Sri Kaliswari College (Autonomous), Sivakasi

(Affiliated to Madurai Kamaraj University,

Re-Accredited with 'A' grade (CGPA 3.30) by NAAC)

Programme Scheme, Scheme of Examinations and Syllabi

(For those who join from June 2018 and afterwards)

Department of Mathematics

UG Programme – B.Sc. (Mathematics)

Curriculum Design and Development Cell

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

B.Sc. Mathematics (Semester) – (2018-2021)

Objectives, Outcomes, Regulations

Programme Objectives:

- To introduce basics in Mathematics.
- To improve analytical skills.
- To introduce and develop abstract concepts in Mathematics.
- To prepare the students for logical thinking.
- To equip the students with mathematical tools that has applications in various fields.
- To give a better exposure to face the competitive exams.

Programme Outcomes (PO):

Knowledge

PO 1: Well grounded knowledge in chosen subjects.

PO 2: Updated knowledge related to the subjects.

Skills

PO 1: Acquisition of cognitive skills

PO 2: Acquisition of Life Skills for Employment.

Attitude

PO 1: Holistic Personality Development through Self-directed and lifelong learning.

PO 2: Eco Sensitivity, inclusive culture, moral uprightless and social commitment.

Programme Specific Outcomes:

- Solve complex problems by critical understanding, formulate and develop analysis and synthesis mathematical arguments in a logical manner.
- Develop students' ability in problem solving and in applying the mathematical knowledge acquired so that they will be able to function effectively and responsibly in their daily lives.
- Provide a systematic understanding of the concepts and theories of mathematics and enhance career prospects in a huge array of fields.
- Become successful professionals by demonstrating logical and analytical thinking.

Duration of the Programme: Three years (Equivalent to six semesters)

Eligibility:

Candidate should have passed the Higher Secondary Examinations conducted by the Board of Higher Secondary Education, Government of Tamilnadu or any other Examinations accepted by the Syndicate of the Madurai Kamaraj University as its equivalent.

Medium of Instruction : English

Age Limit:

Max age limit : 21 years

Age Relaxation:

SC/ST/BC/MBC/DNC & Women : 3 years age relaxation

Differently Abled Students : 5 years age relaxation

Transitory Permission:

Students joined from 2018 to 2021 may be permitted to write their examinations in this pattern up to April 2026.

Sri Kaliswari College (Autonomous), Sivakasi
Choice Based Credit System
Department of Mathematics
UG Programme – B.Sc.
2018 - 2021
Scheme of Examination/ Question Paper Pattern

Theory Examination

The Internal and External marks should be allotted in the ratio 25:75.

Internal Marks:

i. Test : 15 Marks (Average of the best two tests out of three)
ii. Assignment : 5 Marks (Average of two)
iii. Seminar / Quiz : 5 Marks
Total : 25 Marks

External Question Paper Pattern:

Time: 3 Hours Max .Marks:75

The question paper for external exam will have three parts.

Part – A (10 x 1 = 10)

Question No.1 to 10 – All are Multiple choices - Two Questions from each unit.

Part – B (5 x 7 = 35)

(Choosing either (a) or (b) pattern – Alternative Choice - One Question from each unit.)

Question No. 11. (a) or 11. (b) – From Unit I
12. (a) or 12. (b) – From Unit II
13. (a) or 13. (b) – From Unit III
14. (a) or 14. (b) – From Unit IV
15. (a) or 15. (b) – From Unit V

Part – C (3 x 10 = 30)

Answer any three out of five. (One Question from each unit)
Question No.16 – 20.

16 - From Unit I
17 - From Unit II
18 – From Unit III
19 – From Unit IV
20 – From Unit V

Blue Print of the Question Paper:

Component / Unit	**Knowledge**			**Understanding**			**Higher Objective**			**Total Marks**
	PART A	PART B	PART C	PART A	PART B	PART C	PART A	PART B	PART C	
UNIT I	**1**(1) **2**(1)				**11a**(7)	**16**(10)		**11b**(7)		26
UNIT II	**3**(1) **4**(1)	**12a**(7)				**17**(10)		**12b**(7)		26
UNIT III	**6**(1)	**13a**(7)			**13b**(7)		**5**(1)		**18**(10)	26
UNIT IV	**8**(1)		**19**(10)		**14a**(7) **14b**(7)		**7**(1)			26

UNIT V	**9**(1) **10**(1)	**15a**(7)			**15b**(7)	**20**(10)				26
Total	8	21	10		35	30	2	14	10	130

-
- Knowledge based - 30 %
- Understanding - 50 %
- Higher Objective (Applications and Skill based) - 20 %

Practical Examination(Computer)

Internal Marks:

i. Average of two tests : 30 Marks
ii. Record Work : 5 Marks
iii. Lab Performance : 5 Marks
` **Total** **: 40 Marks**

External Marks:

i. Aim, Procedure / Algorithm and Program : 15 Marks
ii. Coding and Compilation : 10 Marks
iii. Debugging : 15 Marks
iv. Results : 10 Marks
v. Viva : 10 Marks
Total **: 60 Marks**

Practical Examination (Non - Computer)

Internal Marks:

i. Regular Practicals : 30 Marks
ii. Record Work : 10 Marks
` **Total** **: 40 Marks**

External Marks:

Practicals : 60 Marks

Sri Kaliswari College(Autonomous), Sivakasi

Department of Mathematics

Choice Based Credit System-Curriculum Structure

UG Programme - B.Sc Mathematics

2018 - 2021

Part	Courses	Sem I	Sem II	Sem III	Sem IV	Sem V	Sem VI	Total Credits
I	Tamil/Hindi	6(3)	6(3)	6(3)	6(3)	-	-	12
II	General English	6(3)	6(3)	6(3)	6(3)	-	-	12
III	Core Courses	Foundation Course - 4(3) 4(4)	4(4) 4(4)	4(4) 4(4)	4(4) 4(4)	5(5) 5(5) 5(5) 5(5)	5(5) 5(5) 5(5) 5(5)	71
	Allied Courses	4(3) 2P(-)	4(3) 2P(2+2)	4(4) 2P(1)	4(4) 2P(1)	-	-	20
	Major Elective Courses	-	-	-	4(3)	4(3)	4(3)	9
IV	Non-Major Elective Courses	2(1)	2(1)	-	-	-	-	2
	Skill Based Courses	-	-	2(2)	-	2(1) 2(1)	2(2)	6
	Value Based Courses	-	-	2(1)	-	-	2(1)	2
	Enrichment Courses	2(1)	2(1)	-	-	-	-	2

	Value Education	**-**	**-**	**-**	**-**	**1(1)**	**-**	**1**
	Disaster Management	**-**	**-**	**-**	**-**	**1(1)**	**-**	**1**
	Environmental Studies	**-**	**-**	**-**	**-**	**-**	**2(1)**	**1**
V	**Extension**				**(1)**			**1**
Total hours (per week)		**30**	**30**	**30**	**30**	**30**	**30**	**140** **180**

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

Choice Based Credit System - Curriculum Pattern

UG Programme - B.Sc Mathematics

2018 - 2021

Semester	Part	Course Code	Course Name	Hours	Credits
I	I	18UTAL11	**Tamil/Hindi - I**	6	3
	II	18UENL11	**General English - I**	6	3
	III	18UMAC11	**Core Course -I:**		
			Foundation Course-Basic Mathematics	4	3
		18UMAC12	**Core Course -II:**		
			Calculus and its Applications	4	4
			Allied Course - I:		
		18UMAA11	Physics-I Theory	4	3
			Practical	2	-
	IV	18UMAN11	**Non-Major Elective Course - I:**		
			Fundamentals of Mathematics	2	1
		18UMAE1P	**Enrichment Course-I:**		
			PC Software Lab	2	1
			Total	**30**	**18**
II	I	18UTAL21	**Tamil/Hindi – II**	6	3
	II	18UENL21	**General English – II**	6	3
	III	18UMAC21	**Core Course -III:**		

			Classical Algebra	4	4
		18UMAC22	**Core Course -IV:**		
			Analytical Geometry-3D	4	4
		18UMAA21	**Allied Course-II:**		
			Physics-II Theory	4	3
		18UMAA2P	Practical	2	2+2
	IV	18UMAN21	**Non-Major Elective Course-II:**		
			Statistical Methods	2	1
		18UMAE21	**Enrichment Course-II:**		
			Astronomy	2	1
			Total	**30**	**23**
III	I	18UTAL31	**Tamil/Hindi – III**	6	3
	II	18UENL31	**General English – III**	6	3
	III	18UMAC31	**Core Course -V:**		
			Sequences and Series	4	4
		18UMAC32	**Core Course -VI:**		
			Numerical Methods	4	4
			Allied Course-III:		
		18UMAA31	Programming in C and C++	4	4
		18UMAA3P	Programming in C and C++ Lab	2	1
	IV	18UMAS31	**Skill Based Course-I:**		
			Trigonometry	2	2
		18UMAV31	**Value Based Course-I:**		

			Data Interpretation	2	1
			Total	**30**	**22**
IV	I	18UTAL41	**Tamil/Hindi – IV**	6	3
	II	18UENL41	**General English-IV**	6	3
	III	18UMAC41	**Core Course -VII:**		
			Mechanics	4	4
		18UMAC42	**Core Course -VIII:**		
			Differential Equations and its Applications	4	4
			Allied Course-IV:		
		18UMAA41	Multimedia and its Applications	4	4
		18UMAA4P	Multimedia Lab	2	1
			Major Elective Course-I:	4	3
		18UMAO41	1. Vector Calculus		
		18UMAO42	2. Consumer Affairs		
		18UMAO43	3. Discrete Mathematics		
	V		**Extension**	-	1
			Total	**30**	**23**
V	III	18UMAC51	**Core Course -IX:**		
			Modern Algebra	5	5
		18UMAC52	**Core-X**:		
			Real Analysis	5	5
		18UMAC53	**Core Course -XI:**		
			Operations Research	5	5
		18UMAC54	**Core Course -XII:**		

			Mathematical Statistics I	5	5
			Major Elective Course-II:	4	3
		18UMAO51	1. Laplace Transforms and Fourier Series		
		18UMAO52	2.Introduction to Fractals		
		18UMAO53	3. Fuzzy Sets and Logic		
	IV	18UMAS51	**Skill Based Course-II:**		
			Transform Techniques	2	1
		18UMAS52	**Skill Based Course-III:**		
			Quantitative Aptitude	2	1
		18UVED51	**Value Education**	1	1
		18UDMG51	**Disaster Management**	1	1
			Total	**30**	**27**
VI	III	18UMAC61	**Core Course -XIII:**		
			Linear Algebra	5	5
		18UMAC62	**Core Course -XIV:**		
			Complex Analysis	5	5
		18UMAC63	**Core Course -XV:**		
			Graph Theory	5	5
		18UMAC64	**Core Course -XVI:**		
			Mathematical Statistics II	5	5
			Major Elective Course-III:	4	3
		18UMAO61	1.Mathematical Modeling		
		18UMAO62	2.Stochastic Processes		

		18UMAO63	3.Optimization Techniques		
	IV	18UMAS61	**Skill Based Course-IV:**		
			Lattices and Boolean Algebra	2	2
		18UMAV6P	**Value Based Course-II:**		
			HTML Lab	2	1
		18UESR61	**Environmental Studies**	2	1
			Total	**30**	**27**

Semester	**I**	**II**	**III**	**IV**	**V**	**VI**	**Total**
Credits	**18**	**23**	**22**	**23**	**27**	**27**	**140**

Sri Kaliswari College (Autonomous), Sivakasi
Department of Mathematics
UG Programme – B.Sc
Semester I
(2018 – 2021)
Core Course – I: Foundation Course – Basic Mathematics (18UMAC11)
(For those who join from June 2018 and afterwards)

Credits : 3 **Int. Marks : 25**
Hours/Week : 4 **Ext. Marks : 75**
Duration : 60 hrs **Max. Marks : 100**

Course Objectives:

- To introduce different branches needed for B.Sc. Mathematics.
- To prepare the students to successfully compete both for career and for higher studies.

Course Outcomes:

1. Calculate derivatives of functions defined implicitly.
2. Calculate a definite integral as a limit of approximating sums.
3. Develop skill in two dimensional spaces.
4. Able to find the distance between two points.
5. Able to find the centroid, incentre of the triangle.
6. Know basic concepts of Sets, Functions and Relations.

UNIT I **(12 hrs)**

Differentiation: Differentiability – Algebra of Derivatives – Derivatives of Some Standard Functions Without Proof – The Chain Rule for Differentiation – Differentiation of Inverse Function – Differentiation by Transformation – Logarithmic Differentiation – Differentiation of Functions Represented in terms of a Parameter – Differentiation of Function with respect to Function – Differentiation of Implicit Functions – Higher Derivatives.

UNIT II **(12 hrs)**

Evaluation of Integrals: Some Simple Integrals – Method of Substitution – Integration of Rational Functions – Integration of Irrational Functions – Integration of Trigonometric Functions.

UNIT III **(12 hrs)**

Coordinates: Rectangular Co-ordinates – Distance between Two Points – The Co-ordinates of the Point Dividing the Line Joining Two Given Points in a Given Ratio – Area of a Triangle whose Vertices are Known.

UNIT IV **(12 hrs)**

Straight Line: Equation of the Straight Line Passing Through Two Given Points – Equation of a Straight Line in terms of the Intercepts it Makes on the Axes – The Equation $Ax+By+C=0$ will always represent a Straight Line – Several forms for the Equation of a Straight Line – Other Forms of the Equation of a Straight Line – Point of Intersection of Two Straight

Lines – Angle between Two Straight Lines – Equation of a Line Through the Point of Intersection of Two Given Lines.

UNIT V **(12 hrs)**

Theory of Sets: The Concept of a Set – Set Inclusion **–** Union of Sets – Intersection of Sets – Difference of Sets – Complement of a Set – Symmetric Difference of Two Sets – Cartesian Product of Sets. **Relations and Mappings:** Relations – Equivalence Relations – Partial Order – Functions – Binary Operations.

Text Books:

1. Dr.S.Arumugam and Mr.A.Thangapandi Issac, "Calculus",New Gamma Publishing House,Palayamkottai, 2014.
2. T.K.Manicavachagom Pillay, T.Natarajan, "Analytical Geometry 2D", S.Viswanathan (Printers and Publishers), Pvt., Ltd., Chennai , 2002.
3. Dr.S.Arumugam and Mr.A.Thangapandi Issac, "Modern Algebra",New Gamma Publishing House, Palayamkottai, 2008.

Unit	Text Book No.	Chapter	Section	Page No.
I	1	Part I – 2	2.1 –2.11	16 – 48
II	1	Part II – 2	2.1 – 2.5	326 – 362
III	2	1	1 – 4	5 – 16
IV	2	2	1,2,5 – 10	20 – 24, 26 – 51
V	3	1	1.1 – 1.8	1.1 – 1.13
		2	2.1 – 2.5	2.1 – 2.18

Reference Books:

1. S.Narayanan, T.K.Manicavachagom Pillay, "Calculus", S.Viswanathan (Printers and Publishers), Pvt.,Ltd., Chennai, 2000.
2. Dr.Arup Mukherjee, Dr.Naba Kumar Bej, "Analytical Geometry", Books and Allied (P) Ltd, Kolkatta, 2015.

Sri Kaliswari College (Autonomous), Sivakasi
Department of Mathematics
UG Programme – B.Sc
Semester I
(2018-2021)
Core Course – II: Calculus and its Applications (18UMAC12)
(For those who join from June 2018 and afterwards)

Credits : 4 **Int.Marks : 25**
Hours/Week : 4 **Ext.Marks : 75**
Duration : 60 hrs **Max.Marks : 100**

Course Objectives:

- To know more about differentiation and integration.
- To study application of differentiation such as maxima and minima of functions finding asymptotes for a curve.
- To study about reduction formulae.
- To know about the functions defined in terms of some improper integrals.

Course Outcomes:

1. Understand the concept of differentiation.
2. Find the higher derivatives.
3. Gain an in-depth knowledge of partial differentiation using Euler's theorem.
4. Find critical points, and use them to locate maxima and minima.
5. Use the derivative to find tangent lines to curves.
6. Equip with the basic knowledge of integration.
7. Learn about the beta and gamma functions and its properties.

UNIT I (12 hrs)

Differentiation: n^{th} Derivative of Some Standard Functions – Leibnitz Theorem - Partial Differentiation – Homogeneous Function and Euler's Theorem.

UNIT II **(12 hrs)**

Applications of Differentiation: Tangent and Normal - Polar Curves – Pedal Equations of a Curve – Curvature.

UNIT III **(12 hrs)**

Evolutes – Envelopes – Maxima and Minima of Functions of Two Variables.

UNIT IV **(12 hrs)**

Asymptotes – Methods of Finding Asymptotes for the Curve y = f(x) – Methods of Finding Asymptotes for the Curve f(x, y) =0 – Asymptotes Parallel to the Axes for an Algebraic Curve f(x, y) =0 of Degree n.

UNIT V **(12 hrs)**

Evaluation of Integrals: Reduction Formulae – Reduction Formula for
$\int x^n e^{ax} dx$, $\int x^n cosaxdx$, $\int sin^n xdx$, $\int tan^n xdx$, $\int cot^n xdx$, $\int sec^n xdx$,

$\int cosec^n xdx, \int sin^m xcos^n xdx$.**Beta and Gamma Functions:** Beta and Gamma Functions – Properties and Results Involving Beta and Gamma Functions.

