FACULTY OF SCIENCES

SYLLABUS FOR THE BATCH FROM THE YEAR 2023 TO YEAR 2026

Programme Code:BA

Programme Name:B.A.

(Subject: Mathematics)
(Semester I-IV)

Examinations: 2023-2026

P.G.Department of Mathematics
Khalsa College, Amritsar

Syllabus of Mathematics

COURSE SCHEME											
SEMESTER - I											
Course Code	**Course Name**	**Hours/Week**	**Credits**			**Total Credits**	**Max Marks**				**Page No.**
			L	**T**	**P**		**Th**	**P**	**IA**	**Total**	
Major Courses											
MAT-111A	Algebra	4	3	1	-	4	75	-	50	100	3-4
MAT-111B	Calculus and Trigonometry	4	3	1	-	4	75	-		100	5-6
Total		8	6	2	-	8	150		50	200	

SEMESTER - II											
Course Code	**Course Name**	**Hours/Week**	**Credits**			**Total Credits**	**Max Marks**				**Page No.**
			L	**T**	**P**		**Th**	**P**	**IA**	**Total**	
Major Courses											
MAT-121A	Calculus and Differential equations	4	3	1	-	4	75	-	50	100	7-8
MAT-121B	Calculus	4	3	1	-	4	75	-		100	9-10
Total		8	6	2	-	8	150		50	200	

SEMESTER - III											
Course Code	**Course Name**	**Hours/Week**	**Credits**			**Total Credits**	**Max Marks**				**Page No.**
			L	**T**	**P**		**Th**	**P**	**IA**	**Total**	
Major Courses											
MAT-231A	Analysis	4	3	1	-	4	75	-	50	100	11-12
MAT-231B	Analytical Geometry	4	3	1	-	4	75	-		100	13-14
Total		8	6	2	-	8	150		50	200	

SEMESTER - IV											
Course Code	**Course Name**	**Hours/Week**	**Credits**			**Total Credits**	**Max Marks**				**Page No.**
			L	**T**	**P**		**Th**	**P**	**IA**	**Total**	
Major Courses											
MAT-241A	Statics and Vector Calculus	4	3	1	-	4	75	-	50	100	15-16
MAT-241B	Solid Geometry`	4	3	1	-	4	75	-		100	17-18
Total		8	6	2	-	8	150		50	200	

Khalsa College, Amritsar

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Syllabus for

PROGRAMME: B.A.

SEMESTER–I

MATHEMATICS

COURSE CODE: MAT-111A

COURSE TITLE: Algebra

L	T	P	Credits
3	1	0	4

CREDIT HOURS(PER WEEK): 4

TOTAL HOURS: 60 hrs.

Time: 3 Hours **MAXIMUM MARKS: 75**

Medium: English

INSTRUCTIONS FOR THE PAPER SETTERS:

1. The question paper will consists of five sections namely Section-A, which will be from entire syllabus (equally distributed from each unit), Section–B, C, D and E from Unit-I, II, III and IV, respectively.
2. Section–A will consists of eight short answer type questions, each of 2.5 marks. Students are to attempt any six.
3. Sections–B, C, D & E will consist of two questions each **(each question should be sudivided into atmost two parts)**. Students are to attempt any four questions in total by selecting one question from each section. Each question carries 15marks.
4. Teaching time for this paper would be six periods per week.

COURSE OBJECTIVES:

- Students will be able to solve problems based on matrix algebra, vector spaces, eigen values and eigen vectors, Cardon's and Descarte's methods of solving a system of equations and inequalities.

COURSE CONTENT:

Unit-I

Linear independence of row and column vectors. Row rank, Column rank of a matrix, Equivalence of column and row ranks, Nullity of a matrix, Applications of matrices to a system of linear (both homogeneous and non–homogeneous) equations. Theorems on consistency of a system of linear equations.

Unit-II

Eigen values, Eigen vectors, minimal and the characteristic equation of a matrix. Cayley Hamilton theorem and its use in finding inverse of a matrix. Quadratic Forms, quadratic form as a product of matrices. The set of quadratic forms over a field.

Unit-III

Congruence of quadratic forms and matrices. Congruent transformations of matrices. Elementary congruent transformations. Congruent reduction of a symmetric matrix. Matrix Congruence of skew–symmetric matrices. Reduction in the real field. Classification of real quadratic forms in variables. Definite, semi–definite and indefinite real quadratic forms. Characteristic properties of definite, semi–definite and indefinite forms.

