

Teerthanker Mahaveer University
Faulty of Engineering

M.Sc. Mathematics

Programme Specific Outcomes

PSO – 1	Understanding the skills set required in industries, laboratories, Banks, Insurance Companies, Educational/Research institutions, Administrative positions.
PSO – 2	Applying the knowledge for Professional Growth: Keep on discovering new avenues in the chosen field and exploring areas that remain conducive for research and development.
PSO – 3	Applying Skills like time management, crisis management, stress interviews and working as a team for successful career.
PSO – 4	Analyzing the problems by using problem solving skills and apply them independently to problems in pure and applied mathematics.
PSO – 5	Evaluating quantitative models arising in social science, business and other contexts.
PSO – 6	Creating and applying appropriate techniques, resources and modern technology in multidisciplinary environment.

Course Outcomes

MAT111	CO1.	Understanding the concept of differential equation and analytical techniques to evaluate the solution of second order ordinary differential equations with constant coefficient.
	CO2.	Understanding the concepts of second and higher order linear differential equations with variable coefficients.
	CO3.	Analyzing the intangibility of a differential equation and finding the solution of total differential equation.
	CO4.	Applying the concept of existence and uniqueness of solutions under initial and boundary conditions.
	CO5.	Applying the concept of Picard's iterative methods the solution.
	CO1.	Understanding the concepts of open & closed sets.
MAT112	CO2.	Understanding the properties of Riemann Integrability and theorems on Riemann Integration.
	CO3.	Understanding the bounded, convergent, divergent, Cauchy and monotonic sequences and calculate their limit superior, limit inferior, and the limit of a bounded sequence.
	CO4.	Understanding the concepts of implicit functions and optimizes

		the functions of several variables.
	C05.	Applying the ratio, root, alternating series and limit comparison tests for convergence and absolute convergence.
MAT113	C01.	Understanding the structures, Vector space, subspaces and analyzing the effect of independency of vectors.
	C02.	Understanding the concept of Linear transformation and their matrix representation.
	C03.	Understanding of Inner product space and formation of ortho normal basis using Gram Schmidt Method.
	C04.	Understanding the concepts of Bilinear Forms for Symmetric & skew Symmetric.
	C05.	Analyzing the system of linear equations, consistency and dependency.
MAT115	C01.	Understanding basic concepts of research and its methodologies, sampling techniques, meaning of scaling, its classification, important scaling techniques, basic principles of graphical representation
	C02.	Identifying appropriate research topics using better central tendency and dispersion procedures
	C03.	Analyzing different research problem and their associated parameters, hypothesis with significance levels and different degree of freedoms, correlation and regression
	C04.	Evaluating appropriate project proposal (to undertake a project), significance of report writing, layout and precautions for writing research report
	C05.	Creating, organizing and conducting research (advanced project) in a more appropriate manner with the help of SPSS for data analysis
TMUPA-101	C01.	Operationalizing the inter-related concept of Percentage in Profit Loss and Discount.
	C02.	Applying the arithmetical concepts in Ratio and Proportion, Mixture and Allegation.
	C03.	Employing the techniques of Percentage, Ratios and Average in inter related concepts of Time and Work, Time speed and Distance.
	C04.	Evaluating the different possibilities of various reasoning based problems in series, Direction and Coding-Decoding.
TMUPS-101	C01.	Utilizing effective verbal and non-verbal communication techniques in formal and informal settings
	C02.	Understanding and analyzing self and devising a strategy for self growth and development.

