Purbanchal University

Faculty of Engineering, Biratnagar, Nepal

Syllabus

Level: Bachelor

Program: Bachelor in Biomedical/Civil/Computer/Electrical/Electronics Comm. & Automation/Geomatic Engineering

Subject: BSH---- MATHEMATICS III

Year: II **Semester: III**

Teaching Schedule Hours/Week					Examination Schedule						Total Marks
					Final				Internal Assessment		
					Theory		Practical		Theory Marks	Practical Marks	
Credit Hours	L	T	P	Total	Duration	Marks	Duration	Marks	40	-	100
3	3	3	-	6	3 Hrs.	60	-	-			

Note: L: Lecture T: Tutorial P: Practical

OBJECTIVES: The main objective of this course is to provide students a sound knowledge of Linear Algebra, Laplace Transform, Vector Calculus with Integral Theorems, Fourier series and Linear Programming Problems with respective applications.

1. Determinants and Matrices 11 Hrs

1.1 Review of Matrices: types, transpose and inverse with properties (without proof) and applications

1.2 Review of Determinants: Introduction, Properties (without proof), applications

1.3 Vector spaces: Introduction, Dependent and independent Vectors, Linear transformation

1.4 System of linear equation and techniques to solve it (Gauss elimination method only), Elementary row operations, Gauss-Jordan method to find inverse of a matrix.

1.5 Rank of the matrix: Echelon Form and Normal Form, Application of the Rank

1.6 Eigen values and Eigen Vectors of matrix with applications, Cayley-Hamilton Theorem and its applications in finding inverse of a matrix

2. Laplace Transform 10 Hrs

2.1 Introduction

2.2 Laplace Transforms of elementary functions

2.3 Properties of Laplace Transform

2.4 Inverse Laplace transforms

2.5 Application of Laplace Transform in solving differential equations with initial conditions

2.6 Convolution of Laplace transform, Inverse of Laplace transform using convolution

3. Line Integrals, Surface Integrals and Volume Integrals 13 Hrs

3.1 Line Integrals: Introduction, evaluation, application as work done, independent of Path, Conservative fields

3.2 Surface Integrals: Introduction, evaluation, application as flux

3.3 Volume Integrals: Introduction, evaluation, Dirichlet's Integral

3.4 Integral Theorems

- Green's Theorem in the plane (without proof), its applications.
- Stoke's Theorem (without proof), its applications.
- Gauss' Divergence Theorem (without proof), its applications.

4. Fourier Series **6 Hrs**

4.1 Introduction, Periodic Functions, odd and even functions

4.2 Fourier Series: Introduction, evaluation (Period 2π and arbitrary period)

4.3 Half Range Fourier (sine and cosine) Series: Introduction, evaluation

4.4 Parseval's Formula

5. Linear Programming Problem **5 Hrs**

5.1 Review of Simplex method and duality (Converting in to dual)

5.2 Big-M Method and Two Phase Method

Text Book

1. Zill D., Wright W. S. and M. R. Cullen, *Advanced Engineering Mathematics*, Jones and Bartlett Publishers Inc.
2. Kreyszig, E. (1999), *Advanced Engineering Mathematics, 9th Edition*, John Wiley and Sons.
3. Peter V. O'Neil , *Advanced Engineering Mathematics* , 8th Edition , University of Alabama at Birmingham

Evaluation Scheme

Internal Assessment: 40

Final Examination: 60

Chapter-wise Marks Division for Final Exam

Unit	Chapter Name	Short questions (2 marks)	Long questions (4 marks)	Total Marks
1	Determinants and Matrices	4	2	16
2	Laplace Transform	3	2	14
3	Line Integrals, Surface Integrals and Volume Integrals	1	4	18
4	Fourier Series	2	1	8
5	Linear Programming Problem	-	1	4
	Total	10	10	60

NOTE: *There may be at most one OR question from each unit 1, unit 2 and unit 3. There will be altogether three OR questions in the final question paper.*