SRI MEENAKSHI GOVERNMENT ARTS COLLEGE FOR WOMEN(AUTONOMOUS) MADURAI - 2

DEPARTMENT OF MATHEMATICS

**CBCS course structure for B.Sc. Mathematics
as directed by
Tamilnadu State Council for
Higher Education**

From June 2022 Onwards

SRI MEENAKSHI GOVERNMENT ARTS COLLEGE FOR WOMEN(A), MADURAI- 625 002

DEPARTMENT OF MATHEMATICS

The Department of Mathematics is offering B.Sc. Mathematics since 1966 and M.Sc. Mathematics since 1980.

The department has an enterprising faculty team and provides an enriched academic ambience for the students. Seven of the faculty members have a Ph.D. Three of them are recognized research guides of Madurai Kamaraj University. Four of the faculty members are currently pursuing Ph.D.

Five of the staff members have degree in pedagogy. Four faculty members have PGDCA qualification.

Vision

The Vision of our department is to empower the Women Students to attain academic excellence.

Mission

The Mission of Mathematics department is to provide a strong foundation in Mathematics which will enable our students to excel in pedagogy and research.

Program Outcomes:

The successful completion of B.Sc. program will enable the students to:

PO1 : Demonstrate the comprehensive knowledge in core subjects and allied

     Disciplines

PO2: Develop scientific aptitude and analytical skills

PO3: Apply the acquired knowledge and skills to tackle the real life situations

PO4 :Act as socially responsible and effective team player

PO5 : To exhibit appropriate soft skills to attain professional competencies

Program Specific Outcomes:

On successful completion of B.Sc. Mathematics program the students will be able to:

PSO1: Acquire a good foundation in the core subjects of Algebra, Calculus, Analysis, and Differential equations and applications of mathematics such as Statistics, Mechanics, Optimization techniques.

PSO2 :Absorb and understand the abstract concepts that lead to various advanced theories in mathematical sciences.

PSO3: Develop the ability to model problems in the actual physical world using the abstract mathematical concepts.

PSO4: Demonstrate effective problem solving skills appropriate to the situation.

PSO5: Tackle competitive exams like Bank recruitment, IAS, TNPSC, TANCET with

confidence.

Semester	Part	Course / Title of the Paper	Code	Hours	Credit
I	I	Tamil / Hindi	U221A1/ U221H1	6	3
	II	English	U222A1	6	3
	III	Core1–Differential Calculus	U22CM1	5	4
		Core 2 – Classical Algebra	U22CM2	5	4
		Allied Paper – 1 : Statistics – I	U22AMM1	6	4
	IV	AEC –I:Value Education	U22AE1	2	2
		Total		**30**	**20**
II	I	Tamil / Hindi	U221A2/ U22IH2	6	3
	II	English	U222A2	6	3
	III	Core 3 - Integral Calculus	U22CM3	4	4
		Core 4-Analytical Geometry	U22CM4	4	4
		Allied Paper II : Statistics – II	U22AMM2	4	4
		Allied Paper III : Discrete Mathematics	U22AMM3	4	3
	IV	AEC–II:Environmental Studies	U22AE2	2	2
		Total		**30**	**23**
III	I	Tamil / Hindi	U221A3/ U22IH3	6	3
	II	English	U222A3	6	3
	III	Core 5 – Statics	U22CM5	5	4
		Core 6 –Vector Calculus	U22CM6	4	3
		Allied–IV Physics–Theory (T)	U22APMT1	4	3
		Allied – V : Physics – Practical	U22APMP	3	-
	IV	NMECI-Quantitative Aptitude for competitive examinations	U22NMM1	2	2
		Extension Activity		-	1
		Total		**30**	**19**

Semester	Part	Course / Title of the Paper	Code	Hours	Credit
IV	I	Tamil/Hindi	U221A4/ U221H4	6	3
	II	English	U222A4	6	3
	III	Core 7 – Differential Equations	U22CM7	4	4
		Core 8 – Dynamics	U22CM8	3	3
		Allied –V:Allied Practical	U22APMP	3	4
		Allied–VI:Allied Physics(T)	U22APMT2	4	3
	IV	NMEC-II Data interpretation and reasoning	U22NMM2	2	2
		Skill Enhancement Course I:Mathematical Aptitude for competitive Examinations.	U22SEM1	2	2
		Total		**30**	**24**
V	III	Core 9 -Abstract Algebra	U22CM9	6	6
		Core 10 – Graph Theory	U22CM10	5	5
		Core11-Fourier Series & Trigonometry	U22CM11	5	5
		Core12-Operations Research	U22CM12	6	5
		DSEC-I	C-Programming	U22DSM1A	4	4
			OOPS With C++	U22DSM1B		
	IV	SEC –II: Laplace Transforms and Fourier Transforms	U22SEM2	2	2
		SEC–III:Optimization Technique-II	U22SEM3	2	2

Semester	Part	Course / Title of the Paper	Code	Hours	Credit
		Total		**30**	**29**
VI	III	Core 13 - Complex Analysis	U22CM13	6	5
		Core 14 -Real Analysis	U22CM14	6	5
		Core 15 –Number Theory	U22CM15	5	4
		DSEC-II	C Programming Lab	U22DSM2AP	3	2
			C++ Programming Lab	U22DSM2BP		

		DSEC -III	Numerical Methods	U22DSM3A	6	5
			Fuzzy Mathematics	U22DSM3B		
		GEC-I	Astronomy	U22GEM1A	2	2
			Mathematical Modelling	U22GEM1B		
	IV	AEC-III: General Knowledge		U22AE3	2	2
		Total			**30**	**25**
		Overall Total			**180**	**140**

MAPPING PATTERN

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

B.Sc. Mathematics

CORE, ELECTIVE AND ALLIED

<u>Evaluation Pattern</u>

Internal : 25

External :75

Total : 100

Passing Minimum   : 40 Marks

No Internal Minimum

External Minimum   : 35% (27 Marks)

Internal and External together : 40%

Question Paper Pattern

Time : 3 hours   Maximum Marks :75

Section A :

     5 Compulsory Questions

     5×2 Marks = 10 Marks

Section B :

     5 Questions to be answered under 'either - or' pattern

     That is each question has an internal choice

     5×5 Marks =25 Marks

     (1 Question from each unit)

Section C :

5 Questions to be answered under 'either - or' pattern

     5×8 Marks = 40 Marks

     (1 Question from each unit)

B.Sc. Mathematics

<u>VALUE ADDED COURSE</u>

<u>Evaluation Pattern</u>

Internal : 20

External :30

Total :50

Passing Minimum   :20 Marks

No Internal Minimum

External Minimum   : 35% (12 Marks)

Internal and External together : 40%

Question Paper Pattern

Time : 2 hours   Maximum Marks :30

Section A :

5 Questions to be answered under 'either - or' pattern

5×6 Marks =30 Marks

BLOOM'S TAXONOMY

REMEMBERING	50%
UNDERSTANDING	30%
APPLYING	20%

LIST OF MAJOR BASED ELECTIVE COURSES

1. Discrete Mathematics
2. C-Programming
3. C-Lab
4. Numerical Analysis
5. OOPs with C++
6. Practical - C++ Programming Lab

SKILL ENHANCEMENT COURSES

1. Mathematical Aptitude for Competitive Exams
2. Laplace Transform and Fourier Transform
3. Optimization Techniques II
4. History of Mathematics I
5. History of Mathematics II
6. Combinatorial Mathematics

GENERIC ELECTIVE COURSES

1. Astronomy
2. Mathematical Modeling
3. Application of Mathematics in Insurance

LIST OF NON MAJOR ELECTIVES

1. Linear Programming
2. Optimization Techniques I
3. Modern Algebra for Physical Sciences
4. Optimization Techniques II
5. Quantitative Aptitude for Competitive Exams
6. Data Interpretation and Reasoning

ALLIED COURSES FOR B.Sc. PHYSICS AND B.Sc. CHEMISTRY

1. Allied Mathematics – Paper I
2. Allied Mathematics – Paper II
3. Allied Mathematics – Paper III

LIST OF VALUE ADDED COURSES

  .   1. Logical Reasoning

      2. History of Mathematics

      3. Problem Solving

MAPPING PATTERN

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Hours: 5/W 90hrs/Sem

Course Code: U22CM1 **Credits: 4**

Title of the Paper:CC1-- DIFFERENTIAL CALCULUS

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	5	5	-	-	-

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Acquire a good foundation in the topics of curvature, envelops.	1	
CO2. Students will have a working knowledge of important Mathematical concepts in evolutes, involute and p-r equations	2	
CO3. Understand tangents, normal, polar subtangent and polar subnormal	3	
CO4. Gain understanding of mathematical concepts of asymptotes, singularity .	4	
CO5. Solve problems related to tracing of curves.	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	5	4	2	2	5	5	2	4	2	3.5
CO2	4	5	4	2	2	5	5	3	4	2	3.6
CO3	4	5	5	3	2	5	5	4	3	2	3.8
CO4	3	5	4	2	2	5	5	4	5	2	3.7
CO5	3	5	4	3	2	5	3	2	5	2	3.4

Overall Mean Score : 3.6

Course Code: U22CM1   **Credits: 4**

Title of the Paper: DIFFERENTIAL CALCULUS

UNIT I: Leibnitz formula and Curvature

      Leibnitz formula for the nth derivative of the product – Envelopes – Curvature – Circle radius and centre of curvature– Cartesian formula for the radius of curvature – The co-ordinates of the centre of curvature.

UNIT II: Evolutes and involutes

      Evolutes and involutes – Radius of curvature in polar coordinates – p-r equation – Pedal equation of a curve – chord of curvature.

UNIT III: Tangent and Normal

      Tangent and Normal-Polar co-ordinates-Angle between the radius and the tangent-The slope of the tangent –The angle of intersection of two curves-Polar sub tangent and polar sub Normal-The length of arc.

UNIT IV: Linear Asymptotes

      Linear Asymptotes-Definitions-Asymptotes parallel to the axis- Special cases-Asymptotes by inspections-Intersection of a curve with its Asymptotes.

UNIT V: Singular points

      Singular points (node,cusp and conjugate points)-Tracing of curves-Folium of Descartes, Cycloid, Cardioid and Lemniscate of Bernoulli.

TEXT BOOK

Calculus Volume I by S. Narayanan and T.K.ManicavachagomPillay,S.Viswanathan (Printers and Publishers) Pvt. Ltd., 2010 print.

UNIT I : Chapter III : Section 2.1,

          Chapter X: Section 1, Section 2 – 2.1 to 2.4.

UNIT II : Chapter X: Sections 2.5 - 3.1.

UNIT III: Chapter IX: Sections 4.1 to 4.6.

UNIT IV: Chapter XI.

UNIT V : Chapters XII & XIII.

REFERENCE BOOKS

1. Arumugam S and ThangapandiIssac A, Calculus, New Gamma Publishing House, June 2014.
2. Kandasamy, P and K. Thilagavathi, Mathematics for B.Sc., - Volume II – 2004, S. Chand & Co.,
3. Apostol, T.M. Calculus. Vol. II (4nd Edn.) John Wiley and Sons, Inc., New York. 1991.
4. Apostol, T.M. Calculus. Vol. II (2nd Edn.) John Wiley and Sons, Inc., New York. 1969.
5. Tan, S.T. Single Variable Calculus. Brooks/Cole, Cengage Learning. 2012.
6. Tan, S.T. Multivariable Calculus. Brooks/Cole, Cengage Learning. 2010.
7. Stewart, J. Single Variable Calculus. (4th Edn.) Brooks/Cole, Cengage Learning 2010.
8. Stewart, J. Multivariable Calculus. Brooks/Cole, Cengage Learning. 2005.

Hours: 5/W 90hrs/Sem

Course Code: U22CM2   **Credits: 4**

Title of the Paper: CLASSICAL ALGEBRA

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	5	4	-	-	1

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Analyse and sum the series of binomial, exponential and logarithm	1	
CO2. Understand relation between roots and coefficients of nth degree equation	2	
CO3. Solve reciprocal equation, apply Rolle's theorem, Transformationof equation, Descarte's rule of sign	3	
CO4. Apply Strum's theorem and Solve equation by using Horner's method	4	
CO5. Solve cubic equation by using Cardon's method, biquadratic equation by using Ferrari's method	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	4	3	2	2	3	4	3	4	3	3.1
CO2	4	4	3	2	2	4	5	3	2	3	3.2
CO3	4	4	3	2	2	3	4	3	3	3	3.1
CO4	4	4	4	2	2	3	4	3	4	3	3.3
CO5	5	3	4	2	2	3	5	3	3	3	3.3

Overall Mean Score :3.2

Hours: 5/W 90hrs/Sem

Course Code: U22CM2   **Credits: 4**

Title of the Paper: CLASSICAL ALGEBRA

UNIT I

Vandermonde's theorem– Binomial theorem for rational index – Particular cases of the Binomial expansion – Sign of terms in the Binomial expansion– Application of the Binomial theorem to the summation of series – Sum of coefficients – Approximate values.   Exponential series – Summation – The logarithmic series .

UNIT II

Theory of equations –Remainder theorem– Every n^{th} degree equation has exactly n roots and no more – Relations between roots and coefficients of equations – Symmetric function of the roots – Sum of powers of the roots of an equation – Newton's theorem on the sum of the powers of the roots.

UNIT III

Transformations of equations – Reciprocal equation– Reciprocal roots – Removal of terms – Transformation in general – Descarte's Rule of signs – Rolle's Theorem and its applications – Multiple roots.

UNIT IV

Strum's theorem – Solutions of numerical equations– Horner's method (upto 2 decimals).

UNIT V

General solution of the cubic equations – Cardon's method – Solution of biquadratic equations – Ferrari's method.

<u>TEXT BOOK</u>

Algebra Volume I- T. K. Manicavachagom Pillay, T. Natarajan and K.S. Ganapathy S.Viswanathan Printers and Publishers Pvt. Ltd., 2008

UNIT I   : Chapter 3 : Sections 4 to 11,14 and Chapter 4 : Sections 3 & 5

UNIT II   : Chapter 6 :Sections 1 to 14

UNIT III : Chapter 6 :Sections 15 to 26

UNIT IV   : Chapter 6:Sections 27 to 30 (excluding section 29.4)

UNIT V   :Chapter 6 :Sections 34 and 35.

Semester: I

ALLIED PAPER-I

Hours: 6/W 90hrs/Sem

Course Code: U22AMM1   **Credits: 4**

Title of the Paper: STATISTICS-I

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	6	6	-	-	-

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Recall basic concepts and solve problems in Probability Theory.	1	
CO2. Classify discrete and continuous one dimensional and two dimensional random variables.	2	
CO3. Define and find Mathematical Expectation, Moment Generating Function and Characteristic Function.	3	
CO4. Describe Binomial and Poisson distributions.	4	
CO5. Recognize the concept of Rectangular and Normal distributions.	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3	4	3	3	3	4	4	3	3	3.4
CO2	4	2	4	2	2	3	4	4	3	2	3.0
CO3	3	3	3	2	2	3	5	5	3	2	3.1
CO4	3	2	3	3	2	3	4	5	3	2	3.0
CO5	3	3	3	3	2	3	3	5	3	2	3.0

Overall Mean Score : 3.1

ALLIED PAPER-I

Hours: 6/W 90hrs/Sem

Course Code: U22AMM1   **Credits: 4**

Title of the Paper: STATISTICS-I

UNIT I Theory of Probability

Introduction – Definition of various terms – Axiomatic approach to Probability – Probability – Mathematical Notion – Law of Multiplication – Baye's Theorem.

UNIT II Random Variables and Distribution Functions

Random variable – Distribution function – Discrete Random Variable – Continuous Random Variable.

UNIT III Mathematical Expectation and Generating Functions

Mathematical Expectation – Addition Theorem of Expectation – Multiplication Theorem of Expectation – Covariance – Expectation of Linear Combination of Random Variables – Variance of Linear Combination of Random Variables – Moment Generating Function.

UNIT IV Theoretical Discrete Distributions

Introduction – Bernoulli Distribution – Binomial Distribution – Poisson Distribution.

