SVKM'S
NMIMS
Deemed to be UNIVERSITY

Mukesh Patel School of Technology Management and Engineering

B.Tech (Mechatronics Engineering)

- **Program Educational Objectives (PEOs)**
- **Program Outcomes (POs)**
- **Course Outcomes (COs)**

Program Educational Objectives (PEOs):

1. **Professional Skills**
2. **Career Growth**
3. **Higher Studies**

Program Outcomes (POs):

PO-1: Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.

PO-2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

PO-3: Design/Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)

PO-4: Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8)..

PO-5: Engineering Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6).

PO-6: The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).

PO-7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity, and inclusion; adhere to national & international laws. (WK9).

PO-8: Individual and Collaborative Team work: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.

PO-9: Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective

reports and design documentation, make effective presentations considering cultural, language, and learning differences.

PO-10: Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.

PO-11: Life-Long Learning: Recognize the need for, and have the preparation and ability for independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change..

Courses and Course Outcomes (COs):

Constitution of India

- **CO-1:** Recall the historical evolution of India's democratic values, emphasizing the foundational principles of justice, equality, and liberty as enshrined in the Preamble of the Constitution.
- **CO-2:** Understand the fundamental rights enshrined in the Constitution, their permissible restrictions, and how these rights are balanced with duties, to grasp their application within societal and professional frameworks.
- **CO-3:** Apply the knowledge of the structure of India's polity and the role of the Judiciary in maintaining the basic structure of the Constitution in real-world professional contexts

Chemistry

- **CO-1:** Explain the basic concepts of polymers, their types, and applications
- **CO-2:** Apply knowledge of lubrication properties and numerical problem-solving
- **CO-3:** Evaluate combustion processes and the characteristics of different types of fuels by solving related numerical problems
- **CO-4:** Assess the chemistry of water hardness, and softening methods, and solve related numerical problems
- **CO-5:** Investigate the properties and applications of engineering materials, composites, and nanomaterials

English Communication

- **CO-1:** Use their knowledge of vocabulary and grammar to articulate their ideas effectively
- **CO-2:** Demonstrate effective listening and speaking skills in oral communication situations such as speeches, conversations, power-presentations, etc.
- **CO-3:** Apply different reading techniques as needed to read passages effectively

Technical Communication

- **CO-1:** Apply the fundamentals of written communication to create written documents that are coherent, error-free, and well organized.

- **CO-2:** Develop the ability to create effective and persuasive business correspondence, such as letters and emails, that follow etiquette and are able to achieve the desired outcomes.
- **CO-3:** Create basic reports such as memo, letter, and survey-based report, using their understanding of report writing.

Dynamic Systems Modelling

- **CO-1:** Understand and apply theoretical concepts in kinematics
- **CO-2:** Analyze the given system using the Free Body Diagram
- **CO-3:** Understand and calculate the forces acting on dynamic systems
- **CO-4:** Apply the constitutive laws to analyze the dynamic systems of particles and rigid bodies
- **CO-5:** Understand and calculate the energy of a dynamic system and power dissipated

Engineering Mechanics

- **CO-1:** Identify and solve force systems using fundamental principles of mechanics to understand their effects on engineering structures and components.
- **CO-2:** Apply equilibrium conditions to determine support reactions, internal forces, and assess the stability of various structures.
- **CO-3:** Identify centroids and moments of inertia of engineering components, utilizing the parallel and perpendicular axis theorems for structural analysis.
- **CO-4:** Analyze particle motion using velocity, acceleration, and different coordinate systems.
- **CO-5:** Apply Newton's laws, D'Alembert's principle under translational motion, rotational motion to solve particle motion problems.

Critical Thinking

- **CO-1:** solve problems or take decisions by processing information in a clear, logical, reasoned, and reflective manner.
- **CO-2:** recognise, build, and appraise arguments
- **CO-3:** analyse contexts effectively

- **CO-4:** recognise bias and its impact on decision making

Probability and Random Variables

- **CO-1:** Know the concept of probability and random variables.
- **CO-2:** Solve problems involving conditional probability and moments.
- **CO-3:** Demonstrate understanding of the applications of various probability distributions, measures of central tendency to solve real life problems.
- **CO-4:** Analyse the different probability density functions and their applications.