

ALLIED MATHEMATICS

Course Structure and Syllabus

(For the candidates admitted from the academic year 2024 - 2025 onwards)

CHOICE BASED CREDIT SYSTEM (CBCS)



THANTHAI HANS ROEVER COLLEGE (AUTONOMOUS)
(Accredited with 'A' Grade by NAAC (3rd cycle) with CGPA 3.23 out of 4)
(Affiliated to Bharathidasan University, Tiruchirappalli)
ELAMBALUR, PERAMBALUR – 621 220



Question Paper Pattern

Mathematics Programme		
Maximum Marks : 75		Duration: 3 Hours
Part – A	20 Multiple Choice Questions	20 x 1 = 20 Marks
Part – B Paragraph	5 Questions (Internal Choice) One set of questions from each unit	5 x 5 = 25 Marks
Part – C Essay Type	3 Questions (Answer any 3 out of 5 Questions) One question from each unit	3 x10 = 30 Marks
Total		75 Marks

MODEL QUESTION PAPER:

BSC/ BCA SEMESTER EXAMINATIONS

Time: 3 Hours Maximum Marks - 75

SECTION – A

Answer **ALL** of the Following

(20 x 1 = 20 Marks)

SECTION – B

Answer **ALL** of the Following

(5 x 5 = 25 Marks)

SECTION – C

Answer any **THREE** of the Following

(3 x 10 = 30 Marks)

BCA, Computer Science, Information Technology and Artificial Intelligence & Machine Learning

(For the candidates admitted from the academic year 2024 - 2025 onwards)

ALLIED MATHEMATICS

ALLIED COURSE - I - NUMERICAL METHODS AND STATISTICS

Course Code: **23UMA1AC13**

Exam Hours: 3

Instruction Hours: 5

Internal Marks: 25

Credits: 3

External Marks: 75

OBJECTIVES:

- To apply the numerical problem in efficiency with various methods.
- To Derive numerical methods for various mathematical operations and tasks

COURSE OUTCOMES:

On completion of the course, the student will be able to

CLO 1: Compute the Solution of Algebraic and Transcendental equation using Bisection and Newton-Raphson Method.

CLO 2: Find the solution of linear system of equation by Gaussian Elimination, Gauss Jacobi, and Gauss Seidel Methods

CLO 3: Evaluate finite integrals using Trapezoidal and Simpsons rule and Solve differential equation and integration.

CLO 4: Categorize and evaluate various measures of central tendency.

CLO 5: Calculate correlation and regression.

UNIT – I

The Solution of Numerical Algebraic and Transcendental Equations: Bisection Method - Iteration Method –Regula Falsi Method - Newton Raphson Method – Simple Problems only.

UNIT – II

Solutions of Simultaneous Linear Algebraic Equations: Gauss Elimination Method– Gauss Jordan Method - Gauss Jacobi - Gauss Seidel Method.

UNIT – III

Numerical solution of ODE: Taylor Series Method - Euler’s Method - Runge– Kutta Second and Fourth order method

Numerical Integration: Trapezoidal Rule - Simpson’s Rule (Proof not needed).

UNIT – IV

Measures of Central Tendency: Arithmetic Mean – Median – Mode – Geometric Mean – Harmonic Mean. **Measures of Dispersion:** Range– Quartile Deviation - Standard Deviation.

UNIT – V

Correlation and Regression: Introduction –Scatter Diagram -Karl Pearson Co-efficient of Correlation – Rank Correlation- Lines of Regression- Simple Problems only.

TEXT BOOK(S):

1. S.S.Sastry, “Introductory Methods of Numerical Analysis”, PHI Learning Pvt.Ltd, New Delhi 2010.
2. Gupta.S.C&Kapoor, V.K, “Fundamentals of Mathematical Statistics”, Sultan Chand & sons, New Delhi 1994.