Text Book :

Dr.S.Arumugam ,Mr.A.Thangapandi Isaac, "Calculus", New Gamma Publishing House, Palayamkottai , 2014.

Unit	Chapter	Section	Page No.
I	Part I – Chapter 2	2.12 – 2.15	54-90
II	Part I – Chapter 3	3.1 – 3.4	91-143
III	Part I – Chapter 3	3.5 – 3.7	144-179
IV	Part I – Chapter 3	3.11	219-248
V	Part II – Chapter 2	2.8	381-396
	Part II –Chapter 4	4.1	440-456

Reference Books :

1. S.Narayanan,T.K.Manickavachagam Pillai, "Calculus Volume I", S.Viswanathan (Printers and Publishers) Pvt. Ltd, 2000.
2. S.Narayanan,T.K.Manickavachagam Pillai, "Calculus Volume II ", S.Viswanathan (Printers and Publishers) Pvt. Ltd, 17th Edition, 2002.

Sri Kaliswari College (Autonomous), Sivakasi
Department of Mathematics
UG Programme
Semester I
(2018 – 2021)

Non - Major Elective Course - I: Fundamentals of Mathematics (18UMAN11)
(For those who join from June 2018 and afterwards)

Credit : 1 **Int. Marks : 25**
Hours / Week : 2 **Ext. Marks : 75**
Duration : 30 hrs **Max. Marks : 100**

Course Objectives:

- To study about real number system.
- To know about the basic concepts of sets and matrices.
- To know more about differentiation.

Course Outcomes :

1. Able to find LCM and HCF of numbers.
2. Able to solve applications involving permutations and combinations.
3. Use sets and/or Venn diagrams to solve a stated problem.
4. Learn the differentiation rules for products, quotients and the chain rule.
5. Find critical points, and use them to locate maxima and minima.

Eligibility: Any student from any programme can be admitted.

UNIT I **(6 hrs)**

Introduction: The Real Number System – Constant – Variable – Least Common Multiple (L.C.M) and Highest Common Factor (H.C.F) – Simple Operations. **Permutations and Combinations:** Factorial Notation – Fundamental Principle – Permutations – Circular Permutations – Combinations.

UNIT II **(6 hrs)**

Set Theory: Meaning – Definition – Notation – Representation of a Set – Forms of Sets - Set Operations – Venn Diagrams – Ordered Pairs – Cartesian Product.

UNIT III **(6 hrs)**

Matrices: Meaning - Notations – Basic Concepts - Types of Matrices – Algebra of Matrices.

UNIT IV **(6 hrs)**

Differential Calculus: Meaning – Differential Calculus of One Variable – Rules of Differentiation – Polynomial Function Rule – Constant Function Rule – Linear Function Rule – Addition Rule – Subtraction Rule – Product Rule – Quotient Rule – Chain Rule – Parametric Function Rule – Implicit Function Rule – Inverse Function Rule – Derivative of a Derivative – Exponential Function Rule – Logarithmic Function Rule – The Derivative of Trigonometric Functions.

UNIT V **(6 hrs)**

Maxima and Minima - Maxima and Minima of One Variable – Conditions for Maxima and Minima.

Text Book:

Dr.D.Bose, "An Introduction to Mathematical Methods", Himalaya Publishing House, New Delhi, First Edition, 2009.

Unit	Chapter	Page No.
I	1	3 -16
	4	159 - 170
II	8	321 – 343
III	9	346 – 364
IV	6	182 – 201
V	6	212 - 218

Reference Books :

1. M.Manoharan and C.Elango, "Business Mathematics", Palani Paramount Publication, Palani, 2001.
2. Dr.S.Arumugam and Mr.A.Thangapandi Isaac, "Calculus", New Gamma Publishing House, Palayamkottai, 2014.

Sri Kaliswari College (Autonomous) – Sivakasi
Department of Mathematics
UG Programme – B.Sc.
Semester – I
(2018 – 2021)
Enrichment Course - I: PC Software Lab (18UMAE1P)
(For those who join from June 2018 and afterwards)

Credit : 1 **Int.Mark : 40**
Hours/Week : 2 **Ext.Mark : 60**
Duration : 30 hrs **Max.Mark : 100**

Course Objectives:

- To gain the knowledge of Ms-office.
- To learn concept of Ms- Excel.
- To know about MS – PowerPoint.

Course Outcomes:

1. Give the basic knowledge on MS word.
2. Design the creation of newspaper format with header & footer.
3. Learn how to do Mail Merge practically.
4. Provide the ability to understand Excel functions.
5. Learn the better skills to effectively use Power point for presentation.

MS- WORD

1. To prepare business letter.
2. Preparing Time table using table properties.
3. To Create Mail-merge application for sending mail into many recipient.
4. Design a Company advertisement using header and footer.
5. To wrapping text in news paper format using dropcap.

MS-EXCEL

6. To apply various statistical excel function.
7. To prepare student mark statement with chart.
8. To Calculate Employee salary.
9. To prepare sales report.

MS – POWER POINT

10. To Create advertisement using various slides presentation.
11. To preparing a lecturer presentation.
12. To apply business presentation and changing the slide layout .

Sri Kaliswari College (Autonomous), Sivakasi
Department of Mathematics
UG Programme – B.Sc
Semester II
(2018-2021)
Core Course – III: Classical Algebra (18UMAC21)
(For those who join from June 2018 and afterwards)

Credits : 4 **Int.Marks : 25**
Hours/Week : 4 **Ext.Marks : 75**
Duration : 60 hrs **Max.Marks : 100**

Course Objectives:

- To learn about numbers ,like prime numbers and composite numbers.
- To study about congruence.
- To solve problems which has fascinated to professional and amateur mathematicians.
- To find the solution of equations.
- To know more about transformation of equations.
- To find the roots of cubic and biquadratic equations.

Course Outcomes:

1. Understand the basic knowledge of numbers and its types.
2. Introduce the notion of Euler's function.
3. Get in insight into divisibility using Fermat's Theorem and generalized Fermat's Theorem.
4. Learn about the characterization of prime numbers using Wilson's theorem.
5. Learn the concept of rational roots, irrational roots , imaginary roots and the relation between the roots and coefficient of the equations.

6. Gain knowledge of removal of terms using theorems like Rolle's theorem and strum's theorem.
7. Find the roots of biquadratic and cubic equations by using Cardon's method.

UNIT I **(12 hrs)**

Theory of Numbers: Divisibility in Z - Division Algorithm – Prime Numbers – Sieve of Eratosthenes.

UNIT II **(12 hrs)**

Congruences – Linear Congruence – Simultaneous Congruences – Euler's Function – Some Theorems on Congruences.

UNIT III **(12 hrs)**

Theory of Equations: Formation of Equations – Reciprocal Equations.

UNIT IV **(12hrs)**

Transformation of Equations – Formation of the Equation whose Roots are k times the Roots of f(x)= 0 – Formation of the Equation whose Roots are Diminished by h - Removal of terms – Multiple Roots.

UNIT V **(12hrs)**

Nature and Position of Roots - Rolles' Theorem – Strum's Theorem – Cubic Equations - Approximate Solutions of Numerical Equations.

Text book:

Dr. S. Arumugam and A. Thangapandi Issac, "Classical Algebra", New Gamma Publishing House, Palayamkottai, 2003.

Unit	Section	Page No.
I	Part A : Section 2.1	2.1-2.29
II	Part A : Section 3.1 – 3.5	3.1-3.37
III	Part C : Section 5.1 - 5.4	5.01-5.56
IV	Part C : Section 5.5 – 5.6	5.56-5.72
V	Part C : Section 5.7 – 5.8, 5.10	5.74-5.99,5.103-5.112

Reference Books :

1. T.K.ManicavachagomPillay, T. Natarajan and K.S. Ganapathy, "Algebra– Volume II", S. Viswanathan Printers and Publishers Pvt.Ltd.,2006.

2. Dr.S.Arumugam and Mr.A.Thangapandi Isaac, " Theory of Eqauations, Theory of Numbers and Trigonometry", New Gamma Publishing House, Palayamkottai, 2011.

Sri Kaliswari College (Autonomous), Sivakasi
Department of Mathematics
UG Programme – B.Sc
Semester II
(2018 – 2021)

Core Course – IV: Analytical Geometry – 3D (18UMAC22)

(For those who join from June 2018 and afterwards)

Credits : 4 **Int. Marks : 25**
Hours/Week : 4 **Ext. Marks : 75**
Duration : 60 hrs **Max. Marks : 100**

Course Objectives:

- To extend analytical geometry of 2D in a natural way to analytical geometry of 3D.
- To know the application of algebraic methods to the study of curves and surfaces that lie in three dimensional spaces.
- To improve analytical skills.

Course Outcomes:

1. Define and represent geometrical shapes in a numerical way and extracting numerical information from shapes' numerical definitions and representations.

2. Enable the students to develop their skill in 3 dimensional Cartesian Co-ordinates system.
3. Learn the properties of straight lines and spheres.
4. Derive the conditions for parallelism and perpendicularity of two lines.

UNIT I **(12 hrs)**

Coordinate System: Rectangular Cartesian Coordinates – Distance between Two Points – Direction Cosines. **Planes:** Equation of a Plane – Angle between Two Planes.

UNIT II **(12 hrs)**

Angle Bisectors of Two Planes. **Straight Lines:** Equation of a Straight Line.

UNIT III **(12 hrs)**

A Plane and a Line – Equations of Two Skew Lines in a Simple Form.

UNIT IV **(12 hrs)**

The Intersection of Three Planes – Volume of a Tetrahedron. **Sphere:** Equation of a Sphere.

UNIT V **(12 hrs)**

Tangent Line and Tangent Plane – Section of a Sphere

Text Book:

Dr.S.Arumugam and Mr.A.Thangapandi Issac, "Analytical Geometry 3D,Vector Calculus and Trigonometry", New Gamma Publishing House, Palayamkottai, 2014.

Unit	Chapter	Section	Page No.
I	1	1.1 –1.3	1.1 – 1.18
	2	2.1, 2.2	2.1 – 2.8
II	2	2.3	2.8 – 2.21
	3	3.1	3.1 – 3.9
III	3	3.2, 3.3	3.11 – 3.28, 3.32 - 3.37
IV	3	3.4, 3.5	3.37 – 3.56
	4	4.1	4.1 – 4.3
V	4	4.2, 4.3	4.3 – 4.21

Reference Books:

1. Dr.Arup Mukherjee, Dr.Naba Kumar Bej, “Analytical Geometry”, Books and Allied (P) Ltd, Kolkatta, 2015.

2. T.K.Manicavachagom Pillay, T.Natarajan, “Analytical Geometry 3D”, S.Viswanathan (Printers and Publishers), Pvt.,Ltd., Chennai, 2000.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme

Semester II

(2018 – 2021)

Non - Major Elective Course - II : Statistical Methods (18UMAN21)

(For those who join from June 2018 and afterwards)

Credit : 1 **Int. Marks : 25**
Hours / Week : 2 **Ext. Marks : 75**
Duration : 30 hrs **Max. Marks : 100**

Course Objectives:

- To introduce statistical constants measures of central tendency, dispersion.
- To study the quantitative and qualitative characteristics of a missing data.

Course Outcomes:

1. Enable the students to understand the meaning, definition, nature, importance and limitations of statistics.
2. Able to create, read, and interpret graphs, charts, histograms, and diagrams.
3. Explain the relevance and use of statistical tools for analysis and forecasting.
4. Understand and use the basic measure of central tendency.
5. Know about the concept of Index numbers.

Eligibility: Any student from any programme can be admitted.

UNIT I **(6 hrs)**

Frequency Distribution: Collection of Data - Classification of Data - Class Intervals and Frequency Distribution - Frequency Curve and Cumulative Frequency Curve.

UNIT II **(6 hrs)**

Central Tendencies: Arithmetic Mean - Partition Values (Median, Quartiles, Deciles and Percentiles) - Mode - Geometric Mean and Harmonic Mean.

UNIT III **(6 hrs)**

Measures of Dispersion: Measures of Dispersion – Range - Quartile Deviation - Mean Deviation - Standard Deviation.

UNIT IV **(6 hrs)**

Index Numbers: Index Number – Consumer Price Index Numbers.

UNIT V **(6 hrs)**

Interpolation: Newton’s Formula - Lagrange`s Formula.

Text Book:

Dr.S.Arumugam and Mr.A.Thangapandi Isaac, “Statistics”, New Gamma Publishing House, Palayamkottai, 2009.

Unit	Chapter	Section	Page No.
I	1	1.1 – 1.4	1 – 9

II	2	2.1 – 2.4	12 – 56
III	3	3.1	60 – 76
IV	9	9.1 , 9.2	229 – 252
V	7	7.2 and 7.3	173 – 194

Reference Books :

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

2. S.P.Gupta, “Statistical Methods”, Sultan Chand and Sons, New Delhi, Fortieth Revised Edition, 2011.

Sri Kaliswari College (Autonomous), Sivakasi
Department of Mathematics
UG Programme - B.Sc
Semester II
(2018-2021)
Enrichment Course – II: Astronomy (18UMAE21)
(For those who join from June 2018 and afterwards)

Credit : 1 **Int. Marks : 25**
Hours/ Week: 2 **Ext. Marks : 75**
Duration : 30 hrs **Max. Marks : 100**

Course Objectives:

- To introduce the students to space science.
- To study about duration of day and night time and different system of co-ordinates.
- To know about the changes in the azimuth of a star in the course of a day.

Course Outcomes:

1. Achieve a good understanding of physical laws and principles.
2. Appreciate the wide variety of objects contained in the universe.
3. Understand the relative sizes of the planets within the solar system.
4. Use Mathematics to perform calculations on earth and / or space science problems.
5. Make observations regarding the earth or space and infer conclusions from them.
6. Describe and explain the observed daily and long-term motion of objects (sun, moon, planets and stars).

UNIT I **(6 hrs)**

Spherical Trigonometry: Sphere – Theorem "The Section of a Sphere by a Plane is a Circle" – Great Circles and Small Circles – Axis and Poles of a Circle – Distance between Two Points on a Sphere – Angle between Two Circles – Secondaries – Angular Radius or Spherical Radius – Theorems i) The Points of Intersection of Two Great Circles are the Poles of the Great Circles joining their Poles (**without Proof**) (ii) The Angle between Two Great Circles is the Angle between the Tangents to the Circles at a Point of Intersection (**without Proof**) (iii) The Length of an Arc of a Small Circle is Equal to the Corresponding Arc on the Parallel Great Circle Multiplied by the Sine of its Spherical Radius (**without Proof**) – Spherical Figures - Spherical Triangle – Polar Triangle – Theorem "If $A'B'C'$ is the Polar Triangle of ABC then ABC is the Polar Triangle of $A'B'C'$" – Relation between the Elements of a Spherical Triangle and its

Polar Triangle – Some Properties of Spherical Triangles (**without proof**) – Principle of Duality - Colunar and Antipodal Triangles – Relations between the Sides and Angles of a Spherical Triangle – Cosine Formula – Sine Formula – Cotangent Formula – Supplemental Cosine Formula.

UNIT II **(6 hrs)**

Five Parts Formula – Functions of Half an Angle – Functions of Half a Side – Delambre's Analogies - Napier's Analogies – Right Angled Spherical Triangle – Theorem in Right Angled Spherical Triangle - Napier's Rules – Spherical Co-ordinates – Relations between the Spherical and Rectangular Co-ordinate (**without Proof**) – Worked Examples.

UNIT III **(6 hrs)**

Celestial Sphere, Diurnal Motion: Astronomy – Celestial Sphere – Diurnal Motion, Celestial Axis and Equator - Celestial Horizon – Zenith and Nadir – Celestial Meridian – Cardinal Points – Northern and Southern Hemispheres – Eastern and Western Hemispheres – Visible and Invisible Hemispheres – Declination Circles – Verticals – Parallactic Angle – Rising and Setting - Transit or Culmination – Due East and Due West – Due South and Due North – Annual Motion of the Sun, Ecliptic, Obliquity – First Point of Aries and First Point of Libra – Equinoxes and Solstices – Colures – Celestial Co-ordinates – Horizontal System –Equatorial System – Meridian System –Ecliptic System.

UNIT IV **(6 hrs)**

To Find the Relation between Right Ascension and Longitude of the Sun – To Trace the Changes in the Co-ordinates of the Sun in the Course of a Year – To Find the Longitude of the Sun on any Day –Worked Examples. **The Earth:** Experimental Proofs for the Rotation of Earth – Worked Examples – Dip of Horizon – To Find an Expression for Dip – To Find the Distance between Two Mountains whose Tops are Just Visible from Each Other – Effects of Dip – To Find the Acceleration in the Time of Rising of a Star Due to Dip - Worked Examples.

UNIT V **(6 hrs)**

Twilight – To Find the Duration of Twilight – To Find the Condition that Twilight may last Throughout Night – To Find the Number of Consecutive Days having Twilight Throughout Night – To Find the Duration of Twilight when it is Shortest - Civil, Nautical and Astronomical Twilights - Worked Examples

Text Book:

S. Kumaravelu and Susheela Kumaravelu, "Astronomy", S. Kumaravelu, Muruga Bhavanam, Nagercoil, Revised and Enlarged Edition, 2011.

