G. VENKATASWAMY NAIDU COLLEGE, KOVILPATTI-628502
(AUTONOMOUS)

(Re-Accredited with "A" Grade by NAAC)

Department of Mathematics

(for those who joined from the Academic year 2023-2024 and onwards)

VISION

- To become a center of excellence in Mathematics. To empower students with sound knowledge and investigate new methodologies and applications in Research. To equip them for better service towards the Society.

MISSION

- To encourage the students to conduct student projects to develop their analytical and logical thinking.
- To provide quality education Research and consultancy by providing highly skilled Mathematical knowledge.
- To provide excellent knowledge of Mathematical sciences for suitable career and groom them for National recognition.
- To enable the students as mathematical thinkers and become life-long learners in their chosen profession.

PROGRAMME OUTCOMES (PO)

PO1: Capable of demonstrating computational ability in solving a wide array of mathematical problems.

PO2: Capability to utilize mathematical skills to solve theoretical and applied problems.

PO3: Capacity to identify applications of mathematics in various disciplines and society.

PO4: Ability to become successful professionals by demonstrating logical and analytical thinking.

PO5: Ability to provide systematic and understanding of the concepts and theories of mathematics and enhance career prospects in a huge array of fields.

PO6: Ability to analyse, interpret and draw conclusions from quantitative / qualitative data; and critically evaluate ideas from reasoned perspective.

PO7: Ability to work independently, identify and manage a project. Ability to acquire knowledge and skills, including "learning how to learn", through self-placed and self-directed learning aimed at personal development, meeting economic, social and cultural objectives.

PROGRAMME EDUCATIONAL OBJECTIVES

PEO 1: Provide students with a thorough knowledge of fundamental mathematical facts and good knowledge in analytical, algebraic structures, applied mathematics and statistics.

PEO 2: Students should develop the ability to apply the acquired knowledge to solve the real life problems.

PEO 3: Students will become leaders in their associated organization with team building and managing capabilities.

PROGRAMME SPECIFIC OUTCOMES

PSO1: Acquire good knowledge and understanding, to solve specific theoretical & applied problems in different area of mathematics & statistics.

PSO2: Understand, formulate, develop mathematical arguments, logically and use quantitative models to address issues arising in social sciences, business and other context /fields.

PSO3: To prepare the students who will demonstrate respectful engagement with other's ideas, behaviours, beliefs and apply diverse frames of references to decisions and actions. To create effective entrepreneurs by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate start-ups and high potential organizations

GRADUATE ATTRIBUTES

1. Computational ability:

Demonstrate a computational ability in solving a wide array of mathematical problems.

2. Problem Solving:

Utilize mathematical skill to solve theoretical and applied problems. Identify and analyze the problem and formulate solution for problems using principles of Mathematics.

3. Applied Learning:

Identify application of Mathematics in various disciplines and society to apply disciplinary or inter discipline learning across multiple context.

4. Professional Development:

Become successful professionals by demonstrating logical and analytical thinking. To develop on self professionally and to critically improve on self with a view to taking appropriate decision in diverse professional environment.

5. Career prospects:

Provide a systematic understanding of the concepts and theories of Mathematics and enhance career prospects in huge array of fields.

6. Critical Thinking and Analytical Reasoning:

Ability to employ critical thinking in understanding the concepts in every area of Mathematics. To Analyze the results and apply them in various branches of Mathematics.

7. Contemporary Skill:

Ability to work independently and do in depth study of various notations of Mathematics.

G. VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS), KOVILPATTI

Programme Structure for B. Sc (Mathematics)

For those admitted from the academic year 2023-24 and onwards)

Category	Course Type	Course Code	Course Title	Contact Hours	Exam Hours	Marks			Credit
						CIA	ESE	Total Marks	
Semester-I									
PART-I	Language	U23TA1L1	Tamil– I	6	3	25	75	100	3
PART-II	English	U23EN1L1	English - I	6	3	25	75	100	3
PART-III	Core-1	U23MA101	Algebra and Trigonometry	4	3	25	75	100	4
	Core-2	U23MA102	Differential Calculus	4	3	25	75	100	4
	Elective Generic -1	U23PH1A1	Allied Physics - I	4	3	25	75	100	3
	Elective Generic Lab - 1	U23PH1AP	Allied Physics Practicals - I	2	3	40	60	100	1
PART-IV	Skill Enhancement Courses SEC1(NME - I)	U23MA1S1	Mathematics for Competitive Exam - I	2	-	50	-	50	2
	Foundation Course FC	U23MAFC1	Foundation Course	2	-	50	-	50	2
TOTAL				**30**				**700**	**22**
Semester-II									
PART-I	Language	U23TA2L2	Tamil– II	6	3	25	75	100	3
PART-II	English	U23EN2L2	English - II	6	3	25	75	100	3
PART-III	Core-3	U23MA203	Analytical Geometry (two and three Dimensions)	4	3	25	75	100	4
	Core-4	U23MA204	Integral Calculus	4	3	25	75	100	4
	Elective Generic -2	U23PH2A2	Allied Physics -II	4	3	25	75	100	3
	Elective Generic Lab - 2	U23PH2AP	Allied Physics Practicals - II	2	3	40	60	100	1
	Comprehension - 1(Self Study Course-	U23MA2C1	Comprehension in Mathematics – I	-	1	-	50	50	1

