MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR

मोहनलाल सुखाडिया विश्वविद्यालय, उदयपुर

DEPARTMENT OF MATHEMATICS AND STATISTICS

SYLLABUS

Bachelor of Science/ Arts (B.Sc./B.A.) 2023-24 Onwards

FACULTY: SCIENCE

SUBJECT: MATHEMATICS

Programme Specific Objective:

The main objectives of the B.Sc. with Mathematics (as one of the core subjects) is to formulate and develope Mathematical arguments in a logical manner, provide complementary scientific training in Mathematics with further studies in another scientific fields, extending the range of knowledge with skills for employability in both Industry and Academia.

Programme Specific Outcomes:

After completion of program, students will be able to:

- Understand the basic concept of Calculus, Group Theory, Various types of Differential Equations, Real analysis, Linear Algebra, Mechanics, Geometry, Number theory, Graph Theory, Tree and Boolean Algebra, Operations Research and their applications.
- Students will be equipped with Mathematical modelling ability, problem solving skills and creative thinking for employment.
- Students will be able to interpret critically and analyse numerical and graphical data, thus cultivating a proper attitude for higher learning in Mathematics.
- Demonstrate effective communication of Mathematical ideas and creative thinking using Mathematical software's GeoGebra, Scilab, LaTeX, etc.

Revised & Reviewed

MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR

DEPARTMENT OF MATHEMATICS AND STATISTICS

Bachelor of Science/ Arts (B.Sc./B.A.) 2023-24 Onwards

Faculty : SCIENCE

Subject : MATHEMATICS

Semester : First

Level	Semester	Course Type	Course Code	Title	Delivery Type			Total Hours	Credit	Total Credit	Internal Assessment	EoS Exam	M. M.	Remarks
					L	T	P							
5	**I**	DCC	MAT5000T	Calculus	L	T	-	90	5+1	6	20	80	100	---

B. Sc./B.A. MATHEMATICS, SEMESTER - I, 2023-24 Onwards

Code of the Course : **MAT5000T**

Title of the Course : **CALCULUS**

Level of the Course : **NHEQF Level 4.5**

Credit of the Course : **6**

Type of the Course : **Discipline Centric Compulsory (DCC)**

Delivery type of the Course : **Lecture** (60 Hours for content delivery) and **Tutorial** (30 Hours for subject/ class activity, problem solving, diagnostic assessment and formative assessment)

Prerequisites :

Mathematics courses of Central Board of Secondary Education or equivalent at Sr. Sec. level.

Objectives of the Course :

The objective of the course is to studying "instantaneous" change by fundamental idea of Calculus, apply the concept and principle to connect them with real world problem.

Course Learning Outcomes:

After completion of course, students will be able to

- Understand the concepts of Asymptotes, points of inflexion.
- Trace standard curves in Cartesian and polar form.
- Understand partial differentiation and its applications.
- Apply Beta and Gamma function in quadrature and rectification.
- Do applications of double and triple integrals.

Syllabus:

UNIT - I

Polar coordinates and derivatives of arc (Cartesian and Polar formula), Angle between Radius vector and tangent, Polar subtangent and subnormal, Pedal-equation, Asymptotes (Cartesian and Polar coordinates). (18 Lecture hours)

UNIT – II

Curvature, Radius of curvature for Cartesian, Parametric, Polar, Pedal and Tangential polar equations, Circle of curvature, Test of concavity and convexity, Points of inflexion, Multiple points, Tracing of curves in Cartesian and polar coordinates. (16 Lecture hours)

UNIT – III

Beta and Gamma functions, Relation between Beta and Gamma functions, Euler's functional equation, Duplication formula, and their properties, Quadrature, Area bounded by curves in Cartesian, Parametric, Polar equations, Rectification, Intrinsic equation from the Cartesian, Parametric, Polar equations. (18 Lecture hours)

UNIT -IV

Partial differentiations, Euler's theorem for homogeneous functions, Total differential coefficient, Envelopes and Evolutes, Maxima and Minima of two and more variables including Lagrange's multiplier, Jacobians. (20 Lecture hours)

UNIT - V

Evaluation of double and triple integrals, Change of order of integration, Dirichlet's theorem and Liouville's extension, Area and Mass by double integration, Volume and Mass of a solid by triple integration, Volume and Surface of solid of revolution. (18 Lecture hours)

References:

1. Gorakh Prasad : A Text book on Differential Calculus, PothiShala.
   : A Text book on Integral Calculus, PothiShala.
2. S.K. Pundir & B. Singh : Differential and Integral Calculus, PragatiPrakashan.
3. Shanti Narayan & P.K. Mittel : Differential Calculus, S. Chand.
   : Integral Calculus, S. Chand.
4. Bansal & Bhargava : Differential Calculus, JPH.
   : Integral Calculus, JPH.
5. Gokhroo & Saini : Calculus, Navkar.
   : Advanced Calculus, Navkar.
6. Goswami, Saini & Saini : Differential Calculus, Neelkanth.
   : Integral Calculus, Neelkanth.

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DEPARTMENT OF MATHEMATICS AND STATISTICS

Bachelor of Science/ Arts (B.Sc./B.A.) 2023-24 Onwards

Faculty : SCIENCE

Subject : MATHEMATICS

Semester : Second

Level	Semester	Course Type	Course Code	Title	Delivery Type			Total Hours	Credit	Total Credit	Internal Assessment	EoS Exam	M. M.	Remarks
					L	T	P							
5	**II**	DCC	MAT5001T	Algebra	L	T	-	90	5+1	6	20	80	100	---
Exit with Certificate in Science (After 4 more credits in SEC)														

B. Sc./B.A. MATHEMATICS, SEMESTER - II, 2023-24 Onwards

Code of the Course	**: MAT5001T**
Title of the Course	**: ABSTRACT ALGEBRA**
Level of the Course	**: NHEQF Level 4.5**
Credit of the Course	**: 6**
Type of the course	**: Discipline Centric Compulsory (DCC)**
Delivery type of the course	**: Lecture** (60 Hours for content delivery) and **Tutorial** (30 Hours for subject/ class activity, problem solving, diagnostic assessment and formative assessment)
Prerequisites	**:**

Mathematics courses of Central Board of Secondary Education or equivalent at Sr. Sec. level.

Objectives of the Course:

The course aim is to introduce the basic concepts of Algebra and lay foundation for further learning of Linear and Advanced Algebra.

Course Learning Outcomes:

After completion of course, students will be able to

- Understand basic concept of group, subgroup and their various types such as cyclic group, permutation group, normal subgroup etc. and their applications.
- Apply Lagrange's and Cayley's theorems.
- Understand the basic concept of ring theory and its applications.
- Study the concept of homomorphism and isomorphism of rings and its applications.

