

SRI SARADA COLLEGE FOR WOMEN
(AUTONOMOUS),
SALEM-16



DEPARTMENT OF MATHEMATICS
COURSES SCHEME
&
SYLLABUS
FOR
UG MATHEMATICS

DEPARTMENT OF MATHEMATICS
B.Sc. MATHEMATICS COURSE STRUCTURE UNDER CBCS
(Applicable to the candidates admitted from the academic year 2020 - 2021 onwards)
Total Credits: 140 + 15*

I SEMESTER

PART	COURSE	COURSE TITLE	CODE	HRS/ WEEK	CREDITS
I	Tamil/Hindi/Sanskrit	Tamil /Hindi / Sanskrit Paper I	20ULTC1/20ULHC1/ 20ULSC1	6	3
II	English	English Paper I	20ULEC1	6	3
III	Core – I	Calculus I	20UMAC1	5	5
III	Core – II	Algebra	20UMAC2	5	5
III	Allied – I	Allied: Physics I	20UMAAC1	3	3
	Allied - I (Practical)	Allied: Physics Practical	20UMAAQC	2	-
IV	Skill Based – I	Theory of Equations with Matlab – Practical	20UMASQC1	2	2
IV	Extension Activity	Group Project based on Extension Activity	20UEXAC	1	1
V	Articulation and Idea Fixation Skills – 6 Hours per Semester (out of college hours) Life Skills Promotion – 2 Hours per Semester (out of college hours – 1 Credit extra) Physical Fitness Practice – 35 Hours per Semester (out of college hours – 1 Credit extra)				
Total				30	22 + 2*

II SEMESTER

PART	COURSE	COURSE TITLE	CODE	HRS/ WEEK	CREDITS
I	Tamil/Hindi/Sanskrit	Tamil / Hindi / Sanskrit Paper II	20ULTC2/20ULHC2/ 20ULSC2	6	3
II	English	English Paper II	20ULEC2	6	3
III	Core – III	Analytical Geometry and Trigonometry	20UMAC3	5	4
III	Core – IV	Analytical Solid Geometry	20UMAC4	4	4
III	Allied – II	Allied: Physics II	20UMAAC2	3	3
	Allied - II (Practical)	Allied: Physics Practical	20UMAAQC	2	2+2
IV	Skill Based – II	Analytical Geometry With Geogebra- Practical	20UMASQC2	2	2
IV	Environmental Studies	Theory and group project based on Environmental Studies	20UEVSC 20UEVSPC	2	2
V	Articulation and Idea Fixation Skills – 6 Hours per Semester (out of college hours – 1 Credit extra) Life Skills Promotion – 2 Hours per Semester (out of college hours – 1 Credit extra) Physical Fitness Practice – 35 Hours per Semester (out of college hours – 1 Credit extra) Certificate Course – 25 Hours (out of college hours – 1 Credit extra)				
Total				30	25 + 4*

DEPARTMENT OF MATHEMATICS
B.Sc. MATHEMATICS COURSE STRUCTURE UNDER CBCS
(Applicable to the candidates admitted from the academic year 2019 - 2020 onwards)

III SEMESTER

PART	COURSE	COURSE TITLE	CODE	HRS/ WEEK	CREDITS
I	Tamil/Hindi/Sanskrit	Tamil / Hindi / Sanskrit Paper III	19ULTC3/19ULHC3/ 19ULSC3	6	3
II	English	English Paper III	19ULEC3	6	3
III	Core – V	Calculus II	19UMAC5	4	4
III	Core – VI	Vector Analysis and Theory of Numbers	19UMAC6	5	4
III	Allied – III	Mathematical Statistics	19UMAAC3	5	5
IV	Skill Based – III	Data Analytics with R– Practical	19UMASQC3	2	2
IV	Non Major Elective – I			2	2
V	Articulation and Idea Fixation Skills – 6 Hours per Semester (out of college hours) Life Skills Promotion – 2 Hours per Semester (out of college hours – 1 Credit extra) Physical Fitness Practice – 35 Hours per Semester (out of college hours – 1 Credit extra)				
Total				30	23 + 2*

IV SEMESTER

PART	COURSE	COURSE TITLE	CODE	HRS/ WEEK	CREDITS
I	Tamil/Hindi/Sanskrit	Tamil / Hindi / Sanskrit Paper IV	19ULTC4/19ULHC4/ 19ULSC4	6	3
II	English	English Paper IV	19ULEC4	6	3
III	Core – VII	Differential Equations and Laplace Transforms	19UMAC7	4	4
III	Elective – I			5	5
III	Allied – IV	Discrete Mathematics	19UMAAC4	5	5
IV	Skill Based – IV	Optimization Techniques with Tora – Practical	19UMASQC4	2	2
IV	Non Major Elective – II			2	2
V	Articulation and Idea Fixation Skills – 6 Hours per Semester (out of college hours – 1 Credit extra) Life Skills Promotion – 2 Hours per Semester (out of college hours – 1 Credit extra) Physical Fitness Practice – 35 Hours per Semester (out of college hours – 1 Credit extra)				
Total				30	24 + 3*

DEPARTMENT OF MATHEMATICS
B.Sc. MATHEMATICS COURSE STRUCTURE UNDER CBCS
(Applicable to the candidates admitted from the academic year 2018 - 2019 onwards)

V SEMESTER

PART	COURSE	COURSE TITLE	CODE	HRS/ WEEK	CREDITS
III	Core – VIII	Algebraic Structures I	18UMAC8	6	4
III	Core – IX	Complex Analysis I	18UMAC9	5	4
III	Core – X	Real Analysis I	18UMAC10	5	4
III	Core – XI	Dynamics	18UMAC11	6	4
III	Elective II			5	5
I V	Non Major Skill Based-I	Industrial Mathematics with R Programming – Practical	18UMANSQC1	2	2
IV	Value Education	Value Education	18UVENC	1	-
V	Life Skills Promotion – 2 Hours per Semester (out of college hours) Physical Fitness Practice – 35 Hours per Semester (out of college hours – 1 Credit extra) Certificate Course – 25 Hours (out of college hours – 1 Credit extra)				
Total				30	23 + 2*

VI SEMESTER

PART	COURSE	COURSE TITLE	CODE	HRS/ WEEK	CREDITS
III	Core – XII	Algebraic structures II	18UMAC12	6	4
III	Core – XIII	Complex Analysis II	18UMAC13	5	3
III	Core – XIV	Real Analysis II	18UMAC14	5	3
III	Core – XV	Numerical Methods And Programming in C	18UMAC15	6	4
III	Elective III			5	5
I V	Non Major Skill Based-II	Mathematical Modeling with R Programming- Practical	18UMANSQC2	2	2
IV	Value Education	Value Education	18UVENC	1	2
V	Life Skills Promotion – 2 Hours per Semester (out of college hours – 1 Credit Extra) Physical Fitness Practice – 35 Hours per Semester (out of college hours – 1 Credit Extra)				
Total				30	23 + 2*

• Free and Open Source Software (FOSS) - 2 hours per semester (out of college hours)

* Extra Credit

MAJOR ELECTIVE

Major Elective – I

COURSE TITLE	CODE	HOURS/WEEK	CREDITS
Operations Research	19UMAEC1	5	5
Number Theory	19UMAESC1	5	5

Major Elective – II

COURSE TITLE	CODE	HOURS/WEEK	CREDITS
BioMathematics	18UMAEC2	5	5
Number Theory	18UMAESC2	5	5

Major Elective – III

COURSE TITLE	CODE	HOURS/WEEK	CREDITS
Operations Research	18UMAEC3	5	5
Graph Theory	18UMAESC3	5	5

NON MAJOR SKILL BASED COURSE OFFERED TO OTHER MAJORS

SEMESTER	COURSE TITLE	CODE	HOURS /WEEK	CREDITS
V	Industrial Mathematics with R Programming– Practical	18UMANSQC1	2	2
VI	Mathematical Modeling with R Programming– Practical	18UMANSQC2	2	2

ALLIED COURSES OFFERED TO OTHER MAJORS

SEMESTER	COURSE TITLE	CODE	HOURS/WEEK	CREDITS
I	Allied Mathematics I (For I B.Sc. Statistics / I B.Sc. Computer Science)	20USTAC1/ 20UCSAC1	5	5
II	Allied Mathematics II (For I B.Sc. Statistics / I B.Sc. Computer Science)	20USTAC2/ 20UCSAC2	5	5
III	Allied Mathematics I (For II B.Sc. Physics / II B.Sc. Chemistry) Business Mathematics (For II B.Com)	19UPHAC3/ 19UCHAC3/ 19UCOAC3	5	5
IV	Allied Mathematics II (For II B.Sc. Physics / II B.Sc. Chemistry)	19UPHAC4/ 19UCHAC4	5	5

NON MAJOR ELECTIVE COURSE OFFERED TO OTHER MAJORS

SEMESTER	COURSE TITLE	CODE	HOURS/WEEK	CREDITS
III	Basic Mathematics	19UMANEC1	2	2
IV	Mathematics for Competitive Examinations	19UMANEC2	2	2

Programme Title : B.Sc. Mathematics**Programme Outcome**

PO Number	PO Statement
PO1	To apply the knowledge of mathematics to obtain the solution for the complex mathematical problems.
PO2	To identify, formulate and analyze mathematical problems in research.
PO3	To acquire information and clear understanding in advanced areas of mathematics.
PO4	To create and analyze mathematical models for solving the problems in the emerging areas of the societal and environmental contexts.
PO5	To apply mathematical knowledge in real life situations and in the context of scientific change via modern tools.
PO6	To communicate mathematical concepts effectively.
PO7	To equip the students' career needs and to synthesize with the industry requirements.
PO8	To inculcate the ethical responsibilities via mathematical concepts.
PO9	To enhance the ability of students to transfer ideas and develop team working skills.

Programme Specific Outcomes:

PSO Number	PSO Statement
PSO1	To demonstrate basic manipulate skills in Algebra, Geometry, Trigonometry, Calculus, Mechanics, Statistics, Numerical Methods, Programming in C, Analysis and gain ability to know the basic ideas of Information Technology.
PSO2	To develop the capacity to write the proofs of mathematical statements in a suitable manner.
PSO3	Can take summer classes for the school children to do mathematics in a shortcut way.
PSO4	To gain knowledge to solve the biological and community oriented problems via suitable mathematical models
PSO5	To participate summer training programmes to get enhancement on Calculus, Algebra, Analysis, Mechanics, Differential equations and Geometry.

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM - 16
B.Sc. MATHEMATICS - SEMESTER I
CORE I - Calculus I (20UMAC1)

For candidates admitted from 2020 - 2021 onwards (Under CBCS)

5 Hours / Week

5 Credits

Course Objectives: The course aims to

1. make the students familiarize with the successive differentiation and Higher order partial derivatives.
2. develop the ability of obtaining Maxima and Minima of functions of 2 (or) 3 variables.
3. discuss the concepts of curvature, Radius and centre of curvature.

Syllabus

Unit – I :

No. of Hours : 15

Successive differentiation - nth derivatives, Leibnitz theorem (statement only) and applications.

Chapters 1 and 2

Unit – II :

No. of Hours :15

Partial derivative, Higher derivatives, Homogenous function, Total differential co-efficient, Implicit functions.

Chapter 3(Sections 1.1, 1.2, 1.3, 2.3, 2.4)

Unit – III :

No. of Hours : 15

Jacobians, Maxima and Minima of Functions of two variables, Necessary and sufficient conditions (without proof), Method of Lagrange's multipliers (no derivation) - simple problems only.

Chapter 3 (Sections 3, 4, 5)

Unit – IV :

No. of Hours : 15

Polar co-ordinates - Angle between Radius Vector and the Tangent, Angle of intersection of two curves, Length of perpendicular from the pole to the Tangent, Pedal Equation, Radius of curvature in Polar Co-ordinates, Radius of Curvature for pedal curve, Radius of curvature for polar tangential curve.

(Chapters 5 and 6)

Unit – V:

No. of Hours : 15

Curvature and Radius of Curvature - Cartesian Formula for Radius of Curvature, Parametric formula for Radius of Curvature, Centre of curvature, Chord of curvature, Evolutes.

(Chapters 6 and 9)

Text Book:

Calculus by **P.R. Vittal** and **V. Malini**, Margham publications, Chennai - 17.

Books for Reference:

1. Calculus Volume I by **S. Narayanan** and **T. K. Manicavachagom Pillai**, S. Viswanathan (Printers and Publishers) Pvt Limited, Chennai- 2011.
2. Calculus, Volume I by **S. Arumugam** and **Isaac**, New Gamma Publishing House – 1991

Web Resources:

1. <http://www.math.wise.edu>free221>
2. www.ma.huji.ac.il>iWeb>Teaching_files

Note: Questions to be taken only from the Text Book.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO 1	Recall and understand the concepts of successive differentiation	K-2
CO 2	Understand and apply the concept of derivatives for higher order and implicit function.	K-3
CO 3	Applying the concepts of derivative to find the maxima and minima functions of two variables	K-3
CO 4	Acquire knowledge about finding the angle between the radius vector and the tangent and Radius of curvature in polar Co-ordinates	K-3
CO 5	Examine the Cartesian formula and parametric formula for Radius of curvature	K-4

**K-1 :Recall; K-2 :Understand; K-3 :Apply; K-4 :Analyze; K-5 :Evaluate; K-6 :Create.
Mapping of COs with POs and PSOs :**

CO \ PO/ PSO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	M	M	M	S	M	S	S	S	M	M	S
CO2	M	M	S	M	M	M	S	M	S	S	M	S	M	S
CO3	S	M	S	M	S	S	M	M	M	S	S	M	M	S
CO4	S	S	M	S	M	S	M	S	S	S	M	M	M	S
CO5	S	M	S	M	M	M	M	S	S	S	M	M	M	S

S-Strong, M-Medium, L-Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM - 16
B.Sc. MATHEMATICS - SEMESTER I
CORE II - ALGEBRA (20UMAC2)

For candidates admitted from 2020 - 2021 onwards (Under CBCS)

5 Hours / Week

5 Credits

Course Objectives: The course aims to

1. gain knowledge about binomial series, exponential series, logarithmic series and matrices.
2. develop the ability of solving different types of algebraic equations.
3. develop the ability to reflect critically on the methods they have chosen to solve problems.
- 4.

Unit - I

No. of Hours: 15

Binomial Series: Binomial theorem for a positive integral index - Binomial theorem for a rational index - Summation of Binomial series.

Exponential Series: Exponential series for all real values of x - Standard results for the exponential series - Logarithmic series.

Chapter 2 (Sections 1,2,3), Chapter 3 (Sections 1 & 2) & Chapter 4

Unit - II

No. of Hours: 15

Matrices : Condition for consistency - Characteristic equation of a matrix - Cayley - Hamilton theorem - Similarity of matrices – Diagonalizable matrix.

Chapter 6

Unit - III

No. of Hours: 15

Theory of equations: Rational integral equation of the n^{th} degree, Fundamental theorem in the theory of equations (without proof) – Relation between the roots and coefficients of an equation - Imaginary and Irrational roots - Symmetric functions of the roots of an equation in terms of its coefficients.

Chapter 7 (Sections 1 to 5)

Unit - IV

No. of Hours: 15

Reciprocal equations - Transformation of equation - Multiplication of roots by m -Diminishing the roots of an equation - Removal of a term.

Chapter 7 (Sections 6 -10)

Unit - V

No. of Hours: 15

Descarte's rule of signs - Descarte's rule of signs for negative roots of an equation - Horner's method for approximation of roots of a polynomial equation - Newton's method of evaluating a real root correct to given decimal places.

Chapter 7 (sections 11 – 14)

Text Book :

Algebra, Analytical Geometry & Trigonometry by **Dr.P.R.Vittal &V.Malini**, Margham publications, Chennai - 17.