	Online Exam)								
PART-IV	Skill Enhancement Courses SEC2(NME – II)	U23MA2S2	Mathematics for Competitive Exam - II	2	-	50	-	50	2
	Skill Enhancement Courses (DS) SEC3	U23MA2S3	Computing Skills(Office Automation)	2	2	-	50	50	2
TOTAL				**30**				**750**	**23**

Part-III B.Sc. Mathematics Semester – I

Core-I: ALGEBRA & TRIGONOMETRY (U23MA101)

Lecture Hours	**:55**	**Tutorial Hours**	**: 5**
Practical Hours	**: -**	**No. of Credit**	**: 4**
Contact Hours per Semester	**: 60**		
Contact hours per Week	**: 4**		
Internal Marks	**: 25**		
External Marks	**: 75**		
Total Marks	**: 100**		

Objectives of the Course:

- 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 (for Mapping with POs and PSOs)

Students will be able to

CO 1: Classify and Solve reciprocal equations

CO 2: Find the sum of binomial, exponential and logarithmic series

CO 3: Find Eigen values, eigen vectors, verify Cayley – Hamilton theorem and diagonalize a given matrix

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

CO 5: Determine relationship between circular and hyperbolic functions and the summation of trigonometric series

CO - PO Mapping (Course Articulation Matrix

COs	**Program Outcomes (POs)**							**Program Specific Outcome (PSOs)**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	2	2	2	2	3	2	2
CO2	2	3	2	3	2	2	2	3	2	2
CO3	3	2	3	2	2	1	1	3	2	2
CO4	3	3	2	2	2	2	3	3	2	2
CO5	2	2	2	1	1	2	2	3	2	1
Total Contribution of Cos to POs	**13**	**12**	**12**	**10**	**9**	**9**	**10**	**15**	**10**	**9**
Weighted Percentage of Cos contribution to POs	**86.66**	**80**	**80**	**66.67**	**60**	**60**	**66.66**	**100**	**66.67**	**60**

No Correlation - 0; Weak - 1; Moderate- 2; Strong - 3

COURSE CONTENT

Unit I: Reciprocal Equations: (L – 11 + T – 1 Hrs)

Standard form–Increasing or decreasing the roots of a given equation- Removal of terms, Approximate solutions of roots of polynomials by Horner's method – related problems.

Unit II: Summation of Series: (L – 11 + T – 1 Hrs)

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

Unit III: Characteristic equation: (L – 11 + T – 1 Hrs)

Eigen values and Eigen Vectors-Similar matrices - Cayley – Hamilton Theorem (Statement only) - Finding powers of square matrix, Inverse of a square matrix up to order 3, Diagonalization of square matrices - related problems.

Unit IV: Expansion of Trigonometric Series: (L – 11 + T – 1 Hrs)

Expansions of $\sin n\theta$, $\cos n\theta$ in powers of $\sin\theta$, $\cos\theta$ - Expansion of $\tan n\theta$ in terms of $\tan\theta$, Expansions of $\cos^n\theta$, $\sin^n\theta$, $\cos^m\theta\sin^n\theta$ –Expansions of $\tan(\theta_1+\theta_2+\ldots+\theta_n)$-Expansions of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in terms of θ - related problems.

Unit V: Hyperbolic functions: (L – 11 + T – 1 Hrs)

Relation between circular and hyperbolic functions Inverse hyperbolic functions, Logarithm of complex quantities, Summation of trigonometric series – related problems.

Tutorial Section:

Unit	Topic	Hours
I	Horner's method	1
II	Logarithmic series	1
III	Diagonalization of square matrices	1
IV	Expansions of $tan\theta$	1
V	Summation of trigonometric series	1

Text Books:

1. Manikavachagom Pillai, T. K., Natarajan, T. and Ganapathy, K. S., *Algebra*, Volume 1 & 2, Viswanathan, S., (Printers & Publications) Pvt. Ltd, 2015.
2. Arumugam, S. and Thangapandi Issac, A., *Theory of Equations and Trigonomentry*, New Gamma Publishing House, Palayamkottai,, 2006.

Reference Books:

1. Thomas, G. B. and Finney, R. L., *Calculus*, 9th Ed., Pearson Education, Delhi, 2005.
2. Durell, C. V. and Robson, A., *Advanced Trigonometry*, Courier Corporation, 2003.
3. Stewart, J., Redlin, L., and Watson, S., *Algebra and Trigonometry*, Cengage Learning, 2012.
4. Thomas, G. B. and Finny, R. L., *Calculus and Analytical Geometry*, Pearson Publication, 9th Edition, 2010.

Web References:

1. https://nptel.ac.in

Part-III B.Sc. Mathematics Semester – I

Core-II: DIFFERENTIAL CALCULUS (U23MA102)

Lecture Hours	**: 55**	**Tutorial Hours**	**:5**
Practical Hours	**: -**	**No. of Credit**	**:4**
Contact Hours per Semester	**: 60**		
Contact hours per Week	**: 4**		
Internal Marks	**: 25**		
External Marks	**: 75**		
Total Marks	**: 100**		

Objectives of the Course:

- The basic skills of differentiation, successive differentiation, and their applications.
- Basic knowledge on the notions of curvature, evolutes, involutes and polar co-ordinates and in solving related problems.