UNIT V Theoretical Continuous Distributions

Rectangular Distribution –Normal Distribution

TEXT BOOK

Elements of Mathematical Statistics by S.C.Gupta and V.K. Kapoor, Sultan Chand & Sons, New Delhi, Third Edition, 2006

UNIT I   : Chapter 4 : Sections 4.1, 4.3, 4.5 to 4.8

UNIT II   : Chapter 5 : Sections 5.1 to 5.4

UNIT III   : Chapter 6 : Sections 6.1 to 6.6 and 6.9

UNIT IV   : Chapter 7 : Omitting Sections 7.2.7, 7.2.8, 7.2.9, 7.3.6 and 7.3.7

UNIT V   : Chapter 8 : Sections 8.1, 8.2 to 8.2.5

Hours:4/W75hrs/Sem

Course Code: U22CM3   **Credits: 4**

Title of the Paper: INTEGRAL CALCULUS

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	4	3	-	-	1

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO2. Understand the reduction formulae and Bernoulli's formula	2	
CO3. Solve problems in double and triple integrals	3	
CO4. Solve volume of solids of revolutions and areas of curved surfaces	4	
CO5. Understand the Beta & Gamma function. Demonstrate the techniques of integration.	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	4	3	3	3	5	5	4	3	2	3.5
CO2	4	4	3	4	4	5	5	3	3	2	3.7
CO3	5	5	5	5	5	5	5	4	3	2	4.4
CO4	5	5	5	5	5	5	5	5	4	2	4.6
CO5	4	4	4	3	3	4	4	4	3	1	3.4

Overall Mean Score : 3.92

Hours:4/W75hrs/Sem

Course Code: U22CM3   **Credits: 4**

Title of the Paper: INTEGRAL CALCULUS

UNIT I: **Definite Integrals**

Properties of definite integrals – Integration by parts.

UNIT II : Definite Integrals

Reduction formulae – Bernoulli's formula.

UNIT III: Multiple Integrals

   Multiple Integrals- Changing the Order of Integration- Double Integrals-Definition-Evaluation-In polar co-ordinates-Triple Integrals-Definition-Evaluation-Application of Multiple Integrals.

UNIT IV: Multiple Integrals

Multiple Integrals-Volumes of solids of revolution-Volumes of solids as Double Integrals-Areas of curved surfaces.

UNIT V: Change of Variables

Change of Variables-Jacobian-Change of variable in the case of two variables and three variables-Transformation from Cartesian and polar co-ordinates and from Cartesian to spherical polar co-ordinates-Improper Integrals-Beta and Gamma functions-Definitions-Properties of Beta functions-Relation between Beta and Gamma functions.

TEXT BOOK

Calculus Volume II by S. Narayanan and T.K. ManicavachagomPillay,S.Viswanathan (Printers and Publishers) Pvt. Ltd., 2010 print.

UNIT I: Volume II: Chapter 1: sections 11 and 12.

UNIT II:Volume II: Chapter 1: sections 13-15.1.

UNIT III:Volume II: Chapter 5: sections 2.1, 2.2, 3.1, 3.2, 4, 5.1 to 5.4.

UNIT IV: Volume II: Chapter 5: sections 6.1 to 6.3 and 7.

UNIT V: Volume II: Chapter 6: sections: 1.1, 1.2, 2.1 to 2.4.

                    Chapter 7: sections: 2.1, 2.3, 3 to 5

REFERENCE BOOKS

1. Kandasamy, P and K. Thilagavathi, Mathematics for B.Sc., - Volume II – 2004, S. Chand & Co., New Delhi.

2. Arumugam S and ThangapandiIssac A, Calculus, New Gamma Publishing House, June 2014.

3. Apostol, T.M. Calculus. Vol. I (4th Edn.) John Wiley and Sons, Inc., New York 1991.

4. Apostol, T.M. Calculus. Vol. II (2nd Edn.) John Wiley and Sons, Inc., New York. 1969.

5. Tan, S.T. Single Variable Calculus. Brooks/Cole, Cengage Learning. 2012.

6. Tan, S.T. Multivariable Calculus. Brooks/Cole, Cengage Learning. 2010.

7. Stewart, J. Single Variable Calculus. (4th Edn.) Brooks/Cole, Cengage Learning 2010.

8. Stewart, J. Multivariable Calculus. /Cole, Cengage Learning 2005

Hours:4/W 60hrs/Sem

Course Code: U22CM4   **Credits: 4**

Title of the Paper: ANALYTICAL GEOMETRY

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	4	3	½	-	½

Course Outcomes On completing this course, the student will be able to	Unit	Hrs/S
CO1. Derive the polar equation of straight lines, circles, conics	1	
CO2. Understand the concept of direction cosines of a line and normal of the plane	2	
CO3. Interpret plane and straight line and coplanar lines	3	
CO4. Expand hyperbolic functions and find logarithm of complex numbers	4	
CO5. Sum up trigonometric series	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	4	4.5	4	4.5	5	4.5	4	5	4.5	4.4
CO2	4	4.5	4	4.5	4	4	4	4.5	4	4	4.15
CO3	4	4	4	4.5	4	4	3.8	4.5	4	4	4.08
CO4	4	4.5	4	4.5	4	4	3.8	4	4	4	4.08
CO5	4	4.5	4.5	4.5	4	4	3.8	4.5	4	4	4.18

Overall Mean score : 4.18

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SEMESTER: II

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Hours4/W 75hrs/Sem

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Course Code: U22CM4   **Credits: 4**

Title of the Paper: ANALYTICAL GEOMETRY

UNIT I

Polar equations – Straight lines – Circles – Conics – Tangent – Normal.

UNIT II

Rectangular Cartesian Co-ordinates – Direction cosines of a line – The plane.

UNIT III

The straight line –The Plane and the straight line – Coplanar lines.

UNIT IV

Sphere: Tangent Plane - Circle of intersections - Tangency of Spheres - Coaxial System of Spheres - Radical Planes - Orthogonal Spheres.

UNIT V

Cone and Cylinder: Equation of a Cone - Cone with Vertex at the origin - Quadric cone with the vertex at the origin - Right circular cone - Cylinder - Right circular cylinder.

TEXT BOOK:

TB1. Analytical Geometry Part I - Two Dimensions by T. K. Manicavachagom Pillay and

T. Natarajan - S.Viswanathan (Printers and Publishers) Pvt.Ltd.,-2004 print.

TB2. Analytical Geometry Part II -Three Dimensions by T. K. Manicavachagom Pillay and T. Natarajan - S.Viswanathan (Printers and Publishers) Pvt.Ltd.,-2004 print.

UNIT I   : TB1 : Chapter 9

UNIT II   : TB2 : Chapters 1 & 2

UNIT III   : TB2 : Chapter 3: Sec 1 to 8

UNIT IV   : TB2 : Chapter 4

UNIT V   : TB2 : Chapter 5 : Sec 1 to 8

Reference :

1. Arumugam and Issac- Analytical Geometry of three dimensions and Vector Calculus,New Publishing House, 2017.

2. Kandasamy. P. and K. Thilagavathi – Mathematics for B.Sc., Vol IV - 2004, S.Chand and Co., New Delhi.

3. Thomas,G.B. and R.L. Finney, Calculus, 9th Ed., Pearson Education, Delhi, 2005.

4. Anton,H.Bivens,I. and S. Davis, Calculus, John Wiley and Sons (Asia) Pvt. Ltd. 2002.

5. Loney, S.L.The Elements of Coordinate Geometry, McMillan and Company, London.

6. Bill, R.J.T.Elementary Treatise on Coordinate Geometry of Three Dimensions, McMillan India Ltd., 1994.

Course Code: U22AMM2   **Credits: 4**

Title of the Paper: STATISTICS II

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	4	4	-	-	-

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Explain curve fitting.	1	
CO2. Execute Correlation coefficient, Rank Correlation, Regression coefficient and Angle between two lines of regression.	2	
CO3. Define Attributes and find the consistency of data and independence of data.	3	
CO4. Discuss the significance of single mean and difference of means of large samples.	4	
CO5. Implement t-distribution, F-distribution and Chi-square distribution	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	4	4	3	2	4	3	4	3	3	3.3
CO2	4	3	4	5	4	2	3	3	4	4	3.6
CO3	4	3	3	4	3	3	4	3	4	3	3.4
CO4	3	4	3	5	3	4	4	4	4	3	3.7
CO5	3	4	5	3	4	3	4	4	3	3	3.6

Overall Mean score : 3.52

Hours:4/W 75hrs/Sem

Course Code: U22AMM2   **Credits: 4**

Title of the Paper: STATISTICS -II

UNIT I: Curve fitting and Principle of Least Squares

Curve fitting – Fitting of a straight line – Fitting of second degree parabola – Change of origin – Conversion of data into linear form

UNIT II: Correlation and Regression

Bivariate distribution, Correlation – Scatter diagram – Karl Pearson coefficient of correlation – Calculation of the correlation coefficient for a bivariate frequency distribution – Rank correlation – Regression- Lines of regression – Regression coefficients – Properties of regression coefficients – Angle between two lines of regression.

UNIT III: Theory of Attributes

Introduction – Notations – Dichotomy – Classes and class frequencies – Order of classes and class frequencies – Class symbols as operators – Consistence of data – Independence of attributes – Association of attributes.

UNIT IV: Sampling and Large Sample Tests

Sampling introduction – Types of sampling – Parameters and Statistic – Test of significance – Null hypothesis – Errors in sampling – Critical region and level of significance – Test of significance for large samples – Sampling of attributes – Sampling of variables – Unbiased estimates for population mean μ and variance σ^2 – Standard error of sample mean – Test of significance for single mean –Test of significance for difference of means –Test of significance for the difference of standard deviations.

UNIT V: Exact Sampling Distributions

Chi-square variate – Derivation of the Chi-square distribution –M.G.F. of ψ^2-distribution – Applications of Chi-square distribution – Yate's correction – Students 't'(Definition) – Fisher's 't' (Definition) – Applications of t-distribution –Test for single Mean–t-test for difference of

means – t-test for Testing Significance of an Observed Sample Correlation Coefficient– F-statistic(definition) –Applications of F-distribution– F-test for equality of Population Variance.

TEXT BOOK

Elements of Mathematical Statistics by S.C.Gupta and V.K. Kapoor, Sultan Chand & Sons, New Delhi, Third Edition, 2006

UNIT I: Chapter 9: Sections 9.1 and 9.3

UNIT II   : Chapter 10: omitting the sections 10.5, 10.7.2 and 10.7.6

UNIT III   : Chapter 11

UNIT IV   : Chapter 12

UNIT V   : Chapter13 omitting sections 13.3.1, 13.3.2, 13.3.3 and 13.4

Chapter 14 omitting sections14.2.1, 14.2.3 and 14.2.4

BOOKS FOR REFERENCE:

1. Arumugam and Issac- Statistics , New Gamma Publishing House, 2016.

2. Kandasamy, P.,K.Thilagavathi and K. Gunavathi - Probability, Statistics and Queueing theory   (2007) S.Chand and Co., New Delhi.

3. S.C. Gupta & V.K. Kapoor – Fundamentals of Mathematical Statistics – 2002 Sultan Chand & Sons, New Delhi – Eleventh thoroughly revised edition.

4. Veerarajan T- Fundamentals of Mathematical Statistics, Yesdee Publishing Private Ltd. 2017.

5. Vittal.P.R. - Mathematical Statistics – 2004 – Maragatham Publishers.

Hours: 4/W 60   hrs/Sem

Course Code: U22AMM3   **Credits: 3**

Title of the Paper: DISCRETE MATHEMATICS

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	4	3	½	-	½

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Understand the concept of Connectives, Negation, Conjunction and Truth Table	1	
CO2. Demonstrate the Algebraic Structure.	2	
CO3. Acquire a good foundation in Lattices and Boolean Algebra.	3	
CO4. Understand the concept of Languages, Finite State Machine Languages.	4	
CO5. Acquire Knowledge about Number System and Codes, Gray Code, ASCII Code.	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	5	4	4	4	3.5	3.5	3.5	4.5	4	4	4
CO2	4	4.5	4.5	4	4	4	4	4	4	4	4.1
CO3	4.5	4.5	4	4	4	4	4	4	4	4	4.1
CO4	4	4	4	4	4	4	4	4	4	4	4
CO5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5

Overall Mean Score : 4.14

Hours: 4/W 60 hrs/Sem

Course Code: U22AMM3   **Credits: 3**

Title of the Paper: DISCRETE MATHEMATICS

UNIT I: Mathematical logic

Statement and Notation - Connectives - Negation - Conjunction - Disjunctions - Statement Formula and Truth Table - Conditional and Biconditional - Well defined formulae - Tautologies - Equivalence of formulae - Duality Laws - Normal forms.

UNIT II:Algebraic Structures

Groups and Monoids - Simple Properties - Group Codes.

UNIT III :Lattices and Boolean Algebra

Lattices and Posets - Properties of Lattices - Special Lattices - Boolean Algebra - Gating Networks - Minimal sums of Products - Karnaugh maps.

UNIT IV: Languages

Finite State Machines Language - The Set Theory and Strings - Finite State Machine - A first encounter - Finite State machine - Second encounter.

UNIT V:Number system and codes

Decimal, Binary, Octal, Hexadecimal - Conversion from one to another - Binary addition, subtraction multiplication and division - BCD - Weighted excess time - Gray Code - ASCII code, Error Detecting Code.

TEXT BOOK:

TB1: Trembley and Manohar - Discrete Mathematical structures with application to Computer Science, (Tata McGraw Hill, New Delhi) 1997.

TB2 :Ralph P. Grimaldi Pearson Edelen - Discrete and Combinational Mathematics - An Applied Introduction (V Edn.).

TB3 : Donald P Leach, Albert Paul Malvino, Goutam Saha - Digital Principles and Applications(7ᵗʰ Edition), TataMcgraw Hill Education Private Ltd.

UNIT I : TB1 : Chapter 1 : 1.1 to 1.3

UNIT II : TB1 : Chapter 3 : 3.1 to 3.3, 3.5,3.7

UNIT III : TB1 : Chapter 4: 4.1, 4.2

UNIT IV : TB2 : Chapter 6

UNIT V : TB3 : Chapter 5, and Chapter 6 : Sec 6.1, 6.2, 6.11

Reference :

1. Venkataraman. M.K. and others – Discrete Mathematics – 2000, The National Publishing Company

SEMESTER III

Hours: 5/W 60 hrs/Sem

Course Code: U22CM5

Credits: 4

Title of the Paper: STATICS

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	4	2	1	½	½

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Gain the knowledge about forces and resultant of forces acting at a point	1	
CO2. Predict the effectiveness of parallel forces and moments	2	
CO3. Use conditions of equilibrium of forces and moments to solve external and internal forces acting on objects	3	
CO4. Describe the force of friction on stationary & moving objects	4	
CO5. Explain the principle of virtual work & basic concepts and to solve the Problems	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	5	4	4	4	4	5	5	5	5	4	4.5
CO2	4	4	5	4	4	5	4	4	5	4	4.3
CO3	4	3	5	5	4	5	5	5	5	4	4.5
CO4	5	4	4	4	4	5	4	4	4	3	4.1
CO5	4	5	4	5	4	5	4	5	4	4	4.4

Overall Mean Score :4.36

Hours: 5/W 60 hrs/Sem

Course Code: U22CM5   **Credits: 4**

Title of the Paper: STATICS

UNIT I:Forces acting at a point

Resultant and Components – Parallelogram of Forces – Triangle of Forces – Perpendicular Triangle of Forces – Converse of the Triangle of Forces – Polygon of Forces – Lami's Theorem – Extended form of Parallelogram law of Forces – Resolution and Components of a Force – Theorem on Resolved Parts – Resultant of any number of Forces acting at a point - Resultant of any number of coplanar forces acting at a point – Conditions of Equilibrium of forces – Problems.

UNIT II:Parallel forces and moments and Couples

The resultant of two like and unlike parallel forces acting on a rigid body - Conditions of equilibrium of three coplanar parallel forces – Centre of two parallel forces – Moment of a force – Sign and Unit of moment – Varigon's Theorem of moments – Moment of a force about an axis – Problems

Couples: Equilibrium of two couples – Equivalence of two couples – Couples in Parallel Planes – Resultant of coplanar couples- Resultant of a Couple and a force – Problems.