UNIT – I	Chapter – 2	Sections 2.2, to 2.5 of [1]
UNIT – II	Chapters – 6 & 8	Sections 6.3.2 to 6.3.3& 8.3.1 to 8.3.2 of [1]
UNIT – III	Chapters – 7 & 5	Sections 7.2, 7.4, 7.5 & 5.4.1 to 5.4.3 of [1]
UNIT – IV	Chapters – 2 & 3	Sections 2.3 to 2.5.2, 2.6 to 2.9.1 & 3.3 – 3.5, 3.7 of [2]
UNIT – V	Chapter – 10	Sections 10.1 to10.3, 10.3.1, 10.6, 10.7 & 10.7.1 of [2]

REFERENCE(S):

1. M.K. Jain, S.R.K. Iyengar and R.K. Jain, “Numerical Methods for Scientific and Engineering Computation”, New Age International Private Limited, 1999.
3. C.E. Froberg, “Introduction to Numerical Analysis”, II Edn., Addison Wesley, 1979.
4. P. Kandasamy, K.Thilagavathy, Calculus of Finite Differences and Numerical Analysis (Allied Mathematics), S.Chand&Co.Ltd, New Delhi.

WEB LINK:

1. <https://www.youtube.com/watch?v=4cqDPHxWs9g>
2. <https://www.youtube.com/watch?v=82IDoaiYU0c>
3. <https://www.youtube.com/watch?v=nmIwSQJmX2M>

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course					Hours	Credits				
I	23UMA1AC13	NUMERICAL METHODS & STATISTICS					5	3				
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)						
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
CO2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
CO3		✓	✓	✓		✓		✓				
CO4		✓		✓			✓	✓				
CO5	✓	✓			✓	✓	✓		✓	✓		
Number of Matches (✓) = 36						Relationship: HIGH						

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

(For the candidates admitted from the academic year 2024 - 2025 onwards)

ALLIED MATHEMATICS

ALLIED COURSE - II - OPERATIONS RESEARCH

Course Code: 23UMA2AC2

Exam Hours: 3

Instruction Hours: 5

Internal Marks: 25

Credits: 3

External Marks: 75

OBJECTIVES:

- To study the methods used to solve assignment problems and transportation problems.
- To train the students in network problems

COURSE OUTCOMES

CLO 1: Recognize and relate LPP and solving LPP using graphical method.

CLO 2: Compute Simplex Algorithm, Two Phase Method and Big-M Method of LPP.

CLO 3: Explain Transportation problem and Evaluate its initial basic feasible solution.

CLO 4: Discuss and solve assignment problem using Hungarian algorithm.

CLO 5: Describe and Construct Network and compute PERT and CPM.

UNIT – I

Linear Programming Problem: Introduction - Graphical Solution Method – General Linear Programming Problem - Canonical and Standard forms of LPP.

UNIT – II

Linear Programming Problem (Continued): Introduction - Simplex Method for $<$, $=$, $>$ constraints – Big-M Method.

UNIT – III

Transportation Problem: Introduction – LP formulation of the Transportation Problem – Finding an Initial Basic Feasible Solution - Transportation Algorithm (Modi Method) – Unbalanced Transportation Problem.

UNIT – IV

Assignment Algorithm: Introduction- Mathematical Formulation of the Problem – Solution Methods of Assignment Problem – Special Cases in Assignment Problems – Travelling salesman Problem.

UNIT – V

Networks: Introduction – Network (Basic Components) – Logical Sequencing – Rules of Networking Construction – Concurrent Activities - CPM computation- PERT computation.

TEXT BOOK:

1. KantiSwarup, P.K.Gupta and Man Mohan, Operations Research, Sultan Chand & Co.Ltd.2012
UNIT – I Chapter – 3 Sections 3.1 to 3.5
UNIT – II Chapter – 4 Sections 4.1, 4.3 & 4.4
UNIT – III Chapter – 10 Sections 10.1, 10.2, 10.9 to 10.13 & 10.15
UNIT – IV Chapter – 11 Sections 11.1 to 11.4 & 11.7
UNIT – V Chapter – 25 Sections 25.1 to 25.7.

