

Gujarat PG CET 2025 Mechatronics Engineering (MC)

Syllabus PDF

ENGINEERING MATHEMATICS

Linear Algebra: Matrix algebra, Systems of linear equations, Eigen values and eigenvectors.

Calculus: Functions of single variable, Limit, continuity and differentiability, Mean value theorems, Evaluation of definite and improper integrals, Partial derivatives, Total derivative, Maxima and minima, Gradient, Divergence and Curl, Vector identities, Directional derivatives, Line, Surface and Volume integrals, Stokes, Gauss and Green's theorems.

Differential equations: First order equations (linear and nonlinear), Higher order linear differential equations with constant coefficients, Cauchy's and Euler's equations, Initial and boundary value problems, Laplace transforms, Solutions of one dimensional heat and wave equations and Laplace equation.

Complex variables: Analytic functions, Cauchy's integral theorem, Taylor and Laurent series.

Probability and Statistics: Definitions of probability and sampling theorems, Conditional probability, Mean, median, mode and standard deviation, Random variables, Poisson, Normal and Binomial distributions.

Numerical Methods: Numerical solutions of linear and non-linear algebraic equations
Integration by trapezoidal and Simpson's rule, single and multi-step methods for differential equations.

MECHATRONICS ENGINEERING

Basic Mechanical Engineering

Motion and power transmission mechanisms, Design of mechanisms, Basics of hydraulic and pneumatic systems, Properties of gas and steam, Heat engines, Steam engines, I.C. engines, Pumps, compressors, Refrigeration and air conditioning.

Basic Electrical and Electronics Engineering

Fundamentals of electrical and electronics engineering, Programmable Logic Controllers (PLCs), Microprocessors, Microcontrollers and embedded systems, Electric Circuits and fields, Control systems, Electrical and electronic measurement, Analog and digital electronics, Power electronics and drives.

Manufacturing Technology

Metal cutting principles and Conventional machining processes, Computer Aided Manufacturing (CAM), Basic part programming, Measuring and gauging standards, Non-traditional manufacturing methods, Location theory and Jig-fixtures design.

Metal Forming Processes

Hot and Cold working, Metal forming processes like Extrusion, Drawing, Rolling, Forging, Casting, Welding, etc.

Robotics

Robot fundamentals, Basic configurations, Robot kinematics, Trajectory planning, types of end effectors, drive systems, Robot sensors, applications in manufacturing.

Computer aided Design

Fundamentals of computer graphics, Geometrical modeling, Finite element analysis.

Machine Vision

Digital image fundamentals, image enhancement, image compression, image restoration.

Operations Research

Linear programming, Transportation model assignment model, Network analysis, sequencing problem, decision theory, replacement, queuing model, inventory control.

Material Science and Metallurgy

Iron-Iron Carbon diagram, Heat treatment processes, Ferrous and non-ferrous metals, Non destructive testing.

Strength of Materials

Stress-strain relationship and elastic constants, Mohr's circle for plane stress and plane strain, thin cylinders, shear force and bending moment diagrams, bending and shear stresses, deflection of beams, torsion of circular shafts, Euler's theory of columns, strain energy methods, thermal stresses.