UNIT III:Equilibrium of Three Forces Acting on a Rigid body

Equilibrium of Three Forces Acting on a Rigid body: Rigid body subjected to any three forces – Three coplanar forces – Two Trigonometrical Theorems – Problems.Coplanar Forces: Introduction – Reduction of any number of coplanar forces – Conditions for a system of forces to reduce to a single force or to a couple – Change of the base point – Equation to the line of action of the resultant – Conditions of equilibrium – Problems.

UNIT IV: Friction

Friction: Introduction – Statistical, Dynamical and Limiting Friction – Laws of Friction – Friction – A passive force – Co-efficient, Angle and Cone of Friction - Equilibrium of a body on

a rough inclined plane under a force parallel to the plane - Equilibrium of a body on a rough inclined plane under any force – Problems.

UNIT V: Virtual Work and equaliburiam of string

Work – Method of Virtual Work – Principal of Virtual Work for a system of coplanar forces acting on a body – Forces which may be omitted in forming the equation of Virtual Work – Work done by an extensible string –Work done by a weight of a body – Application of the principle of Virtual work – Problems.

Uniform string under the action of gravity – Equation of the common catenary – Definitions – Tension at any point – Geometrical properties of the common catenary – Approximations to the shape of the catenary- The parabolic Catenary – Suspension Bridges – Problems.

TEXT BOOK

Statics by Dr. K. Venkataraman, Agasthiar Publications, 12th Edition, Trichy.

UNIT I : Chapter 2

UNIT II : Chapter 3 & 4

UNIT III   : Chapter 5 & 6

UNIT IV   : Chapter 7

UNIT V   :   Chapter 9 & 11

Reference Books

1.Text book on Statics by Varma R.S

Hours:4/W 75hrs/Sem

Course Code: U22CM6   **Credits: 3**

Title of the Paper: VECTOR CALCULUS

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	4	4	-	-	-

Course Outcomes On completing this course the student will be able to		
CO1. Acquire a good foundation in the topics of Differentiation of vector functions.	1	
CO2. Gain understanding of mathematical concepts ofScalar and vector point functions,	2	
CO3. Solve problems related toDivergence and Curl of a Vector point function.	3	
CO4.Analyse the PropertiesofIntegral Theorems	4	
CO5.Demonstrate the techniques of integration .	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	5	4	2	2	5	5	2	4	2	3.5
CO2	4	5	4	2	2	5	5	3	4	2	3.6
CO3	4	5	5	3	2	5	5	4	3	2	3.8
CO4	3	5	4	2	2	5	5	4	5	2	3.7
CO5	3	5	4	3	2	5	3	2	5	2	3.4

Overall Mean Score : 3.6

SEMESTER III

Course Code: U22CM6   **Credits: 3**

Title of the Paper: VECTOR CALCULUS

UNIT I:Differentiation of vector functions

        Vector function-Limit of a vector function- Partial derivatives of vector functions-Examples

UNIT II:Gradient of a scalar point function
      Scalar and vector point functions-Level surfaces-Directional derivative of a scalar point function-Gradient of a scalar point function-Summation notation for gradient

UNIT III: **Divergence and Curl of a Vector point function**

       Divergence and curl of a vector point function-Summation notation for divergence and curl-Summation notation for divergence and curl-Laplacian differential operator-Examples

UNIT IV: Integration of Point Function

        Line integrals-Independence of path of integration-Conservative field and Scalar Potential-Line integral of a Conservative vector-Surface integral-Volume integrals-Cyclindrical and Spherical polar coordinates-Examples

Unit V:Integral Theorems
       Integral therorem-Gauss divergence theorems –Integral theorems derived from the diverengence theorem-Green's theorem in plane-Stokes theorem-Integral theorems derived from stokes' theorem-Operational meanings of∇, ∇, ∇ x in terms of surfaces integrals-Examples

TEXT BOOK:

Duraipandian, P andLaxmiduraipandian - Vector Analysis (Revised Edition-Reprint 2005) Emerald Publishers. .

Books for Reference:

1. Arumugam and Issac- Analytical Geometry of three dimensions and Vector Calculus,New Publishing House, 2017.
2. Shanthi Narayanan-Vector calculus-
2. Susan, J.C. Vector Calculus. (4th Edn.) Pearson Education, Boston. 2012.
3. Anil Kumar Sharma, Text book of Vector Calculus, Discovery Publishing House, 1993.
4. Alice Gorguis. Vector Calculus for college students, Xilbius Corporation, 2014.

5. Marsden, J.R. and A. Tromba, Vector Calculus, 5thedn. W.H.Freeman USA, 2003

UNIT I: Chapter I : Sec:1.1,1.2,1.3,1.4,1.5.
UNIT II: Chapter II : Sec:2.1,2.2,2.3,2.4,2.5.
UNIT III: Chapter II : Sec: 2.6,2.7,2.8,2.9.
 UNIT IV: Chapter III : Sec:3.1,3.2,3.3,3.4,3.5,3.6,3.7,3.8.
UNIT V: Chapter V : Sec: 4.1,4.2,4.3,4.4,4.5,4.6,4.7,4.8.

SEMESTER IV

Course Code: U22CM7   **Credits: 4**

Title of the Paper: DIFFERENTIAL EQUATIONS

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	4	2	1	½	½

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Acquire good knowledge in first & second order linear differential equations and solving techniques	1	12
CO2. Develop the idea about homogeneous linear differential equations and solving techniques	2	12
CO3. Develop the solving techniques of simultaneous differential equations & method of variation of parameters	3	12
CO4. Form the partial differential equations and evaluation of some standard forms	4	12
CO5. Explore the use of differential equations as models in various applications	5	12

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	5	4.8	4.9	4.8	4.7	5	4.9	4.8	4.7	4.5	4.8
CO2	5	4.9	4.8	4.6	4.7	5	4.7	4.7	4.8	4.7	4.8
CO3	5	4.7	4.6	4.8	4.5	5	4.8	4.9	4.6	4.9	4.8
CO4	5	4.7	4.8	4.7	4.6	5	4.7	4.8	4.6	4.7	4.8
CO5	5	4.8	4.7	4.8	4.7	5	4.6	4.7	4.5	4.8	4.8

Overall Mean Score :4.8

Course Code: U22CM7   **Credits: 4**

Title of the Paper: DIFFERENTIAL EQUATIONS

UNIT I

Differential equations of first order -Equation of the first order and first degree, exact differential equations - Integrating factors - Linear equations – Bernoulli's equation – Equation solvable for p – solvable for y – solvable for x, Clairaut's equation.

UNIT II

Linear equation of second order with constant co-efficients.Methods of finding complementary functions – Methods of finding particular integrals.Homogeneous linear equations – Linear equations with variable coefficients -   The general solution in terms of known integral of the C.F. - Removal of the first derivative – Changing the independent variables.

UNIT III

Method of variation of parameters - Simultaneous linear differential equations.

UNIT IV

 Differential equations – Formation of partial differential equations - Methods of solving first order partial differential equations - Some standard forms – Charpit's method.

UNIT V

Applications of differential equations – Orthogonal trajectories – Growth and decay – Continuous compound interest – The Brachistochrone problem - Tautochronous property of the cycloid - Simple electric circuits - Falling bodies – simple harmonic motion – Simple pendulum – Central forces – Planetary motion – Dynamical problem with variable mass.

TEXT BOOK

Differential equations and applications by Dr.S.Arumugam and A.Thangapandi Isaac, New gamma publishing house, Palayamkottai – 627 002.

UNIT I   :   Chapter 1 – 1.2, 1.3, 1.4, 1.5, 1.6, 1.7 and Chapter 2 – 2.1, 2.2,2.3

UNIT II   :   Chapter 2 – 2.4, 2.5

UNIT III   :   Chapter 2 – 2.5, 2.6

UNIT IV   :   Chapter 4 – 4.1, 4.3, 4.4, 4.5

UNIT V   :   Chapter 5 – 5.1 to 5.5

Reference Books:

1.Narayanan .S and T.K.Manica Vahagampillai-Differential Equations and its Applications
   2003,S.Viswanathan Printers

2.Kandasamy .P and Thilagavathy.K ,Mathematics for B.Sc,Vol III-2004-s.Chand &Co,New
Delhi

SEMESTER IV

Course Code: U22CM8   **Credits: 3**

Title of the Paper: DYNAMICS

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	3	3	-	-	-

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Understand the basic laws of forces and their effects on motion	1	
CO2. Define projectiles and explain the characteristics of projectiles.	2	
CO3. Solve problems involving the impulse forces.	3	
CO4. Describe Simple Harmonic Motion and motion under the action of central forces.	4	
CO5. Demonstrate the concept of moment of inertia.	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	4	3	3	4	4	3	4	4	4	3.6
CO2	4	4	3	4	4	3	3	4	4	3	3.6
CO3	4	4	3	3	3	4	4	3	4	4	3.6
CO4	4	4	3	3	2	4	3	3	3	3	3.2
CO5	5	3	3	4	4	3	4	3	3	4	3.6

Overall Mean Score : 3.52

SEMESTER IV

Course Code: U22CM8   **Credits: 3**

Title of the Paper: DYNAMICS

UNIT I :The laws of Motion

Momentum, Newton's law of Motion-Absolute Units of Forces-Gravitational Units of Force - Distinction between Mass and Weight - Force of Friction-Motion of a particle on a rough horizontal plane under the action of a constant force-Motion of a particle up a rough inclined plane under the action of a constant force-Pressure of a body resting on a moving horizontal plane - Motion of connected particles - Atwood's Machine - Work function of a varying force - Tension in an elastic string ,Work done in stretching an elastic string - Power energy - Kinetic energy -Work energy - Potential energy –velocity and acceleration of the centre of inertia of a system of particles Motion in a resisting medium: Terminal or Limiting velocity in a resisting medium - Resistance proportional to the speed and square of the speed.

UNIT II: PROJECTILE

Path of a Projectile – Motion of a Projectile – velocity of the Projectile – Enveloping parabola – Problems on Projectiles.

UNIT III:Impulsive Forces

Impulsive Forces: Impact of two bodies – Loss of kinetic energy in Impact – Motion of a shoot and gun– Impact of water on a surface. Collision of elastic bodies: Fundamental laws of Impact – Impact of a smooth sphere on a fixed smooth plane – Direct Impact and Oblique Impact of two smooth spheres – Loss of kinetic energy due to Direct and Oblique Impact of two smooth spheres – Dissipation of energy due to Impact – Compression and Restitution – Impact of a particle on a rough plane

UNIT IV:Motion in a Circle

Differentiation of a vector – Tangential and normal acceleration - Canonical pendulum – Governors of steam engine – Motion of a cyclist and railway carriage – Upsetting of a carriage –Motion of a carriage on a banked up track-Relative rest – Motion of a particle along a smooth curve – Motion on the outside of a smooth vertical circle –Motion of asuspended particle in a vertical circle- Motion under constraints – Hodograph and normal acceleration.

Simple harmonic motion: simple harmonic motion is a straight line, General solution of the S.H.M. equation, geometric representation of a simple harmonic motion, composition of two simple harmonic motion, Motion of a particle suspended by a spiral spring. Horizontal oscillations of a particle tied to an elastic spring, period of oscillations of a simple pendulum, equivalent simple pendulum, the Seconds Pendulum, loss or gain in the number of oscillations made by a pendulum.

UNIT V: Motion under the action of Central forces

Motion under the action of Central forces: Velocity and Acceleration in polar coordinates, Motion under a central force- Differential equation of central orbits- perpendicular from the pole on the tangent, pedal equation of central orbit pedal equation of some well- known curves, velocities in a central orbit, Two fold problems in central orbits, Apses and apsidal distances, given the law of force to the pole, to find the orbit, law of the inverse square and cube

TEXT BOOK

Dynamics by Dr. M.K.Venkatraman, Agasthiar publications, Thirteenth Edition.

UNIT I :   Chapters: 4& 5

UNIT II: Chapter : 6

UNIT III: Chapters: 7 & 8

UNIT IV: Chapters: 9 & 10

UNITV : Chapter : 11

Reference Books:
1.Dynamics by Dr.P.R.Vittal& V.Anantha Narayanan,Margham Publications

2.Text Book of Dynamics by Kaushal Kumar Singh

3.Dynamicsby M.D.Raisinghania,S.Chand &Company PVT.LTD

Hours: 6 /W   90 /Sem

Course Code: U22CM9   **Credits: 6**

Title of the Paper: ABSTRACT ALGEBRA

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	6	6	-	-	-

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Students will have a working knowledge of important mathematical concepts in abstract algebra such as definition of a group, permutation group and subgroups Students will be knowledgeable of different types of subgroups such as Cyclic subgroups, Normal subgroups, quotient groups and understand the structure and characteristics of these subgroups	1	
CO2.Write precise and accurate mathematical definition of objects in Ring Theory. Understand subrings, Ideals and Integral domain	2	
CO3 Demonstrate theorems about Euclidean domains PIDs and UFDs . Gain theoretical knowledge of vector spaces, and Linear transformations	3	
CO4. Acquire good knowledge of Linear independence, basis and dimension Understand the concepts related to inner product spaces	4	
CO5. Develop the knowledge of Rank of matrix, bilinear and quadratic forms. Understand the concepts related to inner product spaces	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3.5	3	3	3.5	3	4	3	3	3	3.3
CO2	3	3	3	2.5	3	3.5	4	2	2.5	3.5	3.0
CO3	3	3	2	3	2.5	2.5	4	2.54	2.5	3	2.8
CO4	3	3	2.5	3	3	3	4	2.5	3	3	3.0
CO5	3	3	3	2.5	3.5	3	4	2.5	3	2.5	3

Overall Mean Score : 3.1

Hours: 6 /W   90 /Sem

Course Code: U22CM9   **Credits: 6**

Title of the Paper: ABSTRACT ALGEBRA

UNIT I: Groups , Cyclic subgroups, Normal subgroups

Groups – Definition and Examples – Simple Properties of Groups Subgroup: Necessary and sufficient condition for a subset to be a subgroup – Order of the Group – Order of an element – Centre of a group – Normalizer and Centralizer, Product of two subgroups – Order of HK – Necessary and sufficient condition for HK to be of a cyclic group a subgroup – Intersection and union of subgroups.

Cyclic subgroups: Subgroups, generators of a cyclic group – Number of generators of a cyclic groups – cosets – left cosets and right cosets – Partitioning of a group by cosets – Legrange's theorem – Euler's theorem – Fermat's theorem.

Normal subgroups: Quotient groups – Group Homomorphism – Canonical Homomorphism – Kernel of a homomorphism – Isomorphism – Automorphism -Inner Automorphism – Cayley's Theorem – Permutation groups.

UNIT II : Rings

Rings: Definition and examples – Types of rings – Elementary properties of a ring – Integral Domain – Field – Sub rings – Sub fields – Ideals – Left ideal – Right ideal – Principal ideal – quotient ring – Maximal and prime Ideals – Characteristic of a ring.

UNIT III : Unique Factorization Domain, Vector Space

Unique Factorization Domain(UFD) – Principal Ideal Domain(PID) – Homomorphisms – Isomorphism – Kernel of a Homomorphism – Fundamental theorem of Homomorphism – Field of quotients of an Integral domain – Polynomial rings – Division algorithm – Polynomial rings over a UFD – Gauss lemma – Polynomials over the rational field – Eienstein's criterion.

Vector Space: Definition and Examples – Subspaces – Linear Transformation – Fundamental Theorem of Homomorphism.

UNIT IV : Span of a Set

Span of a Set: Linear Independence – Basis and Dimension – Rank and Nullity – Matrix and Linear transformation.

Inner Product Space: Definition and Examples – Orthogonality – Orthogonal Complement – Gram Schmidt orthogonalization process.

UNIT V : Matrices

Matrices: Elementary transformation – Inverse – Rank – Test for consistency – Solving Linear Equations – CayleyHamilton theorem – Uses of CayleyHamilton theorem – Inverse and power of a matrix, Eigenvalues and Eigenvectors.