Syllabus:

UNIT-I

Groups: Definition, Various examples and their defining theorems, Elementary basic theorems, Order of an element and related theorems.

Subgroups: Definition, Various examples and their defining theorems, Union, Intersection of two and finite subgroups, Product of two subgroups. (18 Lecture hours)

UNIT –II

Permutation Groups: Definition, Various examples, Order of permutation, Cyclic permutation, Even and Odd permutations, Alternating group and their related theorems.

Cyclic groups: Various examples and their related theorems. (18 Lecture hours)

UNIT – III

Cosets: Left and right cosets, Various examples and their properties, Lagrange's theorem, Index of a subgroup.

Normal subgroups: Examples and elementary basic theorems, Simple group.

(18 Lecture hours)

UNIT – IV

Quotient group: Definition, their examples and elementary basic theorems.

Group homomorphism and isomorphism with elementary basic properties and various examples, Cayley's theorem for finite groups, Fundamental theorem of homomorphism in groups. (18 Lecture hours)

UNIT -V

The three isomorphism theorems of groups, Automorphisms and inner automorphisms.

Brief introduction to Rings: Definition and examples of various kinds of rings, Integral domain, Division ring, Field, Characteristic of a ring and integral domain. (18 Lecture hours)

References:

1. I. N. Herstein : Topics in Algebra, Wiley Eastern Ltd., New Delhi.
2. R. S. Aggrawal : A Textbook on Modern Algebra, S. Chand.
3. Surjeet Singh & Quazi Zarneeruddin : Modern Algebra, S. Chand.
4. H. S. Hall & S.R. Knight : Higher Algebra, H.M. Publications.
5. Bansal, Bhargava & Agrawal : Amurt Beej Ganita, JPH.
6. Chandrika Prasad : Text book on Algebra and Theory of Equations, PothiShala Pvt. Ltd, Allahabad.
7. Gokhroo & others : Group Theory and Ring Theory, Navkar.
8. Shanti Narayan : A Text-Book of Modern Abstract Algebra.
9. K.C. Sarangi : Element of Abstract Algebra, RBD.

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MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR

DEPARTMENT OF MATHEMATICS AND STATISTICS

Bachelor of Science/ Arts (B.Sc./B.A.) 2024-25 Onwards

Faculty : SCIENCE

Subject : MATHEMATICS

Semester : Third

Level	Semester	Course Type	Course Code	Title	Delivery Type			Total Hours	Credit	Total Credit	Internal Assessment	EoS Exam	M. M.	Remarks
					L	T	P							
6	**III**	DCC	MAT6002T	Differential Equation	L	T	-	90	5+1	6	20	80	100	---

B.Sc./B.A. MATHEMATICS, SEMESTER -III, 2024-25 Onwards

Code of the Course : **MAT6002T**

Title of the Course : **DIFFERENTIAL EQUATIONS**

Level of the Course : **NHEQF Level 5**

Credit of the Course : **6**

Type of the Course : **Discipline Centric Compulsory (DCC)**

Delivery type of the Course : **Lecture** (60 Hours for content delivery) and **Tutorial** (30 Hours for subject/ class activity, problem solving, diagnostic assessment and formative assessment)

Prerequisites :

Mathematics courses of Central Board of Secondary Education or equivalent at Sr. Sec. level and calculus at level 5.

Objectives of the Course :

The course aims to

(i) Introduce the exciting world of differential equations.

(ii) Familiarize with concept of Differential Equations which is an essential for higher order Differential Equations and its applications in Mathematics and other subjects.

Course Learning Outcomes:

After completion of course, students will be able to

- Understand the concept of differential equation and their types and analyse their applications.
- Solve linear differential equation with variable coefficients by various approach. Classify the partial differential equation and evaluate their solution using different approaches.
- Apply these techniques to solve and analyze various Mathematical models.

Syllabus: UNIT - I

Degree and order of a differential equation, Formation of first order and first-degree differential equation, Variable separation, Homogeneous equations, Linear equations and equations reducible to the linear form, Exact differential equations and reducible to exact.

(15 Lecture hours)

UNIT - II

First order and higher degree equations: solvable for x,y,p., Clairaut's form and singular solutions, Geometrical meaning of a differential equation, Linear differential equations with constant coefficients. (18 Lecture hours)

UNIT - III

Homogeneous linear ordinary differential equations and the equations reducible in homogeneous form. Exact differential equations and equations of special forms, reducible to exact differential equation, Simultaneous differential equations. (19 Lecture hours)

UNIT – IV

Linear differential equations of second order and their solutions by:

(i) The method of finding an integral of the C.F. by Inspection,

(ii) Changing of independent variables,

(iii) Removal of the first derivative,

(iv) Operational factors. (18 Lecture hours)

UNIT - V

Linear partial differential equations of first order: Lagrange's method, Integral surfaces passing through a given curve, orthogonal surfaces, Geometric description of Pp+Qq=R.

Non-Linear partial differential equations of first order, Charpit's method of solving non-linear partial differential equations of first order, Special methods of their solutions applicable to certain standard forms. (20 Lecture hours)

References:

1. Ray & Sharma : Differential equation
2. Bansal, Bhargav & Agrawal : Differential equation
3. Raisinghania, M.D. : Advanced differential equations
4. Murray A. Daniel : Differential equation
5. Forsyth, A.R. : A Treatise on Differential equation
6. Ian N. Sneddon : Elements of Partial differential equations
7. Gokhroo & Others : Differential Equations, Partial Differential equations.
8. Codington, E.A. : An introduction to ordinary differential equation by, Prentice hall of India.

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MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR

DEPARTMENT OF MATHEMATICS AND STATISTICS

Bachelor of Science/ Arts (B.Sc./B.A.) 2024-25 Onwards

Faculty : SCIENCE

Subject : MATHEMATICS

Semester : Fourth

Level	Semester	Course Type	Course Code	Title	Delivery Type			Total Hours	Credit	Total Credit	Internal Assessment	EoS Exam	M. M.	Remarks
					L	T	P							
6	IV	DCC	MAT6003T	Real Analysis	L	T	-	90	5+1	6	20	80	100	---
		Select anyone of the following SEC- Skill Enhancement Course in IV semester												
		SEC	SES6360T	Advanced Calculus	L	-	-	30	2	2	20	80	100	---
			SES6361P	Graphical Software GoeGebra	-	-	P	60	2	2	20	80	100	---
Exit with Diploma in Science														

B.Sc./B.A. MATHEMATICS, SEMESTER -IV, 2024-25 Onwards

Code of the Course : **MAT6003T**

Title of the Course : **REAL ANALYSIS**

Level of the Course : **NHEQF Level 5**

Credit of the Course : **6**

Type of the Course : **Discipline Centric Compulsory (DCC)**

Delivery type of the Course : **Lecture** (60 Hours for content delivery) and **Tutorial** (30 Hours for subject/ class activity, problem solving, diagnostic assessment and formative assessment)

Prerequisites :

Mathematics courses of Central Board of Secondary Education or equivalent at Sr. Sec. level.