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CO 1: Find the nth derivative, form equations involving derivatives and apply Leibnitz formula

CO 2: Find the partial derivative and total derivative coefficient

CO 3: Determine maxima and minima of functions of two variables and to use the Lagrange's method of undetermined multipliers

CO 4: Find the envelope of a given family of curves

CO 5: Find the evolutes and involutes and to find the radius of curvature using polar co-ordinates

CO-PO Mapping (Course Articulation Matrix)

COs	**Program Outcomes (POs)**							**Program Specific Outcome (PSOs)**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	2	2	2	2	3	2	2
CO2	2	3	2	3	2	2	2	3	2	2
CO3	3	2	3	2	2	1	1	3	2	2
CO4	3	3	2	2	2	2	3	3	2	2
CO5	2	2	2	1	1	2	2	3	2	1
Total Contribution of Cos to POs	**13**	**12**	**12**	**10**	**9**	**9**	**10**	**15**	**10**	**9**
Weighted Percentage of Cos contribution to POs	**86.66**	**80**	**80**	**66.67**	**60**	**60**	**66.66**	**100**	**66.67**	**60**

No Correlation - 0; Weak - 1; Moderate - 2; Strong - 3

COURSE CONTENT

UNIT-I: Successive Differentiation: **(L – 11 + T – 1 Hrs)**

Introduction (Review of basic concepts) – The n^{th} derivative – Standard results – Fractional expressions – Trigonometrical transformation – Formation of equations involving derivatives – Leibnitz formula for the n^{th} derivative of a product – Feynman's method of differentiation.

UNIT-II: Partial Differentiation: **(L – 11 + T – 1 Hrs)**

Partial derivatives – Successive partial derivatives – Function of a function rule – Total differential coefficient – A special case – Implicit Functions.

UNIT-III: Partial Differentiation (Continued): **(L – 11 + T – 1 Hrs)**

Homogeneous functions – Partial derivatives of a function of two variables –Maxima and Minima of functions of two variables - Lagrange's method of undetermined multipliers.

UNIT-IV: Envelope: **(L – 11 + T – 1 Hrs)**

Method of finding the envelope – Another definition of envelope – Envelope of family of curves which are quadratic in the parameter.

UNIT-V: Curvature: **(L – 11 + T – 1 Hrs)**

Definition of Curvature – Circle, Radius and Centre of Curvature – Evolutes and Involutes – Radius of Curvature in Polar Co-ordinates.

Tutorial Section:

Unit	Topic	Hours
I	Fractional expressions	1
II	Function of a function rule	1
III	Maxima and Minima of functions of two variables	1
IV	Envelope of family of curves	1
V	Evolutes and Involutes	1

Text Books:

1. Narayanan, S. and Manicavachagam Pillai, T. K., *Calculus*, Volume 1, Viswananthan, S., Printers & Publications, Pvt. Ltd, 2015.
2. Arumugam, S. and Thangapandi Issac, A., *Calculus*, New Gamma Publishing House, Palayamkottai, 2011.

Reference Books:

1. Courant, R. and John, F., *Introduction to Calculus and Analysis*, Volumes I & II, Springer - Verlag, New York, Inc., 1989.
2. Apostol, T., *Calculus*, Volumes I and II.
3. Goldberg, S., *Calculus and mathematical analysis*.

Web References:

1. **https://nptel.ac.in**

Part-III B.Sc. Mathematics Semester – I

Elective Generic-1: THEORY OF EQUATIONS AND MATRICES (U23MA1A1)

Lecture Hours	**: 85**	**Tutorial Hours**	**:5**
Practical Hours	**: -**	**No. of Credit**	**:4**
Contact Hours per Semester	**: 90**		
Contact hours per Week	**: 6**		
Internal Marks	**: 25**		
External Marks	**: 75**		
Total Marks	**:100**		

Objectives of the Course:

The course provides mathematical methods to solve theory of equations, formation of equations, and understand the concept of Eigen values and Eigen vectors, Cayley Hamilton theorem.

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CO 1: Understand the theory of equations, relation between the roots and coefficients reciprocal equations
CO 2: Explain transformation of equations, approximation solutions to equation, Newton's and Horner's method
CO 3: Analyze the properties of Theory of equations, Simultaneous linear equations
CO 4: Familiar with the concept of Eigen values and Eigen vectors
CO 5: Explain Laplace transformation and Inverse Laplace transformation

CO - PO Mapping (Course Articulation Matrix)

COs	**Program Outcomes (POs)**							**Program Specific Outcome (PSOs)**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	2	2	2	2	3	2	2
CO2	2	3	2	3	2	2	2	3	2	2
CO3	3	2	3	2	2	1	1	3	2	2
CO4	3	3	2	2	2	2	3	3	2	2
CO5	2	2	2	1	1	2	2	3	2	1
Total Contribution of Cos to POs	**13**	**12**	**12**	**10**	**9**	**9**	**10**	**15**	**10**	**9**
Weighted Percentage of Cos contribution to POs	**86.66**	**80**	**80**	**66.67**	**60**	**60**	**66.66**	**100**	**66.67**	**60**

No Correlation - 0; Weak - 1; Moderate - 2; Strong - 3

COURSE CONTENT

UNIT-I: Theory of Equation: (L – 17 + T – 1 Hrs)

Introduction (Review of basic concepts) – The n^{th} derivative – Standard results – Fractional expressions – Trigonometrical transformation – Formation of equations involving derivatives – Leibnitz formula for the n^{th} derivative of a product – Feynman's method of differentiation. Theory of equations - Formation of equations - Relation between roots and coefficient - Reciprocal equations.

