SPACES DEGREE COLLEGE, PAYAKARAOPETA

DEPARTMENT OF MATHEMATICS

UG COURSE OUTCOMES

PAPER-I: DIFFERENTIAL EQUATIONS

Upon completion of the course students should be able

- To analyze real world scenarios to recognize when ordinary differential equations (ODEs) or systems of ODEs are appropriate, formulate problems about the scenarios, creatively model these scenarios (using technology, if appropriate) in order to solve the problems using multiple approaches, judge if the results are reasonable, and then interpret and clearly communicate the results
- To recognize ODEs and system of ODEs concepts that are encountered in the real world, understand and be able to communicate the underlying mathematics involved to help another person gain insight into the situation
- To work with ODEs and systems of ODEs in various situations and use correct mathematical terminology, notation, and symbolic processes in order to engage in work, study, and conversation on topics involving ODEs and systems of ODEs with colleagues in the field of mathematics, science or engineering

PAPER-II: SOLID GEOMETRY

After studying this course, students should be able

- To understand geometrical terminology for angles, triangles, quadrilaterals and circles
- To measure angles using a protractor
- To use geometrical results to determine unknown angles
- To recognise line and rotational symmetries
- To find the areas of triangles, quadrilaterals and circles and shapes based on these

PAPER-III: ABSTRACT ALGEBRA

Upon successful completion of Abstract Algebra, students will be able to

- Assess properties implied by the definitions of groups and rings
- Use various canonical types of groups (including cyclic groups and groups of permutations) and canonical types of rings (including polynomial rings and modular rings)
- Analyze and demonstrate examples of subgroups, normal subgroups and quotient groups
- Analyze and demonstrate examples of ideals and quotient rings
- Use the concepts of isomorphism and homomorphism for groups and rings
- Produce rigorous proofs of propositions arising in the context of abstract algebra

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PAPER-IV: REAL ANALYSIS

Upon successful completion of Real Analysis, students will be able to

- Describe the real line as a complete, ordered field
- Determine the basic topological properties of subsets of the real numbers
- Use the definitions of convergence as they apply to sequences, series, and functions
- Determine the continuity, differentiability, and integrability of functions defined on subsets of the real line
- Apply the Mean Value Theorem and the Fundamental Theorem of Calculus to problems in the context of real analysis
- Produce rigorous proofs of results that arise in the context of real analysis

PAPER-V: RING THEORY & VECTOR CALCULUS

Upon successful completion of Ring Theory and Vector Calculus, students will be able to

- Abstract Algebra interlaces all branches of Mathematics
- The study of Abstract Algebra is imperative to develop Mathelogical skills and their applications.
- Know the fundamental concepts in ring theory such as the concepts of ideals, quotient rings, integral domains, and fields.
- Further it is a foundation to higher studies in Mathematics

PAPER-VI: LINEAR ALGEBRA

Upon successful completion of Linear Algebra, students will be able to

- Solve systems of linear equations
- Analyze vectors in R^n geometrically and algebraically
- Recognize the concepts of the terms span, linear independence, basis, and dimension, and apply these concepts to various vector spaces and subspaces
- Use matrix algebra and the related matrices to linear transformations,
- Compute and use determinants,
- Compute and use eigenvectors and eigenvalues
- Determine and use orthogonality

PAPER-VII: NUMERICAL ANALYSIS

Upon successful completion of Numerical Analysis, a student will be able to

- Derive numerical methods for approximating the solution of problems of continuous mathematics
- Analyze the error incumbent in any such numerical approximation
- Implement a variety of numerical algorithms using appropriate technology
- Compare the viability of different approaches to the numerical solution of problems arising in roots of solution of non-linear equations, interpolation and approximation, numerical differentiation and integration, solution of linear systems

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PAPER-VIII-A: INTEGRAL TRANSFORMATIONS

Upon successful completion of Integral Transformations, students will be able to

- Have understanding regarding different kind of integral transforms.
- Understand Fourier transform and its properties and will be able to solve the examples based on it.
- Have deep understanding of Laplace Transformation and its real life application.
- Solve initial value problem and boundary value problem using Laplace Transform.
- Derive Fourier series representation of Periodic functions.

PAPER-VIII-B: ADVANCED NUMERICAL ANALYSIS

Upon successful completion of Advanced Numerical Analysis, a student will be able to

- Derive numerical methods for approximating the solution of problems of continuous mathematics
- Analyze the error incumbent in any such numerical approximation
- Implement a variety of numerical algorithms using appropriate technology
- Compare the viability of different approaches to the numerical solution of problems arising in roots of solution of non-linear equations, interpolation and approximation, numerical differentiation and integration, solution of linear systems.

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