TEXT BOOK

1. Arumugam.S and A. ThangapandiIssac – "Modern Algebra", Scitech Publications (India) Pvt.Ltd.,

UNIT I   :   CHAPTER 3 : SECTIONS: 3.1,3.2,3.5 to 3.11
UNIT II :   CHAPTER 4 : SECTIONS: 4.1 to 4.9
UNIT III: CHAPTER 4 : SECTIONS:4.10,4.11,4.13,4.16 to4.18
UNIT IV :   CHAPTER5   : SECTIONS: 5.1to 5.8
                     CHAPTER 6 : SECTIONS: 6.1 to 6.3
UNIT V :   CHAPTER 7: SECTIONS: 7.3 to 7.8

REFERENCE BOOKS

1. Herstein .I.N – Topics in Algebra, Vikas Publishing house Pvt. Ltd.,1975, NewDelhi.

2. Sharma. J.N. and A.R. Vashistha – "Linear Algebra", Krishna Prakash Nandir 1981.

3 . John B. Fraleigh, A First Course in Abstract Algebra, 7th Ed., Pearson, 2002.

4. Murugan .M , A First Course in Groups and Rings, Muthali Publishing House,Chennai, 2017.

5 . Murugan. M, A First Course in Linear Algebra and Boolean Algebra, Muthali Publishing House, Chennai 2018

SEMESTER V

Hours: 5 /W   90 /Sem

Course Code: U22CM10   **Credits: 5**

Title of the Paper: GRAPH THEORY

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	5	3	1	-	1

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Acquire the knowledge of basic definitions of Graphs, Isomorphism, Walks,Connected Graphs and Cut Vertices and Edges	1	
CO2. Gain the knowledge of Eulerian and Hamiltonion Graphs	2	
CO3. Identify the concept of Bipartitite Graphs and Matrices	3	
CO4. Perceive the idea of Planar graphs	4	
CO5. Recognize the concept of Colouring and Directed graphs	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	5	5	5	4	3	5	5	5	5	4	4.6
CO2	5	5	5	4	3	5	5	5	5	4	4.6
CO3	4	4	4	3	3	3	3	4	4	3	3.5
CO4	5	5	5	4	3	4	4	4	4	3	4.1
CO5	4	4	4	4	4	4	4	4	4	4	4

Overall Mean Score : 4.16

SEMESTER V

Title of the Paper: GRAPH THEORY

UNIT I : Graphs

Basics : Graphs – Pictorial Representation – Subgraphs – Isomorphism and degrees – Walks and Connected Graphs- Cycles in Graphs – Cut Vertices and Cut Edges.

UNIT II :Eulerian and Hamiltonion Graphs

Eulerian Graphs – Fleury's Algorithm – Hamiltonion Graphs – Weighted Graphs Connectedness

UNIT III :Bipartite Graphs and Matrices

Bipartite Graphs and Matrices :Bipartite Graphs – Marriage Problem- Trees – Connector Problem – Matrices and Vector Spaces Associated with Graphs : Matrix representations – Vector Spaces associated with Graphs – Cycle Space – Cut –Set Space .

UNIT IV :Planar Graphs

Planar Graphs – Euler Formula – Platonic Solids – Dual of a Plane Graph –

  Characterization of Planar Graphs.

UNIT V : Colourings

Vertex Colouriung – Edge Colouring – An algorithm For Vertex Colouring – Directed Graphs : Directed graphs – Connectivity in digraphs – Strong orientation of graphs – Eulerian digraphs - Tournaments

TEXT BOOK: Choudum S A – A First Course in Graph Theory, Trinity Press New Delhi,2020

UNIT I : Chapter 1

UNIT II   : Chapter 2

UNIT III   : Chapter 3and 4

UNIT IV   : Chapter 5

UNIT V   :   Chapter 6 and 7

REFRENCE BOOKS:

1. Arumugam. S and Ramachandran S, Invitation to Graph Theory , Scitech Publications (India) Pvt. Ltd., Chennai

2. Murugan M, Introduction to Graph Theory, Muthali Publishing House, Chennai, 2005.

Hours: 5 /W 75 /Sem

Course Code: U22CM11   **Credits: 5**

Title of the Paper: FOURIER SERIES AND TRIGONOMETRY

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	5	5	-	-	-

Course Outcomes	Unit	Hrs/S
On completing this course the student will be able to		
CO1. Expand any periodic function as a Fourier series	1	
CO2. Expand Fourier Series in terms of change of interval	2	
CO3. Expand Sine and Cosine series	3	
CO3. Expand hyperbolic and Inverse functions	3	
CO5. Resolving into factors and finding logarithm of a complex function	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO3	PO5	PSO1	PSO2	PSO3	PSO3	PSO5	
CO1	3	3	3	3	3.5	3	3.5	3	3	3.5	3.15
CO2	3	3.5	3	3.5	3	3	3	3.5	3	3	3.15
CO3	3	3	3	3.5	3	3	3.8	3.5	3	3	3.18
CO3	3	3.5	3	3.5	3	3	3.8	3	3	3	3.18
CO5	3	3.5	3.5	3.5	3	3	3.8	3.5	3	3	3.28

Overall Mean score: 3.19

SEMESTER-V

Title of the Paper: FOURIER SERIES AND TRIGONOMETRY

UNIT I

Fourier Series - Period with 2 - Even and Odd functions – Half Range.

UNIT II

Development in Cosine and Sine series – Change of Interval – Combination of Series.

UNIT III

Expansions of cos and – Expansions of and , is a positive integer – Expansions of and in a Series of Ascending Powers of

UNIT IV

Hyperbolic Functions – Relation between Hyperbolic Functions - Inverse Hyperbolic Functions

UNIT V

Resolving Into Factors The Expression   - Resolving Into Factors The Expression - Resolving Into Factors The Expression Logarithms of Complex Quantities – Finding the logarithm of – General Value of logarithm of .

TEXT BOOK

TB 1. Calculus Vol. III, - Manichavasagam Pillai, T.K. and S. Narayanan, – Viswanathan Publishers and Printers Pvt. Ltd, 2011 .

TB 2. Trigonometry - S. Narayanan and T. K. Manikavasagam Pillai , S.Viswanathan Printers and Publishers Pvt. Ltd., 2015

UNIT I   :   Chapter 6 : Section : 6.1 to 6.3
UNIT II   :   Chapter 6 : Section : 6.5 to 6.7
UNIT III   :   Chapter 3
UNIT IV   :   Chapter3
UNIT V   :   Chapter5 Except Section 3

REFRENCE BOOKS

1. Robert T. Seeley. Fourier Series and Integrals, Dover Publications, New York, 2006.

2. ArumugamS and Thangapandi Issac A, Trigonometry, New Gamma Publishing House, 2017

3. SL Loney, Trigonomerty, Arihant Publications

4. Stewart J and LotherRedlin, Algebra and Trigonometry, 3rd Edition, Brokes/Cole, Cengage Learning, USA, 2011.

5. Robert F. Blitzer, Algebra and Trigonometry, 5th Edition, Pearson Education, Newyork.

SEMESTER V

Hours: 6 /W 90hrs/Sem

Course code: U22CM12

Credits: 5

Title of the Paper: OPERATIONS RESEARCH

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	6	6	-	-	-

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Solve linear programming problems.	1	
CO2. Apply different methods to find transportation cost.	2	
CO3. Recognize Hungarian method to solve Assignment Problems.	3	
CO4. State Maximin-Minimax principle and list the types of inventories.	4	
CO5. Identify critical path.	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3	4	3	3	3	4	4	3	3	3.4
CO2	4	4	4	4	4	3	4	4	3	4	3.8
CO3	3	3	3	4	4	3	5	5	3	4	3.7
CO4	3	4	3	3	4	3	4	5	3	4	3.6
CO5	3	3	3	3	4	3	3	5	3	4	3.4

Overall Mean Score : 3.58

SEMESTER V

Hours: 6 /W 90hrs/Sem

Course code: U22CM12   **Credits: 5**

Title of the Paper: OPERATIONS RESEARCH

UNIT I

Linear Programming Problem –Mathematical Formulation of the Problem–Graphical Solution Method – Simplex Method – Artificial Variable Techniques – Concept of Duality – Primal and Dual Problems – Duality and Simplex Method– Dual Simplex Method.

UNIT II

Transportation Problem – North-West Corner Rule– Matrix Minima Method – Vogel's Approximation Method – MODI Method – Degeneracy and Unbalanced Transportation Problem.

UNIT III

Assignment Problem– Hungarian Method - Unbalanced Assignment Problem - Travelling Salesman Problem.

UNIT IV

Two Person Zero sum Games – The Maximin - Minimax Principle – Games without Saddle Points – Mixed Strategies – Graphical Solution of 2 x n and m x 2 games – Dominance Property.

Introductions – Types of Inventories – Inventory decisions – Deterministic inventory Problems – EOQ Problems with no shortages – Production Problems with no shortages – EOQ problems with shortages – Production Problems with shortages – EOQ Problems with One and More Price breaks.

UNIT V

Network and basic components – Rules of Network Construction – Time Calculation in network – Critical Path Method – PERT Calculation.

TEXT BOOK: .Kanti Swarup, P.K. Gupta and Man Mohan - Operations Research - Sultan Chand & Sons – 2012, Sixteenth Throughly Revised Edition.

 UNIT I : Chapter 2-5

UNIT II : Chapter 10: 10.1-10.13

UNIT III : Chapter 11

UNIT IV : Chapter 17:17.1-17.7

Chapter 19: 19.1-19.13

UNITV : Chapter 25: 25.1-25.7

BOOKS FOR REFERENCE:

1. Gupta.P.K.andD.S. Hira – Operations Research,S.Chand and Company.

2. Mokhtar S. Bazaraa, John J. Jarvis and Hanif D.Sherali- Linear

Programming and NetworkFlows,2nd Ed., John Wiley and Sons, India, 2004.

3. Hillier, F.S. and G.J. Lieberman -Introduction to Operations Research, 9th

 Edn., Tata McGrawHill, Singapore, 2009.

 4.   Hamdy A. Taha, Operations Research, An Introduction, 8th Edn., Prentice Hall
    India, 2006.

 5.   Hadley.G - Linear Programming, Narosa Publishing House, New Delhi, 2002.

SEMESTER-VI

Hours: 6 /W   90 hrs/Sem

Course Code: U22CM13   **Credits: 5**

Title of the Paper: COMPLEX ANALYSIS

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	6	6	-	-	-

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Construct Analytic functions and Harmonic functions	1	
CO2. Classify and Evaluate Contours integration	2	
CO3 Find the Taylors and Laurent Series	3	
CO4 Derive Rouches theorem and evaluate improper integrals	4	
CO5. Construct the conformal mapping	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	3	2.5	3.5	2.5	4	4	2	2.5	3	4.1
CO2	4	2.5	3	3	2	4	4	3	3.5	2.5	3.85
CO3	4	3.5	3	2	3	4	4	2	3	3.5	4.2
CO4	4	3	3	2	2.5	4	4	3.5	2	3	2.9
CO5	4	2.5	2	3.5	3	4	4	3	3	2	3.2

Overall Mean Score : 3.65

SEMESTER-VI

Hours: 6 /W   90 hrs/Sem

Course Code: U22CM13   **Credits: 5**

Title of the Paper: COMPLEX ANALYSIS

UNIT – 1

Complex numbers – Conjugation and Modulus - circles and Straight line – Regions in the Extended complex plane - Function of Complex variable - Differentiability – Cauchy -Riemann Equations – Sufficient conditions – Polar form   – Analytic Functions – Harmonic Functions

UNIT II

Introduction – Elementary of Transformations -   Cross ratio under Bilinear Transformation   - Definite integrals   -   Contours - Cauchy - Goursat Theorem - Anti-derivatives and independence of path - Cauchy integral formula - Morera's Theorem.

UNIT III

Convergence of Sequence and Series – Taylor's series - Examples - Laurent's Series - Zeros of analytic functions – Residues -   Residue Theorem -   Principal part of functions - Residues at poles - Quotients of Analytic functions.

UNIT IV

Evaluation of improper Real Integrals - Improper Integrals involving sines and cosines – Definite Integrals involving sines and cosines - Mermorphic functions :Principle of argument   - Rouches's theorem

UNIT V

Conformal mappings basic properties - Mappings $w=$, Z^2 e^z ,sin z, cos z, z +

 TEXT BOOK:
   1. Churchill. R.V. and J.W. Brown – " Complex variables and Applications"   - Fourth Edition - McGraw Hill International Editions.
   2. Arumugam, S. and T. Issaic – " Complex Analysis"   - Scitech Publishing House – Chennai.
   3. Ponnuswamy. S. –" Foundations of Complex Analysis", Narose Publication House New Delhi, 2ⁿᵈ edition 2005.

UNIT I :   Text book 1 : Chapter1 Sections: 1.1 1.2,1.7 - 1.9
                                  Chapter 2 Sections: 2.0,2.5 -2.9
UNIT II :   Chapter 3 Sections :   3.1 – 3.3
                 Text book 2 :   Chapter 4 Sections: 29, 30, 33,37,38,40
UNIT III :   Text Book 2 : Chapter 5 Sections: 43 – 46, 53

<pre>   Chapter 6 Sections: 54 – 58
UNIT IV: Text Book 2 : Chapter 6   Sections: 59 – 61
           Text Book 3 : Chapter 11 Sections: 11.1 - 11.3
UNIT V   Text Book 1 :   Chapter 5 Sections: 5.1 - 5.5 & 5.7</pre>

REFERENCE BOOKS:

1. Duraipandian. P. and Lakshmi Duraipandian – "Complex Analysis" – Emerals Publications, Chennai (2001).
2. Roopkumar R. Complex Analysis, Pearson Education India, 2014

Hours: 6 /W 90 hrs/Sem

Course Code: U22CM14

Credits: 5

Title of the Paper: REAL ANALYSIS

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	6	6	-	-	-

Course Outcomes On completing this course the student will be able to	Unit	
CO1. Define the inequalities,write clear and precise proofs.	1	
CO2. Understand, determine and apply the concept of sequences and series	2	
CO3. Understand and acquire the knowledge of open sets, closed sets, limit in metric spaces	3	
CO4. Sketch the ability to model continuous, complete metric spaces	4	
CO5. Demonstrate the knowledge of connected sets and compact sets of R	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	4	3	3	3	5	5	4	3	2	3.5
CO2	4	4	3	4	4	5	5	3	3	2	3.7
CO3	5	5	5	5	5	5	5	4	3	2	4.4
CO4	5	5	5	5	5	5	5	5	4	2	4.6
CO5	4	4	4	3	3	4	4	4	3	1	3.4

Overall Mean Score : 3.92

Hours: 6 /W 90 hrs/Sem

Course Code: U22CM14   Credits: 5

Title of the Paper: REAL ANALYSIS

UNITI: REAL NUMBER SYSTEM

The field axioms, the order axioms, the rational numbers, the irrational numbers, upper bounds, maximum element, least upper bound (supremum)- The completeness axiom- some properties of the supremum- Absolute values - The triangle inequality- the Cauchy-Schwarz's inequality.

UNITII: SEQUENCE AND SERIES

Bounded, Convergent, Divergent and oscillating sequences, Algebra of limits - Behaviour of Monotonic sequences. Cauchy's first limit Theorem, Cauchy's second limit Theorem, subsequences, Cauchy sequence, upper and lower limit of sequences. Infinite series – n^{th} term test-Comparison test- Linear Comparison test- Root test- Integral test- Alternating series.

UNIT III : METRIC SPACES

Euclidean space -Open sets and closed sets-Bolzano-Weierstrass theorem- The Cantor Intersection theorem-Metric Spaces - Limit in Metric Spaces- point set topology in metric spaces.

UNIT IV: CONTINUITY ON A METRIC SPACE & COMPLETENESS

Functions continuous at a point on the real line - Functions continuous in a metric space - Discontinuous function on R^1- Complete metric spaces.

UNITV: CONNECTEDNESS,COMPACTNESSAND RIEMANN INTEGRAL

Connectedness - Bounded sets and totally bounded sets - Complete metric spaces - Continuous functions on compact metric spaces -Continuity of the inverse function -Uniform

continuity - Existence of the Riemann integral- Derivatives-Rolle's theorem - Fundamental theorem of Calculus –Mean value theorem- Cauchy's Mean Value theorem-Taylor's theorem.