Objectives of the Course :

The course aims to

(i) Study the fundamental concepts of analysis,

(ii) Introduce the concept of the sequence and series of real no. and convergence.

Course Learning Outcomes:

After completion of course, students will be able to

- Understand basic concepts of continuity important theorems.
- Understand the concepts of real number and analyse their properties.
- Study sequence, series and their applications.
- Apply Riemann integrals in evaluation of some integrals.
- Understand the concept of uniform convergence and study their application.

Syllabus:

UNIT -I

Continuity: Cauchy definition of continuity of a function of one variable, Notion of limit and continuity of function of two variables (Not Theorems), Discontinuous functions and their kinds, Properties of continuous functions at a point and in closed intervals.

Derivability: Differentiable functions and their properties including Darboux theorem, Examples of continuous and differentiable functions. (18 Lecture hours)

UNIT - II

Real number system: Field, Ordered field, upper and lower bounds of a set in an ordered field, Supremum and infimum of a set and their properties, Completeness, Archimedean and denseness properties of an ordered field, The set Q of rational numbers as a non-complete dense Archimedean ordered field and the set R of real numbers as a complete dense Archimedean ordered field.

Interval, Neighborhood of a number, Real line R-Interior points and limit points of a set in R, open sets and closed sets in R and their properties, Nested Interval property, Bolzano-Weierstrass theorem, Heine Boral theorem, Compact set and Connected set and their properties. (17 Lecture hours)

UNIT - III

Sequence: Bounded sequence, monotonic sequence, Limit of a sequence, Convergent sequence, Properties of convergent sequence, Cauchy first and second theorems on limits, subsequence and it's properties, Cauchy sequence and it's properties, Cauchy general principle of convergence, Examples of convergent sequences.

Sequences of functions: Point wise convergence, Uniform convergence, M_n-test.

(16 Lecture hours)

UNIT-IV

Series: Convergence and divergence of an Infinite series of real numbers, The necessary and sufficient conditions, Various tests of convergence problems and their illustrations with regard to infinite series of positive terms, Alternating series and Leibnitz test, Absolute and semi (or conditional) convergence.

Uniform convergence of series of functions: Weierstras M-test, Abel’s test, Drichelet’s test.

Fourier series representation of periodic functions, Even & odd function, Half range series.

(20 Lecture hours)

UNIT – V

Riemann Integration: Upper and Lower Darboux sum, Upper and Lower Riemann integrals, Riemann integrability of a bounded function in a closed interval, The necessary and sufficient condition for R integrability in terms of Darboux sums, Properties of R-integrable functions, Fundamental theorem of integral Calculus. (19 Lecture hours)

References:

1. T. M. Apostol : Mathematical Analysis
2. R. R. Goldbeg : Real Analysis
3. Walter Rudin : Principles of Mathematical Analysis
4. P.K. Jain& S. K. Kaushik : An introduction to Real Analysis
5. D. Somasundaram & B. Chaudhary : A First Course of Mathematical Analysis
6. Bhargava & Goyal : Real Analysis
7. Gokhroo & others : Real Analysis
8. Sharma & Purohit : Elements of Real Analysis

B.Sc./B.A. MATHEMATICS, SEMESTER -IV, 2024-25 Onwards

Code of the Course : **SES6360T**

Title of the Course : **ADVANCED CALCULUS**

Level of the Course : **NHEQF Level 5**

Credit of the Course : **2**

Type of the Course : **Skill Enhancement Course (SEC)**

Delivery type of the Course : **Lecture** (20 Hours for content delivery and 10 Hours for subject/ class activity, problem solving, diagnostic assessment and formative assessment)

Prerequisites :

Mathematics courses of Central Board of Secondary Education or equivalent at Sr. Sec. level.

Objectives of the Course :

The objective of the course is to introduce the concept of countable, continuity and differentiability.

Course Learning Outcomes:

After completion of program, students will be able to

- Understand the concepts of continuity and differentiability.
- Apply mean value theorems.
- Familiarize with the concept of Denumerability.
- Evaluate improper integrals

Syllabus:

UNIT -I

Roll's Theorem, Mean Value Theorems, Taylor's Theorem, verifications, Various examples and their geometrical interpretations. (6 Lecture hours)

UNIT-II

Equivalent sets and their examples, Nature of the relations of equivalence, Denumerable and non-numerable sets, Countable and uncountable sets, Nature of subsets of a countable set and that of a denumerable (countable) set. (6 Lecture hours)

UNIT -III

Union of denumerable (countable) sets, Denumerability of the sets of integers and rational numbers, Non-denumerability of the closed unit interval [0, 1] and the sets of real numbers and irrational numbers. (6 Lecture hours)

UNIT -IV

Convergence of improper integrals: Kinds of improper integrals, Comparison test, μ-test, Abel's test, Evaluation of such integrals. (6 Lecture hours)

UNIT -V

Relations of uniform convergence with the continuity of the limit and the sum functions and also with term-by-term differentiation and term by term integration. (6 Lecture hours)

References:

1. P.K. Jain & S. K. Kaushik : An Introduction to Real Analysis, S. Chand & Co., New Delhi.
2. T. M. Apostol : Mathematical Analysis
3. R. R. Goldbeg : Real Analysis
4. Walter Rudin : Principles of Mathematical Analysis
5. Sharma & Purohit : Elements of Real Analysis
6. D. Somasundaram & B. Chaudhary : A First Course of Mathematical Analysis
7. Bhargava & Goyal : Real Analysis
8. Gokhroo & others : Real Analysis

B.Sc./B.A. MATHEMATICS, SEMESTER -IV, 2024-25 Onwards

Code of the Course	**: SES6361P**
Title of the Course	**: GeoGebra**
Level of the Course	**: NHEQF Level 5**
Credit of the Course	**: 2**
Type of the Course	**: Skill Enhancement Course (SEC)**
Delivery type of the Course	**: Practical** (20 Hours for content delivery and 40 Hours for hands on coding of program, execution and problem solving)

Prerequisites **:**
Senior Secondary or equivalent from recognize board.