UNIT-II: Transformation of Equation Transformation of equations: (L – 17 + T – 1 Hrs)

Approximation solutions to equations - Newton's method and Horner's method.

UNIT-III Matrices: (L – 17 + T – 1 Hrs)

Matrices – Rank of matrix – Simultaneous linear equations – Homogeneous linear equations and simple problems.

UNIT-IV: Characteristic Equations of a Matrix: (L – 17 + T – 1 Hrs)

Characteristic equation of matrix - Cayley Hamilton theorem. Eigen Values and Eigen Vectors: Eigen values and Eigen vectors and simple problems.

UNIT-V: Laplace transform (L – 17 + T – 1 Hrs)

Laplace Transformation – Inverse Laplace Transformation

Tutorial Section:

Unit	Topic	Hours
I	Reciprocal equations	1
II	Horner's method	1
III	Rank of matrix	1
IV	Cayley Hamilton theorem	1
V	Laplace Transformation	1

Text Books:

1. Arumugam, S. and others., *Allied Mathematics – I*, New Gamma Publication House, Palayamkottai, 2004.
2. Arumugam, S. and Isaac., *Differential Equation and Applications*, New Gamma Publication House, Palayamkottai, 2003.

Reference Books:

1. Manickavachagam Pillai, T. K. and Nagarajan, T., *Algebra*, volume I, *Algebra*, Volume II, Viswanathan, S., Printer Pvt. Ltd, Chennai, 2010.
2. Arumugam, S. and Isaac., *Algebra*, Purushothaman M R for Scitech Publication Pvt. Ltd, July 2018.

Web References:

1. https://www.msuniv.ac.in/Download/Pdf/ecf666944ae744b
2. https://lvfiles.blob.core.windows.net/4-static/2018-19/syllabus%202018-2021/maths/UG.pdf

Part-IV B.Sc. Mathematics / Semester – I /

SEC-1: Mathematics for Competitive Exam – 1(U23MA1S1)

Lecture Hours	**: 30**	**Tutorial Hours : -**	
Practical Hours	**: -**	**No. of Credit : 2**	
Contact Hours per Semester	**: 30**		
Contact hours per Week	**: 2**		
Internal Marks	**: 50**		
External Marks	**: -**		
Total Marks	**: 50**		

Objectives of the Course:

This course provides methods for aptitude problems and enables one to prepare for different competitive examinations.

Course Learning Outcome (for Mapping with Pos and PSOs)

Students will be able to

CO 1: remember and understand the basic formulas for averages

CO 2: apply the knowledge of quantitative reasoning and Mathematical analysis methodologies to

understand and solve problems on numbers and problems on ages

CO 3: analyse the concept of problems in percentage, profit and loss

CO 4: evaluate the problems on ratio and proportion and partnership

CO 5: find the solutions towards simplification related problems on pipes and cisterns, and chain rule

CO – PO Mapping (Course Articulation Matrix)

Cos	**Program Outcomes (Pos)**							**Program Specific Outcome (PSOs)**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	2	2	2	2	3	2	2
CO2	2	3	2	3	2	2	2	3	2	2
CO3	3	2	3	2	2	1	1	3	2	2
CO4	3	3	2	2	2	2	3	3	2	2
CO5	2	2	2	1	1	2	2	3	2	1
Total Contribution of Cos to Pos	**13**	**12**	**12**	**10**	**9**	**9**	**10**	**15**	**10**	**9**
Weighted Percentage of Cos contribution to POs	**86.66**	**80**	**80**	**66.67**	**60**	**60**	**66.66**	**100**	**66.67**	**60**

No Correlation - 0; Weak - 1; Moderate - 2; Strong - 3

COURSE CONTENT

UNIT-I: Averages **(L – 6 Hrs)**
Simplification – Averages

UNIT-II: Age Problems **(L – 6 Hrs)**
Problems on numbers – Problems on Ages

UNIT-III: Percentage **(L – 6 Hrs)**
Percentage – Profit and Loss.