TEXT BOOK:

1. Arumugam. S. and ThangapandiIssac - "Sequences and Series", New Gamma, Publishing House, Palayamkottai - 627 002. (1997).

2. Arumugam and Issac-Modern Analysis ,New Publishing House,2017.

3. Richard R Goldberg - Methods of Real Analysis Oxford and IBH Publishing Co. New Delhi (2019).

    UNIT I   : Chapter 1 & Chapter 2 in TB 1

    UNIT II :Chapter 3: Sections 3.8-3.12 &Chapter 4 in TB 1

    UNIT III : Chapter 2 & chapter 3: Sections 3.0-3.2 in TB 2

    UNIT IV : Chapter 4: Sections 4.0-4.4,

    UNIT V   : Chapter 5: Sections 5.0-5.3 in TB 2
                 Chapter 6: Sections 6.0-6.4 in TB 2
                 Chapter 7: Sections 7.1-7.8 in TB 3

REFERENCE BOOKS

1.   Tom M. Apostol - Mathematical Analysis, II Edition, Narosa Publishing House, New Delhi (Unit I), (1997).

2. Malik S.C and Savitha Arora (1991) - Mathematical Analysis, Wiley Eastern Limited New Delhi.

3. ViswanathNaik, K. – Real Analysis, Emerald Publishers, Chennai.

Hours: 5/W 75hrs/Sem

Course Code: U22CM15   **Credits: 4**

Title of the Paper: NUMBER THEORY

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	5	5	-	-	-

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Recall the concepts mathematical induction and early number theory .	1	
CO2. Demonstrate divisibility theory in integers.	2	
CO3. Derive fundamental theorem of Arithmetic.	3	
CO4. Analyse and apply the theory of congruence.	4	
CO5. Describe Fermat's Theorem.	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	4	3	4	4	3	4	3	4	3	3.6
CO2	3	4	4	4	4	3	3	3	4	3	3.5
CO3	3	4	3	4	4	3	3	3	4	3	3.4
CO4	3	4	3	4	4	3	4	3	4	3	3.5
CO5	3	4	3	4	4	3	3	3	4	4	3.5

Overall Mean Score: 3.5

SEMESTER VI

Hours: 5/W 75hrs/Sem

Course Code: U22CM15   **Credits: 4**

Title of the Paper: NUMBER THEORY

UNIT I
   Peano's Axiom - Mathematical Induction - The Binomial Theorem - Early
  Number Theory

UNIT II
   Divisibility Theory in Integers - The Division Algorithm - The g.c.d. - Enclidean
  Algorithm - The Diophontine Equation $ax + by = c$

UNIT III
   Primes and their Distributions - The fundamental Theorem of Arithmetic - The seive of
  Eratosthenes - The Gull Conjecture.

UNIT IV
    The Theory of Congruence - Basic Properties of Congruence - Special Divisibility test –
  Linear Congruence.-Prime modulus- Power residues.

UNIT V
   Fermat's Theorem - Fermat's factorization method - The Little theorem -
  Wilson's theorem.

TEXT BOOK: David M. Burton - Elementary Number theory.
UNIT I :   Chapter I
UNIT II :   Chapter 2
UNIT III :   Chapter 3
UNIT IV : Chapter 4
UNIT V : Chapter 5

BOOKS FOR REFERRENCE:

1.Ivan Nivan and H. Zuckerman - An Introduction to theory of Numbers.

2.Kumaravelu. S and SusheelaKumaravelu – Elements of Number Theory,
   Nagarcoil, 2002.

3.Neville Robinns, Beginning Number Theory, 2nd Ed., Narosa Publishing
   House Pvt. Ltd.,Delhi, 2007.Tamilnadu State Council for Higher Education

DISCIPLINE SPECIFIC ELECTIVE COURSES

SEMESTER V

Hours: 4/W   60hrs/Sem

Course Code: U22DSM1A   **Credits: 4**

Title of the Paper: C PROGRAMMING

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	4	2	-	1	1

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Acquire the knowledge of basic structure of a C Program, constants, variables and data types, Managing input and output operations	1	15
CO2. Study about Operators	2	15
CO3. Implement decision making with branching & looping	3	15
CO4. Learn about one dimensional &two dimensional arrays, string handling functions	4	15
CO5. Study about user defined fnctions, structures, unions and pointers	5	15

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	4	3	5	3	2	2	3	3	2	3
CO2	3	4	3	5	3	2	2	3	3	2	3
CO3	3	4	3	5	3	2	2	3	3	2	3
CO4	3	4	3	5	3	3	2	3	3	2	3.1
CO5	3	4	4	5	3	3	2	3	3	2	3.2

Overall Mean Score: 3.06

Hours: 4/W75hrs/Sem

Course Code: U22DSM1A   **Credits: 4**

Title of the Paper: C PROGRAMMING

UNIT I

Basic structure of a C program – Constants – Variables – Data types – Managing input and output operations

UNIT II

Operators – Arithmetic – Relational – Logical – Assignment – Increment and decrement – Conditional – Bit wise and special Operators – Arithmetic expressions – Evaluation of expressions – Precedence of arithmetic operators – Some computational problems – Type conversion in expression – Operator precedence and associativity – Mathematical functions

UNIT III

Decision making – Branching – Simple IF, IF – ELSE – Nesting of IF.. ELSE, ELSE if ladder switch statement – Operator – Go to statements – while, do- while and for statements

UNIT IV

One dimensional and two dimensional arrays – Initialization of arrays – Handling of character strings – String handling functions

UNIT V

User defined functions – Structure and unions - Pointers

TEXT BOOK

Programming in ANSI – C by E. Balagurusamy III Edn. Tata McGraw Hill Publishing Company Ltd. New Delhi

UNIT I   :   Chapter 1: Sections: 1.8, 2 & 4

UNIT II   :   Chapter 3

UNIT III   :   Chapters 5 and 6 : 6.1 – 6.4

UNIT IV   :   Chapter 7: Sections: 7.1 – 7.6

                            Chapter 8 : 8.1 – 8.8

UNIT V   :   Chapter 9, 10 & 11: Sections 11.1 – 11.10

SEMESTER VI

Course Code: U22DSM2AP   **Credits: 2**

Title of the Paper: C PROGRAMMING LAB

UNIT I

1. Programs to illustrate input, output operations

2. Programs using symbolic constants, library functions

3. Program using various operators and arithmetical expressions

UNIT II

4. Programs illustrating concepts of branching

5. Programs illustrating concept of looping

UNIT III

6. Programs using arrays

7. Programs using string handling functions

UNIT IV

8. Programs using concept of user defined functions

9. Programs using recursions

10. Programs illustrating global and local variables

UNIT V

11. Programs using structures and unions

12. Programs using pointers

TEXT BOOKS

Programming in ANSI-C by E. Balagurusamy III Edition, Tata McGraw Hill Publishing Company Ltd., NewDelhi

SEMESTER VI

Hours: 6 /W 75 hrs/Sem

Course Code: U22DSM3   **Credits: 5**

Title of the Paper: Numerical Methods

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	4	2	-	1	1

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Solve the Guass Elimination Method	1	
CO2. Find the Difference and Factorial polynomial and error propagation	2	
CO3 Discuss and demonstrate the concept of interpolation	3	
CO4. Understand the Newton's Forward and Backward formula .	4	
CO5. Apply Euler's and Runge Kutta method for fourth order	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4.5	4	4	4	4.5	5	4	5	4	4	4.3
CO2	4.5	4	4.5	4	4	4.5	4.5	4	4	4.5	4.25
CO3	4.5	4	4	4.5	4	5	4.5	4	4.5	4.5	4.55
CO4	4.5	4	4	4.5	4	4.5	4	5	4	4	4.15
CO5	4.5	4	4.5	4	4	4.5	4	4.5	4	5	4.3

Overall Mean Score : 4.31

Hours: 6 /W 75 hrs/Sem

Course Code: U22DSM3   **Credits: 5**

Title of the Paper: Numerical Methods

UNIT I

The Bisection method - Regular Falsi method - Newton -Raphson method - Criterion for the Convergence of Newton's method - Order of convergence of Newton's method - Gauss Elimination – Gauss Jordan method - Gauss-Jacobi - Gauss Seidel method.

UNIT II

First and higher order differences   - Forward and backward differences - properties of operators -   Relation between the operators - Differences of a polynomial   - Factorial polynomial - Error propagation in a difference table -   Summation of series.

UNIT   III

Gregory-Newton forward interpolation formula - Backward Interpolation Formula - Central Interpolation formula - Gauss's forward interpolation formula - Gauss's backward interpolation formula - Bessel's formula - Divided difference - Newton's divided difference formula - Lagrange's interpolation formula - Inverse interpolation formula.

UNIT IV

Newton's forward difference formula - Newton's backward difference formula - Bessel's formula - Newton-cote's formula - Trapezoidal rule - Simpson's one third rule – Simpson's three-eighths rule - Weddle's rule.

UNIT V

Definition - Order and degree of a difference equation – Linear difference equations - Complementary function –Particular integral - Solution by Taylor series method - Euler's method – Runge-kutta Method (fourth order only)

TEXT BOOK

Numerical Methods by Dr.P. Kandasamy, Dr. K. Thilagavathy, Dr. Gunavathy S. Chandj& Company Pvt. Ltd. Edn. 2006

UNIT I :   Chapter III   Sections: 3.1, 3.3, 3.4, 3.4.2, 3.4.3
                    Chapter IV   Sections: 4.2, 4.2.1, 4.8, 4.9
UNIT II :   Chapter V   Sections: 5.1, 5.3 - 5.5 & 5.7
                    Chapter VI   Sections: 6.2 & 6.3
UNIT III :   Chapter VII   Sections: 7.1 - 7.4 & 7.6
                    Chapter VIII   Sections: 8.2, 8.5,   8.7 & 8.8
UNIT IV :   Chapter IX   Sections: 9.2 9.3,9.6 , 9.7 - 9.9 & 9.13 - 9.15
 UNIT V :   Chapter : X   Sections: 10.1 – 10.6
                    Chapter: XI Sections: 11.5 - 11.7 11.9, 11.13 – 11.15(Fourth order only)

Reference Books:

1. Venkataraman M.K. Numerical Methods in science and Engineering   - National Publishing company V Edition 1999
2. Hamming R.W. Numerical Methods for Scientists and /engineers, Dover Publications, USA 1987
3. Richars L. Burden and J. Dougles Faires, Nujmerical Analysis, 9th edn. Books/Cole, Cengage Learning, USA 2011
4. Arumugam, Issac and Somasundaram, Numerical Analysis with Programming in C,New Gamma Publishing House, June 2015.

Hours: 4 /W 75 hrs/Sem

Course Code: U22DSM1B   **Credits: 4**

Title of the Paper: OOP with C++

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	4	2	-	1	1

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Understand the principles, benefits and applications of OOP & begin with C++	1	
CO2. Understand the functions in C++ programming	2	
CO3. Gain knowledge about classes and objects in C++ programming	3	
CO4. Present knowledge of constructors and destructors	4	
CO5. Understand inheritance	5	

Course comes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	4	4	4	2	2	4	4	3	2	3.1
CO2	3	4	4	3	3	3	4	4	2	3	3.3
CO3	2	3	4	4	3	2	3	4	4	3	3.2
CO4	3	4	4	4	2	3	4	4	3	3	3.4
CO5	2	4	4	3	3	3	4	4	3	2	3.2

Overall Mean Score:3.2

SEMESTER V

Hours: 4 /W 75 hrs/Sem

Course Code: U22DSM1B   **Credits: 4**

Title of the Paper: OOP with C++

UNIT I

Principles of OOP – Basic concepts – Benefits of OOP – Applications of OOP – Beginning with C ++ - Tokens, Expressions and Control Structures

UNIT II

Functions in C++ - Main function – Function prototyping – Call by reference – Return by reference – Function overloading

UNIT III

Classes and objects – Introduction – Specifying a class – Defining member functions – Private member functions – Memory allocation for objects – Objects as function arguments – Friendly functions – Local classes.

UNIT IV

Constructions and destructions – Constructors – Parameterized constructors – multiple constructors – Copy constructors – Destructors – Operator overloading

UNIT V

Inheritance – Working with files – Introduction – Classes for file stream operators – Opening and closing a file – Detecting end of a file – More about open file models – Command line arguments.

TEXT BOOK

Object Oriented Programming with C++ by E.Balagurusamy 2ndEdn.

UNIT I : Chapters 1, 2 & 3

UNIT II :   Chapter 4

UNIT III: Chapter 5

UNIT IV: Chapter 6& Chapter 7 : 7.1 – 7.5

UNIT V :   Chapter 8 & Chapter 11 : 11.1-11.5, 11.10

SEMESTER VI

Hours: 3 /W 75 hrs/Sem

Course Code: U22DSM2BP   **Credits: 2**

Title of the Paper: C++ PROGRAMMING LAB

UNIT I

Programs using tokens - Expressions and Control Structures

UNIT II

Programs using functions

UNIT III

Programs illustrating concept of objects and classes

UNIT IV

Programs using constructions and destructions - Programs using operator overloading

UNIT V

Programs using concept of inheritance - Programs using pointers - Programs using C++ streams

TEXT BOOK

Object Oriented Programming with C++ by E. Balagurusamy 2ndEdn.

SEMESTER VI

Hours: 6 /W 90 /Sem

Course Code: U22DSM3B   **Credits: 5**

Title of the Paper:FUZZY MATHEMATICS

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	6	4	-	1	1

Course Outcomes On completing this course the student will be able to	Unit
CO1. Recall the basic definitions, characteristics and significance of fuzzy sets.	1
CO2. Classify the operations on fuzzy sets, concept of extension principle.	2
CO3. List the concept of fuzzy complements, intersection and union.	3
CO4. Interpret the combination of operations and aggregation operations.	4
CO5. Explain the concept of Fuzzy numbers.	5

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	3	3	3	3	2	3	3	2	2.7
CO2	3	2	3	2	3	3	2	3	3	2	2.6
CO3	3	2	3	3	3	2	2	3	3	2	2.6
CO4	3	2	3	3	3	3	2	3	3	2	2.7
CO5	3	3	2	3	3	3	3	3	3	2	2.8

Overall Mean Score : 2.68

SEMESTER VI

Hours: 6 /W 90 /Sem

Course Code: U22DSM3B   **Credits: 5**

Title of the Paper:FUZZY MATHEMATICS

UNIT I: CRISP SETS AND FUZZY SETS

   Basic Types – Basic Concepts – Characteristics and Significance of the Paradigm Shift.

UNIT II:

   Addditional Properties of α-cuts – representations of fuzzy sets – Extension principle
   for fuzzy sets

UNIT III: FUZZY SET OPERATIONS

   Fuzzy complements – Fuzzy intersections: t-norms – Fuzzy unions: t-conorms

UNIT IV:

   Combinations of operations – Aggregation operations.

UNIT V: FUZZY NUMBERS

   Linguistic variables – Arithmetic operations on intervals – Arithmetic operations on
   fuzzy numbers – Lattice of fuzzy numbers – Fuzzy Equations.

TEXT BOOK:

  1. George J. Klir and Bo Yuan, - Fuzzy Sets and Fuzzy Logic Theory and Applications.
     Prentice Hall of India, 2002, New Delhi.