Books for Reference:

1. Algebra Volume I by **T.K. Manickavasagam Pillai** & others, S.V. Publications, 1985.
2. Algebra Volume II by **T.K. Manickavasagam Pillai** & others, Revised Edition, S.V. Publications, 1985.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	gain knowledge about binomial, exponential and logarithmic series	K-1
CO2	examine the consistency of linear equations and application of Cayley - Hamilton theorem	K-2
CO3	know the application of relations between the roots and coefficients of an equation	K-3
CO4	analyse the method of solving reciprocal equations and diminishing the roots of an equation	K-4
CO5	examine the existence of roots of an equation and determine the roots by using Newton's and Horner's methods	K-5

K-1: Recall, K-2: Understand, K-3: Apply, K-4: Analyse, K-5: Evaluate, K-6: Create
Mapping of COs with POs:

CO \ PO/ PSO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	M	S	S	M	S	S	M	M	S	S
CO2	M	M	M	M	M	S	S	M	S	S	-	M	M	S
CO3	L	L	L	-	L	S	S	M	S	S	-	M	L	S
CO4	M	L	L	L	L	S	M	M	S	S	-	-	M	S
CO5	S	M	M	S	S	S	S	M	S	S	M	-	M	S

S-Strong, M-Medium, L-Low

B.Sc. MATHEMATICS – SEMESTER I
SKILL BASED I–THEORY OF EQUATIONS WITH
MATLAB – PRACTICAL (20UMASQC1)
For candidates admitted from 2020-2021 onwards (Under CBCS)

2 Hours\ Week

2 Credits

Course Objectives:

The course aims to gain knowledge about numerical computations and display information graphically in 2D and 3D

Syllabus

Unit I : Matrices and Determinants and Array Functions

Unit II :Matrix Factorization and Gaussian Elimination

Unit III :Eigen Values, Eigen Vectors and Determinants

Unit IV: Polynomial Factorization and Roots of the Polynomial

Unit V :Horner’s Method for Approximation of Roots of a Polynomial Equation and Newton’s Method of Evaluating a real root

Text Book:

Getting started with MATLAB by RudraPratap

Web Resources:

1. <https://www.mathworks.com/help/symbolic/factor.html>
2. <https://www.mathworks.com/help/symbolic/horner.html>
3. <https://m.njit.edu/Undergraduate/Matlab/M111MATLAB2S08/>

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO 1	get acquainted with fundamental operations in matrices using MATLAB	K-1
CO 2	know matrix factorization and Gaussian elimination by MATLAB.	K-2
CO 3	acquire knowledge to find eigen values, eigen vectors & determinants in MATLAB.	K-2
CO 4	apply MATLAB and familiar with polynomial factorization and roots of the polynomial	K-3
CO 5	apply MATLAB to solve problems on Horner’s Method & Newton’s method	K-3

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse, K-5 Evaluate, K-6 Create

Mapping of COs with POs and PSOs :

PO/ PSO CO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	M	S	S	S	S	S	S	S	M	M	S	M
CO2	S	M	M	S	S	S	S	S	S	S	M	M	S	M
CO3	S	M	M	S	S	S	S	S	S	S	M	M	S	M
CO4	S	M	M	S	S	S	S	S	S	S	M	M	S	M
CO5	S	M	S	S	S	S	S	S	S	S	M	M	S	M

S - Strong, M - Medium, L - Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM - 16
B.Sc., MATHEMATICS - SEMESTER II
CORE III - ANALYTICAL GEOMETRY AND TRIGONOMETRY (20UMAC3)
For candidates admitted from 2020 - 2021 onwards (Under CBCS)

5 Hours / Week

4 Credits

Course Objectives: The course aims to

1. discuss polar coordinates, Equations of straight line, Circle and Conic.
2. gain knowledge about hyperbolic and inverse hyperbolic functions, Logarithm of Complex numbers, Gregory series and summation using telescopic method.
3. discuss the above concepts with suitable examples.

Syllabus

Unit – I

No. of Hours : 15

Polar coordinates - Equation of straight line and circle.
Chapter 4 (Page 4.1 - 4.13)

Unit - II

No. of Hours : 15

Polar equation of a conic.
Chapter 4 (Page 4.14 - 4.47)

Trigonometry

Unit - III

No. of Hours : 15

Expansions of $\sin \theta$, $\cos \theta$, $\tan \theta$ in terms of θ - Expansions of $\sin n\theta$, $\cos n\theta$, $\tan n\theta$ -
Expansions of $\sin n\theta$, $\cos n\theta$, $\tan n\theta$ - Hyperbolic and inverse hyperbolic functions.
Chapter 11 (Page 11.1 - 11.60)

Unit – IV

No. of Hours : 15

Logarithm of a complex number, general value and principal value, Gregory series.
Chapter 11 (Page 11.61 - 11.85)

Unit - V

No. of Hours : 15

Summation of series, Sum of Sines (Cosines) of n angle in A.P, Summation using telescopic method ($V_n = U_n - U_{n-1}$) and the $C + iS$ method.
Chapter 11 (Page 11.86 - 11.123)

Contents and Treatment as in

1. Calculus by **Dr.P.R.Vittal and V.Malini** (for Unit I & II).
2. Algebra, Analytical Geometry and Trigonometry by **Dr.P.R.Vittal** and

V.Malini (for Unit III, IV & V), Margham publications, Chennai - 17.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO 1	know the basic concepts of analytical geometry	K-1
CO 2	understand the concepts of polar equations of straight line, circle and conic	K-2
CO 3	understand the concepts of circular, hyperbolic and inverse hyperbolic functions	K-2
CO 4	understand and apply the concepts of logarithm of complex numbers and gregory series	K-3
CO 5	find the sum of different types of trigonometry series	K-3

K-1 :Recall; K-2 :Understand; K-3 :Apply; K-4 :Analyze; K-5:Evaluate; K-6 :Create.

Mapping of COs with POs and PSOs :

PO/ PSO CO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	L	M	S	S	M	S	S	S	L	S	S	S
CO2	S	M	-	M	S	S	M	S	S	S	S	S	M	S
CO3	S	M	L	S	S	S	M	S	S	S	S	S	S	S
CO4	S	M	L	S	S	S	M	S	S	S	S	S	S	S
CO5	S	M	-	S	S	S	-	S	S	S	S	S	S	S

S-Strong, M-Medium, L-Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM - 16
B.Sc., MATHEMATICS - SEMESTER II
CORE IV - ANALYTICAL SOLID GEOMETRY (20UMAC4)
For candidates admitted from 2020 - 2021 onwards (Under CBCS)

4 Hours / Week

4 Credits

Course Objectives: The course aims to

1. train in visualizing ideas in three dimensions.
2. acquire practical knowledge about plane, straight line, spheres, cone, cylinder and conicoids in three dimensionals.
3. develop the skill of solving problems related to plane, straight line, spheres, cone, cylinder and conicoids in three dimensionals.

Syllabus

Unit – I

No. of Hours : 12

Plane

First degree equation - Determination of a plane - Plane perpendicular to a given direction - Planes parallel to given lines and through given points - Equation $P + \lambda P' = 0$ - Second degree homogeneous equation - Co planarity of the lines through a point - Perpendicular to a plane - Position of points with reference to a plane - Bisector planes of the angles between two given planes - Volume of a tetrahedron.

Chapter 3 (Sections 3.1 - 3.12, Vector methods are to be excluded)

Unit - II

No. of Hours : 12

Straight Line

Equation of a straight line - Symmetrical form - Conditions for various situations of a line - Co planarity of the two lines.

Chapter 4 (Sections 4.1 & 4.2, Vector methods are to be excluded)

Unit – III

No. of Hours : 12

Straight Line (continued)

Angle between a plane and a line - Projection of a line - Image of a point in a plane - Projection and image of a line in a plane - Perpendicular drawn to a line - Shortest distance between two skew lines - Foot of the common perpendicular - Equations of the plane containing the shortest distance - Line intersection the given line - Lines of intersection of three planes - Equation of two given skew lines - Surface generated by the straight line.

Chapter 4 (Sections 4.3 - 4.11, Vector methods are to be excluded)

Unit – IV

No. of Hours : 12

Sphere

Equation of a sphere - Standard equation of a sphere - Results based on the properties of a sphere - Tangent plane to a sphere - Radical plane - Equation of a circle on a sphere - Equations $S + \lambda P = 0$ and $S + \lambda S' = 0$.

Chapter 5 (Sections 5.1 - 5.8, Vector methods are to be excluded)

Unit – V**No. of Hours : 12****Cone, Cylinder and Conicoids**

Cone - Equation of a Right circular cone - Cone whose vertex is at the origin - Cone with vertex at (α, β, γ) - Quadric Cone with Vertex at the origin - Intersection of a cone by a plane - Three mutually perpendicular generators - General Quadric Cone - Cylinder - Equation of a cylinder - Right circular cylinder - Quadric surfaces- Conicoids - Standard equations of central conicoids - Enveloping cone - Tangent Plane.
Chapter 6 (Sections 6.1 - 6.13, Vector methods are to be excluded)

Text Book:

Analytical Geometry-3D by **P. Duraipandian, Laxmi Duraipandian, D. Muhilan**, Emerald Publishers.

Books for Reference:

1. Analytical Solid Geometry by **Shanthi Narayanan** and **Mittal P.K.**, 16th Edition S. Chand and Co., New Delhi.
2. Analytical Geometry 3 Dimensional by **P. Duraipandian**& others - edition.

Note: Questions to be taken only from the text book

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO 1	Assimilate the basic concept of direction ratios and direction cosine, planes in 3D	K-1
CO 2	Understand the concepts of straight lines, symmetrical form and co-planarity of straight lines and solve related problems	K-2
CO 3	Learn about angle between two planes, Shortest distance between two skew lines, Foot of the common perpendicular, Lines of intersection of three planes and solve related problems	K-3
CO 4	Acquire knowledge about sphere and solve relevant problems	K-3
CO 5	Analyse the concepts of Cone, Cylinder and Conicoids	K-4

K-1 :Recall, K-2 :Understand, K-3 :Apply, K-4 :Analyse, K-5 :Evaluate, K-6 :Create

Mapping of COs with POs and PSOs :

CO \ PO/ PSO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	M	M	L	L	L	L	L	L	L	S	-	L	M	S
CO2	S	L	S	S	S	L	S	S	S	S	M	S	S	S
CO3	S	M	S	S	S	S	S	S	S	S	M	S	S	S
CO4	S	M	S	S	S	S	S	S	S	S	M	S	S	S
CO5	S	M	S	S	S	S	S	S	S	S	M	S	S	S

S - Strong, M - Medium, L - Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM - 16
B.Sc. MATHEMATICS – SEMESTER II
SKILL BASED II – ANALYTICAL GEOMETRY WITH
GEOGEBRA – PRACTICAL (20UMASQC2)
For candidates admitted from 2020-2021 onwards (Under CBCS)

2 Hours\ Week

2 Credits

Syllabus

Unit I: Classification of Quadratic equations representing lines, Parabola, Ellipse and Hyperbola.

Unit II: Tracing the conic when its equation is given.

Unit III: Reflection property of Parabola, Reflection property of Ellipse, Reflection property of Hyperbola.

Unit IV: Tracing Spheres, Tracing Cylindrical surfaces.

Unit V: Graphing quadratic surfaces.

Text Book:

A Text Book of Analytical Geometry by **T.K.Manicavachagom Pillay** and **T. Natarajan**, Viswanathan publications.

Web Resources:

1. <https://wiki.geogebra.org/GeoGebra-en-Manual.pdf>
2. https://www.math.utah.edu/~emina/teaching/5270s13/Intro_to_Geogebra.pdf

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO 1	Know the basic concepts of lines, Parabola, Ellipse and Hyperbola.	K-1
CO 2	Get knowledge of quadratic equations and learn to trace the conic when its equation is given	K-2
CO 3	Acquire knowledge about reflection property of Parabola, Ellipse and Hyperbola.	K-2
CO 4	Use Geogebra to trace Spheres and Cylindrical surfaces.	K-3
CO 5	Use Geogebra for Graphing quadratic surfaces	K-3

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse, K-5 Evaluate, K-6 Create

Mapping of COs with POs and PSOs :

PO/ PSO CO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	L	M	M	S	S	S	S	S	S	S	-	M	S	S
CO2	M	M	S	S	S	S	S	S	S	S	-	M	S	S
CO3	M	M	S	S	S	S	S	S	S	S	-	M	S	S
CO4	S	M	S	S	S	S	S	S	S	S	-	M	S	S
CO5	S	M	S	S	S	S	S	S	S	S	-	M	S	S

S - Strong, M - Medium, L - Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM - 16
ALLIED MATHEMATICS - I (20UCSAC1)
(FOR COMPUTER SCIENCE)

For candidates admitted from 2020 – 2021 onwards (Under CBCS)

5 Hours / Week

5 Credits

Course Objectives: The course aims to

1. acquire knowledge about the rank of a matrix, characteristic roots and characteristic vectors.
2. gain knowledge about the various concepts on matrices & theory of equations.
3. acquire knowledge on solving problems by Numerical methods.

Syllabus

Unit - I

No. of Hours : 15

Matrices:

Rank of a matrix, Elementary transformation, Equivalent matrices, Finding the rank of a matrix using elementary transformations (up to third order - simple problems) Characteristic equation of a matrix, Characteristic vectors of a matrix, Cayley - Hamilton's theorem (Statement only), Verification of Cayley - Hamilton theorem. (Examples 3-16 are to be excluded)

Chapter 5 (Page No: 5.25 – 5.37, 5.50 – 5.54, 5.61-5.75)

Unit - II

No. of Hours :15

Theory of Equations:

Relation between the roots and coefficients of an equation, Imaginary and irrational roots, Symmetric functions of the roots of an equation in terms of its coefficients (up to cubic equation) and reciprocal equations.

Chapter 6 (Page No: 6.2 – 6.37)

Unit - III

No. of Hours : 16

Transformation of equation (Definition only), Multiplication of roots by m (Definition only) Diminishing the roots of an equation, Removal of term, Descart's rule of signs, Descart's rule of signs for negative roots of an equation, Horner's method, Newton's method of evaluating a real root to given decimal places.

Chapter 6 (Page No: 6.38, 6.49 – 6.67)

Unit – IV

No. of Hours : 14

The solution of Numerical Algebraic and Transcendental equations - Bisection method - Method of Successive approximations - RegulaFalsi method - Newton's method.

Solution of Simultaneous Linear Algebraic Equations: Gauss-Elimination Method – Gauss-Jordan Elimination Method.

Chapter 3 (Page No: 69 - 98) (Example problems only)

Chapter 4 (Page No: 112 - 126) (Example problems only)

Unit – V

No. of Hours : 15

Numerical Differentiation and Numerical Integration: Newton's forward difference, Newton's backward difference formula to compute the derivative – Derivative using Stirling's formula - To find maxima and minima of the function given the tabular values - A general quadrature formula for equidistant ordinates - Trapezoidal rule -

Simpson's one-third rule - Simpson's three-eighths rule. (Geometrical interpretation, Truncation error in Trapezoidal rule, Romberg's method – Weddle's rule and Truncation error in Simpson's rule are to be excluded)

Chapter 9 (Page No: 281 - 296, 300 - 320) (Example problems only - Examples 7 & 8 in Numerical Differentiation are excluded)

Text Books:

1. "Allied Mathematics" by **P.R.Vittal**, Margham Publications, Chennai for Units I, II & III)
2. "Numerical Methods" by **P.Kandasamy, K.Thilakavathy, K.Gunavathy**, 2003 Edition for Units IV & V.

Book for Reference:

1. "Finite Differences and Numerical Analysis", **H.C. Saxena**, S. Chand Publishers, 2005.
2. "Algebra" Volume I by **T.K. Manickavasagam Pillai** & others, S.V. Publications, 1985.
- 3.

Web Resources:

1. <https://books.googlea.co.in/books?id=4C4rDAAAQBAJ&pg=PR1&dq=allied+mathe matics+and+numerical+method&hl=en&sa=X&ved=0ahUKEwiykt2fxorbAhVFeiskHcA7C SMQ6AEIJzAB#v=onepage&q=allied%20mathematics%20and%20numerical%20methods&f=false>
2. <https://www.sigc.edu>AlgebraandCalculus>

Note: Questions to be taken only from the Text Books.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	Acquire knowledge about the rank of a matrix, characteristic roots and characteristic vectors.	K-4
CO2	Recall the basic concepts and understand the relation between the roots and coefficients of an equation.	K-2
CO3	Understand transformation of equations and apply Horner's method and Newton's method for solving the equations.	K-3
CO4	Solve algebraic and transcendental equations by Numerical methods.	K-3
CO 5	Understand and analyse Numerical differentiation and Integration.	K-4

K-1 :Recall; K-2 :Understand; K-3 :Apply; K-4 :Analyze; K-5 :Evaluate; K-6 :Create.

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM -16
ALLIED MATHEMATICS - I (19USTAC1)
(FOR STATISTICS)

For candidates admitted from 2020 - 2021 onwards (Under CBCS)

5 Hours / Week

5 Credits

Course Objectives: The course aims to

1. acquire knowledge in theory of equations, Differential calculus and Differential equations.
2. understand the method of solving algebraic equations using transformation of equation.
3. promote problem solving ability in differential equations.

Syllabus

Unit - I

No. of Hours : 15

Theory of Equations

Relation between the roots and coefficients of an equation, Imaginary and irrational roots, Symmetric functions of the roots of an equation in terms of its coefficients (up to cubic equations) and Reciprocal equation.

Chapter 6 (Page No : 6.2 – 6.37)

Unit - II

No. of Hours : 15

Transformation of equation (Definition only), Multiplication of roots by m (Definition only), Diminishing the roots of an equation, Removal of a term, Descartes' rule of sign, Descartes rule of signs for negative roots of an equation, Horner's method, Newton's method of evaluating a real root correct to given decimal places.

Chapter 6 (Page. No : 6.38 - 6.67)

Unit - III

No. of Hours : 15

Differential Calculus

Angle between the radius vector and the tangent, Angle of intersection of two curves, Length of perpendicular from the pole to the Tangent, Pedal equation, Cartesian formula for radius of curvature, Parametric formula for radius of curvature.

Chapter 10 & 11 (Page. No : 10.1 – 10.23, 11.1 – 11.22)

Unit - IV

No. of Hours : 15

Ordinary Differential Equations

Second order differential equations with constant coefficients, Finding particular integral for the function $f(x)e^{ax}$, $\cos ax$, $\sin ax$, $\sinh ax$, $\cosh ax$, x^m , $e^{ax}v$ where v is any function of x , Linear homogeneous equation and Variation of parameter.

Chapter 23 & 24 (Page No: 23.1 – 23.32, 24.1 – 24.23)

Unit - V

No. of Hours : 15

Partial Differential Equations

Elimination of arbitrary constants, Elimination of arbitrary functions, Definitions – complete solution, singular solutions, General solutions, Standard types, Lagrange's linear partial differential equations (Charpit's method to be excluded).

Chapter 26 (Page No: 26.1 – 26.40, 26.44 – 26.58)

Text Book:

“Allied Mathematics” by **P.R. Vittal**, Margham Publications, Chennai-17.

Book for Reference:

“Algebra” Volume-I by **T.K.Manicavachagam Pillai, T.Natarajan & K.S. Ganapathy**, S.Viswanathan Publishers, Pvt. Ltd, 2004.