Unit	Chapter	Section	Page No.
I	1	1 - 24	1-16
II	1	25 - 34	16 - 28, 33 - 36
III	2	39 - 63	41 - 51
IV	2	66 - 68	53 - 58
	3	105 - 110	129 - 133, 135 - 142
V	3	111 - 116	144 - 152

Reference Books :

1. W.M.Smart, "Textbook on Spherical Astronomy", Cambridge University Press, Cambridge, Sixth Edition.
2. Daniel A. Murray, "Spherical Trigonometry", Longmans, Green and Company, Mumbai.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc

Semester III

(2018-2021)

Core Course – V: Sequences and Series (18UMAC31)

(For those who join from June 2018 and afterwards)

Credits : 4	**Int.Marks : 25**
Hours/Week : 4	**Ext.Marks : 75**
Duration : 60 hrs	**Max.Marks : 100**

Course Objectives:

- To create interest in learning analysis.
- To know about the behavior of sequences.
- To know about the convergence of series.

Course Outcomes:

1. Provide a formal introduction to the concept of limit and compute the limits of sequences.
2. Gain knowledge of some simple techniques for testing the convergence of sequences.
3. Apply the properties of limits summarized in theorems and recognize when a sequence is increasing, decreasing, bounded and monotonic.
4. Relate the convergence or divergence of the series using the sequence of partial sums.
5. Study about the integral test which shows the equivalence between the convergence of a series and that of an associated integral.
6. Know about the alternating series and its properties.

7. Gain knowledge for testing the convergence of series of positive terms.

UNIT I **(12 hrs)**

Sequences: Sequences – Bounded Sequences – Monotonic Sequences – Convergent Sequences – Divergent and Oscillating Sequences – The Algebra of Limits –Behavior of Monotonic Sequences.

UNIT II **(12 hrs)**

Some Theorems on Limits – Subsequences – Limit Points – Cauchy Sequences – The Upper and Lower Limits of a Sequences.

UNIT III **(12 hrs)**

Series of Positive Terms: Infinite Series – Comparison Test.

UNIT IV **(12 hrs)**

Kummer's Test–Root Test and Condensation Test – Integral Test.

UNIT V **(12 hrs)**

Series of Arbitrary Terms: Alternating Series – Absolute Convergence-Tests for Convergence of Series of Arbitrary Terms.

Text Book:

Dr. S.Arumugam and Mr.A.ThangapandiIsaac, "Sequences and Series and Fourier Series", New Gamma Publishing House, Palayamkottai ,2006.

Unit	Chapter	Section	Page No.
I	3	3.1 – 3.7	39-81
II	3	3.8 – 3.12	82-108
III	4	4.1 , 4.2	112-126
IV	4	4.3-4.5	129-155
V	5	5.1 – 5.3	157-172

Reference Books:

1. Richard R. Goldberg, "Methods of Real Analysis", Oxford Publishers Co. Pvt. Ltd., New Delhi.
2. Shanti Narayanan, M.D. Rai Singhania, "Elements of Real Analysis", S.Chand and Company Ltd., New Delhi, 8th Revised Edition, 2007.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc

Semester III

(2018 – 2021)

Core Course – VI: Numerical Methods (18UMAC32)

(For those who join from June 2018 and afterwards)

Credits : 4	**Int. Marks : 25**
Hours / Week : 4	**Ext. Marks : 75**
Duration : 60 hrs	**Max. Marks : 100**

Course Objectives:

- To find numerical solutions to problems where the exact solutions are not known.
- To apply numerical methods to solve problems in physical and technical applications.

- To use numerical methods for solving linear algebraic equations which occur in engineering and statistical problems.

Course Outcomes:

1. Give procedures for solving numerically different kinds of problems occurring in engineering and technology.
2. Develop skills in solving problems using numerical techniques.
3. Gain an in-depth knowledge of the various aspects of curve fitting of curves.
4. Find solution of system of linear equations, roots of non-linear equations.
5. Use the numerical techniques to solve algebraic and differential equations.
6. Able to approximate the functions and to estimate the errors.
7. Learn the concept of interpolation.

UNIT I **(12 hrs)**

Curve Fitting: Introduction - Method of Least Squares. **Algebraic and Transcendental Equations:** Errors in Numerical Computation – Iteration Method – Bisection Method – Regula Falsi Method – Newton Raphson Method.

UNIT II **(12 hrs)**

Simultaneous Equations: Gauss Elimination Method – Gauss Jordan Elimination Method - Calculation of Inverse of a Matrix – Gauss Seidel Iteration Method.

UNIT III **(12 hrs)**

Interpolation: Newton's Interpolation Formulae – Central Difference Interpolation Formulae - Lagrange's Interpolation Formulae – Inverse Interpolation.

UNIT IV **(12 hrs)**

Numerical Differentiation and Integration: Derivatives using Newton's Forward Difference Formula - Derivatives using Newton's Backward Difference Formula – Numerical Integration.

UNIT V **(12 hrs)**

Numerical Solutions of Ordinary Differential Equations: Taylor's Series Method – Euler's Method – Runge-Kutta Methods. **Numerical Solution of Partial Differential Equations:** Classification of Partial Differential Equations of Second Order – Finite Difference Approximations to Derivatives - Laplace Equation - Poisson's Equation.

Text Book:

Dr.S.Arumugam, Mr.A.Thangapandi Isaac, Dr.A.Somasundaram, "Numerical Methods", Scitech Publications (India) Pvt. Ltd., Chennai, Second Edition, 2007.

Unit	Chapter	Section	Page No.
I	2	2.0, 2.4	40, 62 – 76
	3	3.1 – 3.5	80 – 106
II	4	4.3 – 4.5, 4.8	115 – 123, 139 – 148
III	7	7.1 – 7.3, 7.6	202 – 243, 255 – 258

IV	8	8.1, 8.2, 8.5	260 –261, 263 – 267, 279 - 299
V	10	10.1, 10.3, 10.4	326 – 330, 336 – 352
	11	11.1 – 11.4	379 – 401

Reference Books :

1. S.Kalavathy, “Numerical Methods”, Vijay Nicole Imprints Pvt. Ltd., Chennai, 2004.
2. P.Kandasamy, K.Thilagavathy and K.Gunavathy, “Numerical Methods”, S.Chand and Company Ltd., New Delhi, 2002.

UG Programme – B.Sc

Semester III

(2018-2021)

Allied Course – III: Programming in C and C++ (18UMAA31)

(For those who join from June 2018 and afterwards)

Credits	**: 4**	**Int.Marks**	**: 25**
Hours/Week	**: 4**	**Ext.Marks**	**:75**
Durations	**: 60 hrs**	**Max.Marks**	**:100**

Course Objectives:

- To gather a clear idea on importance of Programming Languages.
- To improve knowledge on C and C++.
- To implement real time problems with C and C++.

Course Outcomes:

1. Gaining experience about structured programming.
2. Helping students to understand the implementation of C and C++ language.
3. Letting the students to know the power of Modular Programming through Functions.
4. Understanding how C++ improves C with object-oriented features.
5. Learning the syntax and semantics of the C++ programming language.
6. Learning how to implement copy constructors and class member functions and Inheritance.

UNIT I **(12 hrs)**

Fundamentals of C: History of C – Importance of C – Basic Structure of C Programs – Character Set – Tokens - Keywords and Identifiers – Constants – Variables – Data types – Declaration of Variables and Storage Class - Operators and Expressions – Managing Input/Output Operations.

UNIT II **(12 hrs)**

Control Statements and Arrays: Decision Making and Branching – Decision Making and Looping – Arrays: One Dimensional Arrays – Two Dimensional Arrays – Character Arrays and Strings: Declaring and Initializing String Variables – Reading and Writing Strings – String Handling Functions.

UNIT III **(12 hrs)**

Functions, Structures, Unions and Pointers: User Defined Function: Elements of User Defined functions – Definition of Functions – Return Values and their Types – Function Calls – Function Declaration – Recursion - Structures and Unions : Defining a Structure – Declaring Structure Variables – Accessing Structure Members – Unions – Pointers : Understanding Pointers – Accessing the Address of a Variable – Declaring Pointer Variable – Initialization of Pointer Variable – Accessing a Variable through its Pointer.

UNIT IV **(12 hrs)**

Fundamentals Of C++: Principles of Object Oriented Programming – Tokens, Expressions and Control Structures : Tokens, Keywords, Identifiers and Constants, Data Types, Operators, Manipulators, Expressions and Control Structures – Functions in C++ : Inline Function, Function Overloading - Classes and Objects : Specifying a Class, Defining Member Functions, Memory Allocation for Objects, Arrays of Objects, Objects as Function Arguments, Friend Functions, Returning Objects.

UNIT V **(12 hrs)**

Constructors, Polymorphism and Inheritance: Constructors and Destructors: Constructors, Types of Constructors, Destructors - Operator Overloading: Defining Operator Overloading, Overloading Unary Operator, Overloading Binary Operator – Inheritance: Defining Derived Class, Types of Inheritance.

Text Books:

1. E.Balagurusamy, "Programming in ANSI C", Tata McGraw-Hill, New Delhi, 6th Edition,2012.
2. E.Balagurusamy, "Object Oriented Programming with C++", Tata McGraw-Hill, New Delhi, 6th Edition, 2014.

Unit	Text Book No	Chapter	Section	Page No.
I	1	1	1.1, 1.2, 1.8	1 - 3, 12, 13
		2	2.2 - 2.9	22 - 38
		3	3.2 - 3.12	52 - 66
		4	4.1 - 4.5	83 - 104
II	1	5	5.1 - 5.9	112 - 142
		6	6.1 - 6.6	151 - 176
		7	7.2 - 7.6	194 - 215
		8	8.2 - 8.4, 8.8	238 - 249, 253 - 259
III	1	9	9.2, 9.4 - 9.8	270 - 271, 274 - 281
		10	10.1 - 10.4, 10.12	324 - 329, 343 - 344
		11	11.1 - 11.6	357 - 365
IV	2	1	1.1 - 1.8	1 - 13
		3	3.1 - 3.8, 3.14 - 3.21, 3.24, 3.25	29 - 38, 43 - 56, 58 - 62
		4	4.6, 4.10	73 - 75, 79 - 81
		5	5.3, 5.4, 5.10, 5.13 - 5.16	90 - 95, 104, 108 - 120
V	2	6	6.1 - 6.5, 6.7, 6.11	129 - 136, 139 - 140, 144 - 147
		7	7.2 - 7.5	153 - 161
		8	8.2 - 8.8	180 - 202

Reference Books:

1. Yashvant P.Kanetkar, "Let Us C", BPB Publications,8th Edition.

2. Byron S.Gottfried, "Programming with C", Tata McGraw-Hill, New Delhi, 2nd Edition, 2014.
3. Herbert Schildt, "The Complete Reference", Tata McGraw-Hill, New Delhi, 4th Edition, 2003.

Sri Kaliswari College (Autonomous), Sivakasi
Department of Mathematics
UG Programme – B.Sc
Semester III
(2018 - 2021)
Allied Course – III : Programming in C and C++ Lab (18UMAA3P)
(For those who join from June 2018 and afterwards)

Credit	**: 1**	**Int.Marks**	**: 40**
Hours/Week	**: 2**	**Ext.Marks**	**:60**
Durations	**: 30 hrs**	**Max.Marks**	**:100**

Course Objectives:

- To improve coding skills through C language.
- To learn Object Oriented Programming concepts.
- To analyze real time problems using C++.

Course Outcomes:

1. Letting the students to learn C programming language through practical experience.
2. Understanding how to implement Programs with and arrays and string Improving problem solving skills using C++.
3. Understanding the difference between C structures and C++ classes.
4. Enabling the students to effectively use Constructors and Destructors.
5. Implementing programs to obtain Overloading concept and various Inheritance techniques.

Programming in C

1. To perform the Arithmetic Operations.
2. To find the Biggest Among Three Numbers.
3. To Sorting a number in an array.
4. To perform the Sum of digits using Function.
5. To perform the Factorial calculation using Recursion.
6. To perform the Student mark list generation using Structure.

Programming in C++

1. To Calculate square and cube values using Class and Objects.

2. To perform Area calculation using Inline Function.
3. To perform Volume calculation using Function Overloading.
4. To Overload Unary operator using Operator overloading.
5. Create constructors and destructor to create different bank accounts.
6. To perform Employee payroll using Inheritance.

Sri Kaliswari College (Autonomous), Sivakasi
Department of Mathematics
UG Programme – B.Sc
Semester III
(2018 - 2021)
Skilled Based Course – I: Trigonometry (18UMAS31)
(For those who join from June 2018 and afterwards)

Credits : 2 **Int.Marks : 25**
Hours/Week : 2 **Ext.Marks :75**
Duration : 30 hrs **Max.Marks:100**

Course Objectives:

- To study logarithm of a complex number and hyperbolic functions.
- To study about expansions of trigonometric functions.

Course Outcomes:

1. Learn about the hyperbolic functions.
2. Evaluate inverse trigonometric functions.
3. Apply logarithms to the solution of problems encountered in mathematics and the sciences.
4. Familiarize themselves with basic properties of sine, cosine and tangent functions.
5. Apply trigonometric techniques as tools in the analysis of mathematical, physical, and scientific problems.

UNIT I **(6 hrs)**

Hyperbolic Functions – Inverse Hyperbolic Functions.

UNIT II **(6 hrs)**

Logarithm of a complex Number. **Trigonometric Series:** Introduction - Difference

Method.

UNIT III **(6 hrs)**

Angles in Arithmetic Progression - C+iS method.

UNIT IV **(6 hrs)**

Gregory's Series - Expression for $\sin n\theta$, $\cos n\theta$ and $\tan n\theta$.

UNIT V **(6 hrs)**

Expression for $\text{Sin}^n \theta$ and $\text{Cos}^n \theta$ – Expansion of $\sin \theta$, $\cos \theta$, $\tan \theta$ in powers of θ.

Text Book:

Dr.S.Arumugam , Prof. A. Thangapandi, " Summation of Series and Trigonometry", New Gamma Publishing House, Palayamkottai, 2003.

Unit	Chapter	Section	Page No.
I	2	2.1 – 2.2	56 - 71
II	3	3.1	75 - 77
	4	4.0 – 4.1	78 - 86
III	4	4.2 – 4.3	87 - 102
IV	4	4.4	104 - 110
	Appendix	-	140 - 144
V	Appendix	-	145 - 157

Reference Books:

1. S. Narayanan, T.K. Manicavachagom Pillay, "Trigonometry", S. Viswanathan Printers and Publishers, Private Limited, Chennai, 2011.
2. Dr. M.D. Raisinghania, H.C. Saxena , H.K.Dass, "Simplified Course in Trigonometry", S.Chand and Company Limited, New Delhi.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc

Semester III

(2018 – 2021)

Value Based Course – I: Data Interpretation (18UMAV31)

(For those who join from June 2018 and afterwards)

Credit	**: 1**	**Int. Marks**	**: 25**
Hours/Week	**: 2**	**Ext. Marks**	**: 75**
Duration	**: 30 hrs**	**Max. Marks**	**: 100**

Course Objectives :

- To study about collection of data.
- To prepare the students for competitive examination.

Course Outcomes :

1. Able to independently read mathematical and statistical literature of various types, including survey articles, scholarly books, and online sources.

2. Communicate statistical ideas clearly in both oral and written form using appropriate statistical terminology.
3. Generate reports that show statistical expertise in writing and model implementation.
4. Methods to summarize a collection of data by describing what was observed using number of graphs.
5. Ability to deal with the collection, organization, presentation, computation and interpretation of data.

UNIT I **(6 hrs)**

Collection of Data : Introduction – Primary and Secondary Data – Choice between Primary and Secondary Data – Methods of Collecting Primary Data – Drafting the Questionnaire – Pre-testing the Questionnaire – Specimen Questionnaire – Sources of Secondary Data – Editing Primary and Secondary Data – Precautions in the use of Secondary Data.

UNIT II **(6 hrs)**

Classification of Data : Introduction – Meaning and Objectives of Classification – Types of Classification – Formation of a Discrete Frequency Distribution – Formation of Continuous Frequency Distribution – Considerations in the Construction of Frequency Distributions – Relative Frequency Distribution – Bivariate or Two-Way Frequency Distribution.

UNIT III **(6 hrs)**

Tabulation of Data : Difference between Classification and Tabulation – Role of Tabulation – Parts of a Table – General Rules of Tabulation – Review of the Table – Types of Tables – Miscellaneous Illustrations – Machine Tabulation.

UNIT IV **(6 hrs)**

Diagrammatic and Graphic Presentation : Introduction – Significance of Diagrams and Graphs – Comparison of Tabular and Diagrammatic Presentation – Difference between Diagrams and Graphs – General Rules for Constructing Diagrams – Types of Diagrams – Choice of a Suitable Diagram.

UNIT V **(6 hrs)**

Graphs – Technique of Constructing Graphs – Graph of Time Series or Line Graphs – Rules for Constructing the Line Graphs on Natural Scale – False Base Line – Graphs of One Variable – Graph of Two or More Variables – Graphs having Two Scales – Range Chart – Band Graph – Semi-Logarithmic Line Graphs or Ratio Charts – Methods of Constructing a Semi – Logarithmic Graph – Interpretation of Logarithmic Curves – Uses of Ratio Charts – Limitations of Ratio Charts – Graphs of Frequency Distributions – Limitations of Diagrams and Graphs.

Text Book :

Dr.S.P.Gupta, “Statistical Methods”, Sultan Chand and Sons, New Delhi, Forty First Revised Edition, 2011.