Objectives of the Course **:**

The objective of this course is to feel Mathematics practically by tracing various graphs using graphical tool GeoGebra.

Course Learning Outcomes:

After the completion of the course, the students will be able to

- Understand basic Number operations, Algebraic expressions and etc. practically.
- Trace the conic by using quadratic equations.
- Apply GeoGebra for Graphing quadratic surfaces

Syllabus:

Student will perform following on software GeoGebra.

PART- A:

Numbers and their operations

Algebraic expressions and formulae

Basics of Triangles, Congruency of triangles, Properties of Quadrilaterals, Types of symmetry, Polynomials.

PART- B:

Functions and graphs

Equation and Inequalities

Tracing Spheres, Tracing Cylindrical surfaces

Graphing quadratic surfaces.

References:

1. Steve Phelps : An Introduction to GeoGebra, GeoGebra an Institute of Ohio Madeira High School, University of Cincinnati

2. GeoGebra Manual : The official manual of GeoGebra.

3. Web Resources 1.https://www.geogebra.org/m/ZMXBaxRY

2. https://www.geogebra.org/m/DS6pbceB

3. https://www.geogebra.org/m/m6cz5fqR

End of Semester (EoS) Examination pattern of Practical Exam.:

Duration: 3-hour Max. Marks: 80 Min Marks: 32

The examination shall be of three hours wherein the students have to perform any two practicals based on solving Mathematical problems and plotting graphs on software GeoGebra, selecting one from each part.

The marks distribution shall be the following:

1- Two Practicals (Formation, coding and execution): 50 Marks (25 + 25)

2- Vivo Voce: 20 Marks

3- Evaluation of the record book of practicals performed in the semester: 10 Marks

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MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR

DEPARTMENT OF MATHEMATICS AND STATISTICS

Bachelor of Science/ Arts (B.Sc./B.A.) 2025-26 Onwards

Faculty : SCIENCE

Subject : MATHEMATICS

Semester : Fifth

Level	Semester	Course Type	Course Code	Title	Delivery Type			Total Hours	Credit	Total Credit	Internal Assessment	EoS Exam	M. M.	Remarks
					L	T	P							
Select anyone of the following Discipline specific Elective (DSE) Courses and Skill Enhancement Course (SEC) in V semester														
7	V	DSE	MAT7100T	Linear Algebra	L	T	-	90	5+1	6	20	80	100	---
			MAT7101T	Discrete Mathematics	L	T	-	90	5+1	6	20	80	100	---
			MAT7102T	Number Theory	L	T	-	90	5+1	6	20	80	100	---
		SEC	SES7362T	Vector Calculus	L	-	-	30	2	2	20	80	100	---
			SES7363P	Mathematical Software Scilab	-	-	P	60	2	2	20	80	100	---

B. Sc./B.A. MATHEMATICS, SEMESTER -V, 2025-26 Onwards

Code of the Course : **MAT7100T**

Title of the Course : **LINEAR ALGEBRA**

Level of the Course : **NHEQF Level 5.5**

Credit of the Course : **6**

Type of the Course : **Discipline Specific Elective (DSE)**

Delivery type of the Course : **Lecture** (60 Hours for content delivery) and **Tutorial** (30 Hours for subject/ class activity, problem solving, diagnostic assessment and formative assessment)

Prerequisites :

Mathematics courses of Central Board of Secondary Education or equivalent at Sr. Sec. level and concept of group & sub groups.

Objectives of the Course :

The course aims to strong foundation has to be laid in studying the abstract algebraic concepts interwining geometric ideas.

Course Learning Outcomes:

After completion of program, students will be able to

- Carry out the matrix operation including inverses and determinants.
- Proficient in vector spaces and related theorems.
- Demonstrate understanding of the concept of basis, dimension and their properties.
- Obtain various variants of diagonalization of linear transformation.
- Apply Sylvester law of nullity in linear transformations.

Syllabus:

UNIT-I

Symmetric, Skew Symmetric, Hermitian and skew Hermitian matrices, Linear independence of row and column matrices, Row rank, Column rank and Rank of a matrix, Equivalence of column and row ranks.

Eigen values, Eigen vectors and characteristic equation of a matrix, Cayley-Hamilton theorem and its use in finding inverse of a matrix, Theorems and examples of consistency of a system of linear equations. (18 Lecture hours)

UNIT –II

Definition and various examples of vector spaces, Subspaces and examples, Intersection, Sum and direct sum of two subspaces, Linear span, Linear dependence, Independence and their basic properties and problems. (18 Lecture hours)

UNIT –III

Basis, Dimension and examples, Finite dimensional vector spaces, Existence theorem for a basis, Extension theorem, Invariance of the number of elements of a basis set, Existence of complementary subspaces of a subspace of a finite dimensional vector space.

(18 Lecture hours)

UNIT –IV

Dimension of sum (and direct sum) of two subspaces, Quotient space and its dimension, Linear transformations, Rank and Nullity of a linear transformation, Sylvester law of nullity.

(18 Lecture hours)

UNIT - V

Matrix from a linear transformation and vice-versa and their problems relating to the same and different bases, The algebra of linear transformations, Dual space, Dual basis and Dimension of dual space. (18 Lecture hours)

References:

1. Surjeet Singh & Quazi Zarneeruddin : Modern Algebra
2. I.N. Herstein : Topics in Algebra
3. R.S. Agrawal : Algebra
4. Gokhroo & Others : Linear Algebra
5. Shanti Narayan : A Text-Book of Modern Abstract Algebra
6. Hoffman & Kunze : Linear Algebra
7. Purohit, Pareek & Sharma : Linear Algebra
8. Halmos, Paul R : Finite - Dimensional Vector spaces
9. Mandot, Gandhi & Khurdiya : Advanced Matrices
10. K.C. Sarangi : Element of Abstract Algebra

B. Sc./B.A. MATHEMATICS, SEMESTER -V, 2025-26 Onwards

Code of the Course : **DSE7101T**

Title of the Course : **DISCRETE MATHEMATICS**

Level of the Course : **NHEQF Level 5.5**

Credit of the Course : **6**

Type of the Course : **Discipline Specific Elective (DSE)**

Delivery type of the Course : **Lecture** (60 Hours for content delivery) and **Tutorial** (30 Hours for subject/ class activity, problem solving, diagnostic assessment and formative assessment)

Prerequisites :

Mathematics courses of Central Board of Secondary Education or equivalent at Sr. Sec. level.