	C03.	Adapting a positive mindset conducive for growth through optimism and constructive thinking.
	C04.	Utilizing time in the most effective manner and avoiding procrastination.
	C05.	Making appropriate and responsible decisions through various techniques like SWOT, Simulation and Decision Tree.
	C06.	Formulating strategies of avoiding time wasters and preparing to-do list to manage priorities and achieve SMART goals.
MAT116	C01.	Understanding the concept of various components of computer system
	C02.	Understanding the Object-Oriented Programming Language concepts.
	C03.	Analyzing basic mathematical problem and their solutions through programming
	C04.	Applying the concepts of programming solutions for distinct problems
	C05.	Applying the concepts of scalable solutions through function
MAT161	C01.	Understanding the concepts of execution to programs written in C language.
	C02.	Applying to prepare programming solutions for specific problems.
	C03.	Applying to prepare scalable solutions through functions.
	C04.	Applying basic elements of a C program including arithmetic and logical operators, functions, control structures, and arrays
	C05.	Analyzing basic mathematical problem and their solutions through programming.
MAT211	C01.	Understanding the concepts of limit continuity and differentiability.
	C02.	Understanding the basic properties of complex integral and their theorems.
	C03.	Understanding the concept of singularity.
	C04.	Applying the concept of bilinear transformation and conformal mappings.
	C05.	Applying the theorems of complex analysis to evaluate definite integrals and infinite series.
MAT212	C01.	Understanding the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.
	C02.	Understanding of important mathematical concepts in abstract algebra such as definition of a group, order of a finite group and order of an element.
	C03.	Applying problem-solving using advanced algebraic techniques

		applied to diverse situations in physics, engineering and other mathematical.
	C04.	Analyzing the concept of advanced algebraic techniques.
	C05.	Creating capacity for mathematical reasoning through analyzing, Proving and explaining concepts from advanced algebra.
MAT213	C01.	Understanding numerical techniques to find the roots of non-linear equations and solution of system of linear equations.
	C02.	Understanding the difference operators and the use of interpolation.
	C03.	Understanding numerical differentiation and integration and numerical solutions of ordinary and partial differential equations.
	C04.	Applying numerical methods to obtain approximate solutions to numerical problems.
	C05.	Applying the concepts of finite difference & interpolation methods.
MAT261	C01.	Understanding the concepts of numerical methods.
	C02.	Applying the numerical method on computer programming language.
	C03.	Applying numerical integration using Simpson's 1/3, 3/8 rules & Trapezoidal rule.
	C04.	Applying the numerical method to solve the differential equation using 4th order Runge Kutta method.
	C05.	Analysis the root of the Algebraic and Transcendental equations using Bisection Method using C programming.
MAT214	C01.	Understanding the concepts of subspace, product and quotient topologies.
	C02.	Understand the structure of topological spaces using continuous functions and homeomorphisms.
	C03.	Understanding the concepts of Hilbert spaces and Banach spaces and their operators.
	C04.	Understanding the concepts of metric spaces.
	C05.	Applying the theorems of connectedness and compactness.
MAT215	C01.	Understanding the Mathematical formulation of optimization problems (linear and non-linear both) and their various solution techniques.
	C02.	Applying the mathematical formulation of inventory problems and obtaining their optimality condition.
	C03.	Applying the concept of job sequencing and their various characteristics in n jobs and m machines problem.
	C04.	Analyzing the characteristics of Poisson queue (M/M/1).

	CO5.	Analyzing the Non linear programming problem and their solutions.
TMUPA-201	CO1.	Applying the concepts of modern mathematics Divisibility rule, Remainder Theorem, HCF /LCM in Number System.
	CO2.	Relating the rules of permutation and combination, Fundamental Principle of Counting to find the probability.
	CO3.	Applying calculative and arithmetical concepts of ratio, Average and Percentage to analyze and interpret data
	CO4.	Employing the concept of higher level reasoning in Clocks and Calendars, Set theory and Puzzle Problems.
TMUPS-201	CO1.	Communicating effectively in a variety of public and interpersonal settings.
	CO2.	Applying concepts of change management for growth and development by understanding inertia of change and mastering the Laws of Change.
	CO3.	Analyzing scenarios, synthesizing alternatives and thinking critically to negotiate, resolve conflicts and develop cordial interpersonal relationships.
	CO4.	Functioning in a team and enabling other people to act while encouraging growth and creating mutual respect and trust.
	CO5.	Handling difficult situations with grace, style, and professionalism.
MAT311	CO1.	Understanding the concepts of completeness for Linear Space.
	CO2.	Understanding the concepts of Hilbert space with related identities and inequalities.
	CO3.	Understanding of fundamental theorems for Normed and Banach Spaces.
	CO4.	Applying the concepts of open mapping theorem, the closed graph theorem and Weierstrass theorem on spaces.
	CO5.	Applying the concept of Queuing Theory.
MAT312	CO1.	Understanding the concepts of partial differential equations, Laplace, Heat & Wave equations.
	CO2.	Applying non- linear partial differential equations of first order.
	CO3.	Applying Solution of partial differential equation by Laplace transform.
	CO4.	Applying specific methods to solve Heat equation, wave equation, Laplace equation.
	CO5.	Applying relaxation method to solve the elliptic equations by difference method.
MHM320	CO1.	Understanding the importance of value education in life and method of self-exploration.

