Mathematics-II
BSC-104

2nd Semester | **L T P C**
Internal Marks: 40 | **3 1 0 4**
External Marks: 60
Total Marks: 100

Course Outcomes

After studying this course, students shall be able to :

- Understand and apply concepts of vector calculus, differential equations and calculus of complex functions to engineering problems.
- Sketch basic cartesian, parametric and polar curves.
- Apply the techniques of multiple integrals in engineering problems.
- Evaluate integrals of vector point functions over line, surfaces and volumes.
- Substantiate the ability to integrate knowledge and ideas of multivariable calculus to engineering problems.
- Understand how to decompose the periodic functions in series of sine and cosine.

Detailed Contents:

PART A

1.Fourier Series: Periodic functions, even & odd functions, Euler's formulae for Fourier series, Dirichlet's conditions, half range Fourier series. **05 Hrs**

2.Curve tracing: Introduction to maxima, minima, concavity, convexity, points of inflexion, tracing of basic cartesian, parametric and polar curves. **07 Hrs**

3.Partial Differentiation: Limit, continuity and partial derivatives, composite functions, total derivative. Applications: tangent plane and normal line, maxima, minima and saddle points, method of Lagrange multipliers, Taylor's and Maclaurian expansions for functions of two variables, errors and approximations. **08 Hrs**

PART B

4.Multiple Integral: Double integrals (cartesian, polar co-ordinates), change of order of integration, change of variables, applications of double integrals to find areas and volumes. Triple integrals (cartesian, spherical and cylindrical polar co-ordinates), applications of triple integrals to find volume involving cubes, sphere and rectangular parallelepipeds. **10 Hrs**

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P.T.O.

5.Vector Calculus: Del, directional derivative, gradient, curl, divergence, scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes (without proof) and their applications. **10 Hrs**

Suggested Readings/Books:

1. G.B. Thomas and R.L. Finney, *Calculus and Analytic geometry*, 9th Edition, Pearson, Reprint, 2002.

2 R.K.Jain and S.R.K.Iyengar, *Advanced Engineering Mathematics*, Narosa Publications, New Delhi.

References:

1. Erwin Kreyszig, *Advanced Engineering Mathematics*, 9th Edition, John Wiley & Sons, 2006.

2. W. E. Boyce and R. C. DiPrima, *Elementary Differential Equations and Boundary Value Problems*, 9th Edn., Wiley India, 2009.

3. S. L. Ross, *Differential Equations*, 3rd Ed., Wiley India, 1984.

4. E. A. Coddington, *An Introduction to Ordinary Differential Equations*, Prentice Hall India, 1995.

5. E. L. Ince, *Ordinary Differential Equations*, Dover Publications, 1958.

6. J. W. Brown and R. V. Churchill, *Complex Variables and Applications*, 7th Ed., Mc-Graw Hill, 2004.

7. N.P. Bali and Manish Goyal, *A text book of Engineering Mathematics*, Laxmi Publications, Reprint, 2008.

8. B.S. Grewal, *Higher Engineering Mathematics*, Khanna Publishers, 36th Edition, 2010.

Topics for Self Learning(TSL)

1. Trigonometric formulas.

2. Methods of differentiation.

3. Methods of integration..

4. Variable separable method.

5. Solution of homogeneous first order differential equations.

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