Objectives of the Course :

The course aims to introduce concept and techniques of modern Mathematics which should serve as a preparation for more advanced quantitative courses.

Course Learning Outcomes:

After completion of program, students will be able to

- Understand mathematical reasoning in order to read, comprehend and construct Mathematical arguments.
- Familiarize with basic counting techniques.
- Model and solve real world problems using graphs and trees.
- Formulate problems and solve recurrence relations.
- Demonstrate the working knowledge of algebraic structure.

Syllabus:

UNIT – I

Sets and propositions: cardinality, Mathematical Induction, Principle of Inclusion and exclusion, Pigeon Hole principle, Permutation and Combinations, Simple problems.

Relations and functions: Cartesian Product, Binary Relations, Representation of relations using graph and matrix, Composition of 2 Relations, Representation of a solution, Difference in Relations and Functions.

Introducing Lattices and Posets: Lower bound, Upper bound, Greatest lower bound (GLB), Least upper bound (LUB), Greatest element, Least element, Hasse Diagrams.

(18 Lecture hours)

UNIT –II

Computability and Formal language: Ordered set, Language, Phrase Structure Grammars, Types of Grammars and Languages.

Graphs and Planar Graphs: Basic Terminology, Multigraphs, Weighted graphs, Paths and Circuits, Shortest paths, Eulerian paths and circuits, Planar graphs. (18 Lecture hours)

UNIT – III

Trees: Definition and basic theorems, Rooted trees, Binary tree, Decision or sorting tree, Spanning tree, Minimal spanning tree with application and examples.

Finite state machine: Designing simple Finite state machine as the Modulo 3 sum counter.

Analysing Algorithms: Time complexity, Complexity of problems. (18 Lecture hours)

UNIT –IV

Recurrence Relations and Recursive Algorithms: Numeric Functions, Generating Functions, Linear Recurrence Relations with Constant Coefficients, Homogeneous Solutions, Particular solution, Total solution, Solution by the method of generating functions. (18 Lecture hours)

UNIT – V

Boolean Algebras: Basic law, Principle of Duality, Example of Boolean Algebra with power set and composition table, Boolean function and expressions, Propositional calculus.

Design and Implementation of Digital network, Switching circuits. (18 Lecture hours)

References:

1. Anjana Gupta : Discrete Mathematics, S. K. Kataria& Sons, New Delhi.
2. Rajendra Akerkar : Discrete Mathematics, Pearson Education.
3. N. Chandrasekaran & M. Umaparvathi : Discrete Mathematics, PHI.
4. S. Arumugam & S. Ramachandran : Invitation to Graph Theory, SCITECH Publication.
5. C.L. Liu : Elements of Discrete Mathematics.
6. K.D. Joshi : Foundation of Discrete Mathematics.
7. Mradula Garg & R. Panday : Discrete Mathematics, JPH.

B. Sc./B.A. MATHEMATICS, SEMESTER -V, 2025-26 Onwards

Code of the Course : **MAT7102T**

Title of the Course : **NUMBER THEORY**

Level of the Course : **NHEQF Level 5.5**

Credit of the Course : **6**

Type of the Course : **Discipline Specific Elective (DSE)**

Delivery type of the Course : **Lecture** (60 Hours for content delivery) and **Tutorial** (30 Hours for subject/ class activity, problem solving, diagnostic assessment and formative assessment)

Prerequisites :

Mathematics courses of Central Board of Secondary Education or equivalent at Sr. Sec. level with knowledge of set theory and algebra of functions.

Objectives of the Course :

The course aims to introduce and illustrate different method of proof in the context of elementary number theory and will apply some basic techniques of number theory to cryptography.

Course Learning Outcomes:

After completion of program, students will be able to

- Develop a deeper conceptual understanding of the theoretical basis of Number Theory.
- Communicate number theoretic techniques to a Mathematical audience.
- Demonstrate uniqueness of distinguishing to prime number factors at integers.
- Familiarize with modular arithmetic and find primitive roots of prime & composite numbers.
- Collect and use numerical data to form conjectures about the integers.

Syllabus:

UNIT - I

Divisibility: g.c.d. and l.c.m. of two or more integers, Euclidean algorithm, The linear diophantine equation ax + by = c, Prime Numbers, Composite numbers, Infinitude of primes, Fundamental theorem of arithmetic. (18 Lecture hours)

UNIT - II

Congruences: Basic properties, Divisibility tests, Linear Congruences,

Application of Congruences: Fermat's little theorem, Euler's generalization, Wilsons's theorem, Chinese remainder theorem. (18 Lecture hours)

UNIT - III

Number Theoretic functions: τ and σ functions, Multiplicative functions, Mobius inversion formula, The greatest integer function, Primitive Roots and Indices, Primitive roots, characterization of natural numbers having primitive roots, theory of indices, Solution of certain congruence through indices. (18 Lecture hours)

UNIT - IV

Quadratic Residues: Quadratic residues and quadratic non residues of an integer in general and of a prime in particular, Gauss Lemma and its applications, The quadratic reciprocity law. (18 Lecture hours)

UNIT - V

Special Numbers: Fibonacci numbers, Fermat's numbers, Perfect numbers.

Diophantine Equations: Representation of integers as sums of 2, 3 and 4 squares.

(18 Lecture hours)

Books Recommended:

1. Devid M. Burton : Elementary Number Theory, Mc Grow Hill Publication.
2. Niven & H.S. Zuckerman : An Introduction to the Theory of Numbers, Willey eastern India Ltd.
3. Lang, S. : Algebraic Number theory, GTM Vol. 110, Springer-Verlag.
4. Thomas Koshy : Elementary Number Theory with Application, Academic press.
5. Pundir & Pundir : Theory of Number, Pragati Prakashan.
6. Hari Kishan : Number Theory, Krishna Prakashan.
7. S.B. Malik : Basic Number Theory, S. Chand publication.

B. Sc./B.A. MATHEMATICS, SEMESTER -V, 2025-26 Onwards

Code of the Course **: SES7362T**

Title of the Course **: VECTOR CALCULUS**

Level of the Course **: NHEQF Level 5.5**

Credit of the Course **: 2**

Type of the Course **: Skill Enhancement Course (SEC)**

Delivery type of the Course **: Lecture** (20 Hours for content delivery and 10 Hours for subject/ class activity, problem solving, diagnostic assessment and formative assessment)

Prerequisites **:**

Mathematics courses of Central Board of Secondary Education or equivalent at Sr. Sec. level, Knowledge of Differentiation and Integration.

Objectives of the Course **:**

The course aims to explain and predict physical phenomena in the study of Mechanics, Differential Geometry and Partial Differential Equation.