UNIT-IV: Partnership **(L – 6 Hrs)**
Ratio and Proportion – Partnership

UNIT-V: Chain Rule **(L – 6 Hrs)**
Chain Rule – Pipe and Cisterns

Text Books:

1. Aggarwal, R. S., *Quantitative Aptitude*, , CHAND. S., Publishing, Edition 2020.

Reference Books:

1. Objective Arithmetic – Agarwal, R. S.
2. Descriptive Mathematics – Agarwal, R. S, Deepak Agarwal.
3. Mathematics for life - Immaculate, M. – Nanjil offset Printers

Web References:

1. https://www.tutorialspoint.com/quantitative_aptitude/index.htm
2. https://www.youtube.com/playlist?list=PLXVjll72kRm0oyWNK4CbLpwaPXhjJb-u

Part-IV B.Sc. Mathematics / Semester – I /

Part IV: Foundation Course - Higher Mathematics (U23MAFC1)

Lecture Hours	**: 30**	**Tutorial Hours : -**	
Practical Hours	**: -**	**No. of Credit**	**: 2**
Contact Hours per Semester	**: 30**		
Contact hours per Week	**: 2**		
Internal Marks	**: 50**		
External Marks	**: -**		
Total Marks	**: 50**		

Objectives of the Course:

- To bridge the gap and facilitate transition from higher secondary to tertiary education.
- To instill confidence among stakeholders and inculcate interest for Mathematics.

Course Learning Outcome (for Mapping with POs and PSOs)

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

CO 1: Prove the binomial theorem and apply it to find the expansions of any $(x + y)^n$ and also, solve the related problems

CO 2: Find the various sequences and series and solve the problems related to them. Explain the principle of counting.

CO 3: Find the number of permutations and combinations in different cases. Apply the principle of counting to solve the problems on permutations and combinations

CO 4: Explain various trigonometric ratios and find them for different angles, including sum of the angles, multiple and submultiple angles, etc. Also, they can solve the problems using the transformations.

CO 5: Find the limit and derivative of a function at a point, the definite and indefinite integral of a function. Find the points of min/max of a function

CO - PO Mapping (Course Articulation Matrix)

COs	**Program Outcomes (POs)**							**Program Specific Outcome (PSOs)**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	2	2	2	2	3	2	2
CO2	2	3	2	3	2	2	2	3	2	2
CO3	3	2	3	2	2	1	1	3	2	2
CO4	3	3	2	2	2	2	3	3	2	2
CO5	2	2	2	1	1	2	2	3	2	1
Total Contribution of Cos to POs	**13**	**12**	**12**	**10**	**9**	**9**	**10**	**15**	**10**	**9**
Weighted Percentage of Cos contribution to POs	**86.66**	**80**	**80**	**66.67**	**60**	**60**	**66.66**	**100**	**66.67**	**60**

No Correlation - 0; Weak - 1; Moderate - 2; Strong - 3

COURSE CONTENT

UNIT-I: Algebra: (L – 6 Hrs)

Binomial theorem, General term, middle term, problems based on these concepts.

UNIT-II: Sequences and series (Progressions): (L – 6 Hrs)

Fundamental principle of counting. Factorial n.

UNIT-III: Permutations and combinations: (L – 6 Hrs)

Derivation of formulae and their connections, simple applications, combinations with repetitions, arrangements within groups, formation of groups.

UNIT-IV: Trigonometry: (L – 6 Hrs)

Introduction to trigonometric ratios, proof of sin(A+B), cos(A+B), tan(A+B) formulae, multiple and sub multiple angles, sin(2A), cos(2A), tan(2A) etc., transformations sum into product and product into sum formulae, inverse trigonometric functions, sine rule and cosine rule

UNIT-V: Calculus: (L – 6 Hrs)

Limits, standard formulae and problems, differentiation, first principle, uv rule, u/v rule, methods of differentiation, application of derivatives, integration - product rule and substitution method.

Text Books:

1. NCERT class XI and XII text books.

2. Any State Board Mathematics text books of class XI and XII

Web References:

1. https://nptel.ac.in

Part-III B.Sc. Mathematics / Semester – II
Core-III: ANALYTICAL GEOMETRY (Two & Three Dimensions)
(U23MA203)

Lecture Hours	**: 55**	**Tutorial Hours**	**:5**
Practical Hours	**: -**	**No. of Credit**	**:4**
Contact Hours per Semester	**: 60**		
Contact hours per Week	**: 4**		
Internal Marks	**: 25**		
External Marks	**: 75**		
Total Marks	**: 100**		

Objectives of the Course:

- Necessary skills to analyze 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 (for Mapping with POs and PSOs)

Students will be able to

CO 1: Find pole, polar for conics, diameters, conjugate diameters for ellipse and hyperbola

CO 2: Find the polar equations of straight line and circle, equations of chord, tangent and normal and to find the asymptotes of hyperbola

CO 3: Explain in detail the system of Planes

CO 4: Explain in detail the system of Straight lines

CO 5: Explain in detail the system of Spheres

CO - PO Mapping (Course Articulation Matrix)

COs	**Program Outcomes (POs)**							**Program Specific Outcome (PSOs)**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	2	2	2	2	3	2	2
CO2	2	3	2	3	2	2	2	3	2	2
CO3	3	2	3	2	2	1	1	3	2	2
CO4	3	3	2	2	2	2	3	3	2	2
CO5	2	2	2	1	1	2	2	3	2	1
Total Contribution of Cos to POs	**13**	**12**	**12**	**10**	**9**	**9**	**10**	**15**	**10**	**9**
Weighted Percentage of Cos contribution to POs	**86.66**	**80**	**80**	**66.67**	**60**	**60**	**66.66**	**100**	**66.67**	**60**

No Correlation -0; Weak - 1; Moderate - 2; Strong - 3

COURSE CONTENT

UNIT-I: Pole: (L – 11 + T – 1 Hrs)

Polar – conjugate points and conjugate lines – diameters – conjugate diameters of an ellipse – semi diameters – conjugate diameters of hyperbola.

