (OOP, Procedural) and **demonstrate** Object Oriented Programming in python.

101007: Environmental Studies-I	
Students shall be able to	
101007.1	**Demonstrate** an integrative approach to environmental issues with a focus on sustainability.
101007.2	**Explain and identify** the role of the organism in energy transfers in different ecosystems.
101007.3	**Distinguish** between and provide examples of renewable and nonrenewable resources & analyze personal consumption of resources
101007.4	**Identify** key threats to biodiversity and develop appropriate policy options for conserving biodiversity in different settings.

101014: Environmental Studies-II	
Students shall be able to	
101014.1	**Understand** environmental pollution and the science behind those problems and potential solutions.
101014.2	Have knowledge of various acts and laws and will be able to **identify** the industries that are violating these rules.
101014.3	**Assess** the impact of ever-increasing human population on the biosphere: social, economic issues and role of humans in conservation of natural resources.
101014.4	**Learn** skills required to research and analyze environmental issues scientifically and learn how to use those skills in applied situations such as careers that may involve environmental problems and/or issues.

111006: Workshop	
Students shall be able to	
111006 .1	**Familiar** with safety norms to prevent any mishap in workshop
111006 .2	**Handle** appropriate hand tool, cutting tool and machine tools to manufacture a job
111006 .3	**Understand** the construction, working and functions of machine tools and their parts.
111006 .4	**Know** simple operations (Turning and Facing) on a Centre lathe.

110013: Project Based Learning	
Students shall be able to	
110013.1	**Increase** their capacity and learning through shared cognition.
110013.2	**Draw** on lessons from several disciplines and apply them in practical way.
110013.3	**Promote** (through learning by doing approach) long-term retention of material and replicable skill, as well as improve teachers' and students' attitudes towards learning.