

DEPARTMENT OF MATHEMATICS
FACULTY OF ENGINEERING AND TECHNOLOGY
SRM UNIVERSITY

MA0121-Mathematics for Architects
(Academic year 2014-15 ODD Semester)

I YEAR B.Arch.

SEMESTER: I

PURPOSE

The course is aimed at developing basic Mathematical skills for Architecture students to understand structural concepts complex form and geometry.

INSTRUCTIONAL OBJECTIVES

To inculcate understanding of the application of matrices, differential calculus, integration & analytical geometry in the study of architecture.

LECTURE SCHEME / PLAN

MATRICES

Lect. No.	Lesson schedule	Learning outcomes	Cumulative day(s)
L 0.0	Review Topics: Types of matrices, operation in matrices, Determinants, properties.	Students are able to understand the applications of matrices	1
L 1.1	Rank of Matrix: Elementary Transforms		2,3
L 1.2	Inverse of a matrix by gauss - Jordan method linear independence		4,5
L 1.3	Consistency of system of equations - Rouche's Theorem (statement only)		6,7
L 1.4	Eigen values and Eigen vectors - problems		8,9
L 1.5	Cayley - Hamilton Theorem - verification & applications		10,11
L 1.6	Tutorial		12

DIFFERENTIAL CALCULUS & APPLICATIONS

Lect. No.	Lesson schedule	Learning outcomes	Cumulative day(s)
L 2.0	Review Topics: Limit, continuity concepts - methods of differentiation	To be familiarized with the fundamental phenomena and applications in Differential calculus	13
L 2.1	Calculus of one variable: Curvature		14
L 2.2	Radius of curvature - Cartesian type		15
L 2.3	Radius of curvature - Polar type		16
L 2.4	centre & circle of curvature.		17,18
L2.5	Calculus of two variables: Partial differentiation - simple problems		19,20
L 2.6	Homogeneous functions Euler's Theorem		21
L 2.7	Maxima and Minima - saddle point-problems		22

L 2.8	Lagrange's multiplier method (simple problems)		23
L 2.9	Tutorial		24

NUMERICAL INTEGRATION

Lect. No.	Lesson schedule	Learning outcomes	Cumulative day(s)
L 3.0	Introduction to Numerical integration	Learners will understand the concept of numerical integration of a definite integral for a given function from a given set of tabular values.	25
L 3.1	Trapezoidal rule and its applications		26,27
L 3.2	Problems based on Simpson's 1/3 rd rule		28,29
L 3.3	Simpson's 3/8 th rule and its applications		30,31
L 3.4	Error formula - order of error.		32,33
L3.5	Weddle's rule - problems		34,35
L 3.6	Tutorial		36

ANALYTICAL GEOMETRY (3DIMENSINAL)

Lect. No.	Lesson schedule	Learning outcomes	Cumulative day(s)
L 4.0	Three dimensional Analytical geometry - Introduction	To inculcate understanding of the application of three dimensional analytical geometry	37
L 4.1	Direction cosines, Direction ratios - Angle between lines - simple problems		38,39
L 4.2	Plane: Equation of plane - Angle between planes - Distance between parallel planes.		40,41
L 4.3	St. Line: Equations of straight line -symmetrical and unsymmetrical forms - problems		42,43
L 4.4	Coplanar lines - applications		44,45
L 4.5	Shortest distance between skew lines - Problems		46,47
L4.6	Tutorial		48

APPLICATIONS OF INTEGRATION

Lect. No.	Lesson schedule	Learning outcomes	Cumulative day(s)
L 5.0	Review: Techniques of integration	Students are acquiring the applications of integration in the study of architecture.	49
L 5.1	Curve tracing - plane curves - Cartesian & polar form		50 - 52
L 5.2	Procedure for curve tracing in parametric form.		53,54
L 5.3	Area bounded by curve - Arc length of curve - volume & surface Area of solids of revolution.		55 - 57
L 5.4	Introduction to sphere, cone, cylinder quadratic surface & solids of revolutions.		58,59
L 5.5	Tutorial		60

For theory cum studio courses, the first assessment will be mid-term test and the second assessment will be a seminar / portfolio. Both the assessments will be conducted for 25 marks each (total 50).

Reference Books:

Grewal B.S., *Higher Engineering Mathematics*, 35th edition, Khanna Publishers, 2000.
Veerarajan.T. *Theory and problems in Numerical Methods*, Tata McGraw Hill Publishing Co., New Delhi, 2004.
Veerarajan T., *Engineering Mathematics*, Tata McGraw Hill Publishing Co., New Delhi, 2000.

Kandasamy P etal. *Engineering Mathematics*, Vol. I (4th revised edition), S.Chand & Co., New Delhi, 2000.

Venkataraman M.K., *Engineering Mathematics - First Year* (2nd edition), National Publishing Co., Chennai, 2000.

Narayanan S., Manicavasagam Pillay T.K., Ramanaiah G., *Advanced Mathematics for Engineering students*, Volume I (2nd edition), S.Viswanathan Printers and Publishers, 1992.

A.Singaravelu, *Numerical methods -Meenakshi Agency*, Chennai -2004.

Web References:

www.wikipedia.com

www.mit.ocw.in

www.sosmath.com

www.tutorial.math.lamar.edu

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