Unit	Chapter	Page No.
I	3	40 – 61
II	5	92 –108
III	5	109 – 126
IV	6	128 – 151
V	6	151 – 176

Reference Books :

1. R.P.Hooda, "Introduction to Statistics",– Macmillan India Ltd, New Delhi, 2005.
2. R.S.N. Pillai and Bagavathi, "Statistics – Theory and Practice", S.Chand and Company Ltd, New Delhi, 2008.

Sri Kaliswari College (Autonomous), Sivakasi
Department of Mathematics
UG Programme – B.Sc
Semester IV

(2018 – 2021)

Core Course – VII: Mechanics (18UMAC41)

(For those who join from June 2018 and afterwards)

Credits : 4 **Int. Marks : 25**

Hours/Week : 4 **Ext. Marks : 75**

Duration : 60 hrs **Max. Marks : 100**

Course Objectives:

- To know about various law of forces.
- To study about two like and unlike parallel forces and moment of a force.
- To know about Impact of Collision of Spheres.

Course Outcomes :

1. Able to construct free-body diagrams and to calculate the reactions necessary to ensure static equilibrium.
2. Understand the analysis of distributed loads.
3. Able to calculate centroid and moments of inertia.
4. Gain knowledge of kinetic energy and momentum methods for particles and systems of particles.
5. Acquire knowledge of the general principles of dynamics.

UNIT I **(12 hrs)**

Forces Acting at a Point : Definition of Resultant and Components – Simple Cases of Finding the Resultant – Parallelogram of Forces – Analytical Expression for the Resultant of Two Forces Acting at a Point – Triangle of Forces – Perpendicular Triangle of Forces – Converse of the Triangle of Forces –The Polygon of Forces – Lami's Theorem – An Extended Form of the Parallelogram Law of Forces – Resolution of a Force – Components of a Force Along Two Given Directions – Theorem on Resolved Parts.

UNIT II **(12 hrs)**

Parallel Forces and Moments : Introduction – Resultant of Two Like Parallel Forces Acting on a Rigid Body – Resultant of Two Unlike and Unequal Parallel Forces Acting on a Rigid Body – Resultant of a Number of Parallel Forces Acting on Rigid Body – Conditions of Equilibrium of Three Coplanar Parallel Forces – Centre of Two Parallel Forces – Moment of a Force – Physical Significance of the Moment of a Force – Geometrical Representation of a Moment – Sign of the Moment – Unit of Moment – Varigon's Theorem of Moments – Generalised Theorem of Moments.

UNIT III **(12 hrs)**

Projectiles : Introduction – Definition of Projectile – Two Fundamental Principles – Path of a Projectile – Characteristics of the Motion of a Projectile – The Path of a Projectile when a Particle is Projected Horizontally – The Horizontal Range on a Projectile – Two Possible Directions to Obtain a Given Horizontal Range – The Velocity of the Projectile in Magnitude and Direction at the end of the time t – The Velocity at any Point P of a Projectile.

UNIT IV **(12 hrs)**

Impulsive Forces : Impulse – Impulsive Force – Impact of Two Bodies – Loss of Kinetic Energy in Impact – Motion of a Shot and Gun – Impact of Water on a Surface – **Collision of Elastic Bodies** : Introduction – Definitions – Fundamental Laws of Impact – Impact of a Smooth Sphere on Fixed Smooth Plane – Direct Impact of Two Smooth Spheres – Loss of Kinetic Energy due to Direct Impact of Two Smooth Spheres.

UNIT V **(12 hrs)**

Motion Under the Action of Central Forces : Introduction – Velocity and Acceleration in Polar Coordinates – Equations of Motion in Polar Coordinates – Note on the Equiangular Spiral – Motion under a Central Force – Differential Equation of Central Orbits – Perpendicularfrom the Pole on the Tangent – Pedal Equation of the Central Orbit – Pedal Equation of the some of the Well – Known Curves – Velocities in a Central Orbit.

Text Books:

1. Dr. M. K. Venkataraman, "Statics", Agasthiar Publications, Trichy, Twelveth Edition, 2007.
2. Dr. M. K. Venkataraman , "Dynamics", Agasthiar Publications, Trichy, Twelveth Edition, 2006.

Unit	Text Book No.	Chapter	Section	Page No.
I	1	2	1 –13	6 – 41
II	1	3	1 – 13	52 – 70
III	2	6	6.1 – 6.10	139 – 151, 156 – 161, 163 - 167
IV	2	7	7.1 – 7.6	201 – 211
		8	8.1 – 8.6	215 – 229, 232 – 241
V	2	11	11.1 – 11.13	356 – 367, 371 - 376

Reference Books :

1. P.Duraipandian, Laxmi Duraipandian and Muthamizh Jayapragasam, "Mechanics", S.Chand and Company Ltd, New Delhi, 2012.
2. M.Ray and G.C.Sharma, "A Text Book on Dynamics", S.Chand and Company Ltd, New Delhi, 2002.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc

Semester IV

(2018 - 2021)

Core Course – VIII: Differential Equations and its Applications (18UMAC42)

(For those who join from June 2018 and afterwards)

Credits : 4 **Int.Marks : 25**

Hours/Week : 4 **Ext.Marks : 75**

Duration : 60 hrs **Max.Marks:100**

Course Objectives:

- To create interest in learning Differential Equations.
- To develop the skill in solving Differential Equations.
- To study various methods of solving Partial Differential Equations.

Course Outcomes :

1. Understand some basic definitions and terminology associated with differential equations and their solutions.
2. Use analytical methods of solution: by direct integration; separation of variables; and the integrating factor method.
3. Determine solutions to first order exact differential equations.
4. Convert separable and homogeneous equations to exact differential equations by integrating factors.
5. Determine solutions to second order linear homogeneous differential equations with constant coefficients.
6. Determine solutions of partial differential equations of the first order.
7. Learn applications of first order equations and linear equations with constant coefficients.

UNIT I **(12 hrs)**

Equations of the First Order and of the First Degree: Variables Separable – Homogeneous Equations – Non-homogeneous Equations of the First Degree in x and y – Linear

Equation – Bernouilli's Equation - Exact Differential Equations. **Applications of First Order Equations:** Growth , Decay and Chemical Reactions.

UNIT II **(12 hrs)**

Equations of the First Order, But of Higher Degree: Equations Solvable for dy/dx – Equations Solvable for x and y – Clairaut's Form – Equations that do not Contain x Explicitly – Equations that do not Contain y Explicitly – Equations Homogeneous in x and y. **Linear Equation with Constant Coefficients:** Definitions – The Operator D – Complementary Function of a Linear Equation with Constant Coefficients – Particular Integral – Linear Equations with Variable Coefficients – Equations Reducible to the Linear Equations – Newton's Law of Gravitation and the Motion of Planets

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UNIT III **(12 hrs)**

Simultaneous Differentiation Equations: Simultaneous Equations of the First Order and First Degree – Solutions of $\frac{dx}{P}=\frac{dy}{Q}=\frac{dz}{R}$ – Methods for Solving $\frac{dx}{P}=\frac{dy}{Q}=\frac{dz}{R}$ – Geometrical Interpretation of $\frac{dx}{P}=\frac{dy}{Q}=\frac{dz}{R}$ – Simultaneous Linear Differential Equations – Simultaneous Equations with Variable Coefficients.

UNIT IV **(12 hrs)**

Linear Equations of the Second order: Complete Solution Given a Known Integral – Reduction to the Normal Form – Change of the Independent Variable – Variation of Parameters – Methods of Operational Factors.

UNIT V **(12 hrs)**

Partial Differential Equations of the First Order: Classification of Integrals – Derivation of Partial Differential Equations – Lagrange's Method of Solving the Linear Equation – Special Methods; Standard Forms – Charpit's Method.

Text Book:

S.Narayanan, T.K.Manickavachagom Pillay,"Differential Equations and its Applications", Ananda Book Depot, Chennai , 2017.

Unit	Chapter	Section	Page No.
I	II	1 – 6	7 – 26
	III	1	29 - 37
II	IV	1- 4	60 - 66
	V	1 – 6, 8	68 – 101, 110 - 114
III	VI	1- 7	119 - 133

IV	VIII	1 – 5	145 - 156
V	XII	1- 6	219 - 249

Reference Books:

1. Dr.S.Arumugam, Prof. A. Thangapandi Isaac,"Differential Equations and Applications", New Gamma Publishing House, Palayamkottai, 2014.
2. P.R.Vittal, "Differential Equations , Fourier and Laplace Transforms, Probability", Magham Publications, Chennai, Third Revised Edition, 2002.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc

Semester IV

(2018-2021)

Allied Course – IV : Multimedia and its Applications (18UMAA41)

(For those who join from June 2018 and afterwards)

Credits : 4 **Int.Marks : 25**

Hours/Week : 4 **Ext.Marks :75**

Durations : 60 hrs **Max.Marks :100**

Course Objectives:

- To gather a clear idea about Mulmedia and elements of multimedia.
- To get knowledge from text, image and Audio.
- To understand the concept of Video and Animation.

Course Outcomes:

1. Understanding Multimedia and its elements.
2. Providing knowledge on Text,Audio and Video.
3. Making students to analyze image its formats.
4. Learning how moving and stable images work.
5. Introducing various techniques to Animation.

UNIT I **(12 hrs)**

Multimedia – An Overview: Introduction – Multimedia Presentation and Production – Characteristics of a Multimedia Presentation – Uses of Multimedia – Promotion of Multimedia Based Content – Steps for Creating a Multimedia Presentation.

UNIT II **(12 hrs)**

Text: Introduction – Type of Text – Unicode Standard – Font – Insertion of Text –Text Compression – File Format.

Unit- III: **(12 hrs)**

Image: Introduction – Image Type – Seeing Color – Color Model – Basic Steps for Image Processing – Specification of Digital Image. **Audio:** Introduction – Acoustics – Nature of Sound Waves – Fundamental Characteristics of Sound – Elements of Audio System.

Unit IV: **(12 hrs)**

Video: Introduction –Analog Video Camera – Transmission of Video Signal – Video Signal Formats.

Unit V: **(12 hrs)**

Animation: Introduction – Historical Background – Use of Animation – Key Frame and Tweening – Types of Animation – Computer Assisted Animation – Creating Movement – Principles of Animation – Some Techniques of Animation.

Text Book:

Ranjan Parekh, "Principles of Multimedia" ,Tata McGraw-Hill, New Delhi, 2011.

Unit	Chapter	Section	Page No.
I	1	1.1,1.2,1.3,1.7,1.8,1.9	1 - 5, 9 - 20
II	4	4.1,4.2,4.3,4.4,4.5,4.6,4.7	76 - 88
III	5	5.1,5.2,5.3,5.4,5.5,5.9	91 - 99, 111 - 113
	7	7.1,7.2,7.3,7.4,7.7	178 - 183,193
IV	8	8.1,8.2,8.3,8.4	289 - 301
V	9	9.1,9.2,9.3,9.4,9.6,9.7,9.8,9.9	339 - 352

Reference Books:

1. Tay Vaughan, "Multimedia: Making it work", Tata McGraw-Hill, New Delhi, Fifth Edition, 2001.
2. Ramesh Bangia, "Introduction to Multimedia", Laxmi Publications Pvt. Ltd., Chennai.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc

Semester IV

(2018 - 2021)

Allied Course – IV: Multimedia Lab – (18UMAA4P)

(For those who join from June 2018 and afterwards)

Credits	**: 1**	**Int.Marks**	**: 40**
Hours/Week	**: 2**	**Ext.Marks**	**:60**
Durations	**: 30 hrs**	**Max.Marks**	**:100**

Course Objectives:

- To know about designing concept.
- To understand simple animation.
- To gain knowledge about dynamic Multimedia tools

Course Outcomes:

1. Understanding the package Adobe Photoshop.
2. Designing different shapes and allowing students to improve their designing skill.
3. Providing knowledge on moving pictures and stable pictures.
4. Making students to create interesting edited images.

Adobe Photoshop

1. To convert black and white picture to color.
2. To develop passport size photo.
3. To design ID card.
4. To design flex banner.
5. To design greeting card.
6. To apply mirror effects.
7. To design book wrapper and water mark sea.
8. To create simple animation using Image Ready.
9. To animate story using Image Ready.

Sri Kaliswari College (Autonomous), Sivakasi
Department of Mathematics
UG Programme - B.Sc
Semester IV
(2018-2021)
Major Elective Course – I: Vector Calculus (18UMAO41)

(For those who join from June 2018 and afterwards)

Credits : 3 **Int. Marks : 25**

Hours/ Week : 4 **Ext. Marks : 75**

Duration : 60 hrs **Max. Marks : 100**

Course Objectives:

- To learn about gradient, divergence and curl.
- To discuss the classical theory of curves and surfaces using vector methods.
- To study about surface integrals.

Course Outcomes:

1. Gain knowledge about the dot product of vectors, lengths of vectors, and angles between vectors.
2. Evaluate the velocity and acceleration of a particle moving along a space curve.
3. Evaluate line integrals of scalar functions or vector fields along curves.
4. Evaluate surface integrals.
5. Apply the divergence theorem to give a physical interpretation of the divergence of a vector field.

UNIT I **(12 hrs)**

Gradient, Divergence and Curl: Differentiation of Vectors - A Few Results on Differentiation of Vectors - Meaning of the Derivative of Position Vector - Physical Applications - Level Surfaces - The Vector Differential Operator - Gradient - Direction and Magnitude of Gradient.

UNIT II **(12 hrs)**

Divergence and Curl - Solenoidal - Irrotational - Formulae Involving Operator ∇ - Operators Involving ∇ Twice.

UNIT III **(12 hrs)**

Differential Geometry: Space Curve - Tangent at a Given Point - Curvature: Principal Normal - Binormal: Torsion Frenet's Formulae.

UNIT IV **(12 hrs)**

Vector Integration: Line Integral - Volume Integral - Surface Integral.

UNIT V **(12 hrs)**

Gauss Divergence Theorem - Green's Theorem (in Space) - Green's Theorem- Stokes' Theorem- Green's Theorem (in Plane) (without Proof for all these Theorems).

Text Book:

S. Narayanan, T.K. Manicavachagom Pillai, "Vector Calculus", S. Viswanathan Printers and Publishers, Private Limited, Chennai.

Unit	Chapter	Section	Page No.
I	1	1 - 8	1 - 11
II	1	9 - 12	14 - 32
III	2	1 - 4	34 - 47
IV	3	1 - 5	49 - 65
V	3	6 - 10	65 - 92

Reference Books:

1. Dr. M.D. Raisinghania, H.C. Saxena and H.K. Dass, "Simplified Course in Vector Calculus", S.Chand and Company limited, New Delhi.
2. Shanti Narayan and J.N.Kapur, "Text Book of Vector Calculus", S.Chand and Company limited, New Delhi, 2000.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc

Semester IV

(2018 – 2021)

Major Elective Course – I: Consumer Affairs (18UMAO42)

(For those who join from June 2018 and afterwards)

Credits : 3 **Int.Marks : 25**

Hours/Week: 4 **Ext.Marks : 75**

Duration : 60 hrs **Max.Marks : 100**

Course Objectives:

- To familiarize the learners with their rights and responsibilities as a consumer, the social framework of consumer rights and legal framework of protecting consumer rights.
- To provide an understanding of the procedure of redress of consumer complaints, and the role of different agencies in establishing product and service standards.
- To enable the learners to comprehend the business firms' interface with consumers and the consumer related regulatory and business environment.

Course Outcomes:

1. The learners know about the need for consumer protection and the areas covered by consumer protection law
2. Learners will have a clear idea on legislative controls on unconscionable conduct, misleading or deceptive conduct, false or misleading representations and other unfair practices
3. The learners know the legal obligations of a supplier of goods or services
4. The learners know the obligations of manufacturers and the rights of consumers to compensation
5. The learners know the bodies available to protect the rights of the consumer and discuss their operations.

UNIT I **(12 hrs)**

Consumer – meaning, Consumer and markets – Whole sale, Retail and Online markets concept of price – Retail price including Maximum Retail Price (MRP) with Goods and Service Tax (GST)

Consumer problems – Consumer Complaints – defect in goods, spurious goods, deficiency service – unfair trade practices – Restrictive trade practices.

UNIT II **(12 hrs)**

Consumer Rights and UN Guidelines on Consumer Protection – Consumer Protection

Act, 1996, Consumer Protection Bill 2018.

Consumer Protection Council – Objectives – Dispute Redressal forums – Central, State and District lands – Composition, Powers and Jurisdiction.

UNIT III **(12 hrs)**

Grievance Redressal Mechanism under the Indian Consumer Protection Law **:** Who can file a complaint? Grounds of filing a complaint; Limitation period; Procedure for filing and hearing of a complaint; Disposal of cases, Relief/Remedy available; Temporary Injunction, Enforcement of order, Appeal, frivolous and vexatious complaints; Offences and penalties.

Recent Cases decided under Consumer Protection law by Supreme Court/National Commission**.**

UNIT IV **(12 hrs)**

Role of Industry Regulators in Consumer Protection: Banking: RBI and Banking Ombudsman - Insurance: IRDA and Insurance Ombudsman - Telecommunication: TRAI - Food Products: FSSAI - Electricity Supply: Electricity Regulatory Commission - Real Estate Regulatory Authority

UNIT V **(12 hrs)**

Contemporary Issues in Consumer Affairs**:** Consumer Movement in India: Evolution of Consumer Movement in India. Interest of consumer and Misleading Advertisements, National Consumer Helpline and Product testing.

Quality and Standardization: Voluntary and Mandatory standards; Role of BIS, Indian Standards Mark (ISI), Ag-mark, Hallmarking, Licensing and Surveillance.

