







## Semester VI

### GE- 2: GENERAL MATHEMATICS-2

5 Lectures + 1 Tutorial per week (Ideal Tutorial Group Size: 12-15 Students)  
Max. Marks 100 (including internal assessment)  
Examination: 3 hrs

#### UNIT-I

A brief introduction to the lives and information on the works of the following Mathematicians: Dedekind, Cantor, Poincare, Hilbert, Moore, Hausdorff, Hardy, Noether, Polya, Ramanujan, Alexander, Banach, Neumann

#### UNIT-II

Basics of Graph theory, the Konigsberg Bridge problem, four-colour map problem, Mobius strip and Klein bottle

Introduction of functions, graphs of functions, increasing and decreasing functions, even and odd functions, location of points of extrema, inflection, periodic functions-all via graphs

Perspective and Projection, Perspective geometry: lines and points in 2D and 3D, Fundamental trigonometric functions, use of perspective in drawing, historical background, common tools adopted by artists for such representations, analysis of some paintings to spot use of perspective and techniques

Types of symmetry, concrete examples of symmetry groups, basic tilings, Study of symmetry and patterns by looking at monuments/ buildings/ ornamental art, Escher's art

Golden ratio, Golden rectangle, Fibonacci sequences in nature

Shapes and solids, the regular polyhedral, Euler's formula, Importance of Platonic solids and mystical significance to the ancient Greeks, Construction of Altars and geometry in ancient India  
Fractals in nature, for example snowflakes and coastlines

#### UNIT-III

Solving system of linear equations, gauss elimination method and row operations, consistent and inconsistent system, Gauss Jordan row reduction and echelon form, homogeneous system, equivalent system, row equivalence, rank of a matrix, relation between homogeneous systems and rank, solving a system using the inverse of coefficient matrix

#### REFERENCES:

- [1] Gullberg, Jan. *Mathematics: from the birth of numbers*. WW Norton & Company, 1997.
- [2] James, Ioan, *Remarkable mathematicians: from Euler to von Neumann*. Cambridge University Press, 2002
- [3] Stephen Andrilli and David Hecker, *Elementary Linear Algebra*, 4th Edition, Academic Press, 2009.

*Handwritten signature and date: 15/6/16*