Course Learning Outcomes:

After completion of program, students will be able to

- Understand vectors & scalars point functions to evaluate tangent and normal plane.
- Familiarize with the concept of gradient, divergence, curl and some important vector identity.
- Apply Gauss's, Stoke's and Green's theorems.
- Motivates the study of vector differentiation and integration in 2-D & 3-D spaces.

Syllabus:

UNIT –I

Differentiation of vectors: Scalar function, Vector function, Differentiation formulae for vectors, Unit tangent vector, Velocity vector and acceleration vector. (6 Lecture hours)

UNIT – II

Scalar point function, Vector point function, Gradient of scalar function, Some theorems on Gradient, Directional derivative and related theorem. Vector equation of tangent plane and Normal. (6 Lecture hours)

UNIT -III

Divergence of a vector, Curl of a vector, Curl of the product of a scalar and vector, Divergence of a vector product. Solenoidal and Irrotational vectors. (6 Lecture hours)

UNIT - IV

Vector Integration: Integral of vector function, some important result, Line integral, Work done by force, Surface integral. (6 Lecture hours)

UNIT - V

Gauss's theorem, Divergence of the product of a scalar and a vector, Stoke's theorem, Surface integral of the curl of a vector, Green's theorem (Excluding the proofs of the theorems).

(6 Lecture hours)

References:

1. Malik, S.C. : Mathematical Analysis, Wiley Eastern Ltd., New Delhi.
2. Shanti Narayan : A Course of Mathematical Analysis, S. Chand and Company, New Delhi.
3. Spain, B. : Vector Analysis
4. Bhargava, Banwari Lal : Vector Calculus, JPH.
5. Gokhroo & Others : Vector Calculus, Navkar.

B. Sc./B.A. MATHEMATICS, SEMESTER -V, 2025-26 Onwards

Code of the Course : **SES7363P**

Title of the Course : **Scilab**

Level of the Course : **NHEQF Level 5.5**

Credit of the Course : **2**

Type of the Course : **Skill Enhancement Course (SEC)**

Delivery type of the Course : **Practical** (20 Hours for content delivery and 40 Hours for hands on coding of program, execution and problem solving)

Prerequisites :

Mathematics courses of Central Board of Secondary Education or equivalent at Sr. Sec. level.

Learning Objective :

The aim of the course is to familiarize the students with Mathematical tool which provides hands-on training to help you write and test your coding skill, and prepare you for real-life application.

Learning Outcomes:

After completion of this course, students will be able to

- Perform basic Mathematical operations using Scilab software
- Coding of a program
- Solve real life problems with the help of Scilab.
- Interpret and visualize simple Mathematical functions and operations by using Plot.
- Understand how to apply Scilab code for simulation/implementation for the verification of Mathematical functions in Mechanical Engineering.

Syllabus:

PART – A:

Brief about Scilab, Introduction to Scilab environment

Scilab basic operators, Scilab working directory

Scilab as a calculator, matrix operations, statistics, solving polynomials

Mathematical and logical examples,

PART – B:

Plotting graphs 2D plot, 3Dplots, mat plot, bode plot, Pie chart, bar chart and etc.

Programing, script files, function files, data structures.

Solving differential equations.

References:

1. Sandeep Nagar : Introduction to Scilab, Apress publisher, New York, USA, 2017.
2. A.S.Nair : Scilab (A free software to MATLAB), S. Chand Publishing, New Delhi, India, 2012.
3. WEB REFERENCES 1.https://www.scilab.org/
   2. https://onlinecourses.swayam2.ac.in/aic20_sp38/preview
   3. https://www.udemy.com/course/scilab-the-first-course-beginners-to-intermediate/mediate/

End of Semester (EoS) Examination pattern of Practical Exam.:

Duration: 3-hour Max. Marks: 80 Min Marks: 32

The examination shall be of three hours wherein the students have to perform any two practicals based on solving Mathematical problems and plotting graphs on software Scilab selecting one from each part.

The marks distribution shall be the following:

1- Two Practicals (Formation, coding and execution): 50 Marks (25 + 25)

2- Vivo Voce: 20 Marks

3- Evaluation of the record book of practicals performed in the semester: 10 Marks

Revised & Reviewed

MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR

DEPARTMENT OF MATHEMATICS AND STATISTICS

Bachelor of Science/ Arts (B.Sc./B.A.) 2025-26 Onwards

Faculty : SCIENCE

Subject : MATHEMATICS

Semester : Sixth

Level	Semester	Course Type	Course Code	Title	Delivery Type			Total Hours	Credit	Total Credit	Internal Assessment	EoS Exam	M. M.	Remarks
					L	T	P							
Select anyone of the following Discipline specific Elective (DSE) Courses and Skill Enhancement Course (SEC) in VI semester														
7	**VI**	DSE	MAT7103T	Mechanics	L	T	-	90	5+1	6	20	80	100	---
			MAT7104T	Geometry	L	T	-	90	5+1	6	20	80	100	---
			MAT7105T	Operations Research	L	T	-	90	5+1	6	20	80	100	---
		SEC	SES7364T	Vedic Mathematics	L	-	-	30	2	2	20	80	100	---
			SES7365P	LaTeX	-	-	P	60	2	2	20	80	100	---
Exit with Graduation Degree in Science (B.Sc.)														

B.Sc./B.A. MATHEMATICS, SEMESTER -VI, 2025-26 Onwards

Code of the Course : **MAT7103T**

Title of the Course : **MECHANICS**

Level of the Course : **NHEQF Level 5.5**

Credit of the Course : **6**

Type of the Course : **Discipline Specific Elective (DSE)**

Delivery type of the Course : **Lecture** (60 Hours for content delivery) and **Tutorial** (30 Hours for subject/ class activity, problem solving, diagnostic assessment and formative assessment)

Prerequisites :

Mathematics courses of Central Board of Secondary Education or equivalent at Sr. Sec. level.

Objectives of the Course :

The course aims to

(i) Understand motion of particles and fluid pressure.

(ii) Enable students to model real life situation and to equip them with the skills to interpret and understand how thing work.

Course Learning Outcomes:

After completion of this course, students will be able to

- Find resultant of coplanar forces and study equilibrium of bodies under three or more forces.
- Interpret virtual work by forces.
- Study the projective motion of various particles.
- Find velocity and acceleration in various direction and study rectilinear motion.
- Study the motion of particle in resisting medium.

Syllabus:

UNIT – I

Equilibrium of bodies under three or more forces: Lami's theorem, Low of triangle of forces, moment of forces-n theorem.

Friction: Lows of friction, Limiting equilibrium on an inclined plane.

