Course Outcome

2018

UG Mathematics (Major) Programme Outcomes

Students are able to construct and develop logical arguments for mathematical proofs. Students acquire good knowledge to solve problems in advance areas of Mathematics like Analysis, Algebra, Geometry, Differential Equations, Number Theory, Discrete Mathematics etc.

1.Students are able to apply mathematical ideas to solve real world problems. They are motivated to go for internships during the summer and puja breaks in different research institutes to sharpen their skills.Nowadays they are attending many Webinars and Workshops in online mode to enhance their mathematical Knowledge

2.For their higher studies some special entrance preparation classes and mock interviews are arranged in the department to facilitate them to appear in those examinations.

3.Students develop skills in Programming Languages and software like C++, MATLAB to solve ordinary and partial differential equation and
numerical analysis which helps them to be fit for applying for both industry and research.

4.Encourage the students to develop a range of generic skills helpful in employment, internships and social activities.

5.Acquire good knowledge and understanding to solve specific theoretical and applied problems in advanced areas of mathematics and statistics.

Calculus:
This course will enable the students to:
i) Calculate the limit and examine the continuity of a function at a point.
iii) Understand the consequences of various mean value theorems for differentiable functions.
iii) Sketch curves in Cartesian and polar coordinate systems.
iv)Concept of Integration with its geometrical Interpretation
v) Apply derivative tests in optimization problems appearing in physical sciences, life sciences and a host of other disciplines.

Discrete Mathematics
This course will enable the students to:
i) Learn about partially ordered sets, lattices and their types.
ii) Understand Boolean algebra and Boolean functions, logic gates, switching circuits and their applications.
iii) Solve real-life problems using Graph Theory,Koiensberg bridge problem.
iv) Assimilate various graph theoretic concepts and familiarize with their applications.

Ordinary Differential Equations :
This course will enable the students to:
i) Understand the genesis of ordinary differential equations.
ii) Learn various techniques of getting exact solutions of solvable first order differential equations and linear differential equations of higher order.

iii) Know Picard's method of obtaining successive approximations of solutions of first order differential equations, passing through a given point in the plane and Power series method for higher order linear equations, especially in cases when there is no method available to solve such equations.
iv) Grasp the concept of a general solution of a linear differential equation of an arbitrary order and also learn a few methods to obtain the general solution of such equations.
v) Formulate basic mathematical models in the form of ordinary differential equations to suggest possible solutions of the day to day problems arising in physical, chemical and biological disciplines.

Real Analysis:
This course will enable the students to:
i) Understand many properties of the real line $\mathbb{R}$ and learn to define sequence in terms of functions from $\mathbb{R}$ to a subset of $\mathbb{R}$.
ii) Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate their limit superior, limit inferior, and the limit of a bounded sequence.
iii) Apply the ratio, root, alternating series and limit comparison tests for convergence and absolute convergence of an infinite series of real numbers.
iv) Learn some of the properties of Riemann integrable functions, and the applications of the fundamental theorems of integration.

Group Theory
The course will enable the students to:
i) Recognize the mathematical objects called groups a new start to Abstract Mathematics .
ii) Link the fundamental concepts of groups and symmetries of geometrical objects which they can relate to Chemistry in future.
iii) Explain the significance of the notions of cosets, normal subgroups, and factor groups.
iv) Analyze consequences of Lagrange's theorem.
v) Learn about structure preserving maps between groups and their consequences.

Partial Differential Equations
This course will enable the students to:
i) Apply a range of techniques to solve first & second order partial differential equations.
ii) Model physical phenomena using partial differential equations such as the heat and wave equations.
iii)Then analyse the heat equation solution by using MATLAB . They can simulate also .
iv)A glimpse of Finite Difference Method to Numerical Solution by using Scheme to Heat equation ,Wave equation ,Poisson equation

Numerical Analysis
This course will enable the students to:
i) Obtain numerical solutions of algebraic and transcendental equations.
ii) Find numerical solutions of system of linear equations and check the accuracy of the solutions.
iii) Learn about various interpolating and extrapolating methods.
iv) Solve initial and boundary value problems in differential equations using numerical methods.
v) Apply various numerical methods in real life problems.

Ring Theory
This course will enable the students to:

i) Understand the basic concepts of rings and the abstract definition
ii) Recognize and use the chinese remainder theorem
iii) Know the fundamental concepts in ring theory such as the concepts of ideals, quotient rings, integral domains, and fields.
v) Learn in detail about polynomial rings, fundamental properties of Rings,Isomorphism Theorem

Metric Spaces
This course will enable the students to:
i) Learn basic facts about the cardinality of a set.
ii) Understand several standard concepts of metric spaces and their properties like openness, closedness, completeness, Bolzano-Weierstrass property, compactness, and connectedness.
iii) Identify the continuity of a function defined on metric spaces
iv)Analyze the all the definiton of converegence ,continuity ,differentiation in Metric Space a

Linear Programming
This course will enable the students to:
i) Analyze and solve linear programming models of real life situations.
ii) Provide graphical solutions of linear programming problems with two variables, and illustrate the concept of convex set and extreme points.
iii) Understand the theory of the simplex method.
iv) Know about the relationships between the primal and dual problems, and to understand sensitivity analysis.
v) Learn about the applications to transportation, assignment and two-person zero-sum game problems.

Multivariable Calculus
This course will enable the students to:
i) Learn conceptual variations while advancing from one variable to several variables in calculus.
ii) Apply multivariable calculus in optimization problems. I
ii) Inter-relationship amongst the line integral, double and triple integral formulations.
iv) Applications of multivariable calculus tools in physics, economics, optimization, and understanding the architecture of curves and surfaces in plane and space etc.
v) Realize importance of Green, Gauss and Stokes' theorems in other branches of mathematics.

Complex Analysis
This course will enable the students to:
i) Visualize complex numbers as points of $\mathbb{R}$□ and stereographic projection of complex plane on the Riemann sphere.
ii) Understand the significance of differentiability and analyticity of complex functions leading to the Cauchy Riemann equations.
iii) Learn the role of Cauchy Goursat theorem and Cauchy integral formula in evaluation of contour integrals.
iv) Apply Liouville's theorem in fundamental theorem of algebra.
v) Understand the convergence, term by term integration and differentiation of a power series.
vi) Learn Taylor and Laurent series expansions of analytic functions, classify the nature of singularity, poles and residues and application of Cauchy Residue theorem.

Linear Algebra

This course will enable the students to:

i) Understand the concepts of vector spaces, subspaces, bases, dimension and their properties.

ii) Relate matrices and linear transformations, compute eigen values and eigen vectors of linear transformations.

iii) Learn properties of inner product spaces and determine orthogonality in inner product spaces.

iv) Realise importance of adjoint of a linear transformation and its canonical form.

Differential Geometry:

This course will enable the students to:

i)Understand the space curve in three dimensional

ii) concept of curvature,torsion and binormal help to understand the curve is how much curved and deviated from plane

iii)Serret-Frenet formula which is very much useful in Geometry and Physcs

Submitted
Coordinator
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