B. Tech. (Mechanical & Production), Semester – 4　　　　　　　　　　**L　　T　　P　　C**

MH 210: ENGG. MATHEMATICS – III　　　　　　　　　　4　　1　　0　　5

- **CALCULUS, MULTIPLE INTELRALS** **(08 Hours)**
  Reorientation of concepts of integrals, Double and Triple integrals evaluation techniques, Change of order of Integration, Change of variable, Application of double and triple integrals for evaluation of area, volume and mass.

- **BASIC CONCEPTS OF VECTOR CALCULU S** **(08 Hours)**
  Line Integrals, Scalar and vector point function, Differential operator, Gradient, Directional derivative, Physical meaning of gradient, Divergence, Curl and Laplacian with their properties, Surface Integral, Volume integral, Green's ,Gauss and Stoke's theorem & application .

- **FOURIER SERIES** **(06 Hours)**
  Definition, Fourier series with arbitrary period , in particular periodic function with period 2π. Fourier series of even and odd function, Half range, Fourier series.

- **PARTIAL DIFFERENTIAL EQUATION** **(08 Hours)**
  Second order PDE of mathematical physics (Heat, wave one dimensional equation and Laplace equation with standard boundary conditions), Solution by separation of variable method using Fourier series.

- **INTRODUCTION TO ENGINEERING ANALYSIS** **(06 Hours)**
  Types of problems encountered in Mechanical Engineering, Classification of problems based on methods of solution.

- **SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS** **(12 Hours)**
  Euler's method, Runge-Kutta method, Boundary value and eigen value problems, Application to mechanical engineering problems, Taylor's series and Predictor-Corrector method.

- **FINITE DIFFERENCE METHOD (12 Hours)**
  Methods to derive finite difference equations, Elliptic and parabolic equations, Boundary conditions, Explicit and Implicit method, Application to mechanical engineering problems

(Total Lecture Hours: 60)

BOOKS RECOMMENDED:

1. E. Kreyszing, "Advanced Engineering Mathematics", John Wiley, International Student Ed ition, 1995
2. Peter O'Neel, "Advance Engineering & Mathematics", Thompson (Singapore) Indian Edition, 2002
3. Michael D. Greenber, "Advance Engineering Mathematics", Pearson (Singapore) Indian Edition, 2007
4. S.S. Chapra & R.P. Canale, "Numerical Methods for Engineers", McGraw Hill International edition, 2002
5. K. S. Rao, "Numerical Methods for Scientists and Engineers", Prentice -Hall India, 2nd Edition, 2004
6. N. K. Raju & K. U. Muthu, "Numerical Methods for Engineering Problems", Macmillan India Ltd., 2 nd Edition,2005