



SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar, Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.25)
Syllabus with effect from the Academic Year 2021-2022

(Master of Science) (Mathematics)
(M.Sc.) (Mathematics) Semester (II)

Course Code	PS02EMTH54	Title of the Course	Problems and Exercises in Mathematics-I
This course is same as the course PS03EMTH69. The students opting for this course shall not be offered PS03EMTH69.			
Total Credits of the Course	04	Hours per Week	04

Course Objectives:	1.To obtain a better understanding of the techniques of solving problems and exercises of analysis and abstract algebra. 2. To enhance logical thinking, reasoning and problem solving capability in analysis and abstract algebra.
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Course Content		
Unit	Description	Weightage* (%)
1.	Sequences and series of real numbers, tests of convergence, limsup, liminf, power series, function of one variable: continuity, uniform continuity, differentiability, monotone functions, types of discontinuities of monotone functions, mean value theorem.	25
2.	Sequences and series of functions: uniform convergence and continuity, uniform convergence and integration, uniform convergence and differentiation, functions of several variables: directional derivative, partial derivative, derivative as a linear transformation.	25
3.	Vector spaces, subspaces, basis, dimension, linear transformations and matrices, rank, determinant, and trace of matrices, linear equations, eigenvalues and eigenvectors, Cayley-Hamilton theorem.	25
4.	Canonical forms, diagonal forms, diagonalization of matrices, triangular forms, Jordan forms. Quadratic forms, reduction and classification of quadratic forms. Inner product spaces, orthonormal basis.	25

Teaching-Learning Methodology	Classroom teaching, independent thinking, problem solving
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to

1.	gain a problems solving prospective in the subjects like analysis and abstract algebra.
2.	solve problems efficiently asked in various competitive exams in mathematics.

Suggested References:

Sr. No.	References
1.	Rudin W., Principles of Mathematical Analysis (Third Edition), Tata MacGraw-Hill Publ., New Delhi, 1983.
2.	Ghorpade Sudhir R., and Limaye Balmohan V., A Course in Multivariate Calculus and Analysis, Springer 2010.
3.	Peter Olver and Chehrzad Shakiban, Applied Linear Algebra, 2nd Edition, Springer 2018.
4.	Seymour Lipschutz and Marc Lipson, Schaum's Outline of Linear Algebra, 4th Edition, McGraw Hill, 2008.
5.	K. Hoffman and Ray Kunje, Linear Algebra, Prentice-Hall of India private Ltd. 1971
6.	I. N. Herstein, Topics in Algebra, Second edition, Wiley Eastern Ltd. 1975

On-line resources to be used if available as reference material

On-line Resources