Web Resources :

1. <http://www.universityofcalicut.info/SDE/VI%20Sem.%20B.Sc%20Maths%20-%20Additional%20Course%20in%20lie%20of%20Project%20-Theory%20of%20equations%20&%20fuzzy%20set.pdf>

2. https://sol.du.ac.in/pluginfile.php/4111/mod_resource/content/1/B.A.%20st%20m%204_1-7_.pdf

Note: Questions to be taken only from the Text Books.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	understand the relation between the roots and coefficients, symmetric functions of the roots, reciprocal equation and solve the related problems	K-2
CO2	gain knowledge about transformation, multiplying and diminishing the roots of an equation and also acquire knowledge about Horner’s and Newton’s method and solve the related problems	K-3
CO3	understand the concept of angle between the radius vector and the tangent, radius of curvature and pedal equation and apply the concept to solve the problems	K-3
CO4	recall the concepts of second order differential equations and acquire knowledge to find the particular integral for different types of functions .	K-3
CO5	analyse the different types of solutions for partial differential equations.	K-4

K-1 Recall; K-2 Understand; K-3 Apply; K-4 Analyse; K-5 Evaluate; K-6 Create

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM -16
ALLIED MATHEMATICS - II (20UCSAC2)
(FOR COMPUTER SCIENCE)

For candidates admitted from 2020 - 2021 onwards (Under CBCS)

5 Hours / Week

5 Credits

Course Objectives: The course aims to

1. gain knowledge about the concepts of Mathematical logic, Set theory and Mathematical system known as Boolean Algebra.
2. acquire knowledge about Linear Programming Problem and solving them using Graphical method and Simplex method.
3. know about how to transport various quantities from various origins to different destinations with the minimum cost.

Unit - I

No. of Hours : 15

Mathematical Logic

Logical Statement or Proposition - Type of Propositions - The Propositional Calculus - The Negation of a Proposition - Disjunction - Conjunction - Tautologies and Contradictions - Logical Equivalence - The Algebra of Propositions - Conditional Propositions - Converse, Inverse and Contrapositive Propositions - The Negation of a Conditional Proposition - Biconditional Propositions - Arguments.

Chapter 1 Page No: 1-16

Unit – II

No. of Hours : 15

Set Theory

Sets - Set Designation - Null Sets and Unit Sets - Special Sets of Numbers - Universal Set - Subsets: Proper Subsets and Equal Sets - Set Operations - Union Operation - Properties of Union Operation - Intersection - Properties of Intersection Operation - Distributive Properties - Complementation - Relative Complement (or Difference of Sets) - Properties of Complement - Properties of Difference - Symmetric Difference.

Chapter 2 Page No: 17 - 35

Unit - III

No. of Hours : 15

Boolean Algebra

Introduction - Boolean Functions - Normal Form - Fundamental Forms of Boolean/ Functions.

Chapter 5 Page No: 112-132

Unit – IV

No. of Hours : 16

Graphical method of the solution of a LPP and General Linear Programming Problems - Simplex Method - General Linear Programming Problem - Canonical and Standard forms of LPP - The Simplex Method - The Simplex Algorithm.

Chapter 2 Page No: 2.15-2.32 (Example problems only)

Chapter 3 Page No: 3.1 - 3.26 (Example problems only)

Unit - V

No. of Hours : 14

Transportation Model : Introduction - Mathematical Formulation of a Transportation Problem - Methods for finding Initial Basic Feasible Solution - Transportation Algorithm (or) MODI Method (Test for Optimal)
(Balanced problems only)

Chapter 7 Page No: 7.1 - 7.25 (Example problems only)

Text Books:

1. “Discrete Mathematics” by **B.S. Vatsa and SuchiVatsa**, New Age International Publishers, New Delhi for UNITS I, II & III
2. “Resource Management Techniques (Operations Research)” by **V.Sundaresan, K.S. Ganapathy Subramanian and K. Ganesan**, A.R. Publications, SirkaliTaluk for UNITS IV & V

Books for Reference:

1. “Operations Research” by **Kantiswarup, P.K. Gupta and Man Mohan**, (9th Edition), Sultan-Chand Publications.
2. **M. Chandrasekaran, M. Umaparvathi**. PHI Learning Private Ltd. 2010.

Web Resources :

1. http://www.maths.manchester.ac.uk/~avb/On1_pdf/0N1_All.pdf
2. <https://faculty.math.illinois.edu/~vddries/main.pdf>
3. <http://nptel.ac.in/courses/112106134/3>

Note: Questions to be taken only from the text books

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO 1	Define and use propositional logic for expressions involving the logical connectives	K-2
CO 2	Identify and apply fundamentals of sets and its operations	K-3
CO 3	Evaluate Boolean functions and simplify expressions using properties of Boolean Algebra	K-4
CO 4	Understand the fundamental ideas of LPP and apply graphical and simplex method for solving LPP.	K-4
CO 5	Apply MODI method for solving transportation problems and finding the shortest way to the travelling salesman problem.	K-4

K-1 Recall; K-2 Understand; K-3 Apply; K-4 Analyse; K-5 Evaluate; K-6 Create

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM -16
ALLIED MATHEMATICS - II (20USTAC2)
(FOR STATISTICS)

For candidates admitted from 2020 - 2021 onwards (Under CBCS)

5 Hours / Week

5 Credits

Course Objectives: The course aims to

1. acquire knowledge about Characteristic roots and vectors, Trigonometry, Integral calculus and Laplace transform.
2. understand the method of doing problems using the above concepts.
3. analyse the different methods of solving differential equations.

Unit - I

No. of Hours : 15

Characteristic equation of a matrix, Characteristic vectors of a matrix, Cayley-Hamilton theorem (statement only) and its applications.

Chapter 5 (Page No: 5.50 – 5.75 only, Examples 3-16 are to be excluded)

Unit - II

No. of Hours : 15

Trigonometry

Expansions of $\sin n\theta$, $\cos n\theta$, $\tan n\theta$ (n being a positive integer), Expansions for $\cos^n\theta$ and $\sin^n\theta$ in terms of multiples of θ , Express $\cos n\theta$ in terms of cosines of multiples of θ (n is a positive integer), Expansions of $\sin \theta$ and $\cos \theta$ in ascending powers of θ , Expansion of $\tan \theta$.

Chapter 14 (Page No: 14.1-14.30)

Unit - III

No. of Hours : 16

Integral Calculus

Multiple Integrals Evaluation of double integrals, Double integral in polar co-ordinates, Triple integrals, Change of order of integration.

Chapter 20 (Page No: 20.1 – 20.32)

Unit - IV

No. of Hours : 15

Laplace Transform

Definition, Laplace transform of elementary functions, Linearity property, Shifting property, Change of scale property, Laplace transform of derivatives, Laplace transform of integrals. (Periodic functions to be excluded).

Chapter 27 (Page No: 27.2 – 27.20)

Unit - V

No. of Hours : 14

Inverse Laplace transform, Solving differential equations using Laplace transform. (Simultaneous equations are to be excluded).

Chapter 27 (Page No: 27.24– 27.57)

(Section 5 : Examples 1-10, Exercise IV : 1-26 only)

Text Book:

“Allied Mathematics” by **P.R. Vittal**, Margham Publications, Chennai-17.

Books for Reference:

1. "Trigonometry" by **S. Narayanan** and **T.K. Manicavachagom Pillay**, S. Viswanathan Publishers, Pvt. Ltd.,2009.
2. "Differential Equation and its Applications" by **S. Narayanan** and **T. K. Manicavachagom Pillay**, S. Viswanathan Publishers Pvt Ltd, Ninth edition,2009.

Web Resources :

1. https://www.math.ucdavis.edu/~anne/WQ2007/mat67-Notes_on_Matrices.pdf
2. <https://www.cms.waikato.ac.nz/~stokes/MATH102/trigOH.pdf>
3. <http://www.math.northwestern.edu/~scanez/courses/290/notes/lecture-notes-290-3.pdf>
4. http://www.math.psu.edu/shen_w/250/NotesLaplace.pdf
5. https://services.math.duke.edu/~yh89/teaching/Math353_15Summer_I/LectureNotes/lecture13.pdf

Note: Questions to be taken only from the Text Book.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	acquire knowledge about characteristic vectors of a matrix, Cayley - Hamilton theorem and its applications	K-1
CO2	understand the expansions of trigonometric functions and solve the related problems	K-2
CO3	grasp the concept of multiple integrals and its evaluations	K-2
CO4	learn the Laplace transform of elementary functions and study its applications.	K-3
CO5	acquire knowledge of inverse Laplace transforms and solve differential equations using it.	K-3

K-1 Recall; K-2 Understand; K-3 Apply; K-4 Analyse; K-5 Evaluate; K-6 Create

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM - 16
B.Sc. MATHEMATICS - SEMESTER III
For candidates admitted from 2019 - 2020 onwards
CORE V – CALCULUS II (19UMAC5)

4 Hours / Week

4 Credits

Course Objectives: The course aims to

1. acquire knowledge about Bernoulli's formula for integration by parts, Reduction formulae and Beta-Gamma functions.
2. know the evaluation of Multiple integrals and its applications.
3. make the students to familiarize with the concepts of Fourier Series.

Syllabus

Unit – I :

No. of Hours : 12

Bernoulli's formula for Integration by parts, Reduction formulae.
(Chapter 11)

Unit – II :

No. of Hours :12

Beta and Gamma functions, Properties, Relations between Beta and Gamma functions, Evaluations of definite integrals using Beta and Gamma functions.
(Chapter 13)

Unit – III :

No. of Hours : 12

Double Integrals, Double Integral in polar co-ordinates, Triple Integrals.
(Chapter 17)

Unit – IV :

No. of Hours : 12

Change of order of Integration, Applications of Double and Triple Integrals to Area, Volume and Centroid.
(Chapter 17)

Unit – V:

No. of Hours : 12

Fourier Series : Fourier series expansions of periodic functions with period 2π , Fourier series for odd and even functions, Half range Fourier series.
(Chapter 21)

Text Books:

1. Calculus - by **P.R.Vittal and V.Malini** for Units I, II, III and IV, Margham publications, Chennai - 17.
2. Allied Mathematics - by **P.R.Vittal** for Unit V, Margham publications, Chennai- 17.

Books for Reference:

1. Calculus Volume II by S. Viswanathan (Printers and Publishers) Pvt Limited, Chennai-2011.
2. Differential & Integral Calculus by **Shanthi Narayan**,

Web Resources:

1. [Tutorial.math.lamar.edu>Classes>CalcII](http://Tutorial.math.lamar.edu/Classes/CalcII)
2. [www.math.northwestern.edu>courses](http://www.math.northwestern.edu/courses)
3. [www.math.chalmers.se>Fourier>draft_1](http://www.math.chalmers.se/Fourier/draft_1)

Note: Questions to be taken only from the Text Books.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
1	recall and understand the concepts of integration using reduction formula	K-2
2	applying integration in Beta and Gamma functions	K-3
3	learn to solve problems in double and triple integrals	K-3
4	applying double and triple integrals to area, volume and centroid	K-3
5	applying integration in the concepts of Fourier series	K-3

K-1 :Recall; K-2 :Understand; K-3 :Apply; K-4 :Analyze; K-5 :Evaluate; K-6 :Create.

Mapping of COs with POs and PSOs :

PO/ PSO CO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	M	S	S	M	M	M	S	S	-	L	L	S
CO2	S	S	S	M	S	M	M	M	S	S	M	L	M	S
CO3	S	S	S	S	S	S	S	M	S	S	M	-	M	M
CO4	S	S	S	M	S	M	S	M	S	S	M	L	S	S
CO5	S	M	S	S	M	S	S	M	S	S	-	-	M	S

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM - 16
B.Sc. MATHEMATICS - SEMESTER III
For candidates admitted from 2019 - 2020 onwards
CORE VI - VECTOR ANALYSIS AND THEORY OF NUMBERS (19UMAC6)

5 Hours / Week

4 Credits

Course Objectives: The course aims to

1. acquire the knowledge in divergence, curl and integration of vector point functions and number theory.
2. understand the integral theorems in vector analysis and number theory.
3. analyse the evaluation of integrals.
4. develop ability in solving number theory problems.

Syllabus

Unit -I :

No. of Hours : 15

Introduction, Gradient, Divergence curl, Solenoidal and irrotational vectors, Directional derivative, Unit vector normal to a surface, Tangent and normal planes to a surface the operator ∇^2 expansion formulas.

Chapter 2

Unit -II :

No. of Hours : 15

Ordinary integrals of vectors, Line integrals surface and volume integrals.

Chapter 3

Unit -III :

No. of Hours : 15

Gauss stroke's and Green's theorems (without proof) - simple problems based on them.

Chapter 4

Unit -IV :

No. of Hours : 15

Prime number, Composite number decomposition of a composite number as a product of primes uniquely (without proof), Divisors of a given number N, Euler's function $\phi(N)$, formula for $\phi(N)$, (without proof), Integral part of a real number, The highest power of a prime p contained in n!, The product of r consecutive integers is divisible by r! (without proof), simple problems.

Chapter 5 (Sections 1 - 5)

Unit - V:

No. of Hours : 15

Congruences, Numbers in arithmetical progression, Fermat's theorem, Generalisation of Fermat's theorem, Wilson's theorem and Lagrange's theorem (without proof); simple problems.

Chapter 5 (Sections 6 - 9)

Books for Study:

1. Vector Analysis by **P. Duraipandian** and **LaxmiDuraipandian** Emerald publishers, Chennai (For Unit I, II & III),.
2. Algebra, Analytical geometry & Trigonometry by **Dr.P.R. Vittal** and **V. Malini**, Margham publications, Chennai - 17(For Unit IV & V).

Books for Reference:

1. Vector Analysis by **P.R.Vittal** and **V. Malini**, Margham Publications, Chennai (For Unit I, II & III).
2. Vector Analysis by **K.Viswanathan** and **S.Selvaraj**, Emerald Publishers, Chennai(For Unit I, II & III).
3. Elements of Number Theory by **Kumaravelu** and **Susheela -Kumaravelu**, Raja Sankar offset Printers, Sivakasi, 2002(For Unit IV & V).

Web Resources :

1. http://www.math.harvard.edu/archive/21a_spring_09/PDF/13-05-curl-and-divergence.pdf.
2. http://www.southampton.ac.uk/~leor/soton/MATH2017/Notes_full_II.pdf.
3. http://ae.hc.cust.edu.tw/new_website/attachments/article/244/Lecture%206_Some%20Special%20Congruences.pdf.
4. <https://pdfs.semanticscholar.org/80fb/bd54a04908fefb3dbf94ea424690352afddf.pdf>.

Note: Questions to be taken only from the Text Books.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	Gain the knowledge on the concept of divergence, curl and integration of vector point functions.	K-3
CO2	Understand and work with the problems related to ordinary integrals of vectors, line integrals surface and volume integrals	K-4
CO3	Solve the problems related to Gauss Stroke's and Green's theorems	K-3
CO4	Understand the basic concepts of number theory and gain the ability to solve the problems related to them.	K-3
CO5	Understand the concept of Fermat's theorem, generalisation of Fermat's, Wilson's and Lagrange's theorem and gain the ability to solve the problems related to them	K-4

K-1 :Recall, K-2 :Understand, K-3 :Apply, K-4 :Analyse, K-5 :Evaluate, K-6 :Create

Mapping of COs with POs and PSOs :

PO/ PSO CO	PO									PSO				
	P O1	PO 2	PO 3	PO 4	PO5	PO 6	P O7	P O8	PO 9	PS O1	PSO 2	PS O3	PS O4	PS O5
CO1	S	M	M	S	S	S	S	S	S	S	M	S	S	S
CO2	S	M	S	S	S	S	S	S	S	S	M	S	S	S
CO3	S	M	S	S	S	S	S	S	S	S	M	S	S	S
CO4	S	M	S	S	S	S	S	S	S	S	M	S	S	S
CO5	S	M	S	S	S	S	S	S	S	S	M	S	S	S

S - Strong, M - Medium, L - Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM - 16
B.Sc. MATHEMATICS - SEMESTER III
For candidates admitted from 2019 - 2020 onwards
ALLIED II - MATHEMATICAL STATISTICS (19UMAAC3)

5 Hours / Week

5 Credits

Course Objectives: The course aims to

1. understand the concept of random variable with examples.
2. acquire knowledge about moment generating functions and characteristic functions.
3. gain knowledge about correlation and regression, different types of distributions and Large samples with necessary examples.

Syllabus

Unit – I :

No. of Hours : 15

Random Variables: Discrete random Variable, Continuous random variable, Cumulative distribution, Properties of distribution functions, Two dimensional random variable, Marginal probability distribution, Conditional probability distribution, Independent random variable.

Mathematical Expectation: Definition, Properties of expected values.

Chapter 2 (Page No.: 2.1 - 2.33)

Chapter 3 (Page No.: 3.1 - 3.18)

Unit – II :

No. of Hours : 15

Variance: Definition, properties of variance, chebechev's inequality.

Moments and moment generating functions: Definition, Central moments in terms of moments about the origin.

Moment generating function: Definition, Properties of moment generating functions.

Chapter 4 (Page No.: 4.1 - 4.25)

Chapter 5 (Page No.: 5.1 - 5.17)

Unit – III :

No. of Hours : 15

Correlation : Definition, Rank correlation, Properties of correlation coefficient, Limitations, Examples.

Regression : Derivation of regression line, Properties of regression coefficients, Examples.

Chapter 8 (Page No. : 8.2 Definition only, 8.20- 8.47)

Chapter 9 (Page No. : 9.1 - 9.24)

Unit – IV :

No. of Hours : 15

Binomial Distribution : Definition, Binomial frequency distribution and examples.