	CO2.	Understanding 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration.
	CO3.	Applying right understanding about relationship and physical facilities.
	CO4.	Analysing harmony in myself, harmony in the family and society, harmony in the nature and existence.
	CO5.	Evaluating human conduct on ethical basis.
MAT314	CO1.	Understanding the concepts of graphs, types of graphs and operations on graphs.
	CO2.	Understanding the concepts of tree, types of tree, cut-set and connectivity with network flow.
	CO3.	Understanding the concepts of planer graph, geometric dual, thickness and crossings.
	CO4.	Understanding the concepts of matrix representation of graphs, Chromatic number and the Four-Color Problem.
	CO5.	Applying the concepts of shortest path algorithm to solve the traveling salesman problem.

Database Management System

MSC014	CO1.	Understanding the concept of Database Management System
	CO2.	Applying the commercial relational database system (Oracle).
	CO3.	Applying the relational algebra expressions for queries.
	CO4.	Applying the basic database storage structures and access techniques: file and page organizations, indexing methods including B-tree, and hashing.
	CO5.	Analyzing the issues of transaction processing and concurrency control.
MAT315	CO1.	Understanding the concept of the probability, addition law of probability, multiplication law of probability and Bayes theorem with its applications.
	CO2.	Understanding the basic tools of sampling, probability mass function and probability density function.
	CO3.	Applying the moment generating function and mathematical expectation find out the mean & variance of the function.
	CO4.	Applying the different properties of estimator, estimate consistency, unbiasedness and efficiency.
	CO5.	Analyzing the M.G.F, C.F and P.D.F of the discrete distribution and continuous distribution, find out its mean and variance.
MSC013	CO1.	Understanding the concepts of correlation and regression analysis

		using by variable.
	C02.	Understanding the tools necessary for data mining.
	C03.	Applying test according to data in variable field.
	C04.	Analyzing the relevant properties of data.
	C05.	Analyzing the builds models to detect patterns and relationship in data.
MAT411	C01.	Understanding the concepts of division algorithm, greatest common divisor, least common multiple and Bracket functions.
	C02.	Understanding the concept of congruence and solution approach of the Diophantine equations.
	C03.	Understanding the concept of number theoretic functions and their applications to cryptography.
	C04.	Understanding the three milestone theorems on number theory: Chinese remainder theorem, Fermat theorem, Wilson Theorem and their applications.
	C05.	Analyzing the primitive roots and learn the solution approach of solving quadratic congruence.
MAT412	C01.	Understanding the concepts of propositions, logical implication and Boolean algebra.
	C02.	Understanding the concepts of isomorphism of semi groups and monoids.
	C03.	Understanding the concepts of poset, lattice and types of lattice.
	C04.	Understanding the concepts of language, regular set and finite state machine.
	C05.	Applying the concepts of Karnaugh map to convert the Boolean expressions in Normal forms.
MAT461	C01.	Understanding simple program modules to implement single numerical methods and algorithms.
	C02.	Applying to use basic flow controls (if-else, for, while).
	C03.	Applying Test program output for accuracy using hand calculations and debugging techniques
	C04.	Applying multiple program modules into larger program packages
	C05.	Analyzing the generate plots and export this for use in reports and presentations.
MAT414	C01.	Understanding basic knowledge of fuzzy sets and fuzzy logic.
	C02.	Applying fuzzy inferences.
	C03.	Applying fuzzy information in decision making.
	C04.	Applying the theory of possibility on the basis of evidences.
	C05.	Analyzing the fuzzy relations on fuzzy sets.

MAT415	C01.	Understanding the concepts of variationally problems.
	C02.	Applying the numeric method on various integral equations.
	C03.	Applying the method of Successive Approximations & Fredholm Theory.
	C04.	Analyzing isoperimetric problems.
	C05.	Analyzing the decomposition method.