B.Sc. (Mathematics)

2015,Programme Outcome

- Enabling students to develop a positive attitude towards mathematics as an interesting and valuable subject of study.
- A student should get a relational understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning.
- Ability to analyze a problem, identify and define the computing requirements, which may be appropriate to its solution.Think in a critical manner. Know when there is a need for information, to be able to identify, locate,evaluate, and effectively use that information for the issue or problem at hand.
- Formulate and develop mathematical arguments in a logical manner.
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The Syllabus will help students to get into Higher Studies like Msc and int-PhD

Course TitleCalculus I

Course Outcomes:-

- Gain Knowledge of fundamental concepts of real numbers.
- Verify the value of the limit of a function at a point using the definition of the limit
- Introduction to sequence and series.
- Learn to check function is continuous understand the consequences of the intermediate value theorem for continuous functions.

Introduction to analytical geometry of 2 dimensional.

- Study of lines in 2 and 3 dimension.
- Finding equation in various form of line, circle, ellipse, sphere, cones etc.
- Give the knowledge of geometry using maxima software.

Course Title: Algebra.

Course Outcomes:-

- Learn to solve system of linear equation.
- Learn to solve Diophantine equation.
- Learn to find roots of polynomial over rational.
- Learn to find graphs, roots and primes integer using maxima software.
- Introduction to complex analysis.

Concept of Eigen Value and Eigen vector

Course Title: Real Analysis I

Course Outcomes'

- Student will be to understand differentiation and fundamental theorem in differentiation and various rules.
- Geometrical representation and problem solving on MVT and Rolls theorem.
- Finding extreme values of function.
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- Describe fundamental properties of the real numbers that lead to the formal development of real analysis.
- Comprehend rigorous arguments developing the theory underpinning real analysis.
- Demonstrate an understanding of limits and how they are used in sequences, series,

Construct rigorous mathematical proofs of basic results in real analysis

Understand Integrability and theorems on integrability. Recognize the difference between point wise and uniform convergence of a sequence of functions.

Course Title: Differential equation.

Course Outcomes

 Student will be able to solve first order differential equations utilizing the standard techniques for separable, exact, linear, homogeneous, or Bernoulli cases.

Student will be able to find the complete solution of a nonhomogeneous differential equation as a linear combination of the complementary function and a particular solution.

Student will have a working knowledge of basic application problems described by second order linear differential equations with constant coefficients.

Be familiar with the modeling assumptions and derivations that lead to PDEs.

Recognize the major classification of PDEs and the qualitative differences between the classes of equations.

Be competent in solving linear PDEs using classical solution methods.

Learn Maxima software.

 Problem solve on analytic geometry and calculus by using maxima software.

 Problem solving on geometry and calculus

Course Title: Real Analysis I

Course Outcomes

 Describe fundamental properties of the real numbers that lead to the formal development of real analysis.

 Comprehend rigorous arguments developing the theory underpinning real analysis.

 Demonstrate an understanding of limits and how they are used in sequences, series,

Construct rigorous mathematical proofs of basic results in real analysis

Understand Integrability and theorems on integrability. Recognize the difference between point wise and uniform convergence of a sequence of functions.

 Illustrate the effect of uniform convergence on the limit function with respect to continuity, differentiability, and integrability.

 Study improper integration using Riemann integration.

 Appreciate how abstract ideas and rigorous methods in mathematical analysis can be applied to important practical problems.

 Problem solving on metric space and connected and contactless.

Course Title: PDE

student will have a working knowledge of basic application problems described by second order linear partial differential equations with constant coefficients.

Be familiar with the modeling assumptions and derivations that lead to PDEs.

Recognize the major classification of PDEs and the qualitative differences between the classes of equations.

Be competent in solving linear PDEs using classical solution methods.

Course Title:Group Theory

Course Outcomes

 Understand the importance of algebraic properties with regard to working within various

number systems.
- Extend group structure to finite permutation groups (Caley Hamilton Theorem).
- Generate groups given specific conditions.
- Symmetry using group theory.
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Course Title: Linear Algebra

Course Outcome
- Introduction to vector space and subspace.
- Use computational techniques and algebraic skills essential for the study of systems of Linear equations, matrix algebra, vector spaces, eigenvalues and eigenvectors, Orthogonality and Diagonalization. (Computational and Algebraic Skills).

Course Title: -Numerical Analysis

Course Outcome
- To apply appropriate numerical methods to solve the problem with most accuracy.
- Using appropriate numerical methods determine approximate solution of ODE and system of linear equation.
- Compare different methods in numerical analysis w.r.t accuracy and efficiency of solution.

Practical Course

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- To demonstrate used of interpolation method in numerical analysis.
- Use computational techniques and algebraic skills essential for the study of systems of Linear equations, matrix algebra, vector spaces, eigenvalues and eigenvectors, Orthogonality and Diagonalization.

Course Title Ring Theory

Course Outcomes
- Students will be able to define ring and subrings.
- Study of ideals and concept related to ideal.
- Study of various integral domain in ring.
- Introduction to field.

Course Title: Multivariable Calculus

Course Outcome
- Gain Knowledge of fundamental concepts of real numbers in n dimensions.
- verify the value of the limit of a function at a point using the definition of the limit in R*R
- Find the extreme value in 2 dimensions.
- Study multiple integration.

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Course Title: Discrete Mathematics

Course Outcome

- To understand logical concepts and to show logical equivalences by using truth tables and rules in logics.
- Learn concept related to counting.Introduction to advanced counting.
- Problem solving on multivariable calculus and discrete mathematics.
- Introduction to application of mathematics in real life.
- Learn to build logical concept.

Course Title: Operational Research

- Develop linear programming (LP) models for shortest path, maximum flow, minimal spanning tree, critical path, minimum cost flow, and transshipment problems.
- Understand the mathematical tools that are needed to solve optimization problems. Formulate pure, mixed, and binary integer programming models.
- Formulate the nonlinear programming models.
- Develop a report that describes the model and the solving technique, analyze the results and propose recommendations in language understandable to the decision-making processes in Management Engineering
- Use some solution methods for solving the nonlinear optimization problems.

Course Title: Complex Analysis & Metric Spaces

Course Outcomes:-

- Able to understand the Euclidean distance function on R n and appreciate its properties, and state and use the Triangle and
- Reverse Triangle Inequalities for the Euclidean distance function on R n
- Explain the definition of continuity for functions from R n to R m and determine whether a given function from R n to R m is continuous
- Explain the geometric meaning of each of the metric space
- Distinguish between open and closed balls in a metric space
- Define convergence for sequences in a metric space and
- Determine whether a given sequence in a metric space converges
- Compute sums, products, quotients, conjugate, modulus, and argument of complex numbers · Define and analyze limits and continuity for complex functions as well as consequences of continuity ·
- Conceive the concepts of analytic functions and will be familiar with the elementary complex functions and their properties ·Determine whether a given function is differentiable, and if so find its derivative. Applies the theory into application of the power series expansion of analytic functions ·

 Understand the basic methods of complex integration and its application in contour integration. · Analyze sequences and series of analytic functions and types of convergence, · Evaluate complex contour integrals directly and by the fundamental theorem, apply the Cauchy integral theorem in its various versions, and the Cauchy integral formula.

Submitted
Kedarnath Sahu
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