Poisson Distribution : Definition and Example of Poisson distribution.

Normal Distribution : Definition, standard normal probability distribution and examples.

Sampling Distributions: Students t-distribution, F-distribution- χ^2 - distribution (definition and derivation only).

Chapter 12 (Page No. : 12.1 - 12.16)

Chapter 13 (Page No. : 13.1 - 13.12)

Chapter 16 (Page No. : 16.1, 16.13 - 16.27)

Chapter 22 (Page No.: 22.3 - 22.5, 22.25- 22.28, 22.33-22.35)

Unit – V:**No. of Hours : 15**

Large Samples: Population, sample parameter, sampling distribution, sampling distribution of mean, characteristic of a sampling distribution, Interpolation of standard error of the mean, central limit theorem, finite population, test of hypothesis, significance level, one tail test, two tail test, procedure for test of hypothesis, procedure for two tail test, procedure one tail test, test for equality of two means.

Test of Hypothesis: Null and alternate hypothesis, Type Critical region, errors, power function, significance level of the test, best critical region, Neymann Pearson lemma (with proof).

Chapter 24 (Page No. : 24.1 - 24.25); Chapter 29 (Page No. : 29.1 – 29.5)

Book for Study:

Mathematical Statistics by **P.R. Vittal**, 2004 - Maragatham Publishers.

Books for Reference:

1. Fundamentals of Mathematical statistics by **S.C. Gupta** and **V.K. Kapoor**, Sultan Chand and Sons, Pvt. Ltd.

Web Resources:

1. www.iiserpue.ac.in>Sahoo_textbook
2. [Spartan.ac.brocku.ca](http://Spartan.ac.brocku.ca/~jvr/bik)>~jvr/bik>Statistics
3. www.maths.adelaide.edu.au>MSIII

Note: Questions to be taken only from the Text Books.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	recall the concepts of random variables ,marginal probability distribution and conditional probability distribution.	K-1
CO2	acquire the knowledge about moment generating functions and characteristic functions.	K-2
CO3	learn to solve problems using correlation coefficient and regression coefficient.	K-3
CO4	gain knowledge about different types of distributions.	K-3
CO5	eradicate the consequences of confusion in decision making.	K-5

K-1 :Recall; K-2 :Understand; K-3 :Apply; K-4 :Analyze; K-5 :Evaluate; K-6 :Create.

Mapping of COs with POs and PSOs :

CO \ PO/ PSO	PO									PSO				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	L	L	M	M	S	M	S	L	L	L	M	M
CO2	M	M	-	L	M	S	S	M	S	M	L	-	M	S
CO3	S	M	S	M	S	S	S	M	S	M	-	-	M	M
CO4	S	M	S	S	S	S	S	M	S	M	-	-	M	S
CO5	M	M	S	L	S	S	S	M	S	M	L	-	M	S

S - Strong, M - Medium, L – Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM - 16
B.Sc., MATHEMATICS – SEMESTER III
For candidates admitted from 2019 - 2020 onwards
SKILL BASED III – DATA ANALYTICS WITH R (19UMASQC3)

2 Hours\ Week

2 Credits

UNIT - I:

Vectors and Operations on Vectors

Create, Modify and Access Vector Elements in R, Creating Data Frames in R, Finding Mean, Median and Mode of a vector in R.

UNIT - II:

Basic operations on Matrices

Creating blank and Non Empty Matrices in R, Operations on Matrices in R, Rotating Matrices and Types of Vectors in R.

UNIT – III:

Data Frames

Data Frame Using Numbers and Letters in R, Operations on Data Frames in R.

UNIT – IV:

Big Data Analytics

Creating Tables for Big Data in R, Obtain Structure for Flights in R, Operations for Big Data tables Using R.

UNIT – V:

Univariate and Multivariate Graphs

Problems on Correlation using R.

Book for Reference

1. R Programming for Data Science by Roger D. Peng – Lean Publishing Process
2. Big Data Analytics by David Loshin, Morgan Kaufmann Publications, 2013.

Note: Questions to be taken only from the Text Books.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO 1	Understand the operations on vectors using R	K-2
CO 2	Understand basic operations on matrices using R	K-2
CO 3	Apply commands on data frames to understand various operations on it using R	K-3
CO 4	Analyse the operations on Big Data tables using R	K-4
CO 5	Evaluate Correlation problems using R	K-5

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse, K-5 Evaluate, K-6 Create

Mapping of COs with POs and PSOs :

PO/ PSO CO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	L	M	S	L	-	L	M	S	-	S	M	-
CO2	S	M	L	M	S	L	-	M	M	S	-	S	M	-
CO3	S	M	M	S	S	L	M	M	M	S	-	S	S	M
CO4	S	S	M	S	S	M	M	M	M	S	-	S	S	M
CO5	S	S	S	S	S	M	M	M	S	S	-	S	S	M

S - Strong, M - Medium, L – Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM -16

B.A./B.Sc./B.Com - SEMESTER III

NON MAJOR ELECTIVE - I

For candidates admitted from 2019 - 2020 onwards

BASIC MATHEMATICS (19UMANEC1)

2 Hours\ Week

2 Credits

Course Objectives: The course aims to

1. introduce the basic concepts of mathematics.
2. make the students to acquire knowledge on Geometry and solid and plane figures.
3. initiate the students to find the volume and surface area of solids.

Syllabus

Unit -I :

No. of Hours : 6

Operations on Numbers.

Section-I – Chapter 1 – Solved examples 1-32 only.(Page No. 1-9 only)

Unit -II :

No. of Hours : 6

H.C.F. and L.C.M of Numbers.

Section-I – Chapter 2 (Page No. 30-45 only)

Unit -III :

No. of Hours : 6

Percentage

Section-I – Chapter 10 – Solved examples 1-33 only.(Page No.208-214 only)

Unit -IV :

No. of Hours : 6

Area

Section-I – Chapter 24 – Solved examples 1-32 only.(Page No. 499-505 only)

Unit - V:

No. of Hours : 6

Volume and Surface Area

Section-I – Chapter 25 – Solved examples 1-34 only.(Page No. 549-555 only)

Book for Study:

Quantitative Aptitude for Competitive Examinations (Fully Solved) (Seventh Revised Edition) by **Dr. R. S. Aggarwal**, S.Chand& Company Pvt. Ltd.

Book for Reference:

Fast Track Objective Arithmetic by Rajesh Verma, Arihant Publications India Limited, New Delhi, Completely Revised Edition.

Web Resources:

1. <http://ncert.nic.in/ncerts/l/iemh113.pdf>
2. <https://yoursmahboob.files.wordpress.com/2016/12/quantramandeebook-1.pdf>

Note: Questions to be taken only from the Text Book.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO 1	Understand the operations on numbers	K-2
CO 2	Understand to find the H.C.F and L.C.M of numbers	K-2
CO 3	Applying the operations of numbers to find the percentage	K-3
CO 4	Evaluate the problems related to Area	K-5
CO 5	Evaluate Volume and Surface Area	K-5

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse, K-5 Evaluate, K-6 Create

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM - 16
B.Sc. MATHEMATICS - SEMESTER IV
For candidates admitted from 2019 - 2020 onwards
CORE VII - DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS (19UMAC7)

4 Hours / Week

4 Credits

Course Objectives: The course aims to

1. provide with a carrier and systematic way of solving a given ordinary and partial differential equations.
2. know about Laplace transforms and its application of differential equations.

Syllabus

Unit-I :

No. of Hours : 12

Differential equation of first order but not of first degree, Exact differential equation, Total differential equation $Pdx + Qdy + Rdz = 0$.

Chapter 1(section 3.1-3.3,4,5.1-5.5,6.1,6.2,7.1-7.3)

Chapter 3(Section 7.1-7.4)

Unit-II:

No. of Hours : 12

Second order differential equations with constant coefficients P.I. for the polynomial and $e^{ax} V$, where V is X^n , $\cos mx$, $\sin mx$, (m and n are constants), Differential equations of second order with variable co-efficients, Variation of parameters.

Chapter 2(section 1.1,1.2,2,3,4,8,8.1,8.2,9,10)

Unit –III:

No. of Hours : 12

Partial differential equations : Formation of P.D.E. by elimination of arbitrary constants and functions, solutions of P.D.E., Four standards : $f(p,q) = 0$, $f(x,p,q) = 0$; $f(z,p,q) = 0$, $f(x,p) = g(y,q)$, Clairaut's form, Lagrange's PDE : $Pp + Qq = R$, Charpit's method.

Chapter 4(section 1,2,2.1,2.2,3,4,5.1,5.2,5.3,5.4,6,6.1,7)

Unit - IV :

No. of Hours : 14

Laplace Transforms, Inverse Laplace transform.

Chapter 5(section 1.1,1.2,2,3,4,5,6,7)

Unit-V :

No. of Hours : 10

Application of Laplace Transforms to differential equations, Simple problem - Solving simultaneous equations.

Chapter 5(section 8,9,10,11,12)

Books for Study:

1. Calculus (Volume III) (Major)
2. Differential Equations and Fourier Series and Fourier Transforms **S.Narayanan, T.K.Manicavachagam Pillay**, Viswanathan (Printers and Publishers) Pvt. Ltd., 2004.

Books for Reference:

1. **Arumugam and Isaac**, Differential Equation, New Gamma Publishing House, Palayamkottai, 2003
2. **M.D. Raisinghania**, Ordinary and partial Differential Equations, S. Chand & Co.

Web Resources :

1. <http://nptel.ac.in/courses/111108081/>
2. <https://drasmaa.yolasite.com/resources/Lecture%20notes1.pdf>
3. <http://nptel.ac.in/courses/122104018/node87.html>

Note: Questions to be taken only from the text books

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO 1	Understand basic concepts associated with ordinary differential equations and solve problems.	K-3
CO 2	Discuss the methods in solving second order linear differential equations with constant and variable coefficients	K-3
CO 3	Learn to solve PDE using Charpit's method and Langrange's methods	K-3
CO 4	Assimilate knowledge about Laplace transforms and Inverse Laplace transforms and solve related problems	K-3
CO 5	Know the Applications of Laplace Transforms and solve biological problems using differential equations and laplace transforms	K-6

K-1 :Recall, K-2 :Understand, K-3 :Apply, K-4 :Analyse, K-5 :Evaluate, K-6 :Create

Mapping of COs with POs and PSOs :

CO \ PO/ PSO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	M	L	L	L	S	S	S	S	-	L	S	S
CO2	S	M	M	M	L	L	S	S	S	S	-	M	S	S
CO3	S	M	S	S	M	M	S	S	S	S	-	M	S	S
CO4	S	M	S	S	M	M	S	S	S	M	-	M	S	S
CO5	S	M	S	S	S	M	S	S	S	S	-	M	S	S

S - Strong, M - Medium, L – Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM-16.

B.Sc. MATHEMATICS - SEMESTER IV

For candidates admitted from 2019 - 2020 onwards

ELECTIVE I – OPERATIONS RESEARCH (19UMAEC1)

5 Hours / Week

5 Credits

Course Objectives: The course aims to

1. understand the concept of Linear Programming Problem
2. develop the ability of solving the real world problem through Network analysis.

UNIT I

No. of Hours : 15

Linear Programming Formulation

Introduction, Requirements for employing LPP Technique & Mathematical Formulation of LPP.

General Linear Programming Problems – Simplex Methods

General Linear Programming Problems, Canonical and Standard forms of LPP, The Simplex Method, The Simplex Algorithm, Artificial Variables Techniques, The Big M – Method & The Two Phase Method.

Chapter – 2- Sec: 2.1, 2.2 & 2.3 (Page No: 2.1 – 2.14)

Chapter – 3- Sec: 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.2, 3.2.1 & 3.2.2(Page No: 3.1 – 3.56)

UNIT II

No. of Hours : 15

Duality in LPP and Dual Simplex Method

Introduction, Formulation of dual problems, Some important Results in duality & Dual Simplex Method.

Transportation Model

Introduction, Mathematical formulation of a Transportation Problem, Methods for finding initial basic feasible solution, Transportation Algorithm (or) MODI Method (modified distribution method) (Test for optimal solution), Degeneracy in Transportation Problems & Unbalanced Transportation Problem.

Chapter – 5- Sec: 5.1, 5.2, 5.3 & 5.5(Page No: 5.1 – 5.34)

Chapter – 7- Sec: 7.1- I, II, 7.2, 7.3 & 7.4 (Page No: 7.1 – 7.47)

UNIT III

No. of Hours : 15

Assignment Problem

Assignment Algorithm (or) Hungarian Method, Unbalanced Assignment Models & Travelling Salesman Problem.

Inventory Models

Introduction, Types of Inventory, Reasons for maintaining Inventory, Costs Involved in Inventory Problems, Variables in Inventory Problem, Lead time, Reorder Level (R.O.L) & Deterministic Inventory Models.

Chapter – 8- Sec: 8.1, 8.5, 8.6 & 8.9 (Page No: 8.4 – 8.21, 8.33 – 8.49)

Chapter – 12- Sec: 12.1, 12.2, 12.3, 12.4, 12.5, 12.6 & 12.7(Page No: 12.1 – 12.26)

UNIT IV

No. of Hours : 15

Scheduling by PERT and CPM

Introduction, Basic Terminologies, Rules for constructing a project network, Network Computations (Earliest completion time of a Project and Critical path), Floats, Programme Evaluation Review Technique : (PERT) & Basic differences between PERT and CPM.

Chapter – 15- Sec: 15.1, 15.2, 15.3, 15.4, 15.5, 15.6 & 15.7 (Page No: 15.1 – 15.45)

UNIT V

No. of Hours : 15

Game Theory

Introduction, Two person zero – Sum Games, The Maximin – Minimax Principle, Games without Saddle Points, Mixed Strategies, Dominance Property & Graphical Method for $2 \times n$ or $m \times 2$ games.

Chapter – 16- Sec: 16.1, 16.2, 16.3, 16.4, 16.6 & 16.7

(Page No: 16.1 – 16.13, 16.20 – 16.39)

Text Book:

1. **Prof. V.Sundaresan, Prof. K.S. Ganapathy Subramanian and Prof. K. Ganesan,** Resource Management Techniques(Operations Research)(Fourth Revised Edition), A.R.Publications,Chennai.

Books for Reference:

1. **Kantiswarup, P.K. Gupta and Man Mohan,** (9th Edition), Operations Research, Sultan-Chand Publications.
2. **Taha H.A.,** Operations Research: An introduction(Seventh edition), Pearson Prentice Hall, 2002
3. **Gupta P.K and D.S.Hira,** Operations Research, S.Chand and Company.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	Formulate and solve L.P.P by using Simplex, Big M and two Phase simplex methods.	K-4
CO2	Acquire the knowledge on solving transportation problems and analyse the concepts of assignment problems.	K-4
CO3	Acquire the knowledge on inventory models	K-4
CO4	Understand project scheduling by PERT and CPM.	K-4
CO5	Recall the basic concepts and acquire the knowledge on Games & Strategies.	K-4

K-1 :Recall; K-2 :Understand; K-3 :Apply; K-4 :Analyze; K-5 :Evaluate; K-6 :Create.

Mapping of COs with POs and PSOs :

PO/ PSO CO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	M	M	M	S	-	M	-	S	-
CO2	S	S	S	S	S	M	M	M	S	-	M	-	S	-
CO3	S	M	M	S	M	M	M	M	S	-	M	-	S	-
CO4	S	S	S	S	S	M	M	M	S	-	M	-	S	-
CO5	S	S	S	S	S	M	M	M	S	-	M	-	S	-

S - Strong, M - Medium, L – Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM-16.

B.Sc. MATHEMATICS - SEMESTER IV

For candidates admitted from 2019 - 2020 onwards

ELECTIVE I - NUMBER THEORY (19UMAESC1)

5 Hours / Week

5 Credits

Course Objectives: The course aims to

1. know about the basic concepts of number theory.
2. get a complete grip of various concepts to present modern Mathematics in elementary terms.
3. develop the skill of solving problems in number theory.

Syllabus

Number Theory

Unit - I

No. of Hours : 15

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

Unit - II

No. of Hours : 15

Divisibility Theory in Integers - The Division Algorithm - The g.c.d. -
Euclidean Algorithm - The Diophantine Equation $ax + by = c$.

Unit - III

No. of Hours : 15

Primes and their Distributions - The fundamental theorem of Arithmetic
- The Sieve of Eratosthenes - The Goldbach Conjecture.

Unit - IV

No. of Hours : 15

The Theory of Congruence - Basic Properties of Congruence - Special Divisibility test
- Linear Congruence.

Unit - V

No. of Hours : 15

Fermat's Theorem - Fermat's factorization method - The little
theorem - Wilson's theorem.

Book for Study:

Elements of Number Theory, **S.Kumaravelu** and **Susheela Kumaravelu**, Nagercoil,
2002.

Books for Reference:

An Introduction to the Theory of Numbers: G.H. Hardy, Edward M. Wright,
Andrew Wiles, Roger Heath Brown and Joseph Silverman.