Text Books:

1. "The Consumer Protection Act, 1986", Universal Law Publishing, New Delhi, 2017.
2. Dr. Francis Cherunilam, "Business Environment: Text and Cases", Himalaya Publishing House, Mumbai, 26th Revised Edition, 2017.
3. Swarup C. Sahoo and Suresh C. Das, "Insurance Management: Text and Cases", Himalaya Publishing House, Mumbai, 2nd Revised Edition, 2017.

Unit	Text Book No.	Chapter	Section	Page No.
I	1	1 & 2	-	3 - 14
II	2	10	-	188 - 206
III	1	3	-	14 – 36
IV	3	25 & 27	-	220 – 229, 244 - 249
V	1	4	-	40 – 54

Reference Books:

1. Khanna, Sri Ram, SavitaHanspal, Sheetal Kapoor, and H.K. Awasthi, "Consumer Affairs" - Universities Press, 2007
2. Choudhary, Ram Naresh Prasad , "Consumer Protection Law Provisions and Procedure" - Deep Publications Pvt Ltd, 2005.
3. G. Ganesan and M.Sumat,"Globalisation and Consumerism", - Regal Publications, 2012.

4. Rajyalaxmi Rao, -“Consumer is King”, - Universal Law Publishing Company, 2012.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc

Semester IV

(2018-2021)

Major Elective Course - I: Discrete Mathematics (18UMAO43)

(For those who join from June 2018 and afterwards)

Credits : 3	**Int.Marks : 25**
Hours/Week : 4	**Ext.Marks : 75**
Duration : 60 hrs	**Max.Marks : 100**

Course Objectives:

- To know about the concept of coding theory.
- To study about the Automata languages and computations.

Course Outcomes:

1. Make a good background on coding theory.
2. Enhance the idea of decoding.
3. Demonstrate the Logics and its properties.
4. Get insight knowledge of Tautology and Tautological Implications.
5. An ability to identify the replacement process.
6. Give a strong foundation on Automata language.
7. Gain knowledge for Non - Deterministic Finite Automata.

UNIT I **(12 hrs)**

Coding Theory: Introduction – Hamming Distance – Encoding a Message – Group Codes – Procedure for Generating Group Codes – Decoding and Error Correction – An Example of Simple Error correcting Code.

UNIT II **(12 hrs)**

Logic: Introduction – TF Statements – Connectives – Atomic and Compound Statements – Well Formed Formulae –Truth Table of a Formula – Tautology – Tautological Implications and Equivalence of Formulae.

UNIT III **(12 hrs)**

Replacement Process – Functionally Complete Sets of Connectives and Duality Law – Normal Forms – Principal Normal Forms – Theory of Inference.

UNIT IV **(12 hrs)**

Automata, Languages and Computations: Introduction- Finite Automata – Definition of Finite Automation – Representation of a Finite Automation – Acceptability of a String by a Finite Automation – Languages Accepted by a Finite Automation.

UNIT V **(12 hrs)**

Non – Deterministic Finite Automata – Acceptability of a String by Non – Deterministic Finite Automata –Equivalence of FA and NFA – Procedure for finding an FA Equivalent to a given NFA.

Text Book:

Dr. M. K. Venkataraman, Dr. N. Sridharan and N. Chandrasekaran, "Discrete Mathematics", The National Publishing Company, Chennai,2011.

Unit	Chapter	Section	Page No.
I	VIII	1 – 7	8.1-8.15
II	IX	1 – 8	9.1-9.34
III	IX	9 – 13	9.34-9.69
IV	XII	1 – 6	12.1-12.10
V	XII	7 -10	12.12-12.25

Reference Books:

1. J.K.Sharma, "Discrete Mathematics", Macmullian India Ltd, Second Edition 2008.
2. John.E.Hopcroft, "Introduction to Automata theory Languages and Computation", The Narosa Publishing House, Nineteenth Edition, 2001.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc

Semester V

(2018 - 2021)

Core Course –IX: Modern Algebra (18UMAC51)

(For those who join from June 2018 and afterwards)

Credits : 5 **Int.Marks :25**

Hours/Week: 5 **Ext.Marks :75**

Duration :75 hrs **Max.Marks : 100**

Course Objectives:

- To introduce and develop abstract concepts.
- To study the basic structures like groups and rings.
- To study the field of quotients of integral domain.

Course Outcomes:

1. Ability to demonstrate the importance of algebraic properties with regard to working with in various number systems.
2. Understand the relationships between abstract algebraic structures with familiar number systems such as the integers and real numbers.
3. Effectively write abstract mathematical proofs in a clear and logical manner.
4. Demonstrate ability to think critically by interpreting theorems and relating results to problems in other mathematical disciplines.
5. Gain Knowledge about the fundamental concepts such as groups and rings.
6. Apply the theorems, proof techniques and standard computations of group and ring theory to solve problems.
7. Gain knowledge about different types of subgroups such as normal subgroups and cyclic subgroups.

UNIT I **(15 hrs)**

Groups: Definition and Examples – Elementary Properties of a Group – Equivalent Definitions of a Group – Permutation Groups – Subgroups.

UNIT II **(15hrs)**

Cyclic Groups – Order of an Element – Cosets and Lagrange's Theorem – Normal Subgroups and Quotient Groups – Isomorphism – Homomorphisms.

UNIT III **(15 hrs)**

Rings: Definition and Examples – Elementary Properties of Rings – Isomorphism – Types of Rings – Characteristic of a Ring – Subrings.

UNIT IV **(15 hrs)**

Ideals – Quotient Rings – Maximal and Prime Ideals – Homomorphism of Rings

UNIT V **(15 hrs)**

Field of Quotients of an Integral Domain – Ordered Integral Domain – Unique Factorization Domain – Euclidean Domain.

Text Book:

Dr. S. Arumugam and Mr. A. Thangapandi Isaac, "Modern Algebra", Sci Tech Publications (India) Pvt, Ltd, Chennai, 2008.

Unit	Chapter	Section	Page No.
I	3	3.1-3.5	3.1-3.21
II	3	3.6-3.11	3.22-3.49
III	4	4.1-4.6	4.1-4.18
IV	4	4.7-4.10	4.18-4.26

V	4	4.11-4.14	4.27-4.32

Reference Books:

1. Surjeet Singh and Qazi Zameeruddin, “Modern Algebra”, Vikas Publishing House PVT LTD, New Delhi, 2003.
2. M.L. Santiago, “Modern Algebra”, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2001.

Semester V

(2018-2021)

Core Course – X : Real Analysis (18UMAC52)

(For those who join from June 2018 and afterwards)

Credits : 5 **Int.Marks : 25**

Hours/Week : 5 **Ext.Marks : 75**

Duration : 75hrs **Max.Marks : 100**

Course Objectives:

- To assist the students in learning fundamental ideas and theorems about metric space.
- To enrich their knowledge in completeness and connectedness of a metric space.
- To study about continuous and discontinuous functions on Real number system.

Course Outcomes:

1. Learn the basic ingredients of reals and understand the properties of functions defined on the Real line.
2. Develop a sound knowledge and appreciation of the ideas and concepts related to metric spaces.
3. Construct proofs, counter arguments or counter examples in reals.
4. Construct the field axioms of the reals, covers, monotonicity, boundedness.
5. Demonstrate completeness, limits, continuity.
6. Describe and prove continuity conditions for real.
7. Demonstrate compactness and its characterization.

UNIT I **(15 hrs)**

Preliminaries: Sets and Functions - Countable Sets - Uncountable Sets - Inequalities of Holder and Minkowski - **Metric Space** - Definition and Examples - Bounded Sets in a Metric Space -Open Ball in a Metric Space - Open Sets - Subspace - Interior of a Set - Closed Sets – Closure - Limit Point - Dense Sets.

UNIT II **(15 hrs)**

Complete Metric Spaces: Completeness – Baire's Category Theorem.

UNIT III **(15 hrs)**

Continuity: Introduction – Continuity - Homeomorphism – Uniformcontinuity – Discontinuous Functions on R.

UNIT IV **(15 hrs)**

Connectedness: Definition and Examples – Connected subsets of R – Connectedness and Continuity.

UNIT V **(15 hrs)**

Compactness: Compact Metric Spaces – Compact Subsets of R – Equivalent Characterizations for Compactness – Compactness and Continuity.

Text Book:

Dr. S. Arumugam and Mr. A. Thangapandi Isaac, "Modern Analysis", New Gamma Publishing House , Palayamkottai, 2010.

Unit	Chapter	Section	Page No.
I	1 ,2	1.1 – 1.4, 2.1 – 2.10	1- 77
II	3	3.1, 3.2	80-100
III	4	4.1 – 4.4	102-136
IV	5	5.1 – 5.3	139-149
V	6	6.1 – 6.4	151-178

Reference Books:

1. Shanti Narayanan, M.D. Rai Singhania, "Elements of Real Analysis", S.Chand and Company Ltd., New Delhi, 8th Revised Edition, 2007.
2. D. Soma Sundaram, B. Choudhary, "A First Course in Mathematical Analysis", Narosa Publishing House, New Delhi, 2005.

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Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc

Semester V

(2018-2021)

Core Course –XI: Operations Research (18UMAC53)

(For those who join from June 2018 and afterwards)

Credits : 5 **Int.Marks : 25**

Hours/Week : 5 **Ext.Marks :75**

Duration :75 hrs **Max.Marks : 100**

Course Objectives:

- To provide a scientific basis to the decision makers for obtaining optimal solution.
- To study about the formulation of Linear Programming Problem and its solution.
- To introduce the concept of Game theory.
- To know about inventory control.

Course Outcomes:

1. Identify and develop operational research models from the verbal description of the real System.
2. Understand the mathematical tools that are needed to solve optimization problems.
3. Develop a report that describes the model and the solving technique, analyze the results and propose recommendations in language understandable to the decision-making processes.
4. Able to design new simple models, like CPM, PERT, etc. to improve decision –making and develop critical thinking and objective analysis of decision problems.
5. Formulate simple reasoning, learning and optimization problems, in terms of the representations and methods presented.
6. Demonstrate the hand execution of basic reasoning and optimization algorithms on simple problems.

UNIT I (Theorems without Proof) **(15 hrs)**

Linear Programming Problem – Mathematical Formulation: Introduction -Linear Programming Problem - Mathematical Formulation of the Problem – Illustrations on Mathematical Formulation of LPPs. **Linear Programming Problem - Graphical Solution and**

Extension: Introduction - Graphical Solution Method – Some Exceptional Cases – General Linear Programming Problem – Canonical and Standard Forms of L.P.P.

UNIT II (Theorems without Proof) (15 hrs)

Linear Programming Problem-Simplex Method: Introduction - The Computational Procedure - Use of Artificial Variables. **Duality in Linear Programming:** Introduction - General Primal- Dual Pair – Formulating a Dual Problem - Primal-Dual Pair in Matrix Form.

UNIT III (15 hrs)

Games and Strategies: Introduction– Two Person Zero Sum Games – Some Basic Terms – The Maximin-Minimax Principle – Games Without Saddle Points-Mixed Strategies – Graphic Solution of 2×n and m×2 Games – Dominance Property – Arithmetic Method for n×n Games – General Solution of m × n Rectangular Games.

UNIT IV (Theorems without Proof) (15 hrs)

Inventory Control – I: Introduction– Types of Inventories – Reasons for Carrying Inventories -The Inventory Decisions – Objectives of Scientific Inventory Control - Costs Associated with Inventories – Factors Affecting Inventory Control – An Inventory Control Problem –The Concept of EOQ – Deterministic Inventory Problems with no Shortages - Deterministic Inventory Problems with Shortages –Problems of EOQ with Price Breaks.

UNIT V (15 hrs)

Network Scheduling by PERT/CPM: Introduction – Network : - Basic Components – Logical Sequencing –Rules of Network Construction – Concurrent Activities - Critical Path Analysis – Probability Considerations in PERT – Distinction between PERT and CPM.

Text Book:

Kanti Swarup, P.K.Gupta, Man Mohan, "Operations Research", Sultan Chand and Sons, New Delhi, Sixteenth Edition, 2012.

Unit	Chapter	Section	Page No.
I	2	2.1-2.4	39-57
	3	3.1-3.5	65-83
II	4	4.1,4.3,4.4	87-89, 99-113
	5	5.1-5.4	129-133
III	17	17.1-17.9	443-473
IV	19	19.1-19.12	507-538
V	25	25.1-25.8	763-791

Reference Books:

1. Er.Premkumar Gupta and D.S.Kira, "Problems in Operations Research", S.Chand and Company Ltd, New Delhi, 2012.
2. R.Pannerselvam, "Operations Research", Prentice Hall of India Private Limited, New Delhi, Second Edition, 2006.

Sri Kaliswari College (Autonomous), Sivakasi
Department of Mathematics
UG Programme – B.Sc
Semester V
(2018 – 2021)
Core Course – XII: Mathematical Statistics – I (18UMAC54)
(For those who join from June 2018 and afterwards)

Credits : 5	**Int. Marks : 25**
Hours / Week : 5	**Ext. Marks : 75**
Duration : 75 hrs	**Max. Marks : 100**

Course Objectives:

- To introduce several statistical constants like measures of central tendency, dispersion, skewness etc.
- To introduce the concept of discrete, continuous random variables.
- To analyze the qualitative data.

Course Outcomes:

1. Gain knowledge in basic mathematical statistics.
2. Able to collect, organize, and represent data, and be able to recognize and describe relationships.
3. Demonstrate the relevance and use of statistical tools for analysis and forecasting.
4. Gain the basic knowledge of measures of dispersion like mean, median and mode.
5. Obtain a point estimate for the variance and standard deviation of the conditional distribution of the response variable given a value for the predictor.
6. Determine a probability distribution of random variable (one or two dimensional) in the given situation.

7. Be familiar with techniques to calculate probabilities, expected values and probability, moment and cumulant generating functions for discrete, continuous and multivariate random variables and know how to apply these concepts in practical problems.

UNIT I **(15 hrs)**

Frequency Distributions and Measures of Central Tendency: Frequency Distributions – Graphic Representation of a Frequency Distribution –Averages or Measures of Central Tendency or Measures of Location – Requisites for an Ideal Measure of Central Tendency – Arithmetic Mean – Median – Mode – Geometric Mean - Harmonic Mean – Selection of an Average – Partition Values. **Measures of Dispersion, Skewness and Kurtosis:** Dispersion – Characteristics for an Ideal Measure of Dispersion - Measures of Dispersion – Range – Quartile Deviation – Mean Deviation – Standard Deviation and Root Mean Square Deviation – Coefficient of Dispersion –Moments – Pearson's β and γ Co-efficients. – Skewness – Kurtosis.

UNIT II **(15 hrs)**

Random Variables and Distribution Functions: Random Variable – Distribution Function – Discrete Random Variable – Continuous Random Variable – Joint Probability Mass Function and Marginal and Conditional Probability Function – Transformation of One-Dimensional Random Variable.

UNIT III **(15 hrs)**

Mathematical Expectation and Generating Functions: Mathematical Expectation – Addition Theorem of Expectation – Multiplication Theorem of Expectation – Co-variance – Expectation of Linear Combination of Random Variables – Variance of a Linear Combination of Random Variables – Expectation of a Continuous Random Variable – Conditional Expectation and Conditional Variance – Moment Generating Function – Cumulants – Characteristic Function – Chebyshev's Inequality – Weak Law of Large Numbers.

UNIT IV **(15 hrs)**

Theoretical Discrete Distributions: Introduction – Bernoulli Distribution – Binomial Distribution – Poisson Distribution.

UNIT V **(15 hrs)**

Theoretical Continuous Distributions: Rectangular Distribution – Normal Distribution – Gamma Distribution – Beta Distribution of First Kind – Beta Distribution of Second Kind – The Exponential Distribution.

Text Book:

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

Unit	Chapter	Section	Page No.
I	2	2.1 – 2.11	8 – 27
	3	3.1 – 3.12	34 – 59

II	5	5.1 – 5.6	109 – 147
III	6	6.1 – 6.13	148 – 179
IV	7	7.0 – 7.3	181 – 211
V	8	8.1 – 8.6	214 – 248

Reference Books :

1. Dr.S.Arumugam and Mr.A.Thangapandi Isaac, "Statistics", New Gamma Publishing House, Palayamkottai, 2009.
2. S.P.Gupta, "Statistical Methods", Sultan Chand and Sons, New Delhi, Fortieth Revised Edition, 2011.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc

Semester V

(2018 - 2021)

Major Elective Course – II: Laplace Transforms and Fourier Series (18UMAO51)

(For those who join from June 2018 and afterwards)

Credits : 3 **Int.Marks : 25**

Hours/Week : 4 **Ext.Marks : 75**

Duration : 60 hrs **Max.Marks:100**

Course Objectives:

- To develop the solution of linear differential equations using Laplace Transform.
- To Find the Fourier Series of the function f(x).
- To enrich the knowledge of the students about the half range Fourier Series.

Course Outcomes:

1. Inculcate the insight knowledge of Laplace Transforms and the conditions for its existence.
2. Demonstrate the idea of inverse Laplace Transforms.
3. Able to solve certain equations involving integrals by Laplace Transform.
4. Gain knowledge of even and odd Functions.
5. Introduce the concept of Half Range Fourier Series.
6. Gain an in-depth knowledge of the various aspects of cosine series and change of interval.