Unit-IV

Relations between the roots and coefficients of general polynomial equation in one variable. Transformation of equations and symmetric function of roots, Descarte's rule of signs, Newton's Method of divisors, Solution of cubic equations by Cardan method, Solution of biquadratic equations by Descarte's and Ferrari's Methods.

BOOKS PRESCRIBED:

1. K.B. Dutta: Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd., New Delhi (2002).
2. H.S. Hall and S.R. Knight: Higher Algebra, H.M. Publications, 1994.
3. Chandrika Parsad: Text book on Algebra and Theory of Equations, Pothishala Pvt. Ltd., Allahabad.

COURSE OUTCOMES: On completing the course, the students will be able to:

- solve problems based on matrices, vector spaces, eigen values and eigen vectors,
- recognize consistency and inconsistency of linear equations.
- understand the relation between roots and coefficients.

Khalsa College, Amritsar

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Syllabus for

PROGRAMME: B.A.

SEMESTER–I

MATHEMATICS

COURSE CODE:MAT-111B

COURSE TITLE: Calculus and Trigonometry

L	T	P	Credits
3	1	0	4

CREDIT HOURS(PER WEEK): 4

TOTAL HOURS: 60 HRS.

MAXIMUM MARKS: 75

Medium: English

Time: 3 Hours

INSTRUCTIONS FOR THE PAPER SETTERS:

1. The question paper will consists of five sections namely Section-A, which will be from entire syllabus (equally distributed from each unit), Section–B, C, D and E from Unit-I, II, III and IV, respectively.
2. Section–A will consists of eight short answer type questions, each of 2.5 marks. Students are to attempt any six.
3. Sections–B, C, D& E will consist of two questions each **(each question should be sudivided into atmost two parts)**. Students are to attempt any four questions in total by selecting one question from each section. Each question carries 15marks.
4. Teaching time for this paper would be six periods per week.

COURSE OBJECTIVES:

- Calculus has widespread applications in science, economics, and engineering and can solve many problems for which algebra alone is insufficient.
- Trigonometry is a branch of mathematics that studies relationships between side lengths and angles of triangles.
- Students will apply calculus and Trigonometry in areas such as geodesy, surveying, celestial mechanics, and navigation.
- Students will learn relationships to other branches of mathematics, in particular complex numbers, infinite series, logarithms and calculus.

COURSE CONTENT:

Unit-I

Real number system and its properties, lub, glb of sets of real numbers, limit of a function, Basic properties of limits, Continuous functions and classification of discontinuities, Uniform continuity.

Unit-II

Differentiation of hyperbolic functions, Successive differentiation, Leibnitz theorem, Taylor's and Maclaurin's theorem with various forms of remainders, Indeterminate forms.

Unit-III

De–Moivre's Theorem and its applications, circular and hyperbolic functions and their inverses.

Unit-IV

Exponential and Logarithmic function of complex numbers, Expansion of trigonometric functions, Gregory's series, Summation of series.

BOOKS PRESCRIBED:

1. N. Piskunov: Differential and Integral Calculus, Peace Publishers, Moscow.
2. Gorakh Prasad: Differential Calculus, Pothishala Pvt. Ltd., Allahabad.
3. Erwin Kreyszig: Advanced Engineering Mathematics, John Wiley and Sons, 1999.
4. Shanti Narayan and P.K. Mittal: Differential Calculus, S Chand & Company.
5. Shanti Narayan and P.K. Mittal: Real Analysis, S Chand & Company.
6. Rajinder Pal Kaur:Calculus, First world Publication, Ludhiana.

COURSE OUTCOMES: On completing the course, the students will be able to:

- understand the relationships between side lengths and angles of triangles.
- understand Calculus as a major part of contemporary mathematics education.
- Have knowledge in applications in science, economics, and engineering and students can solve many problems for which algebra alone is insufficient.
- Calculate the limit and examine the continuity of a function at a point.
- Develop intricate relationships to other branches of mathematics, in particular complex numbers, infinite series, logarithms and calculus.

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Syllabus for

PROGRAMME: B.A.