Web Resource :

<http://www2.math.uu.se/~lal/kompendier.pdf>

Note: Questions to be taken only from the text books

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO 1	recall the basic concepts in number theory	K-1
CO 2	understand the concepts of divisibility theory in integers, the division algorithm, Euclidean algorithm and Diophantine equation $ax + by = c$	K-2
CO 3	solve the problems using the Fundamental theorem of arithmetic	K-3
CO 4	understand the basic properties of congruence and solve the problems on congruence	K-3
CO 5	gain knowledge about the Fermat's factorization method, the Little theorem & Wilson's theorem and acquire knowledge to apply them	K-3

K-1 :Recall, K-2 :Understand, K-3 :Apply, K-4 :Analyse, K-5 :Evaluate, K-6 Create

Mapping of COs with POs and PSOs :

CO \ PO/ PSO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	-	S	S	S	S	S	-	S	L	-	-
CO2	S	S	S	-	S	S	S	S	S	-	S	L	-	-
CO3	S	S	S	-	S	S	S	S	S	-	S	L	-	-
CO4	S	S	S	-	S	S	S	S	S	-	S	L	-	-
CO5	S	S	S	-	S	S	S	S	S	-	S	L	-	-

S - Strong, M - Medium, L – Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM-16
B.Sc., MATHEMATICS - SEMESTER IV
For candidates admitted from 2019 - 2020 onwards
ALLIED II - DISCRETE MATHEMATICS (19UMAAC4)

5 Hours / Week

5 Credits

Course Objectives: The course aims to

1. gain knowledge about the concept of Mathematical logic and algebraic structures.
2. Know about Boolean algebra and its application to Sequential Machines.
3. make them to use in practical applications related to computer science.

Unit – I :

No. of Hours : 15

Connectives: Negation, Conjunctions, Disjunctions, WFF, Tautologies equivalence and duality.

Normal forms: DNF,CNF,PDNF,PCNF, Theory of inference calculus validity using truth table.

Predicate calculus: Predicates, Statement function, Variables and Quantifiers.

Inference theory of predicate calculus: Valid formulae and Equivalences.

Chapter 1 (sections 1.2, 1.3, 1.5, 1.6. omit 1.2.5)

Unit – II :

No. of Hours :15

Relations and ordering: Relations, Properties of binary relation in a set.

Functions: Definitions and introduction, composition of functions, Inverse function, Binary and n-array operations, Hashing functions.

Natural numbers :Peano axioms and Mathematical introduction, cardinality.

Chapter 2 (Sections 2.3, 2.4, 2.5)

Unit – III :

No. of Hours : 15

Algebraic systems: Definition and examples, Semigroups and monoids - Definition and examples - Homomorphism of semi group and monoids, Sub semigroups and sub monoids - Polish expression and their compilation - Polish rotation, Conversion of infix to polish.

Group codes : The communication model and basic notations of error correction, Generation of codes by using parity checks, Error recovery in group codes.

Chapter 3 (Sections 3.1, 3.2, 3.4, 3.7)

Unit – IV :

No. of Hours : 15

Lattices as partially ordered set : Definition and example, Some properties of lattices, Sub lattices, Direct product and homomorphism.

Boolean algebra: Definition and example, Sub algebra, Direct product and homomorphism.

Chapter 4 (Sections 4.1, 4.2)

Unit – V:

No. of Hours : 15

Grammar and Language : Discussion of grammar, Formal definition of language

Finite state machines: Introductory sequential circuit, Equivalence of finite state machines.

Chapter 3 and 4 (Sections 3.3, 4.6)

Book for Study:

Discrete Mathematical Structures with Applications to Computer Science by **J.P.Trembley, R.Manohar**, Year of publication 2001, Tata McGraw-Hill, New Delhi.

Books for Reference:

1. **M. Chandrasekaran, M. Umaparvathi**. PHI Learning Private Ltd. 2010.
2. Discrete Mathematics by **T. Veerarajan**, Nlgraw- Hill Company Ltd, 2007

Web Resources:

1. [www.crectirupati.com>default>files](http://www.crectirupati.com/default/files)
2. [www.mafy.lut.fi>Lectures>Lecture2](http://www.mafy.lut.fi/Lectures/Lecture2)
3. [Faculty.atu.edu>mfinan>main2](http://Faculty.atu.edu/mfinan/main2)

Note: Questions to be taken only from the Text Book.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
1	Understand the concept of connectives and inference theory of predicate calculus	K-2
2	Classify the various type of functions and make them to use in practical applications related to computer science	K-3
3	Gain knowledge about the Algebraic system and group codes	K-3
4	Understand the concept of Boolean Algebra and its application to sequential Machines	K-4
5	Examine about the grammar and language and apply to finite state machine	K-4

K-1 :Recall; K-2 :Understand; K-3 :Apply; K-4 :Analyze; K-5 :Evaluate; K-6 :Create.

Mapping of COs with POs and PSOs :

PO/ PSO CO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	-	M	M	-	M	-	M	M	M	M	-	M	M
CO2	M	M	-	M	L	M	-	M	M	M	L	-	M	M
CO3	M	L	-	L	L	M	-	M	M	S	M	-	M	M
CO4	S	M	M	S	-	M	-	M	M	M	M	-	M	M
CO5	L	-	-	M	-	M	-	M	M	M	M	-	-	-

S - Strong, M - Medium, L – Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM-16.
B.Sc. MATHEMATICS – SEMESTER IV
For candidates admitted from 2019 - 2020 onwards
SKILL BASED IV – OPTIMIZATION TECHNIQUES WITH TORA-PRACTICAL
(19UMASQC4)

2 Hours / Week

2 Credits

List of Practicals using Tora:

1. Solving Linear Programming Problems – Simplex Methods
2. Solving Transportation Problems
 - North –West corner rule
 - Least cost method
 - Vogel’s approximation method
 - Test for optimal solution by Modi method
3. Solving Assignment Problem by Hungarian method
4. Solving Network Analysis Problems
 - CPM
 - PERT
5. Solving Game theory problems
 - Two person zero – Sum Games
 - Graphical Method for $2 \times n$ or $m \times 2$ games

Book for Study:

1. Resource Management Techniques(Operations Research)(Fourth Revised Edition), by **Prof.V.Sundaresan, Prof. K.S. Ganapathy Subramanian and Prof. K. Ganesan,** A.R.Publications,Chennai.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of TORA software	K-2
CO2	Solving L.P.P by using Simplex, Big M and two Phase simplex methods through Tora.	K-3
CO3	Acquire the knowledge on solving transportation problems and assignment problems by using Tora	K-4
CO4	Understand and apply Tora for solving problems on project scheduling by PERT and CPM.	K-4
CO5	Apply Tora for solving problems on Games & Strategies.	K-3

K-1 :Recall; K-2 :Understand; K-3 :Apply; K-4 :Analyze; K-5 :Evaluate; K-6 :Create.

Mapping of COs with POs and PSOs :

PO/ PSO CO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	M	M	M	S	-	M	-	S	-
CO2	S	S	S	S	S	M	M	M	S	-	M	-	S	-
CO3	S	M	M	S	M	M	M	M	S	-	M	-	S	-
CO4	S	S	S	S	S	M	M	M	S	-	M	-	S	-
CO5	S	S	S	S	S	M	M	M	S	-	M	-	S	-

S - Strong, M - Medium, L – Low

B.A./B.Sc./B.Com - SEMESTER IV
NON MAJOR ELECTIVE II
MATHEMATICS FOR COMPETITIVE EXAMINATIONS (19UMANEC2)
For candidates admitted from 2019 - 2020 onwards

2 Hours / Week

2 Credits

Course Objectives: The course aims to

1. introduce the basic concepts of Mathematics.
2. make them to find simple and compound interest.
3. promote the problem solving ability to write the competitive examinations.

Unit - I

No. of Hours : 6

Averages, Problems on Numbers.

Section-I – Chapter 6 – Solved examples 1-15 only (Page No. 139-141),

Chapter 7 - Solved examples 1-15 only (Page No.161-163).

Unit - II

No. of Hours : 6

Profit and Loss

Section-I – Chapter 11 – Solved examples 1-29 only (Page No.251-256).

Unit - III

No. of Hours : 6

Ratio and Proportion, Partnership

Section-I – Chapter 12 – Solved examples 1-7 only (Page No.294-296),

Chapter 13 (Page No.311-325).

Unit - IV

No. of Hours : 6

Simple Interest, Compound Interest

Section-I – Chapter 21 – Solved examples 1-12 only (445-447),

Chapter 22 – Solved examples 1-15 only(466-470).

Unit - V

No. of Hours : 6

Odd Man Out and Series

Section-I – Chapter 35 (Page No.649-657).

Book for Study:

Quantitative Aptitude for Competitive Examinations (Fully Solved) (Seventh Revised Edition) by **Dr. R. S. Aggarwal**, S. Chand & Company Pvt. Ltd.

Book for Reference:

Quantitative Aptitude for All Competitive Examinations by **AbhijitGuha**, McGraw Hill Education, Sixth edition.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO 1	Understand to find the Averages of numbers	K-2
CO 2	Understand to find the Profit and Loss	K-2
CO 3	Gain the knowledge about the Ratio and Proportion	K-3
CO 4	Evaluate the Simple interest and Compound interest to Problems	K-5
CO 5	Evaluating the Problems of Odd Man Out and series	K-5

K-1 Recall, K-2 Understand, K-3 Apply, K-4 Analyse, K-5 Evaluate, K-6 Create

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM -16

B. COM - SEMESTER III

ALLIED - BUSINESS MATHEMATICS (19UCOAC3)

For candidates admitted from 2019 - 2020 onwards (Under CBCS)

5 Hours / Week

5 Credits

Course Objectives: The course aims to

1. gain knowledge about Matrices and Determinants.
2. acquire knowledge about the fundamental rules of Differentiation and integration.
3. inculcate the application of derivatives and integration in business as a rate measures and in the field of Marginal analysis.
4. acquire knowledge about Linear Programming Problem and solving of them.
5. know about how to transport various quantities from various origins to different destinations with the minimum cost.

Syllabus

Unit -I :

No. of Hours : 17

Definition of a matrix, Notation, Order of a matrix, Types of matrices, Matrix Operations-I, System of linear equations, Determinants, Evaluation (Method 2, Properties of determinants are to be excluded) Cramer's rule, (Product of determinants is to be excluded) Minor and Cofactor, Matrix operations-II.

(Page no.162-181, 184-188, 190-199 only)

Unit -II :

No. of Hours : 15

Limit and Differentiation

Differentiation - Derivatives of standard functions from first principle (All the derivations and differentiation of parametric form are to be excluded), Successive differentiation, Uses of the derivative.

Chapter 6 (Page no: 267-286, 289-303 only)

Chapter 7 (Page no: 304-325 only)

Unit -III :

No. of Hours : 14

Integration

Indefinite integrals, Standard forms, Determination of C, Definite integrals, Method of substitution, Method of partial fractions, Method of integration by parts, Uses in Economics.

Chapter 8 (Page no: 326-342, 346-352 only)

Unit -IV :

No. of Hours : 17

Graphical method, A few important terms, Simplex method. (Simple problems involving slack variables only)

Chapter 9 (Page no: 366-401 only)

Unit - V:

No. of Hours : 12

Transportation problems (Initial basic feasible solution only), Assignment problems (Simple problems only)

Books for Study:

1. Business Mathematics by **PA. Navnitham**, Jai Publishers. Trichy-21. (For Units I-IV).
2. Operations Research by **Kantiswarup, P.K. Gupta** and **Man Mohan**, Eighth Edition. (for Unit V).

Books for Reference:

1. Business Mathematics by Dharmapadam, Visvanathan .S Ltd Publications, 1991.
2. Resource Management Techniques by V.Sundaresan, AR Publications, 2015.

Web Resources:

1. <http://ncert.nic.in/ncerts/l/lemh201.pdf>
2. <http://econweb.ucsd.edu/~jsobel/172aw02/notes8.pdf>

Note: Questions to be taken only from the Text Books.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	gain essential foundation in the areas of business calculus and financial mathematics.	K-1
CO2	learn and apply methods of Differentiation in business problems.	K-1
CO3	get knowledge of integration and its specific uses in economics.	K-2
CO4	get familiarity of Linear Programming techniques and identifying the need of LPP in Business and economic context.	K-2
CO5	connect acquired knowledge and skills with transportation and assignment problems in economic practice.	K-3

K-1 :Recall; K-2 :Understand; K-3 :Apply; K-4 :Analyze; K-5 :Evaluate; K-6 :Create.

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM -16
ALLIED MATHEMATICS - I (19UPHAC3)
(FOR PHYSICS)

For candidates admitted from 2019 - 2020 onwards (Under CBCS)

5 Hours/Week

5 Credits

Course Objectives: The course aims to

1. acquire knowledge in Theory of equations, Differential calculus and Differential equations
2. understand the method of solving algebraic equations using transformation of equation
3. promote problem solving ability in differential equations.

Unit - I

No. of Hours: 15

Theory of Equations

Relation between the roots and coefficients of an equation, imaginary and irrational roots, Symmetric functions of the roots of an equation in terms of its coefficients (upto cubic equations), and Reciprocal equation.

Chapter 6 (Page. No.: 6.2 – 6.37)

Unit - II

No. of Hours: 15

Transformation of equation (Definition only), Multiplication of roots by m , Diminishing the roots of an equation, Removal of a term, Descartes' rule of sign, Descartes' rule of sign for negative roots of an equation, Horner's method, Newton's method of evaluating a real root correct to given decimal places.

Chapter 6 (Page. No : 6.49 – 6.67)

Unit - III

No. of Hours: 15

Differential Calculus

Angle between the radius vector and the tangent, Angle of intersection of two curves, length of perpendicular from the pole to the tangent, Pedal equation, Cartesian formula for radius of Curvature, Parametric formula for radius of curvature, Radius of curvature in Polar Coordinates, Radius curvature for pedal curve, Radius of curvature for polar tangential curve.

Chapter 10 & 11 (Page. No : 10.1 – 10.23, 11.1 – 11.33)

Unit - IV

No. of Hours: 15

Ordinary Differential Equations

Second order linear differential equations with constant coefficients, Finding particular integral for $(D)y = F(x)$ when the function $F(x) = e^{ax}$, $\cos ax$, $\sin ax$, $\sinh ax$, $\cosh ax$, x^m , $e^{ax}v$ where v is any function of x , Linear homogeneous equation and variation of parameters.

Chapter 23 & 24 (Page. No: 23.1 – 23.32, 24.1 – 24.23)

Unit - V

No. of Hours: 15

Partial Differential Equations

Elimination of arbitrary constants, Elimination of arbitrary functions, Definitions – Complete solution, Singular solutions, General solutions, Standard types : $F(p,q) = 0$, $F(z, p, q) = 0$, $f_1(x, p) = f_2(y, q)$ and Clairaut's form (simple problems only), Lagrange's linear partial differential equations.

Chapter 26 (Page. No : 26.1 – 26.40, 26.44 – 26.58)

Book for Study:

Allied Mathematics by **P.R. Vittal**, Margham Publications, Chennai – 17.

Book for Reference:

Algebra, Volume-I by **T.K.Manicavachagom Pillai, T.Natarajan & K.S. Ganapathy**, S.Viswanathan Publishers, Pvt. Ltd, 2004.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the relations between the roots and coefficients of an equation and solve reciprocal equations	K-2
CO2	Examine the existence of roots of an equation and obtain the roots by Newton's and Horner's methods	K-3
CO3	Compute the radius of curvature using Cartesian formula, Parametric formula and in Polar coordinates	K-3
CO4	Obtain the general solution of second order linear differential equations with constant coefficients	K-4
CO5	Form the partial differential equations and obtain the solutions of some standard types of partial differential equations.	K-4

K-1 :Recall; K-2 :Understand; K-3 :Apply; K-4 :Analyze; K-5 :Evaluate; K-6 :Create.

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM -16
ALLIED MATHEMATICS - I (19UCHAC3)
(FOR CHEMISTRY)

For candidates admitted from 2019 - 2020 onwards (Under CBCS)

5 Hours / Week

5 Credits

Course Objectives: The course aims to

1. acquire knowledge about the rank of a matrix, characteristic roots and characteristic vectors.
2. gain knowledge about the various concepts on roots of an equation.
3. acquire knowledge on solving algebraic and transcendental equation by Numerical methods.

Syllabus

Unit - I

No. of Hours : 15

Matrices

Rank of a matrix, Elementary transformation, Equivalent matrices, Finding the rank of a matrix using elementary transformations (up to third order - simple problems) Characteristic equation of a matrix, Characteristic vectors of a matrix, Cayley - Hamilton's theorem (Statement only), Verification of Cayley - Hamilton theorem.

Chapter 5 (Page No: 5.25 – 5.37, 5.50 – 5.75)

Unit - II

No. of Hours : 15

Theory of Equations

Relation between the roots and coefficients of an equation, Imaginary and irrational roots, Symmetric functions of the roots of an equation in terms of its coefficients (up to cubic equation) and Reciprocal equations.

Chapter 6 (Page No: 6.2 – 6.37)

Unit - III

No. of Hours : 15

Transformation of equation (Definition only), Multiplication of roots by m (Definition only) Diminishing the roots of an equation, Removal of term, Descart's rule of signs, Descart's rule of signs for negative roots of an equation, Horner's method, Newton's method of evaluating a real root to given decimal places.

Chapter 6 (Page No: 6.38, 6.49 – 6.67)

Unit - IV

No. of Hours : 15

Finite Differences:

Finite Difference, Forward difference table, Newton's forward formula for interpolation, Newton's Backward difference formula, Binomial method, Lagrange's Formula.

Chapter 7 (Page No: 7.2 - 7.29)

Unit - V

No. of Hours : 15

Differential Calculus:

Angle between the radius vector and the tangent, Angle of intersection of two curves, Length of perpendicular from the pole to the tangent, Pedal equation.

Cartesian formula for radius of curvature, Parametric formula for radius of curvature.

Chapter 10 (Page No: 10.1 – 10.23)

Chapter 11 (Page No: 11.1 – 11.22)

Book for Study:

Allied Mathematics by **P.R.Vittal**, Margham Publications, Chennai – 17.