UNIT I **(12 hrs)**

The Laplace Transforms: Definitions – Sufficient Conditions for the Existence of the Laplace Transform - Results – Examples - Laplace Transform of Periodic Functions - Some General Theorems - Evaluation of Certain Integrals using Laplace Transform.

UNIT II **(12 hrs)**

The Inverse Laplace Transforms - Results - Examples - To Find the Inverse Laplace Transform of Certain Functions by the Method of Partial Fractions.

UNIT III **(12 hrs)**

To Solve Ordinary Differential Equations with Constant Coefficients by Laplace Transform - To Solve System of Differential Equations by Laplace Transform - To Solve Ordinary Differential Equations with Variable Coefficients by Laplace Transform – To Solve Certain Equations Involving Integrals by Laplace Transform.

UNIT IV **(12 hrs)**

Fourier Series: Even and Odd Functions - Properties of Odd and Even Functions.

UNIT V **(12 hrs)**

Half Range Fourier Series - Development in Cosine Series - Development in Sine Series - Change of Interval.

Text Book:

S.Narayanan, T.K.Manicavachagom Pillay, "Calculus - Volume III", S. Viswanathan Printers and Publishers, PVT., LTD, Chennai, Revised 18th Edition, 2002.

Unit	Chapter	Section	Page No.
I	5	1- 5	154 - 172
II	5	6 – 7	174 - 185

III	5	8 – 12	186 - 201
IV	6	1 – 3	202 - 220
V	6	4 – 6	221 - 233

Reference Books:

1. P.R.Vittal, “Differential Equations, Fourier and Laplace Transforms, Probability”, Magham Publications, Chennai, Third Revised Edition, 2002.
2. S.Narayanan, T.K.Manicavachagom Pillay, “Differential Equations and its Applications”, S.Viswanathan (Printers and Publishers) Pvt., Ltd. Chennai , 2011.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc

Semester V

(2018-2021)

Major Elective Course - II : Introduction to Fractals (18UMAO52)

(For those who join from June 2018 and afterwards)

Credits : 3 **Int.Marks : 25**

Hours/Week : 4 **Ext.Marks :75**

Duration : 60 hrs **Max.Marks : 100**

Course Objectives:

- To introduce the concept of Fractals.
- To Know about the Chaos Theory.

Course Outcomes:

1. Introduce the notion of Fall of Determinism.
2. Gain an in-depth knowledge of the Jagged Geometry.
3. Inculcate the basic knowledge of self-similarity.
4. Describe the chaos and fractals in nature.
5. Equip with the basic knowledge of complexity.

UNIT I **(12 hrs)**

Fall of Determinism : Weatherman's Woes – The Erratic Populations – Lamps in the Cathedral – A Moment of Truth – Topology in a Culinary Art.

UNIT II **(12 hrs)**

The Jagged Geometry : The Ugly and Beautiful – Shores of Great Britain – The Seeds of Self - Similarity – Snowflakes and Tiles – Holed Carpets and Spongy Boxes.

UNIT III **(12 hrs)**

Arithmetic Dust and the Devil's Staircase – Strange Attractors - Chaos and Fractals in Nature – Faucets, Fractures, Forest Fires and a Matter of Heart.

UNIT IV **(12 hrs)**

Self- Organisation : Thermodynamic Arrow of Time – The Creative Arrow of Time – Dissipative Structures – Cellular Automata – The Enigma of Life.

UNIT V **(12 hrs)**

Complexity: Reductionism and Holism – The Altered Perceptions.

Text Book:

Arvind Kumar, **"**Chaos, Fractals and Self-organisation", National Book Trust, India

Unit	Section	Page No.
I	1-5	6- 53
II	6 - 10	56-81

III	11 -13	82-117
IV	14-18	119-159
V	19-20	161-178

Reference Books:

1. Benoit B. Mandelbrot, “The Fractal Geometry of Nature”, W. H. Freeman and company, New York.
2. Kenneth Falcer, “Fractal Geometry Mathematical Foundations and Applications”, John Willey and Sons Ltd., Chichester.

Sri Kaliswari College (Autonomous), Sivakasi
Department of Mathematics
UG Programme – B.Sc
Semester V
(2018-2021)

Major Elective Course - II: Fuzzy Sets and Logic (18UMAO53)

(For those who join from June 2018 and afterwards)

Credits : 3 **Int.Marks : 25**
Hours/Week : 4 **Ext.Marks :75**
Duration : 60 hrs **Max.Marks : 100**

Course Objectives:

- To study the newly developed fuzzy concepts.
- To introduce the concepts in fuzzy logics.
- To study applications of fuzzy concepts.

Course Outcomes:

1. Explain the fundamental concepts of fuzzy set.
2. Demonstrate the concept of α-cut and its properties.
3. Compute the fuzzy number using the arithmetic operations.
4. Able to know the relation of fuzzy set.
5. Get the inference from conditional, quantified proposition.
6. Get insight into interpersonal communication as an application of fuzzy.

UNIT I **(12 hrs)**

Fuzzy Set Theory: Introduction – Concept of a Fuzzy Set – Relation between Fuzzy Sets – Operations on Fuzzy Sets – Properties of the Standard Operations.

UNIT II **(12 hrs)**

Certain Numbers Associated with a Fuzzy Set – Certain Crisp Sets Associated with a Fuzzy Set - Certain Fuzzy Sets Associated with a Given Fuzzy Set – Extension Principle.

UNIT III **(12 hrs)**

Fuzzy Relations: Introduction – Fuzzy Relations -Operations on Fuzzy Relations – α-cuts of a Fuzzy Relation – Composition of Fuzzy Relations –Projections of Fuzzy Relations.

UNIT IV **(12 hrs)**

Cylindric Extensions – Cylindric Closure – Fuzzy Relation on a Domain.**Fuzzy Logic**: Introduction - Three -Valued Logics – N-Valued Logics for $N \geq 4$ - Infinite - Valued Logics.

UNIT V **(12 hrs)**

Fuzzy Logics – Fuzzy Propositions and their Interpretations in terms of Fuzzy Sets – Fuzzy Rules and their Interpretations in terms of Fuzzy Relations.

Text Book :

M.Ganesh, "Introduction to Fuzzy Sets and Fuzzy Logic", PHI Learning Private Limited, New Delhi, Sixth Reprint, 2012.

Unit	Chapter	Section	Page No.
I	Part II – Chapter 6	6.1 – 6.5	85-91
II	Part II – Chapter 6	6.6 – 6.9	91-102
III	Part II – Chapter 7	7.1 – 7.6	129-136
IV	Part II – Chapter 7	7.7-7.9	136-144
	Part II – Chapter 8	8.1-8.4	147-151
V	Part II – Chapter 8	8.5 – 8.10	151-165

Reference Books:

1. A.R.Meenakshi , " Fuzzy matrix Theory and Applications", MJP Publishers, Chennai, 2008.
2. Dr.K.Sundareswaran ," Fuzzy Logic Systems", Jaico Publishing House, Mumbai,2008.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc

Semester V

(2018-2021)

Skill Based Course - II: Transform Techniques (18UMAS51)

(For those who join from June 2018 and afterwards)

Credit : 1	**Int.Marks : 25**
Hours/Week : 2	**Ext.Marks : 75**
Duration : 30 hrs	**Max.Marks : 100**

Course Objectives:

- To learn various transformations.
- To enrich the knowledge in difference equations.

Course Outcomes:

1. Gain knowledge of Fourier transforms.
2. Learn about the properties of Fourier Transform.
3. Understand the concept of Fourier sine and cosine Transforms.
4. Develop the skill about Z – Transforms and difference equations.
5. Inculcate the basic knowledge of inverse Z – transform.

UNIT I **(6 hrs)**

Fourier Transforms : Introduction – Statement of Fourier Integral Theorem –Fourier Transform Pair : Fourier Transform.

UNIT II **(6 hrs)**

Inversion Formula for Fourier Transform – Properties of Fourier Transforms - Convolution Theorem – Parseval's Identity.

UNIT III **(6 hrs)**

Fourier Sine and Cosine Transforms - Fourier Cosine Transform - Inversion Formula for Fourier Cosine Transform - Fourier Sine Transform - Inversion Formula for Fourier Sine Transform – Properties of Fourier Sine and Cosine Transform – Problems based on Fourier Sine and Cosine Transform and its Inversion Formula.

UNIT IV **(6 hrs)**

Z – Transforms and Difference Equations: Introduction – Z – Transform, Elementary Properties of Z – Transform.

UNIT V **(6 hrs)**

Inverse Z - Transform – Convolution Theorem – Formation of Difference Equations.

Text Book:

G. Balaji, "Transforms and Partial Differential Equations", G.Balaji Publishers, Chennai,2014.

Unit	Chapter	Section	Page No.
I	4	4.0 , 4.1 , 4.2 (a)	4.1-4.26, 4.35-4.47
II	4	4.2 (b) , 4.2 (c) , 4.2 (d)	4.26-4.35, 4.48-4.78
III	4	4.3 (a) - 4.3 (e)	4.78-4.119
IV	5	5.0 , 5.1	5.1-5.51
V	5	5.2 -5.4	5.52-5.94

Reference Books:

1. Ronald N Bracewell, "The Fourier Transform and Its Applications", Mc-Graw Hill International Edition, Third Edition, 2000.

2. Poularikas, A.D, "The Transforms and Applications Handbook", CRC Press LLC, Second Edition, 2000.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc

Semester V

(2018-2021)

Skill Based Course - III: Quantitative Aptitude (18UMAS52)

(For those who join from June 2018 and afterwards)

Credit : 1	**Int.Marks : 25**
Hours/Week : 2	**Ext.Marks : 75**
Duration : 30 hrs	**Max.Marks : 100**

Course Objectives:

- To solve the questions in a fraction of a minute using short-cut methods.
- To prepare for the competitive examinations.
- To have an idea of solving day-to-day problems.

Course Outcomes:

1. Able to apply quantitative reasoning and mathematical analysis methodologies to understand and solve problems.
2. Understanding the properties of proportion and its usage.
3. Examine how to calculate Simple and Compound interest.
4. Able to demonstrate an understanding of the difference between area and perimeter.
5. Able to solve applications involving permutations and combinations.
6. Understanding event, outcome, trial, simple event, sample space and calculate the probability that an event will occur.

UNIT I **(6 hrs)**

Profit and Loss - Ratio and Proportion - Time and Work.

UNIT II **(6 hrs)**

Pipes and Cistern - Time and Distance - Problems on Trains.

UNIT III **(6 hrs)**

Boats and Streams - Alligation or Mixture.

UNIT IV **(6 hrs)**

Simple Interest - Compound Interest - Area - Volume and Surface Areas.

UNIT V **(6 hrs)**

Permutations and Combinations - Probability - Odd Man Out and Series.

Text Book:

R.S.Aggarwal, "Quantitative Aptitude", S.Chand and Company Pvt. Ltd., New Delhi, First Edition, 2015.

Unit	Section	Page No.
I	11,12,15	251-310, 341-365
II	16 -18	371-424
III	19, 20	425-444
IV	21,22, 24,25	445-486, 499-587
V	30,31,35	613-631, 649-657

Reference Books:

1. S. Abdul Mohideen, "Quantitative Aptitude", Deen Intelligent Books, Thirunelveli, First Edition, 2006.
2. Abhijth Guha, "Quantitative Aptitude for Competitive Examinations", Tata McGraw – Hill publishing Company Ltd, New Delhi, Third Edition, 2005.

Sri Kaliswari College (Autonomous), Sivakasi
Department of Mathematics
UG Programme – B.Sc
Semester VI
(2018 - 2021)
Core Course – XIII: Linear Algebra (18UMAC61)
(For those who join from June 2018 and afterwards)

Credits : 5 **Int.Marks : 25**
Hours/Week: 5 **Ext.Marks : 75**
Duration : 75 hrs **Max.Marks:100**

Course Objectives:

- To study the basic algebraic structures like vector spaces and inner product spaces.
- To study about matrices and its types.
- To study bilinear forms and quadratic forms.

Course Outcomes:

1. Present basic concepts of vector spaces.
2. Demonstrate concepts of linear transformations.
3. Learn about the span of a set and linear independence.
4. Inculcate basic concepts of matrices and matrix algebra.
5. Present methods of solving systems of linear equations.
6. Present methods of computing eigen values and eigenvectors.
7. Demonstrate ability to work within vector spaces and to distil vector space properties.

UNIT I **(15 hrs)**

Vector Spaces: Introduction – Definition and Examples – Subspaces – Linear Transformation.

UNIT II **(15 hrs)**

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

UNIT III **(15 hrs)**

Inner Product Spaces: Introduction - Definition – Orthogonality – Orthogonal Complement.

UNIT IV **(15 hrs)**

Theory of Matrices: Introduction - Algebra of Matrices – Types of Matrices – The Inverse of a Matrix – Elementary Transformations – Rank of a Matrix – Simultaneous Linear Equations – Characteristic Equations and Cayley Hamilton Theorem.

UNIT V **(15 hrs)**

Eigen Values and Eigen Vectors of a Matrix. **Bilinear Forms:** Introduction – Bilinear Forms – Quadratic Forms.

Text Book:

Dr. S. Arumugam , A. Thangapandi Issac , " Modern Algebra" , Scitech Publications (India) Pvt Ltd, Chennai , 2008.

Unit	Chapter	Section	Page No.
I	5	5.0 - 5.3	5.1 – 5.13
II	5	5.4 – 5.8	5.14 – 5.30
III	6	6.0 – 6.3	6.1 – 6.9
IV	7	7.0 – 7.7	7.1 – 7.29
V	7	7.8	7.30 – 7.39
	8	8.0 - 8.2	8.1 – 8.7

Reference Books:

1. P.B. Bhattacharya, S.K. Jain, S.R. Nagpaul, "First Course in Linear Algebra", New Age International Publishers, New Delhi, 2001.
2. S. Kumaresan, "Linear Algebra: A Geometric Approach", PHI Learning Private Limited, New Delhi, 2017.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc

Semester VI

(2018-2021)

Core Course - XIV: Complex Analysis (18UMAC62)

(For those who join from June 2018 and afterwards)

Credits : 5	**Int.Marks : 25**
Hours/Week : 5	**Ext.Marks :75**
Duration : 75 hrs	**Max.Marks :100**

Course Objectives:

- To assist the students in learning fundamental ideas and theorems about complex plane.
- To learn various transformations in complex plane.
- To enrich their knowledge in complex integration.

Course Outcomes:

1. Explain the fundamental concepts of complex analysis.
2. Understand the significance of differentiability for complex functions and be familiar with the Cauchy-Riemann equations.
3. Gain knowledge about the elementary transformation and bilinear transformation.
4. Compute the fixed points of a bilinear transformation.
5. Evaluate integrals along a path in the complex plane and understand the statement of Cauchy's Theorem.
6. Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues.
7. Identify the isolated singularities of the function and determine whether they are removable, poles or essential.
8. Use the Residue theorem to compute complex line integral and real integrals.

UNIT I **(15 hrs)**

Analytic Functions: Functions of a Complex Variable – Limits– Theorems on Limit– Continuous functions–Differentiability– The Cauchy - Riemann Equations– Analytic Functions– Harmonic Functions– Conformal Mapping.

UNIT II **(15 hrs)**

Bilinear Transformations: Elementary Transformations– Bilinear Transformations– Cross Ratio– Fixed Points of Bilinear Transformations– Some Special Bilinear Transformations.

Mapping by Elementary Functions : The Mapping $w=z^2$,$w=z^n$ $w=e^z$, w=sin z, w=cos z.

UNIT III **(15 hrs)**

Complex Integration: Definite Integral – Cauchy's Theorem– Cauchy's Integral Formula – Higher Derivatives.

UNIT IV **(15 hrs)**

Series Expansions: Taylor's Series – Laurent's Series – Zeros of an Analytic Function – Singularities.

UNIT V **(15 hrs)**

Calculus of Residues: Residues – Cauchy's Residue Theorem– Evaluation of Definite Integrals.

Text Book:

Dr.S.Arumugam, A.Thangapandi Isaac and A.Somasundaram, "Complex Analysis", Scitech Publications (India) Pvt Ltd., Chennai, 2011.

Unit	Chapter	Section	Page No.
I	2	2.1-2.9	24-72
II	3	3.1-3.5	74- 100
	5	5.1- 5.5	118-126
III	6	6.1-6.4	132-170
IV	7	7.1-7.4	173-207
V	8	8.1-8.3	209-254

Reference Books:

1. S.Narayanan, T.K.Manicavachagom Pillay , "Complex Analysis", S.Viswanthan (Printers and Publishers) Pvt. Ltd., Fifth Edition.
2. P.Duraipandian Kayalal Pachaiyappa, "Complex Analysis", S.Chand and Company Pvt.Ltd., New Delhi, 2014.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc

Semester VI

(2018 - 2021)

Core Course – XV: Graph Theory (18UMAC63)

(For those who join from June 2018 and afterwards)

Credits : 5 **Int.Marks : 25**

Hours/Week : 5 **Ext.Marks : 75**

Duration : 75 hrs **Max.Marks:100**

Course Objectives:

- To translate real life situation to diagrammatic representations.
- To develop problem solving skills and thereby solve real life problems.
- To create interest in Research. .

Course Outcomes:

1. Understand the basic concepts of graphs.
2. Able to present a graph by matrices.
3. Understand Eulerian and Hamiltonian graphs.
4. Understand the properties of trees.