SEMESTER–II

MATHEMATICS

COURSE CODE: MAT-121A

COURSE TITLE: Calculus and Differential Equations

L	T	P	Credits
3	1	0	4

CREDIT HOURS(PER WEEK) : 4

TOTAL HOURS: 60 HRS

MAXIMUM MARKS: 75

Medium: English

Time: 3 Hours

INSTRUCTIONS FOR THE PAPER SETTERS:

1. The question paper will consists of five sections namely Section-A, which will be from entire syllabus (equally distributed from each unit), Section–B, C, D and E from Unit-I, II, III and IV, respectively.
2. Section–A will consists of eight short answer type questions, each of 2.5 marks. Students are to attempt any six.
3. Sections–B, C, D & E will consist of two questions each **(each question should be sudivided into atmost two parts)**. Students are to attempt any four questions in total by selecting one question from each section. Each question carries 15marks.
4. Teaching time for this paper would be six periods per week.

COURSE OBJECTIVES:

- Calculus is a branch of mathematics focused on limits, functions, derivatives, integrals, and infinite series.
- This subject constitutes a major part of contemporary mathematics education. Calculus has widespread applications in science, economics, and engineering and can solve many problems for which algebra alone is insufficient.
- A differential equation is a mathematical equation that relates some function with its derivatives.
- In applications, the functions generally represent physical quantities, the derivatives represent their rates of change, and the differential equation defines a relationship between the two Differential equations have applications in fields of engineering, physics, economics, and biology.

COURSE CONTENT:

Unit-I

Asymptotes, Tests for concavity and convexity, Points of inflexion, Multiple Points, Curvature, Tracing of Curves (Cartesian and Parametric coordinates only).

Unit-II

Integration of hyperbolic functions. Reduction formulae. Definite integrals. Fundamental theorem of integral calculus. Quadrature, rectification.

Unit-III

Exact differential equations. First order and higher degree equations solvable for x,y,p. Clairaut's Form and singular solutions. Geometrical meaning of a differential equation. Orthogonal Trajectories.

Unit-IV

Linear differential equations with constant and variable coefficients. Variation of Parameters method, reduction method, series solutions of differential equations. Power series Method, Bessel and Legendre equations (only series solution).

BOOKS PRESCRIBED:

1. D.A. Murray: Introductory Course in Differential Equations. Orient Longman (India), 1967.
2. G.F. Simmons: Differential Equations, Tata McGraw Hill, 1972.
3. E.A. Codington: An Introduction to Ordinary Differential Equations, Prentice Hall of India, 1961.
4. Gorakh Prasad: Integral Calculus, Pothishala Pvt. Ltd., Allahabad.
5. Erwin Kreyszig: Advanced Engineering Mathematics, John Wiley and Sons, 1999.
6. Shanti Narayan and P.K. Mittal: Integral Calculus, S Chand & Company

COURSE OUTCOMES: On completing the course, the students will be able to:

- acquaint with the limits, functions, derivatives, integrals, and infinite series.
- associate Differential equations with the Mathematical modeling.
- solve multifarious differential equation that relates functions with its derivatives.
- know about concavity and convexity of the functions, Asymptotes and multiple points of a curve.
- Have knowledge about applications in fields of engineering, physics, economics, and biology.

Khalsa College, Amritsar

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Syllabus for

PROGRAMME: B.A.

SEMESTER–II

MATHEMATICS

COURSE CODE: MAT-121B

COURSE TITLE: Calculus

L	T	P	Credits
3	1	0	4

CREDIT HOURS (PER WEEK) : 4
TOTAL HOURS: 60 hrs.
MAXIMUM MARKS: 75

TIME: 3Hrs
MEDIUM: English

INSTRUCTIONS FOR THE PAPER SETTERS:

1. The question paper will consists of five sections namely Section-A, which will be from entire syllabus (equally distributed from each unit), Section–B, C, D and E from Unit-I, II, III and IV, respectively.
2. Section–A will consists of eight short answer type questions, each of 2.5 marks. Students are to attempt any six.
3. Sections–B, C, D& E will consist of two questions each **(each question should be sudivided into atmost two parts)**. Students are to attempt any four questions in total by selecting one question from each section. Each question carries 15marks.
4. Teaching time for this paper would be six periods per week.

COURSE OBJECTIVES:

- This course introduces the concept of partial derivatives which are used in fields such as computer graphics, physical sciences, vector calculus and engineering.
- Evaluate double and triple integrals of functions of several variables. Apply them in evaluating area and volume of solids.
- This course covers the concepts of jacobians, maxima and minima of functions of two variables, envelopes and evolutes.

COURSE CONTENT:

Unit-I

Limit and Continuity of functions of two variables, Partial differentiation, Change of variables, Partial derivatives and differentiability of real–valued functions of two variables, Schwartz's and Young's Theorem, Statements of Inverse and implicit function theorems and applications.