Book for Reference:

Allied Mathematics by **P.Kandasamy** and **K.Thilagavathy**, S.Chand &Company Ltd, Ram Nagar, New Delhi-110 055

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	recall the concepts of matrix and understand concepts of the characteristic equation, vectors of a matrix	K-1
CO2	understand the relations between the roots and coefficients of an equation and solve the reciprocal equations	K-3
CO3	examine the existence of roots of an equation and find the roots of an equation by Newton's and Horner's method	K-3
CO4	acquire knowledge on Newton's forward and backward difference formulae, Lagrange's Formula and their applications	K-3
CO5	find the angle between the radius vector and the tangent and the radius of curvature and cartesian coordinates	K-4

K-1 :Recall; K-2 :Understand; K-3 :Apply; K-4 :Analyze; K-5 :Evaluate; K-6 :Create.

SRISARADACOLLEGE FOR WOMEN (AUTONOMOUS), SALEM -16
ALLIED MATHEMATICS - II (19UPHAC4)
(FOR PHYSICS)

For candidates admitted from 2019 - 2020 onwards (Under CBCS)

5 Hours/Week

5 Credits

Course Objectives: The course aims to

1. acquire the knowledge in Trigonometry, integral calculus, Fourier series and Laplace transform.
2. understand the method of doing problems using the above concepts.
3. analyse the different methods of solving differential equations using Laplace transform.

Unit - I

No. of Hours : 16

Trigonometry

Expansions for $\sin n\theta$, $\cos n\theta$, Expansion for $\tan n\theta$, Expansion for $\tan[\theta_1+\theta_2+\dots+\theta_n]$ (n being a positive integer), Expansions for $\cos^n\theta$ and $\sin^n\theta$ in terms of multiple angles of θ , Express $\cos n\theta$ in terms of cosines of multiples of θ (n is a positive integer), Expansions of $\sin \theta$ and $\cos \theta$ in ascending powers of θ , Expansion of $\tan \theta$, Hyperbolic functions, Inverse hyperbolic functions.

Chapter 14 (Page No: 14.1-14.60)

Unit - II

No. of Hours : 15

Integral Calculus

Multiple Integrals Evaluation of double integrals, Double integral in polar co-ordinates, Triple integrals, Change of order of integration, Applications of double integral in evaluating area only (Evaluation of volume, centroid and mass to be excluded).

Chapter 20 (Page No: 20.1 - 20.43) (In Exercise 5, only problems to 1 to 8)

Unit - III

No. of Hours : 15

Fourier Series

Definition, Finding Fourier series for a given periodic function with period 2π , Fourier series for odd and even functions, Half range Fourier series.

Chapter 21 (Page No: 21.1 - 21.56)

Unit - IV

No. of Hours : 15

Laplace Transform

Definition, Laplace transform of elementary functions, Linearity property, Shifting property, Change of Scale property, Laplace transform of derivatives, Laplace transform of integrals, Periodic functions.

Chapter 27 (Page No: 27.2 - 27.23)

Unit - V

No. of Hours : 14

Inverse Laplace transform, Solving differential equations using Laplace transform. (Simultaneous equations are to be excluded).

Chapter 27 (Page No: 27.24 - 27.57)

(Section 5 : Examples 1-10, Exercise 4 : 1-26 only)

Book for Study:

Allied Mathematics by **P.R. Vittal**, Margham Publications, Chennai-1

Book for Reference:

Calculus-Volume III by **S.Narayanan** and **T.K ManicavachagamPillay, S.Viswanathan** (Printers and Publishers), Pvt., Ltd, 2011.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	Create reasonable comprehension and familiarity with trigonometric functions, procedures, and controls essential for acquiring practice in Calculus.	K-1
CO2	Compute double and triple integrals efficiently and can also change a double integral into polar coordinates whenever necessary	K-1
CO3	Calculate the Fourier transform of elementary functions, and recognise even, odd functions to use the final reduction for Fourier transforms.	K-2
CO4	Find the Laplace transform of exponential, cosine, sine functions and also for integrals	K-2
CO5	Comprehend solving differential equations using inverse Laplace transform	K-3

K₁-Recall ; K₂-Understand; K₃-Apply; K₄-Analyse; k₅-Evaluate; K₆-Create.

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM -16
ALLIED MATHEMATICS -II (19UCHAC4)
(FOR CHEMISTRY)

For candidates admitted from 2019 - 2020 onwards (Under CBCS)

5 Hours / Week

5 Credits

Course Objectives: The course aims to

1. acquire knowledge about the expansion of trigonometric, hyperbolic and inverse hyperbolic functions.
2. develop the ability of solving second order differential equations and linear homogeneous equations.
3. learn the concepts of Laplace transform and its application in solving differential equations.

Syllabus

Unit - I

No. of Hours : 15

Trigonometry:

Expansions for $\sin n\theta$, $\cos n\theta$, $\tan n\theta$ (n being a positive integer), Expansions for $\cos^n\theta$, and $\sin^n\theta$ in terms of multiple angle of θ , Express $\cos n\theta$ in terms of cosines of multiples of θ (n being a positive integer), Expansions of $\sin\theta$ and $\cos\theta$ in ascending powers of θ , Expansion of $\tan\theta$, Hyperbolic functions, Inverse hyperbolic functions.

Chapter 14 (Page No : 14. 1 – 14. 60)

Unit - II

No. of Hours :15

Integral Calculus

Integration by parts, Definite integral, properties of definite integral, Bernoulli's formula.

Chapter 15 (Page No : 15.38 – 15.45 and 15.54 – 15.79)

Chapter 16 (Page No : 16.1 – 16.4)

Unit - III

No. of Hours : 15

Ordinary Differential Equations

Second order differential equations with constant coefficient, Finding particular integral for the function $f(x) = e^{ax}$, $\cos ax$, $\sin ax$, $\sin hax$, $\cos hax$, x^m , $e^{ax}v$, where v is any function of x , $x^m \sin ax$, $x^m \cos ax$, xv , where v is any function of x . Linear homogeneous equation.

Chapter 23 (Page No : 23.1 – 23.32),

Chapter 24 (Page No : 24.1 – 24.15)

Unit - IV

No. of Hours : 15

Laplace Transform

Definition, Laplace transform of elementary functions, Linearity property, Shifting property change of scale property, Laplace transform of derivatives, Laplace transform of integrals, Multiplication by t .

Chapter 27 (Page No : 27.2 – 27.20)

Unit - V

No. of Hours : 15

Inverse Laplace transform, Solving differential equation using Laplace transform (Solving the simultaneous ordinary differential equation is to be excluded)

Chapters 27 (Page No : 27.24 – 27.50)

(Section 5 : Example 1 – 10 and Exercise IV : Problems 1 – 26 only)

Book for Study:

Allied Mathematics by **P.R. Vittal**, Margham Publications, Chennai - 17.

Books for Reference:

1. Differential & Integral Calculus by **Shanthi Narayan**.
2. Calculus Volume I by **S. Narayanan** and **T. K. Manicavachagom Pillai**, S. Viswanathan (Printers and Publishers) Pvt., Limited, Chennai- 2011.
3. **S. Arumugam** and **Isaac**, Calculus, Volume I, New Gamma Publishing House – 1991.

Web Resources:

1. [www.ugrad.math.ubc.ca>m103_notes_04](http://www.ugrad.math.ubc.ca/m103_notes_04)

2. [www.public.asu.edu>Teaching>ECE202](http://www.public.asu.edu/Teaching/ECE202)

Note: Questions to be taken only from the Text Books.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	recall the basic concepts and understand the expansions of trigonometric functions, hyperbolic and inverse hyperbolic functions.	K-1
CO2	acquire knowledge on integral calculus.	K-3
CO3	solve second order differential equations and linear homogeneous equations.	K-3
CO4	acquire knowledge on Laplace transforms.	K-4
CO5	understand Inverse Laplace transform and solve differential equations using Laplace transform.	K-4

K-1 :Recall; K-2 :Understand; K-3 :Apply; K-4 :Analyze; K-5 :Evaluate; K-6 :Create.

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM-16.
B.Sc. MATHEMATICS - SEMESTER V
For candidates admitted from 2018 - 2019 onwards
CORE VIII - ALGEBRAIC STRUCTURES I (18UMAC8)

6 Hours / Week

4 Credits

Course Objectives: The course aims to

1. acquire knowledge about various groups.
2. gain knowledge about Rings and special classes of Rings.

Syllabus

Group Theory

Unit – I

No. of Hours: 19

Subgroups, Cyclic groups, Cosets and Lagrange's theorem, Normal subgroups and quotient groups.

Chapter 2 (Sections 2.4, 2.5, 2.6 & 2.7)

Unit – II

No. of Hours: 17

Homomorphisms, Isomorphism theorems, Automorphisms, Permutation groups. Chapter 2 (Sections 2.8, 2.9, 2.10, 2.11)

Ring Theory

Unit – III

No. of Hours: 19

Definition and examples, Properties, Special classes of rings, Subrings and subfields, Ideals and quotient rings, Homomorphisms.

Chapter 3 (Sections 3.1 to 3.6)

Unit - IV

No. of Hours: 18

Maximal and prime ideals, The characteristic of an integral domain, The field of quotients of an integral domain. Euclidean rings - Definition and properties, Unique factorization theorem, Gaussian integers.

Chapters 3 & 4 (Sections 3.7 to 3.9, 4.1 to 4.3)

Unit – V

No. of Hours: 17

Polynomial Rings

Polynomials over fields, Polynomials over the rational field, Polynomials over commutative rings.

Chapter 5 (Sections 5.1 to 5.3)

Book for Study:

Modern Algebra by **M.L. Santiago**, Tata McGraw Hill Publishing Co. Ltd., New Delhi.

Books for Reference:

1. Topics in Algebra - Second Edition by **I. N. Herstein**, Wiley India Pvt. Ltd, New Delhi, 2008.
2. Modern Algebra by **S. Arumugam, A. Thangapandi Isaac**, New Gamma Publication House, Palayamkotti, 1997.

Web Resources :

1. <http://www.math.uconn.edu/~kconrad/blurbs/grouptheory/coset.pdf>
2. <http://www3.ntu.edu.sg/home/Frederique/chap2.pdf>

Note : Questions to be taken only from the text books

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	understand the concept of various subgroups and their applications	K-1
CO2	acquire knowledge about the concept of homomorphisms, isomorphisms and automorphisms	K-2
CO3	gain knowledge about the concept of rings, fields, subrings and subfields	K-2
CO4	analyse the concept of ideals, types of ideals, integral domain and unique factorization domain	K-4
CO5	evaluate the properties of polynomial rings	K-5

K-1: Recall, K-2: Understand, K-3: Apply, K-4: Analyse, K-5: Evaluate, K-6: Create

Mapping of COs with POs and PSOs :

CO \ PO/PSO	PO										PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	-	M	S	S	M	S	S	S	S	L	M	S
CO2	S	S	S	S	S	S	S	M	S	S	S	S	-	S	S
CO3	S	S	S	M	M	S	S	M	S	S	S	S	-	M	S
CO4	S	S	S	S	S	S	S	M	S	S	S	S	-	S	S
CO5	S	S	S	M	M	S	S	M	S	S	S	S	-	M	S

S - Strong, M - Medium, L - Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM-16.
B.Sc. MATHEMATICS - SEMESTER V
For candidates admitted from 2018 - 2019 onwards
CORE IX-COMPLEX ANALYSIS - I (18UMAC9)

5 Hours / Week

4 Credits

Course Objectives: The course aims to

1. acquire the knowledge of limits, continuity, differentiability, analyticity of functions of complex variable, contour integrals, transformations, conformal mappings etc.
2. understand the theorems in the contents and their applications to solve problems.
3. analyse the different type of transformations and contour integrals.

Syllabus

Unit -I :

No. of Hours : 15

Regions in the complex plane

Functions of a complex variable - Limits - Theorems on Limits - Continuity - Derivatives - Differentiation Formulas - Cauchy Riemann Equations - Sufficient conditions for Differentiability - polar co-ordinates - Analytic Functions - Examples Harmonic Functions.

Chapter 1 (section 11 only)

Chapter 2 (sections 12, 15, 16, 18 to 26)

Unit -II :

No. of Hours : 15

Derivatives of functions $w(t)$ - Definite integrals of functions $w(t)$ - contours - contour Integrals - Some Examples - Examples with branch cuts - upper bounds for moduli of contour integrals - Antiderivatives - Proof of the theorem - Cauchy - Goursat - Theorem - Proof of the theorem - Simply connected Domains – Multiply connected Domains.

Chapter 4 (sections 37 to 49)

Unit -III :

No. of Hours : 15

Cauchy Integral Formula - An Extension of the Cauchy integral formula - Some consequences of the extension - Liouville's Theorem and the Fundamental Theorem of Algebra - Maximum modulus Principle.

Chapter 4 (sections 50 to 54)

Unit -IV :

No. of Hours : 15

Mappings - Mappings by the Exponential function

Mapping by Elementary functions, Linear Transformations - The transformation $w = 1/z$
Mapping by $1/z$ - Linear Fractional Transformations - An implicit form.

Chapter 2 (sections 13, 14)

Chapter 8 (sections 90 to 94)

Unit - V:**No. of Hours : 15**

The Transformation $w = \sin z$ - Mappings by z^2 and branches of $z^{1/2}$ - Conformal mapping - Preservation of Angles - Scale factors.

Chapter 8 (sections 96, 97)

Chapter 9 (sections 101, 102)

Book for Study:

“Complex variables and Applications”eighth edition by **James Ward Brown** and

Ruel.V. Churchill, McGraw Hill, Inc.

Books for Reference:

1. “Complex Analysis” by **S. Arumugam, A. Thangapandi Isaac** and **A. Somasundaram**, New Scitech Publications (India) Pvt Ltd, 2002.
2. “Functions of Complex Variable” – Thirteenth Edition by J. N. Sharma, Krishna PrakasanMedia(P) Ltd, 1996-97.

Web Resources :

1. <https://www.math.lsu.edu/~neubrand/notes.pdf>
2. <http://www.iitg.ac.in/physics/fac/charu/courses/ph503/book.pdf>
3. <https://www.math.ucdavis.edu/~romik/data/uploads/notes/complex-analysis.pdf>

Note: Questions to be taken only from the Text Book.

Course Outcomes (CO) : On completion of the course, students should be to

CO Number	CO Statement	Knowledge Level
CO1	present the central ideas of Cauchy – Riemann equations and decide the analyticity of a complex function.	K-1
CO2	develop an insight on contour integration and present the emphasis of Cauchy- Goursat theorem in simply and multiply connected domains.	K-1
CO3	evaluate a contour integral using Cauchy's integral formula and be accomplished in implementing the Liouville's theorem, and the maximum modulus principle.	K-2
CO4	explain the concepts of linear transformation and linear fractional transformation in a complex space.	K-3
CO5	exhibit the comprehension of conformal mappings like $w = \sin z$, $w = \cos z$, $w = \sinh z$, $w = \cosh z$ and preservation of angles.	K-4

K1-Recall ; K2-Understand; K3-Apply; K4-Analyse; k5-Evaluate; K6-Create.

Mapping of COs with POs and PSOs

PO/ PSO CO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	M	S	M	S	S	S	S	M	S	M	S	L	S	S
CO2	S	S	M	S	S	S	S	M	S	S	S	L	S	S
CO3	S	S	S	S	S	S	S	S	S	S	S	L	S	S
CO4	S	S	S	S	S	S	S	S	S	S	S	L	S	S
CO5	S	S	S	S	S	S	S	S	S	S	S	L	S	S

S - Strong, M - Medium, L – Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM-16.

B.Sc. MATHEMATICS - SEMESTER V

For candidates admitted from 2018 - 2019 onwards

CORE X - REAL ANALYSIS I (18UMAC10)

5 Hours / Week

4 Credits

Course Objectives: The course aims to

1. enable the students to understand the basic concepts in analysis.
2. introduce the fundamental material on sequences and series to the students who have studied elementary calculus.
3. make them study about metric spaces.

Syllabus

Unit – I

No. of Hours:14

Sets and Functions

Real valued functions - Equivalence countability - Real numbers - Least upper bounds.

Sequence of Real Numbers:

Definition of sequence and subsequence - Limit of a sequence.

Chapter 1(Sections 1.4 to 1.7)

Chapter 2(Sections 2.1 and 2.2)

Unit - II

No. of Hours: 16

Convergent sequences - Divergent sequences - Bounded sequences - Monotone sequences - Operations on convergent sequences - Operations on divergent sequences.

Chapter 2 (Sections 2.3 to 2.8)

Unit - III

No. of Hours: 15

Limit superior and Limit Inferior - Cauchy sequences.

Series of Real Numbers:

Convergence and divergence - Series with non-negative terms - Alternating series.

Chapter 2 (Sections 2.9 & 2.10)

Chapter 3 (Sections 3.1 to 3.3)

Unit - IV

No. of Hours: 15

Conditional convergence and absolute convergence - Tests for absolute convergence - Series whose terms form a non increasing sequence - The class l^2 .

Chapter 3 (Sections 3.4, 3.6, 3.7, 3.10)

Unit - V

No. of Hours : 15

Limits and Metric Spaces

Limit of a function on the real line - Metric spaces - Limits in metric spaces.

Continuous functions on metric spaces:

Functions continuous at a point on the real line - Reformulation - Functions continuous on a metric space.

Chapter 4 (Sections 4.1 to 4.3)

Chapter 5(Sections 5.1 to 5.3)

Book for Study:

Methods of Real Analysis by **Richard R.Gold Berg**, Oxford & IBH. Publicatins
CO.PVT.LTD.New delhi.