5. Demonstrate the usage of Euler's Formula.
6. Find chromatic index and chromatic polynomial for graphs.

UNIT I **(15 hrs)**

Graphs and Subgraphs: Introduction – Definition and Examples – Degrees – Sub graphs – Isomorphism – Ramsey Numbers – Independent Sets and Coverings – Intersection Graphs and Line Graphs – Matrices – Operations on Graphs.

UNIT II **(15 hrs)**

Degree sequences: Introduction - Degree Sequences – Graphic Sequences. **Connectedness:** Introduction – Walks, Trails and Paths – Connectedness and Components – Blocks – Connectivity.

UNIT III **(15 hrs)**

Eulerian and Hamiltonian graphs: Introduction – Eulerian Graphs – Hamiltonian Graphs. **Trees**: Introduction – Characterization of Trees – Centre of a Tree.

UNIT IV **(15 hrs)**

Matchings: Introduction - Matchings – Matchings in Bipartite Graphs. **Planarity:** Introduction **-** Definition and Properties – Characterization of Planar Graphs – Thickness, Crossing and Outer Planarity.

UNIT V **(15 hrs)**

Colourability: Introduction – Chromatic Number and Chromatic Index - The Five Colour Theorem – Four Colour Problem – Chromatic Polynomials.

Text Book:

Dr. S. Arumugam and Dr. S. Ramachandran,"Invitation to Graph Theory", Scitech Publications (India) Pvt. Ltd, Chennai , 2009.

Unit	Chapter	Section	Page No.
I	2	2.0 – 2.9	5 – 27
II	3	3.0 – 3.2	29 – 33
	4	4.0 – 4.4	34 – 47
III	5	5.0 – 5.2	48 – 59
	6	6.0 – 6.2	61 – 65
IV	7	7.0 – 7.2	66 – 72
	8	8.0 – 8.3	73 – 83
V	9	9.0 – 9.4	85 - 97

Reference Books:

1. Harary, "Graph Theory", Narosa Publishing House, New Delhi, 2001.
2. Dr.M.Murugan, "Topics in Graph Theory and Algorithms", Muthali Publishing

House, Chennai, 2003.

Sri Kaliswari College (Autonomous), Sivakasi
Department of Mathematics
UG Programme – B.Sc
Semester VI
(2018 – 2021)
Core Course – XVI : Mathematical Statistics – II (18UMAC64)
(For those who join from June 2018 and afterwards)

Credits : 5 **Int. Marks : 25**
Hours / Week : 5 **Ext. Marks : 75**

Duration : 75 hrs **Max. Marks : 100**

Course Objectives:

- To study about sampling theory.
- To study the method employed to understand the parent population.
- To study the quantitative and qualitative characteristics of a population.
- To know about ANOVA.

Course Outcomes :

1. Able to understand the significance of the connection between statistics and probability and their applicability to the real world.
2. Explain the concepts of random sampling, statistical inference and sampling distribution, and state and use basic sampling distributions.
3. Frame distribution functions and its types.
4. Gain knowledge about the multivariate distributions.
5. Gain knowledge about Chi-square distribution.
6. Present the ideas about the t and F distributions.
7. Formulate and analyze mathematical and statistical problems, precisely define the key terms, and draw clear and reasonable conclusions using various discrete distributions and estimation theory techniques.

UNIT I **(15 hrs)**

Sampling and Large Sample Tests: Sampling Introduction – Types of Sampling – Parameters and Statistic – Tests of Significance – Null Hypothesis – Errors in Sampling – Critical Region and Level of Significance – Tests 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 II **(15 hrs)**

Exact Sampling Distribution: Chi-square Variate – Derivation of the Chi-square Distribution – M.G.F. of χ^2 Distribution - Chi-square Probability Curve – Applications of Chi-square Distribution – Yate's Correction.

UNIT III **(15 hrs)**

Exact Sampling Distributions: Introduction – Student's 't' (Definition) – F-statistic (Definition).

UNIT IV **(15 hrs)**

Theory of Estimation: Introduction – Characteristics of Estimators – Method of Estimation – Rao-Cramer Inequality. **Testing of Hypothesis:** Introduction – Statistical

Hypothesis - Simple and Composite – Steps in Solving Testing of Hypothesis Problem – Optimum Test under Different Situations – Heyman J and Pearson, E.S.Lemma.

UNIT V **(15 hrs)**

Analysis of Variance: Introduction – One-way Classification – Two-way Classification. **Design of Experiments:** Introduction – Terminology in Experimental Designs – Principles of an Experimental Design – Size of the Plot – Completely Randomised Design (C.R.D). - Randomised Block Design (R.B.D) – Latin Square Design.

Text Book:

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

Unit	Chapter	Section	Page No.
I	12	12.1 – 12.15	307 – 331
II	13	13.1 – 13.6	334 – 350
III	14	14.1 – 14.3	352 – 372
IV	15	15.1 – 15.4	S.1 – S.16
	16	16.1 – 16.5	S.18 – S.29
V	17	17.1 – 17.3	S.31 – S.45
	18	18.1 – 18.7	S.46 – S.74

Reference Books :

1. Dr.S.Arumugam and Mr.A.Thangapandi Isaac, "Statistics", New Gamma Publishing House, Palayamkottai, 2009.
2. S.P.Gupta, "Statistical Methods", Sultan Chand and Sons, New Delhi, Fortieth Revised Edition , 2011.

Sri Kaliswari College (Autonomous), Sivakasi
Department of Mathematics
UG Programme – B.Sc
Semester VI
(2018 - 2021)

Major Elective Course – III: Mathematical Modeling (18UMAO61)
(For those who join from June 2018 and afterwards)

Credits : 3 **Int.Marks : 25**
Hours/Week : 4 **Ext.Marks : 75**
Duration : 60 hrs **Max.Marks:100**

Course Objectives:

- To create interest in study of mathematical models.
- To transfer the concepts of mathematical concepts gained from special case-studies to other situations.

Course Outcomes :

1. Familiarize themselves with the basic knowledge of mathematical modelling and its techniques.
2. Gain knowledge of Mathematical modelling through Geometry, Algebra, Calculus, Differential Equations.
3. Learn about the limitations of Mathematical modelling.
4. Study about Linear Growth and non linear growth with Decay Models.
5. Gain an in-depth knowledge of Mathematical modelling in dynamics through ordinary differential equations.
6. Study the concept of models in terms of directed Graphs and signed Graphs.

UNIT I **(12 hrs)**

Mathematical Modelling: Need, Techniques, Classifications and Simple Illustrations: Simple Situations Requiring Mathematical Modelling - The Technique of Mathematical Modelling - Classification of Mathematical Models - Some Characteristics of Mathematical Models - Mathematical Modelling Through Geometry.

UNIT II **(12 hrs)**

Mathematical Modelling Through Algebra - Mathematical Modelling Through Trigonometry - Mathematical Modelling Through Calculus - Limitations of Mathematical Modelling.

UNIT III **(12 hrs)**

Mathematical Modelling Through Differential Equations of First Order: Mathematical Modelling Through Differential Equations - Linear Growth and Decay Models - Non-linear Growth and Decay Models.

UNIT IV **(12 hrs)**

Compartment Models - Mathematical Modelling in Dynamics Through Ordinary Differential Equations of First Order - Mathematical Modelling of Geometrical Problems Through Ordinary Differential Equations of First Order.

UNIT V **(12 hrs)**

Mathematical Modelling Through Graphs: Situations that can be Modelled Through Graphs - Mathematical Models in Terms of Directed Graphs - Mathematical Models in Terms of Signed Graphs - Mathematical Modelling in Terms of Weighted Digraphs - Mathematical Modelling in Terms of Unoriented Graphs.

Text Book:

J.N.Kapur , "Mathematical Modelling", **N**ew Age International (P) Limited, Publishers, Chennai, 2009.

Unit	Chapter	Section	Page No.
I	1	1.1 – 1.5	1 – 15
II	1	1.6 – 1.9	16 – 28
III	2	2.1 - 2.3	20 – 37
IV	2	2.4 – 2.6	39 – 51
V	7	7.1 – 7.5	151 – 175

Reference Books:

1. Frank R. Giordano, William P. Fox, Steven B. Horton, Maurice D. Weir, "Mathematical Modeling Principles and Applications", - Cengage Learning India Private Limited, New Delhi, First Indian Reprint, 2009.
2. Michael D Alder, " Introduction to Mathematical Modelling", HeavenForBooks.com.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc

Semester VI

(2018 - 2021)

Major Elective Course – III: Stochastic Processes (18UMAO62)

(For those who join from June 2018 and afterwards)

Credits : 3 **Int.Marks : 25**

Hours/Week : 4 **Ext.Marks : 75**

Duration : 60 hrs **Max.Marks:100**

Course Objectives:

- To introduce the concept of Stochastic Process.
- To study about Special chains and Foster type theorems.
- To know about Poisson process and renewal theory.

Course Outcomes :

1. Apply the specialised knowledge in probability theory and random processes to solve practical problems.
2. Gain advanced and integrated understanding of the fundamentals of Markov chains and interrelationship between discrete and continuous random variables and between deterministic and stochastic processes.
3. Evaluate the n-step transition probability.
4. Learn about renewal theory.
5. Demonstrate the transition function and Know about the Birth – Death and Yule process.
6. Study the properties of Poisson process and their characterization.

UNIT I **(12 hrs)**

Discrete Time Markov Chains: Definition and Transition Probabilities – A Few More Examples – Classification of States – Limit Theorems for Markov Chains – Stationary Distribution.

UNIT II **(12 hrs)**

Special Chains and Foster Type Theorems – Theorems Regarding Finite Markov Chains – Methods of Evaluation of the n-step Transition Probability.

UNIT III **(12 hrs)**

Renewal Theory: Introduction – Renewal Equation – Renewal Theorems – Central Limit Theorem for Renewal Theory.

UNIT IV **(12 hrs)**

Continuous Time Discrete State Markov Processes: Axiomatic Definition and Transition Function – Differentiability of Transition Function – Kolmogorov Differential Difference Equation – Infinitesimal Generators and Examples– Birth and Death processes – The Yule Process.

UNIT V **(12 hrs)**

Poisson Process: Different Definitions and their Equivalence – Poisson Process and Renewal theory – Properties of Poisson Process – Characterization of Poisson process – Generalization of Poisson Process.

Text Book:

A.K.Basu, "Introduction to Stochastic Process", Narosa Publishing house, New Delhi, 2007.

Unit	Chapter	Section	Page No.
I	2	2.1 – 2.5	8 - 32
II	2	2.6 – 2.8	32 - 43
III	4	4.1 – 4.4	65 - 75
IV	6	6.0 – 6.5	107 – 121
V	7	7.1 – 7.5	133 - 148

Reference Books:

1. J.Medhi , "Stochastic Processes", New age international (P) Limited, Publishers, New Delhi, Second Edition, 2004.
2. S.K. Srinivasan, K.M. Mehata, "Stochastic Processes", Tata McGraw-Hill Publishing Company Limited, New Delhi.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc

Semester VI

(2018-2021)

Major Elective Course –III: Optimization Techniques (18UMAO63)

(For those who join from June 2018 and afterwards)

Credits : 3	**Int.Marks : 25**
Hours/Week : 4	**Ext.Marks : 75**
Duration : 60 hrs	**Max.Marks : 100**

Course Objectives:

- To study about transportation cost optimization.
- To enrich the knowledge about operations research and to explain how it gives integrated solutions for the entire organization.
- To know more about decision-making problems in multi-stage problems.

Course Outcomes:

1. Understand and identify the need of using Operations Research techniques.
2. Find optimum solution for real life problems.
3. Gain the knowledge of transportation problem using many techniques.
4. Develop the ability to solve the transhipment problems.
5. Find optimum solution using assignment method.
6. Inculcate the basic knowledge of sequencing problems.
7. Make a wide knowledge in Dynamic programming for solving real life problems.

UNIT I **(12 hrs)**

Transportation problem: Introduction – LP Formulation of theTransportation Problem – Existence of Solution in T.P. – Duality in Transportation Problem -Transportation Table – Loops in Transportation Tables –Triangular Basis in a T.P. – Solution of a Transportation Problem – Finding an Initial Basic Feasible Solution.

UNIT II **(12 hrs)**

Test for Optimality –Economic Interpretation of $u_i's$ and $v_j's$ - Degeneracy in Transportation Problem – Transportation Algorithm (MODI Method) - Stepping Stone Solution Method – Some Exceptional Cases – Time-Minimization Transportation Problem – Transhipment Problems.

UNIT III **(12 hrs)**

Assignment Problem: Introduction - Mathematical Formulation of the Problem – Solution Methods of Assignment Problem – Special Cases in Assignment Problems – A Typical Assignment Problem – The Travelling Salesman Problem.

UNIT IV **(12 hrs)**

Sequencing Problem: Introduction - Problem of Sequencing – Basic Terms Used in Sequencing – Processing n Jobs Through Two Machines – Processing n Jobs Through k Machines – Processing 2 Jobs Through k Machines – Maintenance Crew Scheduling.

UNIT V **(12 hrs)**

Dynamic Programming: Introduction - The Recursive Equation Approach – Characteristics of Dynamic Programming – Dynamic Programming Algorithm – Solution of Discrete D.P.P – Some Applications – Solution of L.P.P. by Dynamic Programming.

Text Book:

KantiSwarup, P.K.Gupta, Man Mohan, "Operations Research", Sultan Chand and Sons, New Delhi, Sixteenth Edition , 2012.

Unit	Chapter	Section	Page No.
I	10	10.1-10.9	247-258
II	10	10.10-10.17	259-291
III	11	11.1-11.5, 11.7	295-317 , 320-322

IV	12	12.1-12.7	327- 343
V	13	13.1-13.7	347-370

Reference Books:

1. Er. Premkumar Gupta and D.S.Kira, "Problems in Operations Research", S.Chand and Company Ltd, New Delhi, 2012.
2. R.Pannerselvam, "Operations Research", Prentice Hall of India Private Limited, New Delhi, Second Edition, 2006.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc

Semester VI

(2018 - 2021)

Skill Based Course – IV: Lattices and Boolean Algebra (18UMAS61)

(For those who join from June 2018 and afterwards)

Credits : 2 **Int.Marks : 25**

Hours/Week : 2 **Ext.Marks: 75**

Duration : 30 hrs **Max.Marks:100**

Course Objectives:

- To introduce lattices and various type of lattices.
- To study about Boolean algebra.
- To learn Karnaugh map and its applications.

Course Outcomes :

1. Able to recognize, identify, classify and describe the problems of set theory so that they can differentiate between functions and relations.
2. Understand abstract algebraic concepts like posets, lattices, Boolean algebra.
3. Gain an insight into the types of lattices and its properties.
4. Draw a Karnaugh map for a logic system with up to four inputs and use it to minimise the Boolean expression.

UNIT I **(6 hrs)**

Lattices – Some Properties of Lattices.

UNIT II **(6 hrs)**

New Lattices –Modular and Distributive Lattices.

UNIT III **(6 hrs)**

Boolean Algebras – Boolean Polynomials.

UNIT IV **(6 hrs)**

Karnaugh Map – Simplification of Logical Functions using Karnaugh Map – Minimization Algorithm for Boolean Polynomials – Karnaugh Maps for 5-variables and 6-variables.

UNIT V **(6 hrs)**

Switching Circuits.

Text Book:

Dr.M.K.Venkataraman, Dr.N.Sridharan, N.Chandrasekaran, "Discrete Mathematics", The National Publishing Company, Chennai, 2011.

Unit	Chapter	Section	Page No.
I	X	1 - 2	10.1 – 10.12
II	X	3 - 4	10.13 – 10.32
III	X	5 - 6	10.34 – 10.49
IV	X	7	10.50 – 10.69
V	X	8	10.71 – 10.85

Reference Books:

1. B.S. Vatsa, Suchi Vatsa, "Discrete Mathematics", New Age International Private Limited, Publishers, New Delhi, Fourth Revised Edition, 2012.

2. V. Subramanian, “Discrete Mathematical Structures”, Scitech Publications (India) Private Limited, Chennai, 2008.

Sri Kaliswari College (Autonomous), Sivakasi
Department of Mathematics
UG Programme – B.Sc
Semester VI
(2018 - 2021)
Value Based Course – II: HTML Lab (18UMAV6P)
(For those who join from June 2018 and afterwards)

Credits	**: 1**	**Int.Marks**	**: 40**
Hours/Week	**: 2**	**Ext.Marks**	**:60**
Durations	**: 30 hrs**	**Max.Marks**	**:100**

Course Objectives:

- To know about of basic page designing tags.
- To study of Table tag, Image tag and Frame tag.
- To study of Form tag.

Course Outcomes:

1. Designing and implementing dynamic websites with good aesthetic sense.
2. Getting a good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services.
3. Designing web pages through code using HTML.
4. Understanding HTML tags.
5. Gain Knowledge about Creation of application form in web page.

HTML:

1. To design simple web page using basic HTML Tags.
2. To prepare the resume using Basic tags.
3. To implement the list (Order list & Unordered list).
4. To create a Time Table format using Table tags.
5. To design a page in image Map using Image tag.
6. To prepare the advertisement using HTML tags.
7. To implement the Frame tag.
8. To design a application form using Form tags.
9. To create college website using HTML Tags.
10. Creation of on-line application forms for any application.

Sri Kaliswari College (Autonomous), Sivakasi
Department of Mathematics
UG Programme – B.Sc (Physics/Chemistry)
Semester I
(2018 – 2021)
Allied Course – I: Mathematics – I (18UPHA11/18UCHA11)
(For those who join from June 2018 and afterwards)

Credits : 5 **Int. Marks : 25**
Hours/Week : 6 **Ext. Marks : 75**
Duration : 90 hrs **Max. Marks : 100**

Course Objectives:

- To study about Statistical tools.
- To know about Operations Research techniques.