REFERENCE(S):

1. PremKumar, Gupta and D.S. Hira, “Operations Research”, An Introduction, S. Chand and Co., Ltd. New Delhi,
2. Hamdy.A.Taha, “Operations Research”, Seventh Edition, McMillan Publishing Company, New Delhi, 1982.

Semester	Code	Title of the Course					Hours	Credits			
II	23UMA2AC2	OPERATIONS RESEARCH					5	3			
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓		✓	✓		✓	✓	✓	✓		
CO2	✓		✓	✓	✓	✓		✓	✓		
CO3		✓	✓		✓	✓		✓	✓	✓	
CO4		✓			✓		✓	✓		✓	
CO5	✓	✓		✓	✓		✓			✓	
Number of Matches (✓) = 32					Relationship: MODERATE						

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

B.Sc., PHYSICS

(For the candidates admitted from the academic year 2024 - 2025 onwards)

ALLIED MATHEMATICS
ALLIED COURSE - I – ALGEBRA AND CALCULUS

Course Code: **23UMA1AC11**

Instruction Hours: 5

Credits: 3

Exam Hours: 3

Internal Marks: 25

External Marks: 75

OBJECTIVES:

- To train the students to solve the problems in Theory of Equations.
- To learn the basic concepts in the integration.

COURSE OUTCOMES

CLO 1: Apply domain knowledge for Relation between the coefficients and the roots of an algebraic equation with illustrate the examples.

CLO 2: Determine the concepts of Eigen values and Eigen vectors.

CLO 3: To find maxima and minima, critical points and inflection points of functions.

CLO 4: To gain the Knowledge of various types of Integration.

CLO 3: Discuss and demonstrate the Linear Equations with constant coefficients, Complementary function and Particular integrals.

UNIT – I

Theory of Equations: Relation between roots & coefficients – Transformations of Equations – Diminishing, Increasing & Multiplying the roots by a constant- Rolle’s Theorem, Descarte’s rule of Signs (statement only) – Simple problems.

UNIT – II

Matrices: Singular matrices – Inverse of a non-singular matrix using adjoint method - Rank of a Matrix – Consistency – Characteristic equation, Eigen values, Eigen vectors – Cayley Hamilton’s Theorem (proof not needed) – Simple applications only

UNIT – III

Differentiation: Maxima & Minima – Concavity, Convexity – Points of inflexion - Partial differentiation – Euler’s Theorem - Total differential coefficients (proof not needed) –Simple problems only.

UNIT –IV

Integration: Evaluation of integrals of types 1. $\int \frac{px+q}{ax^2+bx+c} dx$ 2. $\int \frac{px+q}{\sqrt{ax^2+bx+c}} dx$ 3. $\int \frac{dx}{a+bsinx}$

4. $\int \frac{dx}{a+bcosx}$ – Evaluation using Integration by parts.

UNIT – V

Differential Equations: Variables Separables – Linear equations – Second order of types $(aD^2 + bD + c)y = F(x)$ where a,b,c are constants and F(x) is one of the following types (i) e^{Kx} (ii) $\sin(kx)$ or $\cos(kx)$ (iii) x^n , n being an integer.

TEXT BOOK(S):

1. T.K. Manickavasagam Pillai& Others, Algebra, Vol I, S.V Publications , 2004
2. T.K. Manickavasagam Pillai& Others, Algebra, Vol II, S.V Publications, Pvt. Ltd 2011.
3. S. Narayanan, T.K. Manicavachagam Pillai, Calculus, Vol. I, S.ViswanathanPvt Limited, 2010.
4. S. Narayanan, T.K. Manicavachagam Pillai, Calculus, Vol. II, S. ViswanathanPvt Limited, 2011.
5. S. Narayanan, T.K. Manicavachagam Pillai, Calculus, Vol. III, S. ViswanathanPvt Limited, 2008

UNIT – I	Chapter – 6	Sections 11, 15, 17, 18, 24, 25 of [1]
UNIT – II	Chapter – 2	Sections 1 to 16 of [2]

UNIT – III	Chapters – 5 & 8	Sections 1, 2 & 1.1 to 1.6 of [3]
UNIT – IV	Chapter – 1	Sections 7,8,9,11 of [4]
UNIT – V	Chapter – 1 & 2	Sections 2.1, 2.4 & 1 to 3 of [5]

REFERENCE:

1. M.L. Khanna, Differential Calculus, Jaiprakashnath and Co., Meerut-2004.
2. S. RethinaKumar, “Algebra and Calculus”, Sai Publication – 2015.