UNIT I: Chapter1

UNIT II: Chapter2

UNIT III: Chapter3: Sections 3.1-3.4

UNIT IV : Chapter3: Sections 3.5 & 3.6

UNIT V: Chapter4

REFERENCE BOOK:

1. George J. Klir, Tina. A. Folger – Fuzzy Sets, Uncertainty and Informations – Prentice Hall of India, 2003.

GENERIC ELECTIVE COURSE

Hours: 2 /W 30 /Sem

Course Code:U22GEM1   **Credits: 2**

Title of the Paper:ASTRONOMY

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	2	2	-	-	-

Course Outcomes On completing this course the student will be able to	Unit	Hrs/ S
CO1. Understand Celestial co-ordinates, sidereal time	1	
CO2. Demonstrate effects of Geometric, Heliocentric, Parallax.	2	
CO3. Find equation of time and conversion of time	3	
CO4. Understand relation between sidereal month Lunation and relation between theorem	4	
CO5. Understand Planetary phenomena & Astronomical instruments	5	

Course	Programme Outcomes	Programme Specific Outcomes	Mean

Outcomes	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	Score
CO1	4	4	4.5	4.5	4	3	3.5	4	3.5	4	3.9
CO2	4	4	4.5	4.5	4.5	3.5	4	3	4	4	4.0
CO3	4.5	4.5	4	4	4	4	4	3.5	3	3.5	3.9
CO4	4	3.5	4	3	3	3.5	3.5	3.5	3	3	3.4
CO5	3.5	4	3	3	4	3	4	3	3.5	4	3.5

Over all Mean Score : 3.74

SEMESTER VI

Hours: 2 /W 30 /Sem

Course Code:U22GEM1

Credits: 2

Title of the Paper:ASTRONOMY

UNIT I

Spherical Trigonometry – Spherical Triangle – The fundamental formulae of spherical Trigonometry, the sine, cosine, four parts and Napier formulae (without proof)-The Celestial sphere: Celestial coordinators – Diurnal motion - Rising and setting of a star – Sidereal time – Circumpolar star – Morning and Evening stars – Twilight – Earth – Length of the day.

UNIT II

Refraction – Tangent formula – Cassini's formula Effects of Refraction – Geocentric parallax – Effects of Geocentric parallax – Heliocentric parallax – Effects of Heliocentric parallax – Aberration – Its Effects.

UNIT III

Kepler's Laws–Verification of Kepler's Laws– True anomaly, Mean Anomaly–Eccentric Anomaly, Relation between them – Time - Equation of Time – Seasons – Conversion of Time.

UNITIV

Moon – Sidereal Month, Lunation and Relation between them – Phases of the Moon – Lunar Libration surface of the Moon – Metonic cycle – Tides – Eclipses. Shadow cone – Minimum and Maximum number of Eclipses.

UNIT V

Planetary phenomena - Bodes law – Elongation – Sidereal period, synodic period and the relation between them – Phase of a planet– stationary points – Solar system – Stellar universe – A brief history of Astronomy – Astronomical Instruments.

TEXT BOOK

Astronomy for degree classes by Prof. S. Kumaravelu and Prof. Susheela Kumaravelu –Rainbow Printers, Nagercoil (2005).

UNIT I : Chapters I, II & III

UNIT II   : Chapters IV, V, VIII & IX

UNIT III   : Chapters VI & VII

UNIT IV   : Chapters XII & XIII

UNIT V   :   Chapters XIV, XV, XVI, XVII & XVIII

REFERENCE BOOKS :

1.Ramachandran . G.V- Astronomy

2. George .O.Abell- Exploration of the Universe (Second Edition)

Hours: 2 /W 30 /Sem

Course Code:U22GEM1B   **Credits: 2**

Title of the Paper:MATHEMATICAL MODELING

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	5	3	-	1	1

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Understand models	1	15
CO2. Develop models in medicine	2	15
CO3. Explain models through differential equations	3	15
CO4. Explain models through difference equations	4	15
CO5. Understand models through graphs	5	15

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	3	3	4	5	2	3	3	4	4	3.3
CO2	3	3	4	2	2	3	3	4	4	4	3.2
CO3	3	3	4	4	3	3	4	4	4	4	3.6
CO4	2	2	3	3	3	4	4	3	3	3	3.0
CO5	3	3	4	4	3	3	2	2	2	2	2.8

Overall Mean Score : 3.2

Hours: 2 /W 30 /Sem

Course Code:U22GEM1B   **Credits: 2**

Title of the Paper:MATHEMATICAL MODELING

UNIT I

Mathematical modeling through Ordinary differential Equations (First Order) - Linear growth and Decay models – Non linear growth and Decay models – Compartment models – Dynamics problems – Geometrical problems.

UNIT II

Population Dynamics – Epidemics - Compartment models – Economics, medicine, Arms Race, Battles and International Trade.

UNIT III

Mathematical modeling through Ordinary differential Equations (Second Order) - Planetary motion – circular motion – Motion of satellites – Modeling through Linear difference equations of second order.

UNIT IV

Mathematical modeling through Difference Equations - Basic theory of difference equation with constant coefficients – Economics and finance – Population Dynamics and Genetics – Probability theory.

UNIT V

Modeling through Graphs - Solutions that can be modelled through graphs – Models in terms of directed graphs – Signed graphs weighted digraphs and unoriented graphs.

REFERENCES

1. J.N. Kapur – Treatment as in "Mathematical Modeling" by J.N. Kapur - New age International Publishers, 2004.
2. J.N. Kapur – Mathematical Modeling in Biology and Medicine – East Singh – Mathematical Modeling, International Book House – 2003.

APPLICATION OF MATHEMATICS IN INSURANCE

Hours: 2/W 30hrs/Sem   **Credits: 2**

	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
Pedagogy	5	3	-	1	1

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Understand fundamentals	1	
CO2. Demonstrate benefits to the society	2	
CO3. Understand the premium for all periods	3	
CO4. Finds the claim	4	
CO5.Understands the claim models	5	

course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	3	3	4	5	2	3	3	4	4	3.3
CO2	3	3	4	2	2	3	3	4	4	4	3.2
CO3	3	3	4	4	3	3	4	4	4	4	3.6
CO4	2	2	3	3	3	4	4	3	3	3	3.0
CO5	3	3	4	4	3	3	3	2	2	2	2.8

Overall Mean Score : 3.2

APPLICATION OF MATHEMATICS IN INSURANCE

Hours: 2/W 30hrs/Sem   **Credits: 2**

UNIT I

Insurance Fundamentals – Insurance defined - Meaning of loss - Chances of loss, peril, hazard and proximate cause in Insurance.

UNIT II

Costs and benefits of insurance to the society and branches of insurance – life insurance and various types of general insurance -   Insurable loss exposures feature of a loss that is ideal for insurance.

UNIT III

Life insurance Mathematics – Construction of Mortality Tables - Computation of premium of Life Insurance for a fixed duration and for the whole life.

UNIT IV

Determination of claims for General Insurance – Using Poisson Distribution and Negative Binomial Distribution – The Polya case.

UNIT V

Determination of the amount of claims in General Insurance – Compound Aggregate claim model and its properties and claims of reinsurance function F – recursive and approximate formulae for F.

TEXT BOOK

Sheldon M. Ross, "An Introduction to Mathematical Finance", Cambridge University Press.

SKILL ENHANCEMENT COURSES

CourseCode:U22SEM1   **Hours:2/W 30hrs/Sem**

Title of the Paper: **Credits: 2**

MATHEMATICAL APTITUDE FOR COMPETITIVE EXAMS

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	2	2			-

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Recall LCM and HCF of numbers,BODMAS Rule and learn to do simplifications and find average.	1	
CO2. Analyse Profit and Loss, find percentage , illustrate ratio and proportion and solve partnership problems.	2	
CO3. Relate Time and Work , Pipes and cisterns , Time and distance , Problems on Trains,boats and streams ,Alligation or Mixtures and solve problems	3	
CO4.Distinguish Simple interest & Compound Interest and demonstrate Area , Volume and surface area.	4	
CO5. Analyse Odd man out and series , apply Data interpretation do Tabulation and draw Bar graphs Pie charts , Line graphs	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	

CO1	3	3	2	3	3	2	3	2	3	2	2.6
CO2	2	3	4	3	2	3	3	3	2	3	2.8
CO3	2	4	3	3	3	3	3	2	4	4	3.1
CO4	2	4	3	4	4	3	4	3	3	3	3.4
CO5	2	3	3	3	3	3	4	3	4	3	3.1

Overall Mean Score: 3.0

SEMESTER IV

CourseCode:U22SEM1   **Hours:2/W 30hrs/Sem**

Title of the Paper: **Credits: 2**

MATHEMATICAL APTITUDE FOR COMPETITIVE EXAMS

UNIT I

Numbers – HCF and LCM of numbers - Decimal Fractions – Simplification - Average.

UNIT II

Percentage - Profit and Loss - Ratio and Proportion - Partnership.

UNIT III

Time and Work - Pipes and cisterns - Time and distance - Problems on Trains-boats and streams - Alligation or Mixtures.

UNIT IV

Simple interest - Compound Interest – Area - Volume and surface area.

UNIT V

Odd man out and series - Data interpretation- Tabulation - Bar graphs - Pie charts - Line graphs.

TEXT BOOK

Quantitative Aptitude for competitive examinations by Dr. R.S.Aggarwal (3rdEdn) Published by S.Chand

UNIT I	:	Chapters 1,2,3,4,6
UNIT II	:	Chapters 10-13
UNIT III	:	Chapters 15-20
UNIT IV	:	Chapters 21,22,24,25
UNIT V	:	Chapters 35-39

SEMESTER V

CourseCode:U22SEM2   **Hours:2/W 30hrs/Sem**

Title of the Paper:Laplace Transform and Fourier Transform   **Credits: 2**

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	2	2			-

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Find the Laplace Transform of some standard functions	1	
CO2. Find the Inverse Laplace of functions	2	
CO3. Apply the Laplace Transform to solve the linear differential equations and simultaneous linear differential equations	3	
CO4. Define the Fourier Transform and explain some properties	4	
CO5. Evaluate Fourier sine transform ,cosine transform of functions	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	4	4.5	4.5	4	3	3.5	4	3.5	4	3.9
CO2	4	4	4.5	4.5	4.5	3.5	4	3	4	4	4.0
CO3	4.5	4.5	4	4	4	4	4	3.5	3	3.5	3.9
CO4	4	3.5	4	3	3	3.5	3.5	3.5	3	3	3.4
CO5	3.5	4	3	3	4	3	4	3	3.5	4	3.5

Over all Mean Score : 3.74

SEMESTER V

CourseCode:U22SEM2   **Hours:2/W 30hrs/Sem**

Title of the Paper:Laplace Transform and Fourier Transform   Credits: 2

UNIT I

Laplace Transform – Definition – Laplace transforms of e^{ax}, cosax, sinax, coshax, sinhax, x^n, $e^{ax} f(x)$, $x^n f(x)$, $f^n(x)$, n is a positive integer.

UNIT II

Inverse Laplace transform – Definition - Inverse Laplace transform of standard functions.

UNIT III

Applications of Laplace transform – Solutions of differential equations of second order with constant co-efficient and simultaneous equations using Laplace transform

UNIT IV

Fourier transforms – Sine and Cosine transforms – Properties – Inversion theorem - Sine and Cosine transforms – Convolution theorem.

UNIT V

Parseval's identity – Infinite Fourier Cosine Transform and Sine Transform -Transform of derivatives.

TEXT BOOKS

TB1.   Differential equations and its applications by Dr. S. Arumugam and

   A.Thanga Pandi Issac, New Gamma Publishing house, Palayamkottai.

TB2.   Engineering Mathematics, P. Kandasamy, K.Thilagavathy and

   K.Gunavathy. (Vol. III), S. Chand and Co., Ltd.

UNIT I   :   TB1 Chapter 3 Section 1

UNIT II   :   TB1 Chapter 3 Section 2

UNIT III   :   TB1 Chapter 3 Section 3

UNIT IV   :   TB2 Chapter 4

UNIT V   :   TB2 Chapter 4

REFERENCE BOOKS:

1. Laplace Transformations by Gorain

2. Laplace Transformations by –Schaum's

3. Laplace Transformation and Fourier Transformation by Arvind Garg
.

CourseCode:U22SEM3   **Hours:2/W 30hrs/Sem**

Title of the Paper: OPTIMIZATION TECHNIQUES   **Credits: 2**

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	2	2			-

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Analyse and solve sequencing Problems	1	
CO2. Demonstrate Queuing Theory and Classify Queuing Models .	2	
CO3. Distinguish Single server models with finite capacity and infinite capacity, derive their characteristics and solve problems	3	
CO4. Analyse Birth and Death Process and derive its Characteristics	4	
CO5. Distinguish multi server models with finite capacity and infinite capacity, derive their characteristics and solve problems	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	3	3	3	3	4	3	3	3	3.0
CO2	3	4	2	2	3	3	3	3	3	3	2.9
CO3	4	3	3	2	3	3	3	3	3	3	3.0
CO4	4	4	3	2	3	3	2	3	3	3	3.0
CO5	3	4	3	2	3	3	4	3	3	3	3.1

Overall Mean Score: 3.0

SEMESTER V

CourseCode:U22SEM3   **Hours:2/W 30hrs/Sem**

Title of the Paper: OPTIMIZATION TECHNIQUES   **Credits: 2**

UNIT I

Sequencing Problem:Introduction – Problem of Sequencing - Basic terms – Processing n jobs through 2 machines - Processing n jobs through k machines

UNIT II

Queueing Theory - Introduction – Elements of Queueing System – Classification of Queueing Models – Model I $\{(M/M/1):(\infty/FIFO)\}$

UNIT III

Model II $\{(M/M/1):(\infty/SIRO)\}$ and Model III $\{(M/M/1):(N/FIFO)\}$

UNIT IV

Model IV (Generalized Model: Birth-Death Process)

UNIT V

Model V $\{(M/M/C):(\infty/FIFO)\}$ and Model VI $\{(M/M/C):(N/FIFO)\}$

TEXT BOOK

Operations Research by Kanti Swarup, P.K.Gupta and Manmohan, Sultan Chand & Sons, ninth edition.

UNIT I: Chapter 12: Sections : 12.1 to 12.5

UNIT II,III, IV & V: Chapter 20: Sections 20.1 to 20.3, 20.6 and 20.8

SEMESTER- VI

Hours: 2 /W 30hrs/Sem

Credits: 2

Title of the Paper: HISTORY OF MATHEMATICS- I

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	2	2			-

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1 Recall Mathematics in ancientcivilizations.	1	
CO2 Recognize Thales's Mathematical School, Pythogoras, Zeno and Eudoxus.	2	
CO3 Recognize Appollonius and Archemides.	3	

CO4 Classify the History of Indo - Arabic Numerals and Sulbastras.	4	
CO5 Memorize Indian Mathematicians.	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	4	4	4	4	3	4	4	4	3	3.7
CO2	4	4	4	4	4	4	4	4	4	4	4.0
CO3	4	3	4	3	4	4	3	4	4	4	3.7
CO4	4	4	4	4	4	3	4	4	4	3	3.8
CO5	4	3	4	4	4	4	4	4	4	4	3.9

Overall Mean Score : 3.82

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SEMESTER- VI

HISTORY OF MATHEMATICS- I

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Hours: 2 /W 30hrs/Sem   **Credits: 2**

UNIT I   Mathematics in Ancient Civilizations

Babylonian Mathematics - Egyptian Mathematics - Chineese Mathematics - Mathematics in IndusValley.

UNIT II

Introduction - Thales's Mathematical School – Pythograss – Zeno - Eudoxus

UNIT III

Euclid - Appollonius –Archemides

UNIT IV Indian Mathematics

The History of Indo - Arabic Numerals - Sulbastras

UNIT V

Aryabhatta- Varahamitra - Bhaskaracharya etc.

TEXT BOOK

Mactutor History of Mathematics www-history, mcs.st-andrews.ac.uk

HISTORY OF MATHEMATICS II

Hours:2/w 30/sem   **Credits: 2**

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	2	2			-

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1 RecognizeEuropean Mathematics.	1	
CO2 IdentifyNapier, Descartes, Fermat and Pascal.	2	
CO3 RecognizeNewton, Leibnitz and Bernoullis	3	
CO4 IdentifyEuler, Lagrange, Fourier, Gauss and Abel.	4	
CO5 MemorizeGalois, Cauchy, Cayley, Cantor and Others.	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	4	4	4	4	3	4	4	4	3	3.7
CO2	4	4	3	4	4	4	4	4	3	4	3.8
CO3	3	4	4	4	4	3	4	4	4	3	3.7
CO4	4	4	3	4	4	4	4	4	3	4	3.8
CO5	4	3	4	4	4	4	4	4	4	4	3.9

Overall Mean Score : 3.78

HISTORY OF MATHEMATICS --II

Lecture hours: 2   **Credits: 2**

UNIT I   European Mathematics

Factors aiding progress of Mathematics in Europe - Fibonacci – Cardan – Ferrari– Theory of equations – Coppernicus – Galileo – Kepler.