Unit-II

Euler's theorem on homogeneous functions, Taylor's theorem for functions of two variables, Jacobians, Envelopes. Evolutes, Maxima, Minima and saddle points of functions of two Variables.

Unit-III

Lagrange's undetermined multiplier method. Double and Triple Integrals, Change of variables, Change of order of integration in double integrals.

Unit-IV

Applications to evaluation of Areas, Volumes, Surfaces of solid of revolution.

BOOKS PRESCRIBED:

1. Narayan, S. & **Mittal**, P.K. : Integral Calculus, S. Chand & Co.
2. Kreyszig, E.: Advanced Engineering Mathematics.
3. Narayan S. & Mittal, P.K. : Differential Calculus, S. Chand & Co.

COURSE OUTCOMES: On completing the course, the students will be able to:

- apply Calculus in various fields such as computer graphics, physical sciences, economics and engineering.
- use Calculus in oceanography to calculate the height of tides in oceans.
- understand concept of partial derivatives which are used in fields such as computer graphics, physical sciences, vector calculus and engineering.
- learn about evaluating double and triple integrals of functions of several variables and apply them in evaluating area and volume of solids.
- Understand the concepts of jacobians, maxima and minima of functions of two variables, envelopes and evolutes.

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Syllabus for

PROGRAMME:B.A.

SEMESTER–III

MATHEMATICS

COURSE CODE: MAT-231A

COURSE TITLE: Analysis

L	T	P	Credits
3	1	0	4

Time:3 Hours

Meduim: English

CREDIT HOURS (PER WEEK) : 4

TOTAL HOURS: 60 hrs.

MAXIMUM MARKS: 75

INSTRUCTIONS FOR THE PAPER SETTERS:

1.The question paper will consists of five sections namely Section-A, which will be from entire syllabus (equally distributed from each unit), Section–B, C, D and E from Unit-I, II, III and IV, respectively.

2.Section–A will consists of eight short answer type questions, each of 2.5 marks. Students are to attempt any six.

3. Sections–B, C, D& E will consist of two questions each **(each question should be sudivided into atmost two parts)**. Students are to attempt any four questions in total by selecting one question from each section. Each question carries 15marks.

4. Teaching time for this paper would be six periods per week.

COURSE OBJECTIVES:

- Analysis is the branch of mathematics that studies the behavior of real numbers, sequences and series of real numbers
- The content of this course is designed to make the students understand to work comfortably to test the convergence of sequences and series of various types and the convergence of improper integrals.
- The content of this course helps to solve Riemann integrability, the use of beta and gamma functions in solving various problems of calculus.

COURSE CONTENT:

Unit-I

Definition of a sequence. Theorems on limits of sequences. Bounded and monotonic sequences. Cauchy's convergence criterion.

Unit-II

Series of non-negative terms. Comparison tests. Cauchy's integral tests. Ratio tests. Cauchy's root test. Raabe's test, Logarithmic test. Demorgan's and Bertrand's tests. Kummer's test, Cauchy Condensation test, Gauss test, Alternating series. Leibnitz's test, absolute and conditional convergence.

Unit-III

Partitions, Upper and lower sums. Upper and lower integrals, Riemann integrability. Conditions of existence of Riemann integrability of continuous functions and of monotone functions. Algebra of integrable functions.

Unit-IV

Improper integrals and statements of their conditions of existence. Test of the convergence of improper integral, beta and gamma functions.

BOOKS PRESCRIBED:

1. Malik, S.C & Arora, Savita.: Mathematical Analysis, Wiley Eastern Ltd. (1991).
2. Apostal, T.M.: Mathematical Analysis, Addison Wesley Series in Mathematics (1974).
3. Narayan, S & Mittal, P.K.: Integral Calculus, S. Chand & Co.

COURSE OUTCOMES: On completing the course, the students will be able to:

- Study the behavior of real numbers, sequences and series of real numbers.
- Test the convergence of sequences and series of various types, the convergence of improper integrals.
- Apply the concept of Riemann integrability, the use of beta and gamma functions in solving various problems of calculus.

Khalsa College, Amritsar

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Syllabus for

PROGRAMME: B.A.

SEMESTER–III

MATHEMATICS

COURSE CODE: MAT-231B

COURSE TITLE: Analytical Geometry

L	T	P	Credits
3	1	0	4

Time:3 Hours

Meduim: English

CREDIT HOURS (PER WEEK) : 4

TOTAL HOURS: 60 hrs.