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course					Hours	Credits			
I	23UMA1AC11	ALGEBRA AND CALCULUS					5	3			
Course Outcomes (COs)	Programme Outcomes(POs)					Programme Specific Outcomes(PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓				✓	✓	✓	
CO2	✓	✓	✓	✓		✓	✓	✓	✓	✓	
CO3	✓				✓	✓	✓		✓		
CO4		✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO5		✓	✓	✓			✓	✓		✓	
Number of Matches (✓) = 36						Relationship: HIGH					

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

B.Sc., PHYSICS

(For the candidates admitted from the academic year 2024 - 2025 onwards)

ALLIED MATHEMATICS

ALLIED COURSE – I – ALGEBRA AND TRIGONOMETRY

Course Code: 23UMA1AC12

Instruction Hours: 5

Credits: 3

Exam Hours: 3

Internal Marks: 25

External Marks: 75

OBJECTIVES:

- Basic ideas on the Theory of Equations, Matrices and Number Theory.
- Knowledge to find expansions of trigonometry functions, solve theoretical and applied problems.

COURSE LEARNING OUTCOME:

Students will be able to

CLO 1: Classify and Solve reciprocal equations.

CLO 2: Find the sum of Binomial, Exponential and Logarithmic series.

CLO 3: Find Inverse of Matrix, Eigen values, Eigen vectors and verify Cayley Hamilton theorem a given matrix.

CLO 4: Expand the powers and multiples of trigonometric functions in terms of sine and cosine.

CLO 5: Determine relationship between circular and hyperbolic functions

UNIT – I

Reciprocal Equations - Standard Form Reciprocal Equations – A reciprocal equation of the standard form can always be depressed to another of half the dimension - Increasing or decreasing the roots of a given equation - Removal of terms - Horner's method – related problems.

UNIT – II

Binomial– Exponential – Logarithmic series (Theorems without proof) – Approximations - related problems.

UNIT – III

Summation of Series: Applications of Partial fractions – The Product of successive terms – general term of reciprocal – sum of n-terms of the series.

UNIT – IV

Expansions of $\cos n\theta$ and $\sin n\theta$ – Expansion of $\tan n\theta$ in powers of $\tan\theta$ - Expansion of $\tan(A+B+C \dots\dots)$ - Powers of sines and cosines of θ in terms of function of multiples of θ - Expansion of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in ascending powers of θ - related problems.

UNIT – V

Hyperbolic functions – Relation between circular and hyperbolic functions - Inverse hyperbolic functions.

TEXT BOOK(S):

1. T.K. Manickavasagam Pillai, S. Natarajan and Ganapathy, "Algebra" Volume – I 2006.
2. S. Narayanan, T.K. Manichavasagam Pillai, "Trigonometry", S. Viswanathan (Printers & Publishers, Pvt Limited, 2010.

UNIT – I	Chapter – 6	Section 16,17 ,19,30 of [1]
UNIT – II	Chapter – 3	Section 5,6 & 10 of [1]
	Chapter – 4	section 3,5,6,7 & 14 of [1]
UNIT – III	Chapter – 5	Section 1 to 5 [1]
UNIT – IV	Chapter – 3	Section 1 to 5 of [2]
UNIT – V	Chapter – 4	Section1 to 2 of [2]

REFERENCE(S):

1. G.B. Thomas and R.L. Finney, Calculus, 9th Ed., Pearson Education, Delhi, 2005
2. C. V. Durell and A. Robson, Advanced Trigonometry, Courier Corporation, 2003
3. J. Stewart, L. Redlin, and S. Watson, Algebra and Trigonometry, Cengage Learning, 2012.

