

The logo for Jawaharlal Nehru Technological University consists of several overlapping circles in blue, black, and yellow.

**Jawaharlal Nehru Technological
University, Kakinada, Andhra
Pradesh B.E./B.Tech MECH Sem 1
syllabus**

Mathematics - I

UNIT I: Sequences, Series and Mean value theorems:

Sequences and Series: Convergences and divergence - Ratio test - Comparison tests - Integral test - Cauchy's root test - Alternate series - Leibnitz's rule.

Mean Value Theorems (without proofs): Rolle's Theorem - Lagrange's mean value theorem - Cauchy's mean value theorem - Taylor's and Maclaurin's theorems with remainders.

UNIT II: Differential equations of first order and first degree

Linear differential equations - Bernoulli's equations - Exact equations and equations reducible to exact form.

Applications: Newton's Law of cooling - Law of natural growth and decay - Orthogonal trajectories - Electrical circuits.

UNIT III: Linear differential equations of higher order

Non-homogeneous equations of higher order with constant coefficients - with non-homogeneous term of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x^n , $e^{ax} V(x)$ and $x^n V(x)$ - Method of Variation of parameters.

Applications: LCR circuit, Simple Harmonic motion.

UNIT IV: Partial differentiation

Introduction - Homogeneous function - Euler's theorem - Total derivative - Chain rule - Jacobian - Functional dependence - Taylor's and Maclaurin's series expansion of functions of two variables.

Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method (with constraints).

UNIT V: Multiple integrals

Double and Triple integrals – Change of order of integration – Change of variables.

Applications: Finding Areas and Volumes.

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