UNIT-II: Polar Co-ordinates: (L – 11 + T – 1 Hrs)

General polar equation of straight line – Polar equation of a circle given a diameter, Equation of a Straight line, circle, conic – Equation of a chord, tangent, normal. Equations of the asymptotes of a hyperbola.

UNIT-III: System of Planes: (L – 11 + T – 1 Hrs)

Length of the perpendicular – Orthogonal projection

UNIT-IV: Representation of Line: (L – 11 + T – 1 Hrs)

Angle between a line and a plane – co-planar lines – shortest distance between two skew lines – length of the perpendicular – intersection of three planes.

UNIT-V: Equation of a Sphere (L – 11 + T – 1 Hrs)

Section of a sphere by a plane – equation of the circle – tangent plane – angle of intersection of two spheres – condition for the orthogonality – radical plane.

Tutorial Section:

Unit	Topic	Hours
I	Conjugate diameters of an ellipse	1
II	Polar equation of a circle	1
III	Length of the perpendicular	1
IV	Shortest distance between two skew lines	1
V	Radical plane	1

Text Books:

1. Loney, S. L., *Co- ordinate Geometry*.
2. Manickavachagam Pillay, T. K. and Natarajan., *A text book of Analytical Geometry*, Part-II Three Dimensions, Viswanathan. S(Printers and Publishers) Pvt Ltd., Chennai, 2012.
3. Durai Pandian, *Analytical Geometry 2 Dimension,* Muhil Publication,

Reference Books:

1. Thomas G. B., and Finny, R. L., *Calculus and Analytical Geometry*, Person Publication, 9th Edition, 2010.
2. Robert C. Yates, *Analytic Geometry with calculus*, Prentice Hall, Inc., New York, 1961.

Web References:

1. **https://nptel.ac.in**

Part-III B.Sc. Mathematics / Semester – II

Core-IV: INTEGRAL CALCULUS (U23MA204)

Lecture Hours	**: 55**	**Tutorial Hours**	**: 5**
Practical Hours	**: -**	**No. of Credit**	**: 4**
Contact Hours per Semester	**: 60**		
Contact hours per Week	**: 4**		
Internal Marks	**: 25**		
External Marks	**: 75**		
Total Marks	**:100**		

Objectives of the Course:

- Knowledge on integration and its geometrical applications, double, triple integrals and improper integrals.
- Knowledge about Beta and Gamma functions and their applications.
- Skills to Determine Fourier series expansions.

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CO 1: Determine the integrals of algebraic, trigonometric and logarithmic functions and to find the reduction formulae

CO 2: Evaluate double and triple integrals and problems using change of order of integration

CO 3: Solve multiple integrals and to find the areas of curved surfaces and volumes of solids of revolution

CO 4: Explain beta and gamma functions and to use them in solving problems of integration

CO 5: Explain Geometric and Physical applications of integral calculus

CO - PO Mapping (Course Articulation Matrix

COs	**Program Outcomes (POs)**							**Program Specific Outcome (PSOs)**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	2	2	2	2	3	2	2
CO2	2	3	2	3	2	2	2	3	2	2
CO3	3	2	3	2	2	1	1	3	2	2
CO4	3	3	2	2	2	2	3	3	2	2
CO5	2	2	2	1	1	2	2	3	2	1
Total Contribution of Cos to POs	**13**	**12**	**12**	**10**	**9**	**9**	**10**	**15**	**10**	**9**
Weighted Percentage of Cos contribution to POs	**86.66**	**80**	**80**	**66.67**	**60**	**60**	**66.66**	**100**	**66.67**	**60**

No Correlation -0; **Weak - 1;** **Moderate - 2;** **Strong - 3**

COURSE CONTENT

UNIT-I: Reduction formula **(L – 11 + T – 1 Hrs)**

Reduction formulae -Types, integration of product of powers of algebraic and trigonometric functions, integration of product of powers of algebraic and logarithmic functions - Bernoulli's formula.
Chapter-1, Section-1.1- 6.5, 11, 12, 13.1-13.10, 14, 15.1

UNIT-II: Multiple Integrals **(L – 11 + T – 1 Hrs)**

Multiple Integrals - definition of double integrals - evaluation of double integrals – double integrals in polar coordinates - Change of order of integration.
Chapter-5, Section-1, 2.1,2.2,3.1

UNIT-III: Triple Integrals **(L – 11 + T – 1 Hrs)**

Triple integrals –applications of multiple integrals - volumes of solids of revolution - areas of curved surfaces–change of variables - Jacobian.
Chapter-5, Section-4, 5.1-5.4, 6.1-6.3, 7, Chapter-6, Section-1.1, 1.2, 2.1, 2.2, 2.3, 2.4

