

## CERTIFICATE COURSE IN BASIC MATHEMATICS

Module	Content	No of Lectures
1	Module I: Continuity and Differentiation	
1.1	Properties of Real Numbers Order properties, Interval, Archimedean properties, Bounded Sets, Infimum and Supremum Absolute value function.	2
1.2	Limits and Continuity Left hand limit, Right hand limit, Limit at infinity, Continuity of a function at a point, In an interval, Discontinuity, Removable and non-removable discontinuity,	2
1.3	Differentiation Definition, Leibnitz rule, Chain rule, L'hospital rule, Mean value theorem, Taylors theorem.	2
1.4	Application of Derivatives Increasing and decreasing function, Concave upwards and concave downwards, Optimization,	2
2	Module II: Integration and Differential equation	
2.1	Integration Various integration method Viz: substitution, by Parts, Partial fraction, etc. integration as limit of a Sum	2
2.2	Application of Integration Finding area, Volume, Surface area, Solid of revolution length of the curve.	2
2.3	Ordinary differential equation Formulation, Solving by separation, Substitution, Homogeneous and non-homogeneous differential equation, Exact differential equation, Integrating factor and solving the differential equation. Solving ODE by variation of parameters and Method of undetermined coefficients. D-operator method to solve higher order.	4
3	Module III: Algebra	
3.1	Function. Domain, range, Co-domain, 1-1 functions. Onto functions, bijective function	2
3.2	Logarithm Properties of logarithmic function, Solving mathematical expression using logarithm	2
3.3	Matrices Algebra of matrices, Types of matrices viz: symmetric, skew symmetric, etc. Singular and non-singular matrices, Algebra of matrices.	2
3.4	Solving system of equation and Eigen values and Eigen vectors Solving system of equation using Do-Little's LU decomposition. Finding Eigen values and the corresponding Eigen vectors.	2



**SOMAIYA**  
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K J Somaiya College of Science & Commerce

**Department: Mathematics**



**T R U S T**

**Basic Mathematics – Syllabus**

**Credit Point - 2.0**

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**REFERENCE BOOKS:**

1. Linear Algebra by Gilbert Strang
2. Differential Equation by G. F. Simmons

Practical/Project: Additional 12-15 hours of laboratory work is required to get introduced to mathematical software and complete a project using it.

**EVALUATION SCHEME:**

	Internal	End of the course	Total Marks	Grades offered
Theory	30	60	100	yes
Practical/ Project work	10			