

**MA152 Mathematics - II**  
**CREDITS = 5 (L=4, T=1 , P=0)**

1     **Unit – 1**

**Ordinary Differential Equation of first order and its applications :**

Reorientation, modeling of engineering system pertaining to first order differential equations [Mathematical models: Electrical Network models, Bending beam models, Spring mass system, Simple pendulum].

8 Hours

2     **Unit – 2**

**Ordinary differential equation of higher order and Applications:**

Linear differential equation of higher order with constant coefficients and with variable coefficient (Cauchy and Legendres forms) Models for the Real world problems and their solutions in particular, modeling of electric circuits, Deflection of beams, Free oscillations, Forced oscillations, Resonance.

10 Hours

3     **Unit – 3**

**Multiple Integral and its Applications:**

Double integrals, evaluation, Change of the order of integration for Cartesian Coordinates, Change in Polar Coordinates, Evaluation of Triple Integrals, Application to find area, Volume by double integrals.

8 Hours

4     **Unit – 4**

**Vector Calculus:**

Vector and scalar fields, Vector differentiation, gradient, divergence, curl, Line Integrals.

8 Hours

5     **Unit – 5**

**Integral functions:**

Gamma, Beta and Error functions definitions, their relationship and properties, Elliptic integrals of first and second kind.

8 Hours

**Tutorial :**

- This shall consist of problems of at least 20 examples of each unit mentioned above.
  
- Each unit consists of 2 tutorials.

## REFERENCE BOOKS:

**Title:** Higher Engineering Mathematics  
**Author:** B S Grewal,  
**Publisher:** Khanna Publishers, New Delhi.

**Title:** Advanced Engineering Mathematics,  
**Author:** E. Kreyszig,  
**Publisher:** Wiley India Pvt. Ltd.

**Title:** Higher Engineering Mathematics  
**Author:** Dr T A Desai, Prin. G. C. Patel,  
**Publisher:** Atul Publishers, Ahemdabad.

**Title:** Advanced Engineering Mathematics  
**Author:** Merle C. Potter, J. L. Goldberg, Adverd F. Aboufables,  
**Publisher:** Oxford Press.

**Title:** New Engineering Mathematics, Vol. II,  
**Author:** A. Chandrababu, C. R. Seshan,  
**Publisher:** Narosa Publishing House.

**Title:** Advanced Engineering Mathematics,  
**Author:** R. K. Jain, S. R. K. Iyengar,  
**Publisher:** Narosa Publishing House.

**Title:** Engineering Mathematics  
**Author:** K. A. Stroud  
**Publisher:** Macmillan Publications.

**Title:** Higher Engineering Mathematics  
**Author:** B. V. Ramana  
**Publisher:** Tata Mc. Grow Hill Publications

**Title:** Higher Engineering Mathematics,  
**Author:** Dr. K.R. Kachot,  
**Publisher:** Mahajan Publishers, Ahmedabad.