UNIT-IV: Beta and Gamma function **(L – 11 + T – 1 Hrs)**

Beta and Gamma functions – infinite integral - definitions–recurrence formula of Gamma functions – properties of Beta and Gamma functions- relation between Beta and Gamma functions - Applications.
Chapter-7, Section-1.1-1.5, 2.1-2.3, 3-6

UNIT-V: Applications **(L – 11 + T – 1 Hrs)**

Geometric Applications of Integral calculus.
Chapter-2

Tutorial Section:

Unit	Topic	Hours
I	Bernoulli's formula	1
II	Evaluation of double integrals	1
III	Triple integrals	1
IV	Infinite integral	1
V	Applications of Integral calculus	1

Text Books:

1. Manicavachagom Pillai, T.K., Narayanan, S., *Calculus Volume II*, Viswanathan (Printers & Publishers) PVT. LTD., 2012**.**

Reference Books:

1. Courant, R. and John F., *Introduction to Calculus and Analysis* (Volumes I & II), Springer- Verlag, New York, Inc., 1989.
2. Apostol, T., *Calculus*, Volumes I and II, John Wiley and sons,1967.
3. Goldberg, R., *Methods of Real analysis*, John Wiley and sons, 1976.

Web References:

1. https://nptel.ac.in

Part-III B.Sc. Mathematics / Semester – II

Elective Generic -2: VECTOR CALCULUS (U23MA2A2)

Lecture Hours	**: 85**	**Tutorial Hour**	**: 5**
Practical Hours	**: -**	**No. of Credit**	**: 4**
Contact Hours per Semester	**: 90**		
Contact hours per Week	**: 6**		
Internal Marks	**: 25**		
External Marks	**: 75**		
Total Marks	**:100**		

Objectives of the Course:

The course provides Mathematical methods to solve vector differentiation, gradient, and understand the concept of line, surface, volume integrals, Fourier series, even and odd functions.

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CO 1: remember and understand the concepts of vector differentiation

CO 2: Understand the concept of divergence and curl

CO 3: Apply concept of vector integration to integrate line and triple integrals

CO 4: Analyze the surface and volume integrals

CO 5: evaluate integrals using Stoke's and Divergence theorem

CO - PO Mapping (Course Articulation Matrix)

COs	**Program Outcomes (POs)**							**Program Specific Outcome (PSOs)**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	2	2	2	2	3	2	2
CO2	2	3	2	3	2	2	2	3	2	2
CO3	3	2	3	2	2	1	1	3	2	2
CO4	3	3	2	2	2	2	3	3	2	2
CO5	2	2	2	1	1	2	2	3	2	1
Total Contribution of Cos to POs	**13**	**12**	**12**	**10**	**9**	**9**	**10**	**15**	**10**	**9**
Weighted Percentage of Cos contribution to POs	**86.66**	**80**	**80**	**66.67**	**60**	**60**	**66.67**	**100**	**66.67**	**60**

No Correlation -0; Weak - 1; Moderate - 2; Strong - 3

COURSE CONTENT

UNIT-I: Vector Differentiation: (L – 17 + T – 1 Hrs)

Vector differentiation - Vector algebra – Differentiation of vectors - Gradient.

UNIT-II: Curl &integrals: (L – 17 + T – 1 Hrs)

Divergence and curl- Evaluation of Double integrals.

UNIT-III: Vector Integration: (L – 17 + T – 1 Hrs)

Triple integrals -Vector integration – Line integrals.

UNIT-IV: Green's Theorem: (L – 17 + T – 1 Hrs)

Surface and volume integrals - Green's theorem (without proof) – simple problems.

UNIT-V: Stokes Theorem: (L – 17 + T – 1 Hrs)

Stocks and Divergence theorems (without proof) – simple problems.

Tutorial Section:

Unit	Topic	Hours
I	Gradient	1
II	Evaluation of Double integrals	1
III	Line integrals	1
IV	Surface and volume integrals	1
V	Stocks theorem	1

Text Books:

1. Arumugam, S. & others., *Vector Calculus*, New Gamma Publication House, Palayamkottai, June 2004.
2. Manicavachagam Pillai, T. K., *Calculus* (Vol II), S. Viswanathan Printer Pvt.Ltd, Chennai, 2004

Reference Books:

1. Courant, R. and John, F., *Introduction to Calculus and Analysis* (Volumes I & II), Springer- Verlag, New York, Inc., 1989.
2. Apostol, T., *Calculus*, Volumes I and II, John Wiley and sons,1967.
3. Goldberg, R., Methods of Real *analysis*, John Wiley and sons, 1976

Web References:

1. **https://nptel.ac.in**

Part-IV B.Sc. Mathematics / Semester – II

SEC-II: Mathematics for Competitive Exam – 2 (U23MA2S2)

Lecture Hours	**: 30**	**Tutorial Hours : -**	
Practical Hours	**: -**	**No. of Credit**	**: 2**
Contact Hours per Semester	**: 30**		
Contact hours per Week	**: 2**		
Internal Marks	**: 50**		
External Marks	**: -**		
Total Marks	**: 50**		

Objectives of the Course:

- This course provides a knowledge to fare well in the employment selection process and prepare for competitive exams in general and more particularly for NET and SET exams.