Books for Reference:

1. A First Course in Real Analysis by **M.K. Singhal** and **Asha Rani Singhal**, R. Chand & Co., June 1997 Edition
2. A Course of Mathematical Analysis by **Shanthi Narayan**, S. Chand & Co., 1995.

Web Resource :

1. <http://www.acadiau.ca/~hteisman/3533notes.pdf> Note: Questions to be taken only from the text books

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO 1	know the basic concepts and understand the concepts of real numbers, countable sets, lub and glb	K-1
CO 2	understand the concepts of sequences, nature of sequences and subsequences	K-2
CO 3	understand the notions of cauchy sequences and infinite series	K-2
CO 4	apply various tests of convergence to test the convergence of series	K-3
CO 5	know the concepts of metric spaces and continuous function and gain knowledge to analyze the properties of continuous functions on different types of metric spaces	K-4

K-1:Recall; K-2:Understand; K-2:Apply; K-3:Analyse; K-4:Evaluate; K-6:Create.
Mapping of COs with POs and PSOs :

CO \ PO/ PSO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	M	M	L	-	M	S	M	S	M	S	S	S	-	S
CO2	L	S	M	-	S	S	M	S	M	S	S	S	-	S
CO3	L	S	M	-	S	S	M	S	M	S	S	S	-	S
CO4	M	S	M	-	S	S	M	S	S	S	S	S	-	S
CO5	M	S	M	-	M	S	M	S	M	S	S	S	-	S

S - Strong, M - Medium, L – Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM-16.
B.Sc. MATHEMATICS - SEMESTER V
For candidates admitted from 2018 - 2019 onwards
CORE XI – DYNAMICS (18UMAC11)

6 Hours / Week

4 Credits

Course Objectives: The course aims to

1. gain intuitive insights from physical models.
2. understand the fundamental concepts and principles of dynamics.

Syllabus

Unit - I

No. of Hours : 18

Velocity and acceleration of a particle moving on a curve, velocity and acceleration components in cartesian coordinates, Velocity and acceleration components in polar coordinates (Plane motion)

Simple harmonic motion - Composition of two simple harmonic motions of the same period in the same straight line, Composition of two simple harmonic motions of the same period along two perpendicular lines, Simple Harmonic Motion as the projection of uniform circular motion, Oscillatory motion of particles connected to ends of elastic strings, The simple pendulum. The seconds pendulum.

Chapter 1 (Section 1.10 only) and Chapter 4

Unit – II

No. of Hours : 18

Impulsive Forces, Impulsive motion, Equations of motions for impulsive forces, Motion of a shot and gun, Impact of water on a surface, Impact of Elastic bodies, Newton's Experimental law, Oblique impact of two elastic spheres, Loss in kinetic energy in respect of direct impact of two smooth elastic spheres, Impact of an elastic sphere with a smooth fixed plane.

Chapter 7

Unit – III

No. of Hours : 18

Projectiles - The path of a projectile is a parabola, To trace the parabola, Maximum height reached, Time of flight, Horizontal range, Focus of the parabola, Directrix of the parabola, Velocity at any time 't' of the path, Maximum range on the horizontal plane, Range on an inclined plane through the point of projection, Maximum range on an inclined plane, Motion on an inclined plane.

Chapter 5 (Sections 5.4 - 5.4.1 to 5.4.9, 5.5 - 5.5.1 & 5.5.2 and 5.6)

Unit - IV

No. of Hours : 18

Central force - Central orbit, The central orbit is a plane curve, Areal velocity about the centre of force is constant, Differential equation to a central orbit, p-r equation of the central orbit, An Apse, Given the orbit, to find the law of force, Given the law of force, to find the orbit.

Chapter 6 (Section 6.6, 6.7, 6.8, 6.9)

Unit - V

No. of Hours : 18

Moment of Inertia, Plane Lamina – Momental Ellipse, Parallel and perpendicular axes theorems, Simple cases of Moments of Inertia, Motion of a Rigid Body - Rotation about - a fixed axis, A note on D'Alembert's Principle, Motion about a fixed axis, Expression for kinetic energy, moment of momentum, Equation of motion, Compound pendulum, Centres of Suspension and Oscillation are Reversible, Pressure on the axis.

Chapter 8 & Appendix III

Book for Study:

Dynamics by **A.V. Dharmapadam**, Viswanathan (Printers & Publishers) Pvt. Limited, 2006.

Books for Reference:

1. Dynamics by **Dr. M.K. Venkataraman**, Agasthiyar Publications, Thirteenth Edition, July 2009.
2. Mechanics by **P. Duraipandian, LaxmiDuraipandian and Muthamizh Jayapragasam**, S. Chand and company Pvt Ltd, 2014.

Web Resources :

1. <http://faculty.etsu.edu/gardnerr/2110/notes-12E/c13s6.pdf>.
2. <http://www.farmingdale.edu/faculty/peter-nolan/pdf/UPCh13.pdf>.
3. <https://en.wikipedia.org/wiki/Trajectory>.
4. http://www.mathcity.org/files/bsc/mechanics_TMQ/Ch07_Projectile_Motion.pdf.
5. http://www.vijayacollege.ac.in/Content/PDF/Rigid_Bodies.PDF.

Note: Questions to be taken only from the Text Book.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	Know the basic concepts of velocity and acceleration of a particle moving on a curve, velocity and acceleration components in Cartesian and polar coordinates	K-1
CO2	Understand the concepts of simple harmonic motion and impulsive forces.	K-2
CO3	Gain ability to solve and analyse problems in a systematic and logical manner.	K-3
CO4	Know the principles of projectiles, central force, moment of inertia and gain ability to analyze the practical problems	K-4
CO5	Solve dynamics problems and determine which concepts to apply for finding an appropriate solution.	K-3

K-1 :Recall; K-2 :Understand; K-3 :Apply; K-4 :Analyse; K-5: Evaluate; K-6:Create

Mapping of COs with POs and PSOs :

PO/ PSO CO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PS O1	PSO 2	PS O3	PS O4	PS O5
CO1	L	L	M	L	L	L	L	S	L	S	-	L	L	S
CO2	M	L	S	M	L	L	L	S	L	S	-	L	L	S
CO3	S	S	S	M	M	L	M	S	S	S	-	L	L	S
CO4	S	S	S	M	M	M	M	S	S	S	-	L	L	S
CO5	S	S	S	M	M	M	M	S	S	S	-	L	L	S

S - Strong, M - Medium, L – Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM-16.
B.Sc. MATHEMATICS - SEMESTER V
For candidates admitted from 2018 - 2019 onwards
ELECTIVE II – BIOMATHEMATICS (18UMAEC2)

5 Hours / Week

5 Credits

Course Objectives: The course aims to

1. understand the concept of modeling using MATLAB.
2. develop the ability of solving the homogenous and non-homogenous system of difference equations

Unit I:

No. of hours: 16

Overview of Discrete Dynamical Modeling and Matlab

Introduction to Modeling and Difference Equations - The Modeling Process - Getting Started with MATLAB

Unit II:

No. of hours: 17

Modeling with first – order Difference Equations

Modeling with First - Order Linear Homogenous Difference with Constant Coefficients – Modeling with Non-homogenous First – Order Linear Difference Equations

Unit III:

No. of hours: 13

Modeling with Matrices

Systems Of Linear Equations Having Unique Solutions - The Gauss-Jordan Elimination Method With Models – Introduction to Matrices (3.3.10 – 3.3.17)

Unit IV:

No. of hours: 13

Modeling with Matrices

Determinants and System of Linear Equations (3.4.1 & 3.4.2) - Computing Eigenvalues and Eigenvectors with MATLAB (3.5.3 – 3.5.6)

Unit V:

No. of hours: 16

Modeling with Nonlinear Systems of Difference Equations

Modeling of Interacting Species (5.1.1 & 5.1.2)

TEXT BOOK:

Explorations of Mathematical Models in Biology with MATLAB - Mazen Shahin, Wiley Publishers.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basics of modeling and difference equations and to get an introduction on MATLAB	K-1
CO2	gather knowledge on the modeling of first order homogeneous and nonhomogenous difference equations	K-2
CO3	Apply the notion of Gauss – Jordan Elimination method matrices in modeling	K-3
CO4	Analyse and Evaluate the Eigenvalues and Eigenvectors of Models using MATLAB	K-4 & K-5
CO5	Compute the solutions of the difference equations of Nonlinear systems.	K-5

K-1: Recall, K-2: Understand, K-3: Apply, K-4: Analyse, K-5: Evaluate, K-6: Create

Mapping of COs with POs and PSOs :

CO \ PO/ PSO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO 7	PO 8	PO9	PS O1	PSO2	PS O3	PS O4	PSO 5
CO1	M	S	L	L	S	-	S	S	M	-	-	S	S	M
CO2	M	M	M	M	S	-	S	S	M	-	-	S	S	M
CO3	S	S	M	S	S	-	S	S	M	-	-	S	S	M
CO4	S	S	M	S	S	-	S	S	S	-	-	S	S	M
CO5	S	S	S	S	S	-	S	S	S	-	-	S	S	M

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM-16.
B.Sc. MATHEMATICS - SEMESTER V
For candidates admitted from 2018 - 2019 onwards
ELECTIVE II - NUMBER THEORY (18UMAESC1)

5 Hours / Week

5 Credits

Course Objectives: The course aims to

1. know about the basic concepts of number theory.
2. get a complete grip of various concepts to present modern Mathematics in elementary terms.
3. develop the skill of solving problems in number theory.

Syllabus

Number Theory

Unit - I

No. of Hours : 15

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

Unit - II

No. of Hours : 15

Divisibility Theory in Integers - The Division Algorithm - The g.c.d. - Euclidean Algorithm - The Diophantine Equation $ax + by = c$.

Unit - III

No. of Hours : 15

Primes and their Distributions - The fundamental theorem of Arithmetic - The Sieve of Eratosthenes - The Goldbach Conjecture.

Unit - IV

No. of Hours : 15

The Theory of Congruence - Basic Properties of Congruence - Special Divisibility test - Linear Congruence.

Unit - V

No. of Hours : 15

Fermat's Theorem - Fermat's factorization method - The little theorem - Wilson's theorem.

Book for Study:

Elements of Number Theory, **S.Kumaravelu** and **Susheela Kumaravelu**, Nagercoil, 2002.

Books for Reference:

An Introduction to the Theory of Numbers: G.H. Hardy, Edward M. Wright, Andrew Wiles, Roger Heath Brown and Joseph Silverman.

Web Resource : <http://www2.math.uu.se/~lal/kompendier.pdf> **Note:** Questions to be taken only from the text books

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO 1	recall the basic concepts in number theory	K-1
CO 2	understand the concepts of divisibility theory in integers, the division algorithm, Euclidean algorithm and Diophantine equation $ax + by = c$	K-2
CO 3	solve the problems using the Fundamental theorem of arithmetic	K-3
CO 4	understand the basic properties of congruence and solve the problems on congruence	K-3
CO 5	gain knowledge about the Fermat's factorization method, the Little theorem & Wilson's theorem and acquire knowledge to apply them	K-3

K-1:Recall, K-2 :Understand, K-3 :Apply, K-4 :Analyse, K-5 :Evaluate, K-6 :Create

Mapping of COs with POs and PSOs :

PO/ PSO CO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	-	S	S	S	S	S	-	S	L	-	-
CO2	S	S	S	-	S	S	S	S	S	-	S	L	-	-
CO3	S	S	S	-	S	S	S	S	S	-	S	L	-	-
CO4	S	S	S	-	S	S	S	S	S	-	S	L	-	-
CO5	S	S	S	-	S	S	S	S	S	-	S	L	-	-

S - Strong, M - Medium, L – Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM-16.

III - BA / B.SC / B.COM - SEMESTER V

For candidates admitted from 2018 - 2019 onwards

NON MAJOR SKILL BASED I - INDUSTRIAL MATHEMATICS WITH R PROGRAMMING - PRACTICAL (18UMANSQC1)

2 Hours\Week

2 Credits

1. Linear Equations – Matrix Inversion & Linear Equations Solution.
2. Linear programming Problems.
3. Transportation Model
 - North West Corner Method
 - Least Cost Method
4. Transportation Model
 - Vogel's Approximation Method
5. Assignment Problems.

Text Book:

Resource Management Techniques(Operations Research) by **Prof. V. Sundaresan, Prof. K. S. Ganapathy Subramanian and Prof. K. Ganesan.**, AR Publications, Chennai.

R Programming for Data Science by Roger D. Peng

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO 1	Understand the basic matrix operations and solving the same with the aid of R studio	K-2
CO 2	Interpret and solve Linear Programming Problems and Dual Linear Programming Problem using R Studio	K-3
CO 3	Analyse and solve North West Corner Method and Least Cost Method faster using R studio	K-4
CO 4	Solve Vogel's Approximation Method more quickly with the aid of R studio	K-4
CO 5	Analyse and compute the solutions of Assignment problems using R Studio.	K-4

K-1:Recall, K-2 :Understand, K-3 :Apply, K-4 :Analyse, K-5 :Evaluate, K-6 :Create

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM-16.
B.Sc. MATHEMATICS - SEMESTER VI
For candidates admitted from 2018 - 2019 onwards
CORE XII - ALGEBRAIC STRUCTURES II (18UMAC12)

6 Hours/Week

4 Credits

Course Objectives : The course aims to

1. gain knowledge about fundamental concept of the third algebraic system called vector space which has its origin in geometry and physics and establish some of the properties of such systems.
2. analyse the concept of a homomorphism between vector spaces.
3. bring out the formation of matrices from the concept of linear maps.
4. know the fundamental concepts of linear transformation on vector space and another concept known as the determinant and rank of a matrix.
5. determine the existence and nature of solution of system of linear equations.

Syllabus

Unit - I

No. of Hours : 18

Vector Spaces and Inner Product Spaces

Definition and simple properties – Subspaces and quotient Spaces-Sums and direct sums – Linear independence – Basis and dimensions.

Chapter 6(Sections : 6.1- 6.5)

Unit- II

No. of Hours : 18

Homomorphisms – Dual spaces – Inner product spaces.

Chapter 6(Sections : 6.6 - 6.8)

Unit –III

No. of Hours : 18

Linear Transformations and Matrices

The algebra of linear transformations – Eigen values and Eigen vectors.

Chapter 7 (Sections : 7.1, 7.2)

Unit – IV

No. of Hours : 18

Matrix algebra – Triangular forms.

Chapter 7 (Sections : 7.3, 7.4)

Unit –V

No. of Hours : 18

Determinants.

Chapter 7 (Section : 7.8)

Text book:

Modern Algebra by **M.L. Santiago**, Tata Mcgraw – Hill Publishing Company Ltd., New Delhi.

Books for Reference :

1. Topics in Algebra – Second Edition by **I. N. Herstein**, Wiley India Pvt. Ltd, New Delhi, 2008.
2. Modern Algebra by **S. Arumugam, A. Thangapandi Isaac**, New Gamma Publication House, Palayamkotti, 1997.

Web Resources :

1. <http://linear.ups.edu/html/section-S.html>
2. <http://www.math.northwestern.edu/~scanez/courses/334/notes/dual-spaces.pdf>
3. https://mathinsight.org/matrices_linear_transformations

Note: Questions to be taken only from the text book

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	understand the concept of vector spaces, subspaces, basis and dimension of a vector space	K-1
CO2	gain knowledge about the concept of inner product spaces and homomorphisms between vector spaces	K-2
CO3	learn the concept of linear transformation	K-2
CO4	compute the matrix of linear transformation relative to basis and obtain the triangular form of the matrix of a linear transformation	K-3
CO5	determine the solution of a system of linear equations using matrix and determinant	K-5

K-1: Recall, K-2: Understand, K-3: Apply, K-4: Analyse, K-5: Evaluate, K-6: Create

Mapping of COs with POs:

PO/ PSO CO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	M	S	S	S	-	S	S
CO2	S	S	S	S	S	S	S	M	S	S	S	-	S	S
CO3	S	S	S	L	L	S	S	M	S	S	S	-	L	S
CO4	S	S	M	L	L	S	S	M	S	S	S	-	L	S
CO5	S	S	S	S	S	M	S	M	S	S	M	S	S	S

S - Strong, M - Medium, L – Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM-16.

B.Sc. MATHEMATICS - SEMESTER VI

**For candidates admitted from 2018 - 2019 onwards
CORE XIII: COMPLEX ANALYSIS II (18UMAC13)**

Hours/Week : 5

3 Credits

Course Objectives: The course aims to

1. acquire knowledge in series, functions, Residues and integrals.
2. understand the theorems on convergence of series, methods of finding residues at singular points of a function etc.
3. analyse the different methods of evaluation of integrals.

