ENGINEERING MATHEMATICS - I

B.Tech. First Year, I - Semester

Common for all branches

[R-15 Regulation]

Credits	Periods			Exam Hrs.	Sessional Marks	Exam Marks	Total Marks
	Theory	Tutorial	Lab				
3	3	1	-	3	40	60	100

Purpose :

To impart analytical ability in solving mathematical problems as applied to the respective branches of Engineering

Course Objectives:

- To impart knowledge in basic concepts of functions of several variables and their applications like maxima & minima.
- To enable the students to study the concepts of Fourier series.
- To enable the students to study the concepts of three dimensional figures like sphere, cone, cylinder and conicoids.
- To equip the students with the knowledge of multiple integrals and their applications.
- To introduce the concepts of improper integrals like Beta, Gamma & Error functions.

Course Outcomes : At the end of the course the student will be able to	
1	Familiar with the functions of several variables.
2	Apply Fourier series in solving boundary value problems.
3	Apply the concept of three dimensional analytical geometry.
4	Use mathematical tools needed in evaluating multiple integral and their usage.
5	Use the concepts of improper integrals, Gamma, Beta and Error functions which are needed in engineering applications.

CO – PO Mapping :

	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
CO-1	**3**	**2**										**1**
CO-2	**3**	**2**										**1**
CO-3	**3**	**2**										**1**
CO-4	**3**	**2**										**1**
CO-5	**3**	**1**										**1**

SYLLABUS

UNIT – I : PARTIAL DIFFERENTIATION (12 Periods)

Function of two or more variables – Partial Derivatives – Which variable is to be treated as constant – Homogeneous functions – Euler's theorem – Total Derivative – Change of variables – Jacobians – Taylor's theorem for functions of two variables – Maxima and Minima functions of two variables.

UNIT – II : FOURIER SERIES (12 Periods)

Introduction – Euler's formula – conditions for a Fourier expansion – Functions having points of discontinuity – Change of interval – Even and Odd functions – Half range series – Parseval's formula.

UNIT – III : THREE DIMENSIONAL ANALYTICAL GEOMETRY (12 Periods)

Equation of a sphere – Plane section of a sphere – Tangent Plane – Equation of a cone – Right circular cone – Equation of a cylinder – Right circular cylinder.

UNIT – IV: MULTIPLE INTEGRALS (14 Periods)

Double integrals – Change of order of integration – Double integral in polar coordinates – Area enclosed by plane curves – Triple Integrals – Volume of Solids – Change of variables – Area of curved surfaces – Calculation of mass.

UNIT – V : BETA & GAMMA FUNCTIONS (10 Periods)

Beta function – Gamma function – Relation between Beta and Gamma functions – Results and problems – Error function.

TEXT BOOK:

1. **Dr. B.S. Grewal**, "*Higher Engineering Mathematics*", 43rd edition, Khanna Publishers, New Dehli.

REFERENCE BOOKS:

1. **Dr. N.P. Bali, Dr. Ashok Saxena, Dr. N.Ch. S. Narayana**, "*A Text book on Engineering Mathematics*", Laxmi Publications (P)Ltd., New Delhi.
2. **H. K. Dass**, "*Advanced Engineering Mathematics*", S. Chand and Company Ltd.
3. **Dr. M. K. Venkataraman**, "*Higher Engineering Mathematics*", National Publications Co. Madras.
4. **Erwin Kreyszig**. "*Advanced Engineering Mathematics*", John Wiley and Sons, New York.