UNIT II

Napier – Descartes - Fermat – Pascal.

UNIT III

Newton – Leibnitz – Bernoullis

UNIT IV

Euler – Lagrange – Fourier – Gauss – Abel.

UNIT V

Galois – Cauchy – Cayley – Cantor – Others.

TEXT BOOK

Mactutor History of Mathematics www-history, mcs,st-andrews.ac.uk.

COMBINATORIAL MATHEMATICS

Hours:2/w 30/sem   **Credits: 2**

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	2	2			-

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Recall the concepts permutation and combination and solve problems .	1	
CO2. Demonstrate generating function .	2	
CO3. Describe Recurrence relation and solve problems by the technique of generating functions.	3	
CO4. Analyse and classify principles of inclusion and exclusion.	4	
CO5. Explain permutations with Restrictions on Relative positions.	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	4	3	4	4	3	4	3	4	3	3.6
CO2	3	4	4	4	4	3	3	3	4	3	3.5
CO3	3	4	3	4	4	3	3	4	4	4	3.6
CO4	3	4	3	4	4	3	4	3	4	3	3.5
CO5	3	4	3	4	4	3	4	3	4	4	3.6

Overall Mean Score: 3.56

COMBINATORIAL MATHEMATICS

Lecture Hours :2   **Credit:2**

UNIT I
Permutations and Combinations**:** Introduction - The Rules of Sum and Product – Permutations – Combinations -Distribution of Distinct Objects – Distribution of Nondistinct Objects.

UNIT II
Generating Functions**:**
Introduction - Generating Functions of Combinations - Enumerators for Permutations - Distributions of Distinct Objects into Nondistinct Cells - Partition of Integers.

UNIT III
Recurrence Relation**:**
Introduction - Linear Recurrence Relation with Constant Coefficients - Solution by the Technique of Generating Functions.

UNITIV
The Principles of Inclusion and Exclusion**:**
Introduction - The Principle of Inclusion and Exclusion - The General Formula -Derangements - Permutations with Restrictions on Relative Positions.

UNITV
Stirling's Formula, The Ferrers Graph, The Rook Polinomials,Permutations with Forbidden positions.

TEXT BOOK
 C.L.Liu –Introduction to Combinatorial Mathematics, McGraw – Hill Book company.

UNIT I   :Chapter1,Sections 1.1 to 1.6

UNIT II : Chapter 2,Sections 2.1 to 2.5

UNIT III : Chapter 3, Sections 3.1 to 3.3

UNIT IV : Chapter 4,Sections4.1 to 4.5

UNIT V :Sections 1.7, 2.6, 4.6, 4.7

BOOKS FOR REFERRENCE

1.Santha.S – Discrete mathematics with Combinatorics and Graph theory
   cangage Learning

2.J.K.Sharma – Discrete Mathematics,MACMILLAN.

NON MAJOR ELECTIVES

Hours:2/w 30/sem

Course Code:U22NMM1   **Credits:2**

Title of the paper:QUANTITATIVE APTITUDE FOR COMPETITIVE EXAMINATIONS

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	2	2	-	-	-

Course Outcomes On completing this course the student will be able to	Unit
CO1. Recall H.C.F,LCM,decimal fractions and simplifications	1
CO2. Understand, determine and apply the concept of average and percentage.	2
CO3. Clasiffy profit and loss,Ratio and Propositions.	3
CO4. Sketch the ability of partnership, Time and work.	4
CO5. Demonstrate the knowledge of Simple and Compound intrest.	5

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	3	3	3	2	3	3	3	2	2.7
CO2	3	3	3	2	3	2	3	2	3	2	2.6
CO3	3	3	2	3	3	2	3	3	3	2	2.7
CO4	3	2	3	2	3	3	2	3	3	2	2.6
CO5	3	3	2	3	3	2	3	3	3	1	2.6

Overall Mean Score : 2.64

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SEMESTER III

Hours:2/w 30/sem

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Course Code:U22NMM1   **Credits:2**

Title of the paper:QUANTITATIVE APTITUDE FOR COMPETITIVE EXAMINATIONS

UNIT I

> H.C.F and L.C.M of Numbers, Decimal Fractions and Simplification.

UNIT II

> Average and Percentage.

UNIT III

> Profit and Loss, Ratio and Proportion.

UNIT IV

> Partnership, Time and work.

UNIT V

> Simple Interest, Compound Interest.

TEXT BOOK

Quantitative Aptitude for Competitive Examinations by R.S.Aggarwal published by S. Chand (Seventh Revised Edition).

UNIT I: Chapters 2,3and 4

UNIT II: Chapters 6 and 10

UNIT III: Chapters 11 and 12

UNIT IV :   Chapters 13 and 15

UNIT V: Chapters 21 and 22

Course Code:U22NMM2   **Credits:2**

Title of the paper: DATA INTERPRETATION AND REASONING

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	2	2			-

Course Outcomes On completing this course the student will be able to	Unit
CO1 List the Logical Venn Diagrams and Mathematical Operations.	1
CO2 Explain Arithmetic Reasoning,Series.	2
CO3.Recognize about Tabulations.	3
CO4 Demonstrate the concept of Pie Charts.	4
CO5.Sketch the Bar graphs and Line graphs.	5

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	3	3	3	3	2	3	3	2	2.7
CO2	3	2	3	2	3	3	2	3	3	2	2.6
CO3	3	2	3	3	3	2	2	3	3	2	2.6
CO4	3	2	3	3	3	3	2	3	3	2	2.7
CO5	3	3	2	3	3	3	3	3	3	2	2.8

Overall Mean Score : 2.68

Course Code:U22NMM2   **Credits:2**

Title of the paper: DATA INTERPRETATION AND REASONING

UNIT I

Logical Venn Diagrams – Mathematical Operations

UNIT II

Arithmetical Reasoning– Series

UNIT III

Tabulation

UNIT IV

Pie Charts

UNIT V

Bar graphs and Line graphs

TEXT BOOKS

1. A Modern Approach to Verbal & Non-Verbal Reasoning by Dr. R.S.Aggarwal,
     published by Sultan Chand & Company Ltd.

2. Quantitative Aptitude for Competitive Examinations by R.S.Aggarwal, published by Sultan Chand &   Company Ltd.(7th edition)

UNIT I   : TB.1 – Section I– General Mental Ability –Chapters 9 and 13

UNIT II : TB.1 – Section I– General Mental Ability – Chapter 15

 Part II – Non-verbal Reasoning – Chapter 1

UNIT III: TB.2 – Section II – Data Interpretation –Chapter 36

UNIT IV: TB.2 – Section II – Data Interpretation –Chapter 38

UNIT V : TB.2 –Section II – Data Interpretation – Chapter 37 and 39

NON-MAJOR ELECTIVE

Hours: 2 /W 30hrs/Sem   Credits: 2

Title of the Paper: MODERN ALGEBRA FOR PHYSICAL SCIENCES

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	2	2	-	-	-

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Students will have a working knowledge of important mathematical concepts in abstract algebra such as definition of a group, permutation group and subgroups	1	15
CO2. Students will be knowledgeable of different types of subgroups such as Cyclic subgroups, Normal subgroups, quotient groups and understand the structure and characteristics of these subgroups	2	15
CO3. Write precise and accurate mathematical definition of objects in Ring Theory	3	15
CO4. Understand subrings, Ideals and Integral domain	4	15
CO5. Demonstrate theorems about Euclidean domains PIDs and UFDs	5	15

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2.5	2	3	2.5	1.5	4	2	3	3	2.6
CO2	3	2	3	2.5	2	2	4	2	2.5	3	2.6
CO3	3	3	2	3	2.5	1.5	4	2.5	2	3	2.65
CO4	3	2.5	2	1.5	2	2	4	1.5	3	2	2.35
CO5	3	3	1.5	2.5	3.5	2	4	2.5	3	2.5	2.75

Overall Mean Score : 2.59

NON MAJOR ELECTIVE

Lecture hours: 2   Credit: 2

Title of the Paper: MODERN ALGEBRA FOR PHYSICAL SCIENCES

UNIT I

Matrices – Rank of a matrix – Elementary transformations

UNIT II

Simultaneous linear equations – Matrix form of a set of linear equations

UNIT III

Cayley Hamilton theorem – Eigen values – Eigen vectors.

UNIT IV

Groups – Definition and examples – Elementary properties of a group – Equivalent definitions of a group – Permutation groups – Subgroups – Cyclic groups.

UNIT V

Isomorphism – Homomorphism

TEXT BOOK

Ancillary Mathematics – Volume III (Revised) by Dr.S.Arumugam and Issac, New Gamma Publishing House, Palayamkottai.

UNIT I : Chapter 7: Section: 7.1

UNIT II : Chapter 7: Section: 7.2

UNIT III : Chapter 7 : Sections: 7.3 and 7.4

UNIT IV : Chapter 8: Sections: 8.1 – 8.6

UNIT V : Chapter 8: Sections: 8.10 – 8.11

LINEAR PROGRAMMING

Lecture hours: 2   **Credit:2**

UNIT I

Formulation of Linear Programming Problem

UNIT II

Solution of Linear Progarmming Problem: Graphical method

UNIT III

Solution of Linear Progarmming Problem: Simplex method

UNIT IV

Solution of Linear Progarmming Problem: Big M method

UNIT V

Solution of Linear Progarmming Problem: Two phase method

TEXT BOOK

Linear Programming by Dr. S. Arumugam and Prof. A.ThangapandiIssac, New Gamma Publishing House, Palyamkottai

UNIT I: Chapter 3 : Section: 3.1
UNIT II: Chapter 3 : Section : 3.4
UNIT III: Chapter 3 : Section : 3.5
UNIT IV: Chapter 3 : Section: 3.6
UNIT V: Chapter 3 : Section: 3.7

OPTIMIZATION TECHNIQUES – I

Lecture hours : 2   **Credit : 2**

UNIT I Assignment Problem

Introduction – Mathematical Formulation of the Problem – Solution Methods of Assignment Problem.

UNIT II Games and Strategies

Introduction – Two- person Zero- Sum Games – Some Basic Terms – The Maxmin – Minimax Principle – Games Without Saddle Points – Mixed Strategies

UNIT III   Games and Strategies

Graphic Solution of $2 \times n$ and $m \times 2$ Games

UNIT IV Replacement Problem and System Reliability

Introduction - Replacement of Equipment / Asset that Deteriorates Gradually

UNIT V Network Scheduling by PERT/CPM

Introduction – Network: Basic Components – Logical Sequencing - Rules of Network Construction – Critical Path Analysis.

TEXT BOOK

Operations Research by Kanti Swarup, P.K. Gupta and Manmohan, Sultan Chand and Sons, New Delhi, Fifteenth Edition

UNIT I : Chapter 11 : Section 11.1 to 11.3
UNIT II   : Chapter 17 : Section 17.1 to 17.5
UNIT III   : Chapter 17 : Section 17.6
UNIT IV   : Chapter 18 : Section 18.1 & 18.2
UNIT V   :   Chapter 25 : Section 25.1 to 25.4 and 25.6

OPTIMIZATION TECHNIQUES -II

Lecture hours: 2   **Credit: 2**

UNIT I Transportation Problem

Introduction – Linear Programming Formulation of the Transportation Problem – Existence of Solution in T. P. –Duality in Transportation Problem – The Transportaion Table –Loops in Transportaion Tables – Solution of a Transportation Problem – Finding an Initial Basic Feasible Solution.

UNIT IITransportaion Problem

Test for Optimality – Degeneracy in Transportation Problem – Transportation Algorithm (MODI Method).

UNIT IIISequencing Problem

Introduction – Problem of Sequencing - Basic Terms Used in Sequencing – Processing *n* Jobs through 2 Machines – Processing *n*Jobs through *k* Machines.

UNIT IVQueuing Theory

Introduction – Queuing System - Elements of a Queuing System – Classification of Queuing Models – Definition of Transient and Steady States –Poisson queuing systems –- Model I $(M/M/1):(\infty/FIFO)$.

UNIT VQueuing Theory

Poisson queuing systems – Queuing Model III $(M/M/1):(N/FIFO)$.

TEXT BOOK

Operations Research by Kanti Swarup, P.K.Gupta and Manmohan, Sultan Chand & sons, Fifteenth Edition.

UNIT I   :   Chapter 10 : Sections: 10.1 – 10.6 and 10.8-10.9

UNIT II   :   Chapter 10 : Sections: 10.10, 10.12 and 10.13

UNIT III   :   Chapter 12: Sections: 12.1 – 12.5

UNIT IV   :   Chapter 21 : Sections: 21.1 – 21.3, 21.7, 21.8 and 21.9(Model I only)

UNIT V   :   Chapter 21: Section : 21.9(Model III only)

ALLIED COURSES

FOR

B.Sc.PHYSICS

Course Code:U22AMP1   **Credits:3**

Title of the paper:Allied Mathematics Paper -1

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	3	3	-	-	-

Course Outcomes On completing this course the student will be able to	Unit	
CO1. Analyse the Binomial series	1	
CO2. Understand and apply the concept of Exponential & Logarithm series	2	
CO3. Get clean concept of Relation between roots and coeffients	3	
CO4. Demonstrate the techniques of Newton's and Horner's method	4	
CO5: Solve the problems related to Radius& Center of curvature	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	5	4	4	4	3.5	3.5	3.5	4.5	4	4	4
CO2	4	4.5	4.5	4	4	4	4	4	4	4	4.1
CO3	4.5	4.5	4	4	4	4	4	4	4	4	4.1
CO4	4	4	4	4	4	4	4	4	4	4	4
CO5	4.5	4.5	4.5	4.5	4.5	a4.5	4.5	4.5	4.5	4.5	4.5

Overall Mean Score : 4.14

Course Code:U22AMP1   **Credits:3**

Title of the paper:Allied Mathematics Paper -1

UNIT I : ALGEBRA

   Binomial series

UNIT II : ALGEBRA

Exponential series - Logarithmic series.

UNIT III : ALGEBRA

Theory of equations - Formation of equations – Relation between roots and co-efficients –
Reciprocal Equations.

UNIT IV : ALGEBRA

Transformation of equations – Newton's and Horner's method of finding roots upto 2 decimals.

UNIT V : CALCULUS

   Radius of curvature – Centre of curvature.

TEXT BOOK
   Ancillary Mathematics Paper - I by Dr. S. Arumugam and Isaac.
UNIT I   : Chapter 5
UNIT II : Chapter 6 and 7.
UNIT III : Chapter 8 (Section 8.1 to 8.3)
UNIT IV : Chapter 8 (Sections 8.4 and 8.5)
UNIT V : Chapter 2

Course Code:U22AMP2   **Credits:3**

Title of the paper:Allied Mathematics Paper -II

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	4	4	-	-	-

Course Outcomes On completing this course the student will be able to	Unit	
CO1. Understand the Hyperbolic functions and Logarthiam of complex number	1	
CO2. Analysis the properties of definite integral	2	
CO3. Acquire a goodfoundation in Differential equation of first order	3	
CO4. Get Clear Concepts of second order equations and solve the problem	4	
CO5: Demonstrate the techniques of partialdifferential equations	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	5	4	4	4	3.5	3.5	3.5	4.5	4	4	4
CO2	4	4.5	4.5	4	4	4	4	4	4	4	4.1
CO3	4.5	4.5	4	4	4	4	4	4	4	4	4.1
CO4	4	4	4	4	4	4	4	4	4	4	4
CO5	4.5	4.5	4.5	4.5	4.5	a4.5	4.5	4.5	4.5	4.5	4.5

Overall Mean Score : 4.14

Course Code:U22AMP2   **Credits:3**

Title of the paper:Allied Mathematics Paper -II

UNIT I   TRIGONOMETRY

Expansions – Hyperbolic functions – Logarithm of complex number.

UNIT II   CALCULUS

Definite integrals – Reduction formulae for $\sin^n x$, $\cos^n x$, $\tan^n x$, $\operatorname{cosec}^n x$, $\sec^n x$, $\cot^n x$.

UNIT III   DIFFERENTIAL EQUATIONS AND PARTIAL DIFFERENTIAL EQUATIONS

Differential equations of first order.