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CO 1: understand and solve problems on Averages, percentage, age problems, ratio and proportions

CO 2: apply mathematical methodologies to solve problems on Time and work, Time and distance, Allegation and mixture

CO 3: analyze the concepts of problems in simple interest, compound interest, profit and loss

CO 4: evaluate problems on number series, clock and calendar

CO 5: find the solution by interpreting data

CO - PO Mapping (Course Articulation Matrix)

COs	**Program Outcomes (POs)**							**Program Specific Outcome (PSOs)**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	2	2	2	2	3	2	2
CO2	2	3	2	3	2	2	2	3	2	2
CO3	3	2	3	2	2	1	1	3	2	2
CO4	3	3	2	2	2	2	3	3	2	2
CO5	2	2	2	1	1	2	2	3	2	1
Total Contribution of Cos to POs	**13**	**12**	**12**	**10**	**9**	**9**	**10**	**15**	**10**	**9**
Weighted Percentage of Cos contribution to POs	**86.66**	**80**	**80**	**66.67**	**60**	**60**	**66.66**	**100**	**66.67**	**60**

No Correlation -0; Weak - 1; Moderate - 2; Strong - 3

COURSE CONTENT

UNIT-I: Percentage: **(L – 6 Hrs)**
Percentage – Average – Age problems – Ratio and Proportion.

UNIT-II: Time and Work: **(L – 6 Hrs)**
Time and Work – Time and Distance – Alligation and Mixture.

UNIT-III: Simple interest: **(L – 6 Hrs)**
Simple interest – Compound interest – Profit and Loss.

UNIT-IV: Clock Problems: **(L – 6 Hrs)**
Clock Problems – Calendar Problems – Number series.

UNIT-V: Data Interpretation: **(L – 6 Hrs)**
Data Interpretation – Data Sufficiency.

Text Books:

1. Agarwal, R. S., *Quantitative Aptitude*, S. Chand Ltd, 2008.

Reference Books:

1. Sundaresan, V. and Heyaseelan, S. D., *An Introduction to Business Mathematics*, S. Chand and Company Ltd, 2003.

2. Tyra M, *Quicker Mathematics*, 3rd Edition, 2000.

Web References:

1. **https://nptel.ac.in**

Part-IV B.Sc. Mathematics / Semester – II

SEC-III: COMPUTING SKILLS (OFFICE AUTOMATION) (U23MA2S3)

Lecture Hours	**: 30**	**Tutorial Hours :-**	
Practical Hours	**: -**	**No. of Credit**	**:2**
Contact Hours per Semester	**: 30**		
Contact hours per Week	**: 2**		
Internal Marks	**: -**		
External Marks	**: 50**		
Total Marks	**: 50**		

Objectives of the Course:

- This course provides the knowledge of MS Word, MS Excel and MS Power point.

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CO 1: remember the basic skills and understand the essential information of office automation
CO 2: apply different statistical functions in MS office and demonstrate how to effectively merge e-mails
CO 3: analyze various functions in office automation
CO 4: evaluate different functions in office automation
CO 5: develop skills to using office automation

CO - PO Mapping (Course Articulation Matrix)

COs	Program Outcomes (POs)							Program Specific Outcome (PSOs)		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	2	2	2	2	3	2	2
CO2	2	3	2	3	2	2	2	3	2	2
CO3	3	2	3	2	2	1	1	3	2	2
CO4	3	3	2	2	2	2	3	3	2	2
CO5	2	2	2	1	1	2	2	3	2	1
Total Contribution of Cos to POs	**13**	**12**	**12**	**10**	**9**	**9**	**10**	**15**	**10**	**9**
Weighted Percentage of Cos contribution to POs	**86.66**	**80**	**80**	**66.67**	**60**	**60**	**66.66**	**100**	**66.67**	**60**

No Correlation -0; Weak - 1; Moderate - 2; Strong - 3

COURSE CONTENT

1. Text editing with different styles.
2. To create a New Paper document with Heading along with set of margins.
3. Table creation and editing.
4. Creating a flow chart using shapes like ellipse and rectangle.
5. Writing a letter to a friend using atleast two paragraph.
6. Mathematical symbols, suffix and superfix, equation creation and editing.
7. Writing a letter using mail merge.
8. Work sheet for pay roll.
9. To use any spreadsheet a graph obtained by students for mark is plotted.
10. Create a power point presentation with five slides.

Text Books:

1. Rizwan Ahmed, P., Office Automation 2010, Margham Publications. 2016.

Reference Books:

1. Stephen L., Nelson., *Office 2010*, *Computer Reference*, Tata McGraw Hill Publishing company Ltd, 2010.
2. Sumner Mary., *Enterprise Resource Planning*, Pearson Education, inc. I Edition, 2012.

Web References:

1. https://m.youtube.com/watch?v=wuKCgEdpAXU&list=PLdj5pVg1kHiOypKNUmO0NKOfvoIThAv4N&index=13&t=0s
2. https://corporatefinanceinstitute.com/resources/excel/study/basic-excel- formulas-beginners/
3. https://business.tutsplus.com/tutorials/how-to-learn-powerpoint--cms-29884