Common catenary: Intrinsic and Cartesian equation, Geometrical properties.

(18 Lecture hours)

UNIT – II

Virtual work, Principle of virtual work for a system of coplanar forces acting on a particle and at a different point of a body, Problems on equilibrium by using Principle of virtual work, Problems involving elastic strings and curves, Projectile on inclined plane, Motion of a projectile and its trajectory, Impact (Direct and Oblique), Law of conservation of momentum.

(18 Lecture hours)

UNIT – III

Velocity and Accelerations (Tangential, normal, radial, transversal), Rectilinear motion, Simple harmonic motion, Hooke's law and elastic strings, Motion of horizontal and vertical elastic strings. (18 Lecture hours)

UNIT –IV

Constrained motion, Motion of a particle on the inside of a smooth vertical circle or sphere, Parabolic motion of the particle after leaving the circle, Motion of a particle on the outside of a smooth vertical circle or sphere, Motion on a smooth cycloid under gravitation, Motion on a rough curve under gravity, Motion under resisting medium (resistance varies as velocity and square of velocity). (18 Lecture hours)

UNIT –V

Fluid pressure, Specific gravity, Fluid pressure under gravity, Fluid pressure on plane surfaces, Center of pressure, Effect of further immersion, Center of pressure by integration.

(18 Lecture hours)

References:

1. S. L. Loney : Statics, Macmillan and Company, London.
2. R.S. Verma : A Text book of Statics, Pothishala.
3. Ray & Sharma : A Text book of Hydrostatics
4. N. Sharma : A Text book of Dynamics
5. M Ray : A Text book of Dynamics
6. Bhargava & Others : Dynamics, Statics, Hydrostatics, JPH.
7. Gokhroo & Others : Dynamics, Statics, Hydrostatics, Navkar.

B.Sc./B.A. MATHEMATICS, SEMESTER -VI, 2025-26 Onwards

Code of the Course : **MAT7104T**

Title of the Course : **GEOMETRY**

Level of the Course : **NHEQF Level 5.5**

Credit of the Course : **6**

Type of the Course : **Discipline Specific Elective (DSE)**

Delivery type of the Course : **Lecture** (60 Hours for content delivery) and **Tutorial** (30 Hours for subject/ class activity, problem solving, diagnostic assessment and formative assessment)

Prerequisites :

Mathematics courses of Central Board of Secondary Education or equivalent at Sr. Sec. level.

Objectives of the Course :

The course aims to

(i) Identifying and sketching curves, their geometric properties and applications.

(ii) Strengthen the concepts in two dimensional as well as three dimensional geometry.

Course Learning Outcomes:

After completion of this course, students will be able to

- Identify the nature and sketch conic of second and third degree.
- Understand geometrical properties of 2-D as well as 3-D shapes.
- Interpret the relation between plane and straight line.
- Evaluate principal plane and direction of conics.

Syllabus:

UNIT -I

General equation of second degree: Nature of conic, Eccentricity and foci of conic, Tracing of different conics.

Ellipse: Tangent, normal, Chord of contact of the tangents, Pole and Polar, Eccentric angle, Auxiliary circle, Director circle, Equation of chord in term of middle point, Pair of tangents, Conjugate lines, Diameter and conjugate diameters and their properties. (20 Lecture hours)

UNIT - II

Hyperbola: Parametric coordinates, Tangent, Normal, Chord of contact of tangents, Pole and Polar etc., Asymptotes, Conjugate hyperbola, Conjugate diameters, Rectangular hyperbola, Equation of hyperbola referred to its asymptotes.

Polar Equations: Polar equation of conic, Polar equations of tangent, Perpendicular lines and normal, Director circle of the conic. (18 Lecture hours)

UNIT-III

Plane and straight line: Equation to represent two planes and angle between them, Projection on a plane area of a triangle and volume of tetrahedron, Equations of line intersecting two lines, Skew lines, Shortest distance between two lines, Intersection of three planes and three lines. (17 Lecture hours)

UNIT- IV

Sphere: General Equation, Tangent Plane, Pole and Polar, Intersection of two spheres, Radical plane, Radical line, Radical centre, Co-axial spheres, Limiting points.

Cone: Enveloping cone, Tangent plane, Reciprocal cone, Three mutually Perpendicular generators, Right circular cone.

Cylinder: Right circular cylinder, Enveloping cylinder. (18 Lecture hours)

UNIT-V

General equation of second degree in three dimensions, Intersection of a line and a conicoid, Tangent lines and Tangent plane, Condition of tangency, plane section with a given centre, Diametral plane, Principal planes, Principal directions and Plane sections. (17 Lecture hours)

References:

1. Gorakh Prasad & H.C. Gupta : A Text book of coordinate Geometry (Pothishala)
2. S.L. Loney : The Elements of coordinate Geometry; Mack-Millan and Company, London.
3. R.J.T. Bell : Elementary Treatise on coordinate Geometry of Three Dimensions
4. P.K. Jain & Khalil Ahmed : A Textbook of Analytical Geometry of Three Dimensions, Wiley Eastern Ltd.
5. N. Saran & R.S. Gupta : Analytical Geometry of Three Dimensions, (Pothhishala)
6. Bansal & Bhargava : 2-D and 3-D
7. Gokhroo & Others : 2-D and 3-D

B.Sc./B.A. MATHEMATICS, SEMESTER -VI, 2025-26 Onwards

Code of the Course : **MAT7105T**

Title of the Course : **OPERATIONS RESERCH**

Level of the Course : **NHEQF Level 5.5**

Credit of the Course : **6**

Type of the Course : **Discipline Specific Elective (DSE)**

Delivery type of the Course : **Lecture** (60 Hours for content delivery) and **Tutorial** (30 Hours for subject/ class activity, problem solving, diagnostic assessment and formative assessment)

Prerequisites :

Mathematics courses of Central Board of Secondary Education or equivalent at Sr. Sec. level.

Objectives of the Course :

The course aims to

(i) To enrich the knowledge of students with concepts and techniques of linear programming problem.

(ii) To understand the formulation and apply algorithms to solve various types of L.P.P.

Course Learning Outcomes:

After completion of this course, students will be able to

- Understand the concept of linear programming problems and formulation.
- Explain the theoretical working of the graphical, simplex and other methods.
- Apply assignment and transportation problem in various physical problems.
- Learn the relationship between a LPP and its dual.

Syllabus:

UNIT –I

Linear Programming Problems and its formulation, Kinds of solutions, Graphical Approach for Solving some Linear Programs. (17 Lecture hours)

UNIT –II

Theory of simplex method, Optimality and unboundedness, Simplex algorithm, Simplex method in tableau format, Introduction to artificial variables, Two-phase method.