Course Outcomes:

1. Impart knowledge in basic mathematical statistics.
2. Inculcate the basic knowledge of measures of dispersion like mean, median and mode.
3. Know about the concept of correlation, regression and index numbers.
4. Gain an in-sight knowledge in the various aspects of fitting curves.
5. Understand and identify the need of using Operations Research.
6. Gain knowledge of linear programming technique using graphical solution method.
7. Gain knowledge of transportation problem and assignment problem.

UNIT I **(18 hrs)**

Central Tendencies: Arithmetic Mean – Partition Values – Mode – Measures of Dispersion (Theorems without Proof).

UNIT II **(18 hrs)**

Curve Fitting: Principle of Least Squares – Correlation – Rank Correlation – Regression (Theorems without Proof).

UNIT III **(18 hrs)**

Index Numbers: Index Numbers – Consumer Price Index Numbers – Conversion of Chain Base Index Number into Fixed Base Index and Conversely.

UNIT IV **(18 hrs)**

Linear Programming Problems: Formulation of LPP – Graphical Method.

UNIT V **(18 hrs)**

Transportation Problems: Mathematical Formulation of Transportation Problem – Degeneracy in TP. **Assignment Problems:** Mathematical Formulation of an Assignment Problem – Solution to Assignment Problem.

Text Books:

1. Dr.S.Arumugam and Mr.A.Thangapandi Issac, "Statistics", New Gamma Publishing House, Palayamkottai, 2009.

2. Dr.S.Arumugam and Mr.A.Thangapandi Issac, "Operations Research (Volume 1)", New Gamma Publishing House, Palayamkottai, First Edition, 2003.

Unit	Text Book No.	Chapter	Section	Page No.
I	1	2	2.1 – 2.3	12 – 51
		3	3.1	60 – 76
II	1	5	5.1	95 – 104
		6	6.1 – 6.3	106 – 141
III	1	9	9.1– 9.3	229 – 256
IV	2	3	3.1, 3.4	3.1 – 3.22, 3.64 – 3.81
V	2	4	4.1,4.2	4.1 – 4.75
		5	5.1, 5.2	5.1 – 5.34

Reference Books:

1. J.Medhi, "Statistical Methods", New Age International Pvt Ltd, New Delhi, 2015.

2. S.D.Sharma, "Operations Research", Kedar Nath Ramnath and Co, Meerut, 2003.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc (Physics/Chemistry)

Semester II

(2018 – 2021)

Allied Course – II: Mathematics – II (18UPHA21/18UCHA21)

(For those who join from June 2018 and afterwards)

Credits : 5	**Int. Marks : 25**
Hours/Week : 6	**Ext. Marks : 75**
Duration : 90 hrs	**Max. Marks : 100**

Course Objectives:

- To study about Differentiation and Integration.
- To know about Differential equation.

Course Outcomes:

1. Develop an analytic thinking in the concept of transformation of equations.
2. Demonstrate reciprocal equations.
3. Understand the concept of differentiation.
4. Introduction about the higher derivatives.
5. Endow with an in-depth knowledge of partial differentiation using Euler's theorem.
6. Equip with the basic knowledge of integration.
7. Develop the skill of solving differential equations.

UNIT I **(18 hrs)**

Theory of Equations: Introduction – Formation of Equations – Reciprocal Equations – Transformation of Equations – Approximate Solutions of Numerical Equations

UNIT II **(18 hrs)**

Differentiation: Higher Derivatives – n^{th} Derivative of some Standard Functions

UNIT III **(18 hrs)**

Leibnitz's Theorem – Partial Differentiation – Homogeneous Function and Euler's Theorem

UNIT IV **(18 hrs)**

Evaluation of Definite Integrals – Integration by Parts – Reduction Formula

UNIT V **(18 hrs)**

Differential Equations of First Order: Differential Equations – Exact Differential Equations – Integrating Factors – Linear Equations

Text Books:

1. Dr.S.Arumugam and Mr.A.Thangapandi Issac, "Ancillary Mathematics Paper I", New Gamma Publishing House, Palayamkottai, 2007.
2. Dr.S.Arumugam and Mr.A.Thangapandi Issac, "Calculus", New Gamma Publishing House, Palayamkottai, 2014.
3. Dr.S.Arumugam and Mr.A.Thangapandi Issac, "Differential Equations and Applications", – New Gamma Publishing House, Palayamkottai, 2014.

Unit	Text Book No.	Chapter	Section	Page No.
I	1	1	1.1, 1.3 – 1.5	1 – 6, 27 – 63
II	2	Part I – 2	2.11, 2.12	43 – 59
III	2	Part I – 2	2.13 – 2.15	61 – 90
IV	2	Part II – 2	2.6 – 2.8	363 – 396
V	3	1	1.1, 1.3 – 1.5	1.1 – 1.5, 1.14 – 1.32

Reference Books:

1. T.K.Manicavachagom Pillay, T.Natarajan, "Calculus", S.Viswanathan (Printers and Publishers), Pvt.,Ltd., Chennai, 2000.
2. S.Narayanan , T.K.Manicavachagom Pillay, "Differential Equations and Applications", S.Viswanathan (Printers and Publishers), Pvt.,Ltd., Chennai, 2011.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc (Computer Science/Information Technology)/BCA

Semester I

(2018 - 2021)

Allied Course – I: Mathematical Foundations (18UCSA11/18UITA11/18UCAA11)

(For those who join from June 2018 and afterwards)

Credits : 4	**Int.Marks :25**
Hours/Week : 4	**Ext.Marks :75**
Duration : 60 hrs	**Max.Marks :100**

Course Objectives:

- To study about logic.
- To know about the basic concepts of sets and relations.
- To provide a basic foundation for Graph Theory concepts.

Course Outcomes:

1. Understand the mathematical laws of logic and connectives.
2. Gain knowledge of different types of sets such as, finite and infinite sets, empty set, singleton set, equivalent sets, equal sets, sub sets.
3. Determine whether a function is one-one, onto or into.
4. Use row operations to determine whether a square matrix is invertible.
5. Learn a mathematical graph to represent real life situation.
6. Demonstrate the basic definitions, computer representations and properties of a graph.

UNIT I **(12 hrs)**

Mathematical Logic: Introduction – Statements – Laws of Formal Logic – Connectives and Compound Statements – Proposition – Solved Examples – Conditional Statements – Well Formed Formulas – Tautology - Contradiction – Contingency – Logical Equivalence – Solved Examples – Laws of Logic – The Duality Principle – Solved Examples – Logical Implication – Other Connectives.

UNIT II **(12 hrs)**

Set Theory: Introduction – Sets and Operations on Sets – Subsets – Null Set – Singleton Set – Finite Set – Infinite Set – Universal Set – The Power Set – Disjoint Sets – Properties of Set Containment - Operation on Sets - Union of Sets - Properties of Union Operation – Intersection of Sets – Properties of Intersection Operation – Distributive Laws – Complement of a Set – Properties of Complementation – Properties of Difference – Symmetric Difference – Properties of Symmetric Difference. **Relations:** Concept of Relation – Properties of Relations – Miscellaneous Examples – Matrix Representation of Relations. **Functions:** Introduction – Definition – One-to-One Mapping – Onto Mapping – Bijection – Identity Mapping – Composition of Function –Associativity of Mappings – Constant Function - Inverse Mapping.

UNIT III **(12 hrs)**

Graph Theory: Introduction – Basic Definitions – Incidence and Degree – Order of a Graph – Size of a Graph – Solved Examples – Edges in Series - Adjacency – Matrix Representation of Graphs – Linked Representation.

UNIT IV **(12 hrs)**

Walks, Paths and Circuits - Subgraphs – Removal of Vertices and Edges from a Graph – Addition of a Vertex – Operations on Graphs – Complement of a Graph – Connected Graph – Partitions.

UNIT V **(12 hrs)**

Matrix Algebra: Introduction - Matrix Operations –Inverse of a Square Matrix– Elementary Operations and Rank of a Matrix.

Text Books:

1. G.Shanker Rao, "Discrete Mathematical Structures", New Age International (P) Limited, Publishers, New Delhi, 2002.
2. Dr.M.K.Venkataraman, Dr.N.Sridharan and Dr.N.Chandrasekaran, "Discrete Mathematics", The National Publishing Company, Chennai, 2011.

Unit	Text Book No.	Chapter	Section	Page No.
I	1	1	1.1-1.18	1-20
II	1	2	2.1-2.21	39-52
		3	3.1-3.3, 3.15	65-68,75-77
		4	4.1-4.10	87-93
III	1	8	8.1-8.10	224-248
IV	1	8	8.11-8.18	254-267
V	2	6	1-4	6.1-6.26

Reference Books:

1. Dr.N.G.Goudru, "Discrete Mathematical Structures", Himalaya Publishing House, Mumbai, 2003.
2. B.S.Vatsa, SuchiVatsa, "Discrete Mathematics", New Age International (P) Limited, Publishers, New Delhi, 2012.

Department of Mathematics

UG Programme - B.Sc (Computer Science/Information Technology)/BCA

Semester II

(2018-2021)

Allied Course - II: Operations Research (18UCSA21/18UITA21/18UCAA21)

(For those who join from June 2018 and afterwards)

Credits : 4	**Int. Marks : 25**
Hours/ Week : 4	**Ext. Marks : 75**
Duration : 60 hrs	**Max. Marks : 100**

Course Objectives:

- To study about the formulation of Linear Programming Problem and finding its solution.
- To study about Assignment and Transportation problem.

Course Outcomes:

1. Present the history, nature and scope of operations research.
2. Demonstrate the main characteristics of operations research.
3. Inculcate the insight knowledge of linear programming problem.
4. Evaluate the solution of linear programming problem using graphical method.
5. Understand the computational procedure of simplex method.
6. Study the computational procedure of transportation problem.

UNIT I **(12 hrs)**

Introduction for Operations Research: The Historical Development of Operations Research - The Nature and Meaning of Operations Research - Management Applications of Operations Research- Modeling in Operations Research - Main Characteristics of Operations Research - Main Phases of Operations Research Study - Tools, Techniques and Methods - Scope of Operations Research.

UNIT II **(12 hrs)**

Linear programming problem: Introduction - Formulation of Linear Programming Problems - Graphical Solution of Linear Programming Problems - General Formulation of Linear Programming Problem - Slack and Surplus Variables.

UNIT III **(12 hrs)**

Linear Programming Problem (Simplex Method): Computational Procedure for Simplex Methods – Simple Way for Simplex Computations - Artificial Variable Technique.

UNIT IV **(12 hrs)**

Assignment Models: Introduction - Mathematical Formulation of Assignment Problem - Hungarian Method for Assignment Problem - Examples- Unbalanced Assignment Problem- Variations of the Assignment Problem- Travelling Salesman Problem.

UNIT V **(12 hrs)**

Transportation Models: Introduction - Mathematical Formulation – The Initial Basic Feasible Solution to Transportation Problem – Moving Towards Optimum Solution – Transportation Algorithm for Minimization Problem - Degeneracy in Transportation Problems - Unbalanced Transportation Problem.

Text Book:

S.D.Sharma, "Operations Research", Kedar Nath Ramnath and Co, Meerut, 2003.

Unit	Chapter	Section	Page No.
I	1	1.1 - 1.4, 1.8 -1.11	3 - 9, 13 - 16
II	3	3.1 - 3.5	53 - 73, 77 - 88, 90 - 91
III	5	5.3 - 5.5	120 - 130, 132 - 143
IV	11	11.1, 11.2, 11.4-11.7 , 11.9	305 -323, 325 -327, 329 -336, 345 -350
V	12	12.1, 12.2, 12.8 -12.12	356,357, 363-370, 372-392, 398-404, 406-424

Reference Books:

1. Dr. S. Arumugam and Thangapandi Isaac, "Operations Research", - New Gamma Publishing House, Palayamkottai, 2003.
2. S. Kalavathy, "Operations Research", Vikas Publishing House Private Limited, New Delhi, 2003.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc (Computer science)

Semester III

(2018 – 2021)

Allied Course – III: Numerical Methods and its Applications (18UCSA31)

(For those who join from June 2018 and afterwards)

Credits	**: 4**	**Int. Marks**	**: 25**
Hours/ Week	**: 4**	**Ext. Marks**	**: 75**
Duration	**: 60 hrs**	**Max. Marks**	**: 100**

Course Objectives:

- To apply numerical methods to solve problems in physical and technical applications.
- To use numerical methods for solving linear algebraic equations which occur in Engineering and statistical problems.

Course Outcomes:

1. Introduce the learners the methods of solving equations.
2. Enable students to use numerical techniques to tackle problems that are not analytically solvable.
3. Inculcate the basic knowledge of algebraic and transcendental equations.
4. Find the solutions of simultaneous linear equations using Gauss elimination, Gauss Jordan and Gauss Seidel methods.
5. Introduce the concept of Interpolation which will be used to predict the data.
6. Use various techniques like trapezoidal rule, simpson's rule and weddle's rule in solving s numerical integration problems.
7. Learn about the solution of differential equations using different techniques like Taylor's series method and Runge Kutta method.

UNIT I **(12 hrs)**

Algebraic and Transcendental Equations : Introduction – Errors in Numerical Computation – Iteration Method – Bisection Method – Regula Falsi Method – Newton Raphson Method – Horner's Method.

UNIT II **(12 hrs)**

Simultaneous Equations : Introduction – Simultaneous Equations – Back Substitution – Gauss Elimination Method – Gauss Jordan Elimination Method – Calculation of Inverse of a Matrix – Gauss Seidel Iteration Method.

UNIT III **(12 hrs)**

Interpolation : Introduction – Newton's Interpolation Formulae – Central Difference Interpolation Formulae – Lagrange's Interpolation Formulae – Inverse Interpolation.

UNIT IV **(12 hrs)**

Numerical Differentiation and Integration : Introduction – Derivatives using Newton's Forward Difference Formulae – Derivatives using Newton's Backward Difference Formulae – Problems in Derivatives using Newton's Forward and Backward Difference Formulae – Numerical Integration.

UNIT V **(12 hrs)**

Numerical Solutions of Differential Equations : Introduction – Taylor's Series Method – Picard's Method – Euler's Method – Runge-Kutta Method.

Text Book:

S. Arumugam, A.Thangapandi Issac and A.Somasundaram, "Numerical Methods", Sci Tech Publications (India) Pvt Ltd, Chennai, Second Edition, 2007.

Unit	Chapter	Section	Page No.
I	3	3.0 – 3.6	79 – 111
II	4	4.0 – 4.5, 4.8	112 – 123, 139 – 148
III	7	7.0 – 7.3, 7.6	202 – 243, 255 – 258
IV	8	8.0, 8.2, 8.5	260 – 261, 263 – 267, 279 – 299
V	10	10.0 – 10.4	325 – 352

Reference Books :

1. Dr.P.Kandasamy, Dr.K.Thilagavathy and Dr.K.Gunavathi, "Numerical Methods", S.Chand and Company Ltd, New Delhi, 2012.
2. S.Kalavathy, "Numerical Methods", Vijay Nicole Imprints Pvt Ltd, Chennai, 2004.

Sri Kaliswari College (Autonomous), Sivakasi

Department of Mathematics

UG Programme – B.Sc (Computer Science)

Semester IV

(2018-2021)

Allied Course - IV: Numerical Ability (18UCSA41)

(For those who join from June 2018 and afterwards)

Credits : 4	**Int.Marks : 25**
Hours/Week : 4	**Ext.Marks : 75**
Duration : 60 hrs	**Max.Marks : 100**

Course Objectives:

- To make the students to prepare for the competitive examinations
- To have an idea of solving day-to-day problems

Course Outcomes:

1. Able to apply quantitative reasoning and mathematical analysis methodologies to solve problems.
2. Determine the square roots, cube roots of positive whole numbers, decimals and common fractions.
3. Able to perform operations with surds and indices.
4. Understanding the properties of proportion and its usage.
5. Examine how to calculate Simple and Compound interest.
6. Able to demonstrate an understanding of the difference between area and perimeter.

UNIT I **(12 hrs)**

Numbers - H.C.F and L.C.M of Numbers - Decimal Fractions - Simplification - Square Roots and Cube Roots.

UNIT II **(12hrs)**

Average- Problems on Numbers – Problems on Ages - Surds and Indices.

UNIT III **(12 hrs)**

Percentage - Profit and Loss - Ratio and Proportion- Time and Work.

UNIT IV **(12 hrs)**

Pipes and Cistern– Time and Distance - Problems on Trains.

UNIT V **(12 hrs)**

Simple Interest - Compound Interest - Area - Volume and Surface Areas.

Text Book:

R.S.Aggarwal, "Quantitative Aptitude", Chand and Company Ltd., New Delhi, 2015.

Unit	Section	Page No.
I	1- 5	4-138
II	6 - 9	139-207
III	10-12,15	208-310, 341-370
IV	16-18	371-424
V	21,22,24,25	445-486, 549-587

Reference Books :

1. AbhijthGuha, "Quantitative Aptitude for Competitive Examainations", Tata McGraw – Hill publishing Company Ltd, New Delhi, Third Edition , 2005.
2. S. Abdul Mohideen, "Quantitative Aptitude", Deen Intelligent Books, Thirunelveli, First Edition, 2006.