MAXIMUM MARKS: 75

INSTRUCTIONS FOR THE PAPER SETTERS:

1.The question paper will consists of five sections namely Section-A, which will be from entire syllabus (equally distributed from each unit), Section–B, C, D and E from Unit-I, II, III and IV, respectively.

2.Section–A will consists of eight short answer type questions, each of 2.5 marks. Students are to attempt any six.

3. Sections–B, C, D& E will consist of two questions each **(each question should be sudivided into atmost two parts)**. Students are to attempt any four questions in total by selecting one question from each section. Each question carries 15marks.

4. Teaching time for this paper would be six periods per week.

COURSE OBJECTIVES:

- Analytic geometry is a branch of mathematics that enable the students in understanding and applying the concepts of geometry in the daily life.
- Some of such applications of geometry in different fields are art, robotics, Computer, and video games, architecture, Astronomy and physics, geographic information systems, and also in the construction of stairs making the use of angles of geometry.
- Helps to understand the concepts of change of origin, rotation of axes and invariants for second degree equations in two and three dimensions.
- The properties of conics (parabola, ellipse, hyperbola and sphere) are also to be studied.

COURSE CONTENT:

Unit-I

Transformation of axes in two and three dimensions: Shifting of origin, Rotation of axes, The invariants, Joint equation of pair of straight lines, equations of bisectors.

Unit-II

Parabola and its properties. Tangents and normals, Pole and polar, pair of tangents at a point, Chord of contact, equation of the chord in terms of mid point and diameter of conic.

Unit-III

Ellipse and hyperbola with their properties. Tangents and normals, Pole and polar. Pair of tangents at a point, Chord of contact.

Unit-IV

Intersection of three planes, condition for three planes to intersect in a point or along a line or to form a prism. Identifications of curves represented by second degree equation (including pair of lines). Sphere, Section of a sphere by a plane, spheres of a given circle. Intersection of a line and a sphere. Tangent line, tangent plane, power of a point w.r.t. a sphere, radical planes.

BOOKS PRESCRIBED:

1. Gorakh Prasad and H.C. Gupta: Text Book on Coordinate Geometry.
2. S.L. Loney: The Elements of Coordinate Geometry, Macmillan and Company, London.
3. Narayan, S. & Mittal, P.K.: Analytical Solid Geometry, S. Chand & Co.
4. Kreyszig, E.: Advanced Engineering Mathematics, John Wiley & Sons.
5. Thomos, G.B. and Finney, R.L.: Calculus and Analytic Geometry.

COURSE OUTCOMES: On completing the course, the students will be able to:

- understand and apply the concepts of geometry in the daily life.
- analyse the applications of geometry in different fields such as art, robotics, Computer, and video games.
- realize the important role of Analytical Geometry in architecture and also in the construction of stairs by making use of angles.
- comprehend the concepts of change of origin, rotation of axes and invariants for second degree equations in two and three dimensions.
- know about the properties of conics (parabola, ellipse, hyperbola and sphere).

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Syllabus for

PROGRAMME: B.A

SEMESTER–IV

MATHEMATICS

COURSE CODE:MAT-241A

COURSE TITLE: PAPER–I: Statics and Vector Calculus

L	T	P	Credits
3	1	0	4

Time:3 Hours

Meduim: English

CREDIT HOURS (PER WEEK) : 4

TOTAL HOURS: 60 hrs.

MAXIMUM MARKS: 75

INSTRUCTIONS FOR THE PAPER SETTERS:

1.The question paper will consists of five sections namely Section-A, which will be from entire syllabus (equally distributed from each unit), Section–B, C, D and E from Unit-I, II, III and IV, respectively.

2.Section–A will consists of eight short answer type questions, each of 2.5 marks. Students are to attempt any six.

3. Sections–B, C, D& E will consist of two questions each **(each question should be sudivided into atmost two parts)**. Students are to attempt any four questions in total by selecting one question from each section. Each question carries 15marks.

4. Teaching time for this paper would be six periods per week.

COURSE OBJECTIVES:

- The content of this course is designed to make the students understand the resolution and composition of a number of forces.
- Students will understand the concept of parallel forces and couples, the concept of moments of forces and couples about a point and a line, friction and its applications.
- Studenst will learn the differentiation and integration of vector functions, properties of gradient, divergence and curl, the applications of Gauss divergence theorem, Stoke's theorem and Green's theorem.