(18 Lecture hours)

UNIT –III

Big-M method and their comparison. Duality, Formulation of the dual problem, Primal- Dual relationships, Economic interpretation of the dual, Application of Dual over Simplex.

(20 Lecture hours)

UNIT –IV

Transportation problem and its mathematical formulation, Northwest-corner method, Least cost method and Vogel approximation method for determination of starting basic solution, Algorithm for solving transportation problem.

Assignment problem and its mathematical formulation, Hungarian method for solving assignment problem. (18 Lecture hours)

UNIT –V

Game theory: Formulation of two-person zero sum games, solving two-person zero sum games, Games with mixed strategies. (17 Lecture hours)

Recommended Books

1	Mokhtar S. Bazaraa, John J. Jarvis & Hanif D. Sherali,	: Linear programming and Network Flows, 2nd Ed., John Wiley and Sons, India.
2	F.S. Hillier & G.J. Lieberman	: Introduction to Operations Research, 8th Ed., Tata McGraw Hill, Singapore.
3	Hamdy A. Taha	: Operations Research, An Introduction, 8th Ed., Prentice-Hall, India.
4	S.D. Sharma	: Operations Research, KNRN.
5	G. Hadley	: Linear Programming, Narosa.
6	Bharghav, Bhati & Sharma	: Linear Programming, JPH.
7	Gokhroo & Others	: Linear Programming, Navkar.

B.Sc./B.A. MATHEMATICS, SEMESTER -VI, 2025-26 Onwards

Code of the Course	**: SES7364T**
Title of the Course	**: VEDIC MATHEMATICS**
Level of the Course	**: NHEQF Level 5.5**
Credit of the Course	**: 2**
Type of the Course	**: Skill Enhancement Course (SEC)**
Delivery type of the Course	**: Lecture** (20 Hours for content delivery and 10 Hours for subject/ class activity, problem solving, diagnostic assessment and formative assessment)

Prerequisites **:**

Senior Secondary or equivalent from recognize board.

Objectives of the Course **:**

The objective of this course is to doing faster calculations.

Course Learning Outcomes:

After completion of this course, students will be able to

• Getting quick results of big Mathematical calculations.

• Improves Focus, Memory and Concentration of students.

Syllabus:

UNIT –I

Introduction of Vedic mathematics, multiplication by Nikhilam and Urdhvatiryak method, division by Nikhilam and Pravartya methods. (6 Lecture hours)

UNIT – II

Factorization of quadratic and cubic equations, H.C.F. by Vedic method, Solution of simple and special type of equations by Shunyam Samuchhye and Pravartya methods.

(6 Lecture hours)

UNIT -III

Solution of Quadratic, Cubic and biquadratic equation, Solution of system of equations of three and more variables, Solution of Quadratic equations . (6 Lecture hours)

UNIT - IV

Applications of Vedic Mathematics in differentiation, Integration by "Anshikbhinna", Numerical coding of hindi alphabets. (6 Lecture hours)

UNIT - V

Concept of "Sahayakbhinna", Divisibility of large numbers, Sum and difference of squares, square roots and cube roots, Applications of Vedic Mathematics in geometry.

(6 Lecture hours)

References:

1. Shri Bharti Krishna tirthji maharaj : Vedic Mathematics, Motilal banarasidas publishers, Delhi
2. Dhaval Bathia : Vedic Mathematics Made Easy, Jaico Publishing House
3. Vidhya Vikram : Fundamentals of Vedic Mathematics
4. Rajesh Kumar Thakur : The essentials of Vedic mathematics, Rupa Publications

B.Sc./B.A. MATHEMATICS, SEMESTER -VI, 2025-26 Onwards

Code of the Course : **SES7365P**

Title of the Course : **LaTeX**

Level of the Course : **NHEQF Level 5.5**

Credit of the Course : **2**

Type of the Course : **Skill Enhancement Course (SEC)**

Delivery type of the Course : **Practical** (20 Hours for content delivery and 40 Hours for hands on coding of program and execution)

Prerequisites :

Mathematics courses of Central Board of Secondary Education or equivalent at Sr. Sec. level.

Objectives of the Course :

The objective of this course is to prepare Latex documents, create scientific articles and project reports, insert figures and tables into a Latex document, and create conference proceedings and presentations.

Course Learning Outcomes:

After the completion of the course, the students will be able to

- Understand basic typing of Mathematical equations, matrix, tables, and etc.
- Make a format of research paper and its power point presentations.

Syllabus:

PART – A:

A brief History of Latex, what is Latex, Merits of LATEX over Word Processors, Demerits of LATEX, Installation of the software LATEX, Understanding LATEX compilation, LATEX input File structure, Preamble, Basic Syntax: Creating a Title Page, Page Numbering and Headings, Modifying Text etc. Use packages.

Writing equations, Matrix, Tables, adding simple and dashed borders, merging rows and columns, and handling situations where a table exceeds the size of a page, Mathematics in Latex, Advanced Mathematics in Latex.

PART – B:

Page Layout: Titles, Abstract, Chapters, Sections, Equation references, citation. List making environments, Table of contents.

Generating new commands, Figure handling, numbering, List of figures, List of tables, Generating bibliography and index.

Beamer presentation: Introduction to creating slides, adding frames, dividing the slide into multiple columns, adding different blocks, etc.

References:

1. L. Lamport : A Document Preparation System, User's Guide and Reference Manual, Addison-Wesley, New York, second edition, 1994.
2. M.R.C. van Dongen : LATEX and Friends, Springer-Verlag Berlin Heidelberg 2012.
3. Stefan Kottwitz : LATEX Cookbook, Packt Publishing 2015.
4. David F. Griffths and Desmond J. Higham : Learning LATEX (second edition), Siam 2016.
5. George Gratzer : Practical LATEX, Springer 2015.
6. W. Snow : TEX for the Beginner. Addison-Wesley, Reading, 1992
7. D. E. Knuth : The TEX Book. Addison-Wesley, Reading, second edition, 1986

End of Semester (EoS) Examination pattern of Practical Exam.:

Duration: 3-hour Max. Marks: 80 Min Marks: 32

The examination shall be of three hours wherein the students have to preparing a document and PPT on computer with software LaTeX selecting one from each part.

The marks distribution shall be the following:

1- Two Practicals (Formation, coding and execution): 50 Marks (25 + 25)

2- Vivo Voce: 20 Marks

3- Evaluation of the record book of practicals performed in the semester: 10 Marks