

**Mathematics-III**  
**BEG201SH**

**Year: II**

**Semester: III**

Teaching Schedule Hours/week			Examination Scheme				Total Marks	Remarks		
			Final		Internal Assessments					
			Theory	Practical	Theory Marks	Practical Marks				
L	T	P	Duration	Marks	Duration	Marks				
3	2	-	3	80	-	-	20	-	100	

**Objectives:** The purpose of this course is to round out the student's preparation more sophisticated applications with an introduction of linear algebra, a continuous of the study of ordinary differential equations and an introduction to vector algebra and Fourier series.

**1.0 Matrices and Determinant. 14 Hrs**

- 1.1 Matrix and Determinant
- 1.2 Vector Space (Introduction), Dependent and Independent vectors
- 1.3 Linear Transformation
- 1.4 System of Linear Equations, Gauss elimination method only
- 1.5 Inverse of Matrix (Gauss Jordan Method)
- 1.6 Rank of the Matrix
- 1.7 Eigen Values of Matrix, Eigen Vectors and its applications

**2.0 Laplace Transformation 10 Hrs**

- 2.1 Introduction
- 2.2 Laplace Transform of some Elementary Functions
- 2.3 Properties of Laplace Transform
- 2.4 Inverse Laplace Transforms
- 2.5 Application to differential equations

**3.0 Line, Surface and Volume Integrals 9 Hrs**

- 3.1 Definition of Line Integral
- 3.2 Evaluation of Line Integral
- 3.3 Evaluation of Surface and Volume Integrals
- 3.4 Dirichlet Integrals

**4.0 Integral Theorems 6 Hrs**

- 4.1 Greens Theorem in the plane
- 4.2 Stoke's Theorem (without proof)
- 4.3 Gauss Divergence Theorem (without proof)
- 4.4 Consequences and Applications of Integral Theorems

**5.0 Fourier Series 6 Hrs**

- 5.1 Periodic Function
- 5.2 Trigonometric Series
- 5.3 Fourier Series
- 5.4 Determination of Fourier Coefficients: Euler Formulae  $(-\pi, \pi)$
- 5.5 Fourier Series in the Intervals  $(0, 2\pi)$  and  $(-l, l)$
- 5.6 Even and Odd Functions and their Fourier Series: Fourier Cosine & Sine Series
- 5.7 Half Range Function
- 5.8 Parsevals Formula
- 5.9 Fourier Series in Complex Form (Introduction)

**Reference Books:**

1. E. Kreyszig, Advanced Engineering Mathematics – 5<sup>th</sup> Edition, Wiley, New York.
2. A Text Book of Engineering Mathematics Vol. II – P. R. Pokharel.
3. A Text Book of Engineering Mathematics Vol. III – N. B. Khatakho & S. P. Pradhanang.