Unit-I

Composition and resolution of forces (parallelogram law, triangle law, polygon law, Lami's Theorem, λ - μ theorem). Resultant of a number of coplanar forces, parallel forces. Moments, Varignon's theorem of moments, Couples, Resultant of two Coplanar Couples, Equilibrium of two coplanar couples, Resultant of a force and a couple. Equilibrium of coplanar forces.

Unit-II

Friction, Laws of friction, Equilibrium of a particle on a rough plane. Centre of Gravity: Centre of gravity of a rod, triangular lamina, solid hemisphere, hollow hemisphere, solid cone and hollow cone.

Unit-III

Vector differentiation, Gradient, divergence and curl operators, line integrals, Vector identity, Vector integration.

Unit-IV

Theorems of Gauss, Green, Stokes and problems based on these.

BOOKS PRESCRIBED:

1. S.L. Loney: Statics, Macmillan and Company, London.
2. R.S. Verma: A Text Book on Statics, Optical Pvt. Ltd., Allahabad.
3. Spiegal, M.R.: Introduction to Vector Calculus and Tensor.
4. Spiegal, M.R.: Vector Analysis.

COURSE OUTCOMES: On completing the course, the students will be able to:

- understand the study of system of forces in equilibrium and differentiation and integration of vector functions.
- define the resolution and composition of a number of forces, parallel forces and couples, moments of forces and couples about a point and a line.
- generalise the theory behind the friction and centre of gravity.
- apply concept of a vector integration in a plane and in space.

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Syllabus for

PROGRAMME: B.A.

SEMESTER–IV

MATHEMATICS

COURSE CODE:MAT-241B

COURSE TITLE: PAPER–II: Solid Geometry

L	T	P	Credits
3	1	0	4

Time:3 Hours

Meduim: English

CREDIT HOURS (PER WEEK) : 4

TOTAL HOURS: 60 hrs.

MAXIMUM MARKS: 75

INSTRUCTIONS FOR THE PAPER SETTERS:

1.The question paper will consists of five sections namely Section-A, which will be from entire syllabus (equally distributed from each unit), Section–B, C, D and E from Unit-I, II, III and IV, respectively.

2.Section–A will consists of eight short answer type questions, each of 2.5 marks. Students are to attempt any six.

3. Sections–B, C, D& E will consist of two questions each **(each question should be sudivided into atmost two parts)**. Students are to attempt any four questions in total by selecting one question from each section. Each question carries 15marks.

4. Teaching time for this paper would be six periods per week.

COURSE OBJECTIVES:

- It will help students to generalise the concepts and ideas of plane geometry.
- It will give students the basic geometric views of shape, size, length, angle, volume, surface area, rotation, translation, location etc. associated with any figure.
- Students will understand its applications in 3-D modelling, Architectural designing, 3-D Computer graphics.
- This subject will make the students to understand the concepts and properties of solids like cone, right circular cone, cylinder, right circular cylinder and sphere.

COURSE CONTENT:

Unit-I

Cylinder as surface generated by a line moving parallel to a fixed line and through a fixed curve. Different kinds of cylinders such as right circular, elliptic, hyperbolic and parabolic in standard forms

Unit-II

Cone with a vertex at the origin as the graph of homogeneous equation of second degree in x, y, z. Cone as a surface generated by a line passing through a fixed curve and a fixed point outside the plane of the curve, right circular and elliptic cones.

Unit-III

Equation of surface of revolution obtained by rotating the curve $f(x,y)=0$ about the z-axis in the form of $f(x^2+y^2,z)=0$, Equation of ellipsoid, hyperboloid and paraboloid in standard forms.

Unit-IV

Surfaces represented by general equation of 2^{nd} degree $S = 0$. Tangent lines, tangent planes and Normal plane.

BOOKS PRESCRIBED:

1. Narayan, S. & Mittal, P.K. : Analytical Solid Geometry, S. Chand & Co.
2. Kreyszig, E.: Advanced Engineering Mathematics, John Wiley & Sons.

COURSE OUTCOMES: On completing the course, the students will be able to:

- Understand the concept of 3-D Euclidean geometry.
- generalise the concepts and ideas of plane geometry.
- Understand the basic geometric views of shape, size, length, angle, volume, surface area, rotation, translation, location etc. associated with any figure.
- learn about the applications of solid geometry in 3-D modelling, Architectural designing, 3-D Computer graphics.
- understand the concepts and properties of solids like cone, right circular cone, cylinder, right circular cylinder and sphere.