WEB LINK:

1. <https://lib.alfaisal.edu/pdf/AlgebraAndTrigonometry-LR.pdf>
2. <https://home.cs.colorado.edu/~alko5368/lecturesCSCI2820/mathbook.pdf>

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course					Hours	Credits			
I	23UMA1AC12	ALGEBRA AND TRIGONOMETRY					5	3			
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO2	✓		✓	✓	✓	✓		✓			
CO3	✓		✓				✓	✓	✓	✓	
CO4		✓		✓	✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓				
Number of Matches (✓) = 37						Relationship: HIGH					

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

B.Sc., PHYSICS

(For the candidates admitted from the academic year 2024-2025 onwards)

ALLIED MATHEMATICS

ALLIED COURSE - II - ANALYTICAL GEOMETRY (3D), TRIGONOMETRY AND FOURIER SERIES

Course Code: 23UMA2AC21

Instruction Hours: 4

Credits: 3

Exam Hours: 3

Internal Marks: 25

External Marks: 75

OBJECTIVES:

- To learn the basic needs Trigonometry.
- To learn the basic ideas of Fourier Series.

COURSE OUTCOMES

CLO 1: Describe the equation of a straight line passing through two given points and shortest distance between two skew lines.

CLO 2: Finding centre, radius and length of the tangent plan to a sphere.

CLO 3: Expansion of $\sin nx$, $\cos nx$, $\tan nx$ and powers of sines and cosines in terms of functions of multiples of θ

CLO 4: Define and illustrate the concept of hyperbolic functions.

CLO 5: Find Odd and Even function, Half range Fourier series.

UNIT – I

Equation of a straight line passing through two given points - Condition for a line to be parallel to a plane - Coplanar lines - Shortest distance between two given lines – Simple problems.

UNIT – II

Equation of a sphere - Finding centre and radius - Length of the tangent to a sphere - Plane section of a sphere.

UNIT – III

Expansion of $\sin n\theta$, $\cos n\theta$, $\tan n\theta$ (n being a positive integer) - Expansion of $\sin^n\theta$, $\cos^n\theta$, $\sin^n\theta\cos^m\theta$ in a series of sines & cosines of multiples of θ (θ - given in radians) .

UNIT – IV

Euler's formula for $e^{i\theta}$ - Definition of Hyperbolic functions –Formulae involving Hyperbolic functions - Relation between Hyperbolic & circular functions – Expansion of $\sin hx$, $\cosh x$, $\tan hx$ in powers of x

UNIT – V

Definition of Fourier series – Finding Fourier Coefficients for a given periodic function with period 2π .

TEXT BOOK(S):

1. T.K.Manickavasagam Pillai, T.Natarajan, “Analytical Geometry (3D)” Part-II, S. Viswanathan (Printers & Publishers, Pvt Limited, 2011).
2. S. Narayanan, T.K. Manichavasagam Pillai, “ Trigonometry”, S. Viswanathan (Printers & Publishers, Pvt Limited, 2011).
3. S.Narayanan, T.K. Manichavasagam Pillai, “Calculus” Volume – III, S. Viswanathan(Printers & Publishers, Pvt Limited, 2011).

UNIT – I	Chapter – 3	Sections 4, 5, 7 & 8 of [1]
UNIT – II	Chapter – 4	Sections 2 to 5 of [1]
UNIT – III	Chapter – 3	Sections 1,2,3,4 of [2]
UNIT – IV	Chapter – 4	Sections 1, 2 (2.1, 2.2) of [2]
UNIT – V	Chapter – 6	Sections 1 to 2 of [3]

Semester	Code	Title of the Course					Hours	Credits			
II	23UMA2AC21	ANALYTICAL GEOMETRY (3D), TRIGONOMETRY AND FOURIER SERIES					4	3			
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓	✓	✓	✓		✓		
CO2	✓	✓				✓	✓	✓	✓	✓	
CO3	✓	✓	✓	✓	✓	✓	✓			✓	
CO4			✓	✓	✓			✓	✓	✓	
CO5	✓	✓	✓			✓	✓	✓			
Number of Matches (✓) = 35					Relationship: HIGH						