UNIT IV   DIFFERENTIAL EQUATIONS AND PARTIAL DIFFERENTIAL EQUATIONS

Second order equations with RHS of the form X^n, e^{ax}, $\sin bx$, $\cos bx$, $e^{ax}\sin bx$, $e^{ax}\cos bx$, $e^{ax}x^n$.

UNIT V   DIFFERENTIAL EQUATIONS AND PARTIAL DIFFERENTIAL EQUATIONS

Partial differential Equations – Formation – Solutions : standard form $Pp + Qq = R$.

TEXT BOOK

TB 1 : Ancillary Mathematics Paper - I by Dr. S. Arumugam and Isaac.
TB 2 : Ancillary Mathematics Paper - II by Dr. S. Arumugam and Isaac.
TB 3: Ancillary Mathematics Paper - III by Dr. S. Arumugam and Isaac.
UNIT I: TB 1 : Chapter 9, 10 and 11.
UNIT II: TB 2 : Chapter 1 (Section 1.1 to 1.4)
UNIT III: TB 3 : Chapter 1 (Section 1.2)
UNIT IV :   TB 3 : Chapter 1 (Section 1.3)
UNIT V: TB 3 : Chapter 3 (Sections 3.1 and 3.2)

Course Code:U22AMP3   **Credits:4**

Title of the paper:Allied Mathematics Paper -III

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	7	7	-	-	-

Course Outcomes On completing this course the student will be able to	Unit
CO1. Find the Gradiant ,Curl and Divergence of a function	1
CO2. Evaluate line integral and surface integral	2
CO3.Understand the concept of Lplace Transform and inverse Laplace Transform	3
CO4. Calculate correation coefficient and Index numbers	4
CO5: Compute Fourier,Cosine and Sine Series	5

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	5	4	4	4	3.5	3.5	3.5	4.5	4	4	4
CO2	4	4.5	4.5	4	4	4	4	4	4	4	4.1
CO3	4.5	4.5	4	4	4	4	4	4	4	4	4.1
CO4	4	4	4	4	4	4	4	4	4	4	4
CO5	4.5	4.5	4.5	4.5	4.5	a4.5	4.5	4.5	4.5	4.5	4.5

Overall Mean Score : 4.14

Course Code:U22AMP3 **Credits:4**

Title of the paper:Allied Mathematics Paper -III

UNIT I VECTOR DIFFERENTIATION

Differentiation of vectors – Velocity – Acceleration – Gradient – Divegence and curl .

UNIT II VECTOR INTEGRATION

Line and surface integrals – Line integral – Surface Integral – Green, Gauss and Stokes theorems (without proof).

UNIT III DIFFERENTIAL EQUATION

Laplace transform – Inverse Laplace Transform – Solution of Differential equation using Laplace transform.

UNIT IV STATISTICS

Correlation and Rank Correlation – Interpolation – Lagrange and Newton's methods – Index numbers.

UNIT V CALCULUS

Fourier series – The Cosine and Sine series .

TEXT BOOK

TB 1 : Ancillary Mathematics Paper II (Revised) by Dr. S. Arumugam and Isaac.
TB 2 : Ancillary Mathematics Paper III (Revised) by Dr. S. Arumugam and Isaac.
UNIT I : TB 1: Chapter 1
UNIT II : TB 1: Chapter 2
UNIT III : TB 1: Chapter 5
UNIT IV : TB 2: Chapter 3, Chapter 4 (Sections 4.1 and 4.2), Chapter 6.
UNIT V : TB 2: Chapter 9

ALLIED COURSES

FOR

B.Sc.CHEMISTRY

Course Code:U22AMC1   **Credits:3**

Title of the paper: ALGEBRA & TRIGONOMETRY

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	4	4	-	-	-

Course Outcomes On completing this course the student will be able to	Unit
CO1. Analyse the Binomial series	1
CO2. Understand and apply the concept of Exponential & Logarithm series	2
CO3. Get clean concept of Relation between roots and coeffients	3
CO4. Demonstrate the techniques of Newton's and Horner's method	4
CO5: Solve the problems related to Radius& Center of curvature CO1. Understand the Hyperbolic functions and Logarthiam of complex number	5

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	5	4	4	4	3.5	3.5	3.5	4.5	4	4	4
CO2	4	4.5	4.5	4	4	4	4	4	4	4	4.1
CO3	4.5	4.5	4	4	4	4	4	4	4	4	4.1
CO4	4	4	4	4	4	4	4	4	4	4	4
CO5	4.5	4.5	4.5	4.5	4.5	a4.5	4.5	4.5	4.5	4.5	4.5

Overall Mean Score : 4.14

Course Code:U22AMC1   **Credits:3**

Title of the paper: ALGEBRA & TRIGONOMETRY

UNIT I : ALGEBRA

   Binomial series

UNIT II : ALGEBRA

Exponential series - Logarithmic series.

UNIT III : ALGEBRA

Theory of equations - Formation of equations – Relation between roots and co-efficients – Reciprocal Equations.

UNIT IV : ALGEBRA

Transformation of equations – Newton's and Horner's method of finding roots upto 2 decimals.

UNIT V: TRIGONOMETRY

   Expansions – Hyperbolic functions – Logarithm of complex number.

TEXT BOOK
   Ancillary Mathematics Paper - I by Dr. S. Arumugam and Isaac.
UNIT I   : Chapter 5
UNIT II : Chapter 6 and 7.
UNIT III : Chapter 8 (Section 8.1 to 8.3)
UNIT IV : Chapter 8 (Sections 8.4 and 8.5)
UNIT V : Chapter 2

SEMESTER III

Course Code: U22AMC2

Hours: 3 /W 45 /Sem
Credits: 3

Title of the Paper:CALCULUS

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	3	3	-	-	-

Course Outcomes On completing this course the student will be able to	Unit
CO5: Solve the problems related to Radius& Center of curvature	1
CO2. Analysis the properties of definite integral	2
CO3. Acquire a goodfoundation in Differential equation of first order	3
CO4. Get Clear Concepts of second order equations and solve the problem	4
CO5: Demonstrate the techniques of partialdifferential equations	5

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	5	4	4	4	3.5	3.5	3.5	4.5	4	4	4
CO2	4	4.5	4.5	4	4	4	4	4	4	4	4.1
CO3	4.5	4.5	4	4	4	4	4	4	4	4	4.1
CO4	4	4	4	4	4	4	4	4	4	4	4
CO5	4.5	4.5	4.5	4.5	4.5	a4.5	4.5	4.5	4.5	4.5	4.5

Overall Mean Score : 4.14

Hours: 3 /W 45 /Sem

Course Code: U22AMC2   **Credits: 3**

Title of the Paper:CALCULUS

UNIT I   CALCULUS

   Radius of curvature – Center of Curvature

UNIT II   CALCULUS

   Definite integrals – Reduction formulae for $\sin^n x$, $\cos^n x$, $\tan^n x$, $\cosec^n x$, $\sec^n x$, $\cot^n x$.

UNIT III   DIFFERENTIAL EQUATIONS
       Differential equations of first order.

UNIT IV   DIFFERENTIAL EQUATIONS

   Second order equations with RHS of the form X^n, e^{ax}, $\sin bx$, $\cos bx$, $e^{ax}\sin bx$, $e^{ax}\cos bx$, $e^{ax}x^n$.

UNIT V   DIFFERENTIAL EQUATIONS AND PARTIAL DIFFERENTIAL EQUATIONS

Partial differential Equations – Formation – Solutions : standard form $Pp + Qq = R$.

TEXT BOOK

TB 1 : Ancillary Mathematics Paper - I by Dr. S. Arumugam and Isaac.
TB 2 : Ancillary Mathematics Paper - II by Dr. S. Arumugam and Isaac.
TB 3: Ancillary Mathematics Paper - III by Dr. S. Arumugam and Isaac.
UNIT I: TB 1 : Chapter 9, 10 and 11.
UNIT II: TB 2 : Chapter 1 (Section 1.1 to 1.4)
UNIT III: TB 3 : Chapter 1 (Section 1.2)
UNIT IV : TB 3 : Chapter 1 (Section 1.3)
UNIT V: TB 3 : Chapter 3 (Sections 3.1 and 3.2)

Hours: 7/W 105 /Sem

Course Code: U22AMC3   **Credits: 4**

Title of the Paper:APPLICATIONS OF MATHEMATICS.

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	7	7	-	-	-

Course Outcomes On completing this course the student will be able to	Unit
CO1. Calculate correation coefficient and Index numbers	1
CO2: Compute Fourier,Cosine and Sine Series	2
CO3. Find the Gradiant ,Curl and Divergence of a function	3
CO4. Evaluate line integral and surface integral	4
CO5.Understand the concept of Lplace Transform and inverse Laplace Transform	5

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	5	4	4	4	3.5	3.5	3.5	4.5	4	4	4
CO2	4	4.5	4.5	4	4	4	4	4	4	4	4.1
CO3	4.5	4.5	4	4	4	4	4	4	4	4	4.1
CO4	4	4	4	4	4	4	4	4	4	4	4
CO5	4.5	4.5	4.5	4.5	4.5	a4.5	4.5	4.5	4.5	4.5	4.5

Overall Mean Score : 4.14

Hours: 7/W 105 /Sem

Course Code: U22AMC3   **Credits: 4**
Title of the Paper: APPLICATIONS OF MATHEMATICS.

UNIT I   STATISTICS

Correlation and Rank Correlation – Interpolation – Lagrange and Newton's methods – Index numbers.

UNIT II   CALCULUS

   Fourier series – The Cosine and Sine series **.**

UNIT III   VECTOR DIFFERENTIATION

   Differentiation of vectors – Velocity – Acceleration – Gradient – Divegence and curl .

UNIT IV   VECTOR INTEGRATION

   Line and surface integrals – Line integral – Surface Integral – Green, Gauss and Stokes theorems (without proof).

UNIT V   DIFFERENTIAL EQUATION

   Laplace transform – Inverse Laplace Transform – Solution of Differential equation using Laplace transform.

TEXT BOOK

TB 1 : Ancillary Mathematics Paper II (Revised) by Dr. S. Arumugam and Isaac.
TB 2 : Ancillary Mathematics Paper III (Revised) by Dr. S. Arumugam and Isaac.
UNIT I   : TB 1:   Chapter 1
UNIT II   : TB 1:   Chapter 2
UNIT III   : TB 1:   Chapter 5
UNIT IV   : TB 2:   Chapter 3, Chapter 4 (Sections 4.1 and 4.2), Chapter 6.
UNIT V : TB 2:   Chapter 9

VALUE ADDED COURSES

Logical Reasoning

Hours:2/w 30/sem   Credits:2

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	2	2	-	-	-

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Acquire knowledge to complete a series.	1	
CO2. Learn about Classification, Coding, decoding and Blood relation	2	
CO3. Understand the Puzzle test, seating arrangements, Direction sense test and Ranking Test.	3	
CO4. Gain the knowledge of Data sufficiency, Statement-Argument and Assumptions	4	
CO5. Acquire knowledge to complete the incomplete pattern, Figure Matrix, cube and dice.	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3.5	4	3.5	2.5	4	3	3	4	4	4.5	3.6
CO2	3	4	3	2.5	4	3	3	4	4	4.5	3.5
CO3	3	4	3	2.5	4	3	3	4	4	4.5	3.5
CO4	3	4	3	2.5	4	3	3	4	4	4.5	3.5
CO5	4	4	3	2.5	4	3	3	4	4	4.5	3.6

Overall Mean Score : 3.54

LOGICAL REASONING

Lecture Hours :2   Credits : 2

UNIT I

Series completion, Analogy

UNIT II

 Classification, Coding- Decoding, Blood Relation

UNIT III

Puzzle test-seating arrangements, Direction sense test, Ranking Test

UNIT IV

Data sufficiency ,   Statement- Arguments and Assumptions

UNIT V

 Completion of incomplete pattern, Figure Matrix , cubes and dice

TEXT BOOKS

 A Modern Approach to Verbal and Non- Verbal Reasoning by R.S.Aggarwal, published by
Sulthan Chand and Company Ltd.
UNIT I : Section 1- General Mental Ability- Chapter 1,2
UNIT II :   Section 1 – General Mental Ability – Chapter 3,4,5
UNIT III : Section 1 – General Mental Ability Chapter - 6,8,12
UNIT IV: Section 1- General Mental Ability Chapter - 17 and
          Section II – Logical Deduction Chapter- 2, 3
UNIT V : Non Verbal Reasoning - Chapter 8,9,14

<div align="center">**Value Added Course**

HISTORY OF MATHEMATICS</div>

Lecture Hours : 2   **Credits : 2**

UNIT I Early Number Systems and Symbols

Primitive Counting - Number Recording of the Egyptians and Greeks - Number Recording of the Babylonians.

UNIT II Mathematics in Early Civilizations

Egyptian Arithmetic - BabylonianMathematics.

UNIT III The Beginnings of GreekMathematics

Pythagorean Mathematics- Zeno's Paradox-The Pythagorean Problem

UNIT IV Ancient Indian Mathematics

Indian Mathematics-Indian Numerals-Indian Sulbasutras.

UNIT V Indian Mathematicians

Aryabhata I, Aryabhata II, Bhaskara I, Bhaskara II, Bhaskaracharya, Brahmagupta and Ramanujan.

TEXT BOOK:

Burton, David M. The History of Mathematics: An Introduction. McGraw Hill: 1997.

References:

1. Eves, Howard, An Introduction to the History of Mathematics, Saunders, 1990, ISBN 0-03-029558-0

2. Heath, Sir Thomas (1981), A History of Greek Mathematics, Dover. ISBN 0-486-24073-8.

3. Katz, Victor J, A History of Mathematics: An Introduction, 2nd Edition. Addison-Wesley: 1998.

4. Katz, Victor J., ed. (2007), The Mathematics of Egypt, Mesopotamia, China, India, and Islam: A Sourcebook. Princeton, NJ: Princeton University Press, 685 pages, pp 385-514. ISBN 0-691-11485-4.

5. Suzuki, Jeff,A History of Mathematics, SaddleRiver, N.J.: Prentice-Hall, 2002.

6. mathshistory.st-andrews.ac.uk

Value Added Course

Hours:2/w 30/sem

Course Code: Credit : 2

Title of the Paper:PROBLEM SOLVING

Pedagogy	Hours/W	Lecture	Peer Teaching	GD/Tutorial/Videos	ICT
	2	2	-	-	-

Course Outcomes On completing this course the student will be able to	Unit	Hrs/S
CO1. Demonstrate and solve Problems on numbers.	1	
CO2. Identify Problems on Ages and solve problems using chain rule .	2	
CO3. Analyse and apply the formulae to solve problems on Pipes and Cistern and Problems on Trains.	3	
CO4. Describe the problems on Calendar , Distinguish Permutations and combinations and solve problems	4	
CO5. Identify Heights and Distance and solve Odd man out and Series.	5	

Course Outcomes	Programme Outcomes					Programme Specific Outcomes					Mean Score
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	4	4	3	4	4	3	4	3	4	3	3.6
CO2	3	4	4	4	4	3	3	3	4	3	3.5
CO3	3	4	3	4	4	3	3	3	4	3	3.4
CO4	3	4	3	4	4	3	4	3	4	3	3.5
CO5	3	4	3	4	4	3	3	3	4	4	3.5

Overall Mean Score: 3.5

Hours:2/w 30/sem

Course Code: **Credit : 2**

Title of the Paper:PROBLEM SOLVING

UNIT I
        Problems on numbers .

UNIT II
        Problems on Ages, Chain Rule.

UNIT III
        Pipes and Cistern, Problems on Trains

UNIT IV
        Calendar, Permutations and Combinations.

UNIT V
        Heights and Distances, Odd Man Out and Series.

REFERENCE BOOK :
Quantitative Aptitude by Dr.S.Aggarwal, S.Chand&Company LTD.,
New Delhi,2010.

UNIT I   : Arithmetical Ability – Chapter 7
UNIT II : Arithmetical Ability – Chapter 8,14.
UNIT III : Arithmetical Ability – Chapter 16,18.
UNIT IV : Arithmetical Ability – Chapter 27,30.
UNIT V : Arithmetical Ability – Chapter 34,35.