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

B.Sc., PHYSICS
(For the candidates admitted from the academic year 2024-2025 onwards)
ALLIED MATHEMATICS

ALLIED COURSE - II - ANALYTICAL GEOMETRY(3D) AND FOURIER SERIES

Course Code: 23UMA2AC22

Exam Hours: 3

Instruction Hours: 5

Internal Marks: 25

Credits: 3

External Marks: 75

OBJECTIVES:

- Necessary skills to analyse characteristics and properties of two- and three-dimensional geometric shapes.
- To present mathematical arguments about geometric relationships.
- To solve real world problems on geometry and its applications.

COURSE LEARNING OUTCOME:

Students will be able to

CLO1: Explain in detail the system of Planes.

CLO2: Understand the system of Straight lines.

CLO3: Analyse in detail the system of Spheres.

CLO4: Find the Fourier coefficient for the period 2π .

CLO5: Apply the knowledge of Fourier functions.

UNIT-I:

The Planes: System of Planes – Direction cosines of the lines which is perpendicular to a plane – Angle between the planes – Equation of a plane through the line of intersection of two given planes - Length of the perpendicular.

UNIT-II:

The Straight Lines: A straight line may be determined as the intersection of two planes – Symmetrical form of the equations of a line – Equation of a straight line passing through two given points.

The plane and the straight line: Angle between the line and the plane – Coplanar lines – shortest distance between two given lines –The intersection of three planes.

UNIT-III:

The Sphere: Equation of a sphere –The general equation – The plane section of a sphere is a circle - Equation of the circle on a sphere –The equation of a tangent plane.

UNIT-IV:

Definition of Fourier series – Finding Fourier Coefficients for a given periodic function with period 2π .

UNIT-V:

Even and Odd functions – Half Range Fourier Series – Development on Cosine series – Development in Sine series.

TEXT BOOK(S):

1. T.K. Manickavachagom Pillai and T. Natarajan. A Text Book of Analytical Geometry (Part II-Three Dimensions) Viswanathan (Printers & Publishers) Pvt. Ltd.
2. S.Narayanan, T.K. Manichavasagam Pillai, "Calculus" Volume – III, S. Viswanathan(Printers & Publishers, Pvt Limited, 2011.

Unit I Chapter – 2 Sec 1 to 11 of [1]

Unit II Chapter – 3 Sec 1 to 8 & 10 of [1]

Unit III Chapter – 4 Sec 1 to 8 of [1]

Unit IV Chapter – 5 Sec 1 to 2 of [2]

Unit V Chapter – 5 Sec 3 to 4 of [2]

REFERENCE(S):

1. Robert J. T. Bell, Co-ordinate Geometry of Three Dimensions.
2. William F. Osgood and William C. Graustein, Plane and Solid Analytic Geometry, Macmillan Company, New York, 2016.
3. Calculus and Analytical Geometry, G.B. Thomas and R. L. Finny, Pearson Publication, 9th Edition, 2010.
4. Robert C. Yates, Analytic Geometry with Calculus, Prentice Hall, Inc., New York, 1961.
5. William H. McCrea, Analytical Geometry of Three Dimensions, Dover Publications, Inc, New York, 2006.

WEB LINK:

1. <https://ia800504.us.archive.org/11/items/elementsofcoordi00lone/elementsofcoordi00lone.pdf>
2. https://www.forgottenbooks.com/en/download/An_Elementary_Treatise_on_Coordinate_Geometry_of_Three_Dimensions_1000038010.pdf
3. <https://nptel.ac.in>

Relationship Matrix for COs, POs and PSOs

Semester	Code	Title of the Course					Hours	Credits			
II	23UMA2AC22	ANALYTICAL GEOMETRY(3D) AND FOURIER SERIES					5	3			
Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO2	✓		✓	✓	✓	✓		✓			
CO3	✓		✓				✓	✓	✓	✓	
CO4		✓		✓	✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓				
Number of Matches (✓) = 37						Relationship: HIGH					

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High