Syllabus

Unit - I :

No. of Hours : 15

Convergence of Sequences – Convergence of series - Taylor Series - Proof of Taylor's theorem
Examples - Laurent Series - Proof of Laurent's theorem - Examples.
Chapter 5 (Sections 55 to 62)

Unit - II :

No. of Hours : 15

Absolute and Uniform Convergence of Power Series - Continuity of sums of Power series - Integration and Differentiation of Power Series - Uniqueness of series Representations - Multiplication and Division of Power Series.
Chapter 5 (Sections 63 to 67)

Unit - III :

No. of Hours : 15

Isolated Singular Points - Residues - Cauchy's Residue Theorem - Residue at infinity –
The Three types of Isolated Singular Points - Residues at Poles - Zeros of analytic functions
- Zeros and Poles - Behavior of functions near isolated singular points.
Chapter 6 (Sections 68 to 77)

Unit - IV :

No. of Hours : 15

Evaluation of Improper Integrals - Examples - Improper Integrals from fourier analysis - Jordan's Lemma.
Chapter 7 (Sections 78 to 81)

Unit - V :

No. of Hours : 15

Indented Paths - An indentation around a branch point - Integration along a Branch cut - Definite integrals involving sines and cosines - Argument Principle - Rouché's Theorem.
Chapter 7 (Sections 82 to 87)

Text Book:

“Complex variables and Applications” - Eighth Edition by **James Ward Brown** and

Ruel V.churchill. Mc.Graw - Hill, Inc.,

Books for Reference:

1. “Complex Analysis” by **S. Arumugam, A. Thangapandi Isaac** and **A. Somasundaram**, New Scitech Publications (India) Pvt Ltd, 2002.
2. “Functions of Complex Variable” – Thirteenth Edition by **J. N. Sharma**, Krishna Prakasan Media(P) Ltd, 1996-97.

Web Resources :

1. <https://people.math.gatech.edu/~cain/winter99/supplement.pdf>
2. https://wiki.math.ntnu.no/media/tma4175/2016v/solutions_5_ca.pdf
3. <http://wwwf.imperial.ac.uk/~jdg/ee2macom.pdf>

Note: Questions to be taken only from the Text Book.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	understand the concept of sequences and series with respect to the complex numbers system and establish whether a given series/ sequences is convergent/ divergent at a specified point or interval using Taylor's and Laurent's theorem.	K-1
CO2	define continuity of sums of power series, determine whether the series is convergent/divergent and compute various operations on power series.	K-1
CO3	use the Cauchy's residue theorem to find residues and find the behaviour of functions near isolated singular points.	K-2
CO4	recognize and apply properties of Fourier analysis.	K-3
CO5	understand the idea of indented paths and integrals involving sines and cosines and its applications on argument principle and Rouché's theorem.	K-4

K-1: Recall, K-2: Understand, K-3: Apply, K-4: Analyse, K-5: Evaluate, K-6: Create

Mapping of COs with POs and PSOs :

PO/ PSO CO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	M	L	M	M	S	S	S	S	S	M	S	-	S	S
CO2	M	M	M	M	S	S	S	S	S	S	S	-	S	S
CO3	S	S	S	S	S	S	S	S	S	S	S	-	S	S
CO4	S	S	S	S	S	S	S	S	S	S	S	-	S	S
CO5	S	S	S	S	S	S	S	S	S	S	S	-	S	S

S - Strong, M - Medium, L – Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM-16.

B.Sc. MATHEMATICS - SEMESTER VI

For candidates admitted from 2018 - 2019 onwards

CORE XIV - REAL ANALYSIS II (18UMAC14)

Hours/Week : 5

3 Credits

Course Objectives: The course aims to

1. gain knowledge about connected sets, compact metric spaces, totally bounded sets and complete metric spaces.
2. discuss the concepts of the Riemann integral, existence of Riemann integral and properties of Riemann integral.
3. understand the concepts of derivatives and fundamental theorem of calculus.
4. develop the ability to reflect, critically on the methods they have chosen to solve problems.

Syllabus

Unit - I

No. of Hours : 14

Continuous functions on metric spaces :

Open sets - Closed sets - Discontinuous functions on \mathbb{R}^1 . Chapter 5(Sections 5.4 to 5.6)

Unit - II

No. of Hours : 15

Connectedness, Completeness and Compactness: More about open sets - Connected sets - Bounded sets and totally bounded sets - Complete metric spaces.

Chapter 6(Sections 6.1 to 6.4)

Unit - III

No. of Hours : 15

Compact metric spaces - Continuous functions on compact metric spaces- Continuity of the inverse function - Uniform continuity.

Chapter 6(Sections 6.5 to 6.8)

Unit - IV

No. of Hours : 15

Sets of measure zero - Definition of the Riemann integral - Existence of the Riemann integral - Properties of the Riemann integral.

Chapter 7(Sections 7.1 to 7.4)

Unit - V

No. of Hours : 16

Derivatives - Rolle's theorem - The law of the mean - Fundamental theorem of calculus.

Chapter 7(Sections 7.5 to 7.8)

Text Books:

Methods of Real Analysis by **Richard R.Gold Berg**, Oxford & IBH. Publishing CU.PVT.LTD.New delhi.

Books for Reference:

1. A First Course in Real Analysis by **M.K. Singhal** and **Asha Rani Singhal**, R. Chand & Co., June 1997 Edition
2. A Course of Mathematical Analysis by **Shanthi Narayan**, S. Chand & Co., 1995.

Web Resources :

<http://www.acadiau.ca/~hteisman/3533notes.pdf> **Note:** Questions to be taken only from the text books

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO 1	know the notions of open sets, closed sets and discontinuous functions on \mathbb{R}^1	K-1
CO 2	understand the concepts of connectedness and completeness in a metric space and gain knowledge to give examples	K-2
CO 3	Understand the notions of compactness and uniform continuity	K-2
CO 4	gain knowledge of Rolle's theorem, Mean Value Theorem and Fundamental theorems and develop the knowledge to apply these theorems to evaluate the derivatives of a function at a point	K-3
CO 5	analyze the properties of Riemann integral	K-4

K-1:Recall ; K-2:Understand; K-3:Apply; K-4:Analyse; k-5:Evaluate; K-6:Create.

Mapping of COs with POs and PSOs :

PO/ PSO CO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	M	M	M	-	M	S	M	S	M	SM	S	-	S	
CO2	S	M	S	-	L	S	S	S	S	SS	S	-	S	
CO3	S	M	S	-	L	S	S	S	S	SS	S	-	S	
CO4	S	M	M	-	M	S	S	S	S	SS	S	-	S	
CO5	M	M	M	-	M	M	S	S	S	SS	S	-	S	

S - Strong, M - Medium, L – Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM-16.

B.Sc. MATHEMATICS - SEMESTER VI

For candidates admitted from 2018 - 2019 onwards

CORE XV-NUMERICAL METHODS AND PROGRAMMING IN C (18UMAC15)

6 Hours/Week

4 Credits

Course Objectives: The course aims to

1. acquire knowledge on solving problems by Numerical methods.
2. introduce briefly the special features of C that are essential for C programme.

Syllabus

Unit – I :

No. of Hours : 18

The Solution of Numerical Algebraic and Transcendental Equations - The Bisection method, Iteration method, The condition for the convergence of the method, Order of convergence of an Iterative process, Regula Falsi method, Geometrical Interpretation, Newton-Raphson method, Geometrical meaning of Newton's method, Criterion for the convergence in Newton-Raphson method, Order of convergence of Newton's method. Generalised Newton's method.

Chapter 3 (Sec 3.1.1, 3.2, 3.2.1, 3.2.2, 3.3, 3.3.1, 3.4, 3.4.1-3.4.4)

Unit – II :

No. of Hours : 19

Solution of Simultaneous Linear Algebraic Equations - Direct methods: Introduction Gauss Elimination method, Gauss - Jordan elimination method.

Numerical Differentiation and Integration - Introduction, Newton's forward difference formula to get the derivative, Newton's backward difference formula to compute the derivative.

Numerical Integration - Introduction, A general quadrature formula for equidistant ordinates (or Newton-cote's formula), Trapezoidal rule, Simpsons one-third rule.

Chapter 4 (Sec. 4.1, 4.2, 4.2.1)

Chapter 9 (Sec. 9.1-9.3, 9.7, 9.8, 9.9, 9.13)

Unit – III :

No. of Hours : 18

Numerical solutions of ordinary Differential Equations - Solution by Taylor series, Taylor series method for simultaneous 1st order differential equations, Taylor Series method for 2nd order differential equations, Euler's method, Modified Euler's method, Runge-kutta method, Second order Runge-kutta method (for first order O.D.E), Runge-kutta method for simultaneous first order differential equations, Runge-kutta method for second order differential equations.

Chapter 11 (Sec. 11.5- 11.7, 11.9, 11.11, 11.12, 11.13, 11.14, 11.15)

Unit – IV :

No. of Hours : 17

Constants, Variables and Data types. Operators and Expressions Chapter 2 (Sections 2.4, 2.5, 2.6 & 2.7),

Chapter 3 (Sections 3.2, 3.3, 3.4, 3.5 & 3.6)

Unit – V:

No. of Hours : 18

Decision making and branching Decision making and looping Chapter 5 (Sections 5.2 to 5.9)

Chapter 6 (Sections 6.2 to 6.5)

Books for Study:

1. Numerical Methods by **P.Kandasamy, K.Thilagavathy, K.Gunavathy**, (for Units I, II and III), First edition, S.Chand & Company Ltd.,
2. Programming in C by **E.Balagurusamy** TMGH, (for Units IV and V), Second edition.

Books for Reference:

1. Finite Differences and Numerical Analysis, H.C. Saxena, S. Chand Publishers, 2005.
2. Let us 'C', Yashvant. P. Kanetkar, BPB publications, 2002.

Web Resources:

1. <https://books.google.co.in/books?id=cL1boM2uyQwC&printsec=frontcover&dq=NUMERICAL+METHODS+AND+PROGRAMMING+IN+C&hl=en&sa=X&v>

ed=0ahUKEwjY7MrNvInbAhVIto8KHcWRByYQ6AEIODAD#v=onepage&q=NUMERICAL%20METHODS%20AND%20PROGRAMMING%20IN%20C&f=false

2. <https://pdfs.semanticscholar.org/presentation/6682/aec1e598b4afd33969a7ce96f475bf004ae3.pdf>

3. <http://www.math.sjtu.edu.cn/faculty/xqzhang/2013fall.sc/Note4.pdf>

4. http://www-users.math.umn.edu/~olver/num_lno.pdf

5. <http://www.plantation-roductions.com/Webster/www.artofasm.com/Linux/PDFs/ConstsVarsAndDataTypes.pdf>

6. http://www.lessons2all.com/c_decision_making_looping.php Note: Questions to be taken only from the Text Books.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO 1	Recall basic concepts and acquire knowledge on solving algebraic and transcendental equations by Numerical methods.	K-3
CO 2	Gain knowledge on direct methods for solving simultaneous linear algebraic equations and on numerical differentiation and integration.	K-4
CO 3	Acquire knowledge on finding numerical solution of ordinary differential equations.	K-3
CO 4	Know about Data types Operators and Expressions	K-4
CO 5	Understand Decision making statements and loop structures in C	K-4

JK-1:Recall; K-2 :Understand; K-3 :Apply; K-4 :Analyze; K-5 :Evaluate; K-6 :Create.

Mapping of COs with POs and PSOs :

PO/ PSO CO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	-	M	S	M	M	M	M	M	S	-	-	S	M
CO2	S	-	M	S	M	M	M	M	M	S	-	-	S	M
CO3	S	L	M	S	M	M	-	-	M	S	-	-	S	-
CO4	L	-	-	-	M	M	M	-	L	M	-	-	-	-
CO5	L	-	-	-	M	M	M	-	L	M	-	-	-	-

S - Strong, M - Medium, L – Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM-16.

B.Sc. MATHEMATICS - SEMESTER VI

For candidates admitted from 2018 - 2019 onwards

ELECTIVE III – OPERATIONS RESEARCH (18UMAEC3)

5 Hours / Week

5 Credits

Course Objectives: The course aims to

1. understand the concept of Linear Programming Problem.
2. develop the ability of solving the real world problem through Network Analysis.

Syllabus

Unit – I :

No. of Hours : 17

Linear Programming Problem (Mathematical formulation) – Introduction, Linear Programming Problem, Mathematical formulation of the Problem, Illustration on Mathematical Formulation of LPPs. Linear Programming Problem (Graphical Solution and Extension) – General Linear Programming Problem, Canonical and Standard Forms of LPP. Linear Programming Problem (Simplex method) -Introduction, The Computational Procedure, Use of artificial variable.

Chapter 2 (Sections 2.1, 2.2&2.3 Page No.:39-62), Chapter 3 (Sections 3.4&3.5 Page No.: 79-84)&Chapter 4 (Sections 4.1, 4.3& 4.4 Page No.: 87-89,99-114).

Unit – II :

No. of Hours : 17

Transportation Problem: Introduction, LP Formulation of the Transportation Problem, Existence of Solution in T.P., The Transportation Table, Loops in Transportation Tables, Solution of a Transportation Problem, Finding an Initial Basic Feasible Solution, Test for Optimality, Economic Interpretation of u_j 's and v_j 's Degeneracy in Transportation Problem, Transportation Algorithm (MODI Method), Stepping Stone Solution Method, Some Exceptional Cases.

Assignment problem: Introduction, Mathematical formulation of the Problem, Solution Methods of Assignment Problems-Hungarian method only, Special Cases in Assignment Problems, Travelling salesman problem.

Chapter 10 (Sections 10.1-10.3,10.5,10.6,10.8 - 10.15 Page No.: 247-287), Chapter 11 (Sections 11.1 - 11.4, 11.7 Page No.: 295,296,298-315,320-324)

Unit – III :

No. of Hours : 16

Games and strategies :Introduction, Two person zero sum Games, Some Basic Terms , The Maximin -Minimax principle, Games without saddle points - Mixed strategies , Graphical solution of $2 \times n$ and $m \times 2$ games , Dominance property.

Chapter 17 (Sections 17.1-17.7 Page No.: 443-464)

Unit – IV :

No. of Hours : 13

Network Scheduling by PERT/CPM:Introduction,Network:Basic Components, Logical Sequencing, Rules of Network Construction, Concurrent Activities, Critical Path Analysis.

Chapter 25 (Sections 25.1- 25.6 Page No.: 763-780)

Unit – V:

No. of Hours : 12

Network Scheduling by PERT/CPM: Probability Considerations in PERT, Distinction between PERT and CPM.

Chapter 25 (Sections 25.7& 25.8 Page No.: 781-790)

Book for Study:

“Operations Research” by **Kantiswarup, P.K. Gupta and Man Mohan**, (9th Edition), Sultan-Chand Publications.

Books for Reference:

1. “Resource Management Techniques” by Sundaresan. V, Ganapathy Subramanian. K.S and Ganesan. K , A.R. Publications, 2002.

2. “Operations Research: An introduction” by Taha H.A., 7th edition, Pearson Prentice Hall, 2002

Web Resources:

1. <https://books.google.co.in/books?id=wYfxffB62NUC&pg=PA229&dq=elective+ii+operations+research&hl=en&sa=X&ved=0ahUKEwiCiMLrt4nbAhWXTX0KHcydACAQ6AEIKTAB#v=onepage&q=elective%20ii%20operations%20research&f=false>
2. http://rajkumar2850.weebly.com/uploads/1/4/9/8/14980396/transportation_and_assignment_problems_2014.pdf
3. <http://www.personal.psu.edu/cxg286/Math486.pdf>
4. http://www.math.upatras.gr/~tsantas/DownloadFiles/Hillier&Lieberman_7th-edition_Chapter10.pdf

Note: Questions to be taken only from the Text Books.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO1	Formulate and solve L.P.P by using Simplex, Big M and twoPhase simplex methods.	K-4
CO2	Acquire the knowledge on solving transportation problems and analyse the concepts of assignment problems.	K-4
CO3	Recall the basic concepts and acquire the knowledge on Games & Strategies.	K-4
CO4	Understand project scheduling by PERT and CPM.	K-4
CO5	Understand the Probability Considerations in PERT and CPM.	K-4

K-1 :Recall; K-2 :Understand; K-3 :Apply; K-4 :Analyze; K-5 :Evaluate; K-6 :Create.

Mapping of COs with POs and PSOs :

PO/ PSO CO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	M	M	M	S	-	M	-	S	-
CO2	S	S	S	S	S	M	M	M	S	-	M	-	S	-
CO3	S	M	M	S	M	M	M	M	S	-	M	-	S	-
CO4	S	S	S	S	S	M	M	M	S	-	M	-	S	-
CO5	S	S	S	S	S	M	M	M	S	-	M	-	S	-

S - Strong, M - Medium, L – Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM-16.
B.Sc. MATHEMATICS - SEMESTER VI
For candidates admitted from 2018 - 2019 onwards
ELECTIVE III - GRAPH THEORY (18UMAESC3)

5 Hours/Week

5 Credits

Course Objectives: The course aims to

1. acquire the basic knowledge of various types of graphs.
2. know about the problem-solving power of the graph theory.
3. know about the applications of graphs to simple situations and puzzles.

Syllabus

Unit – I

No. of hours: 13

Graphs and Subgraphs

Definition and examples, Degrees, Subgraphs, Operations on graphs

Unit – II

No. of hours: 14

Connectedness

Walks, Trails and Paths, Connectedness and Components, Blocks, Connectivity.

Chapter 4

Unit – III

No. of hours: 15

Eulerian And Hamiltonian Graphs

Eulerian graphs, Hamiltonian graphs.

Unit – IV

No. of hours: 14

Trees

Characterisation of trees, Centre of a tree.

Unit – V

No. of hours: 14

Directed Graphs

Definition and basic properties, Paths and connections, Digraphs and Matrices.

Books for Study:

Invitation to Graph Theory, S. Arumugam, S. Ramachandran - Year of Publication 2001, Scitech Publications, Chennai.

Books for Reference:

1. Graph Theory with applications to Engineering and Computer Science, Narsingh Deo, Prentice Hall of India, 2004.
2. Introduction to Graph Theory, Gary Chartrand and Ping Zhang, Tata McGraw-Hill Edition, 2004

Web Resources :

1. <http://nptel.ac.in/courses/111106050/>
2. <https://cs.bme.hu/fcs/graphtheory.pdf>

(Questions to be taken only from the text books)

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO 1	Know the basic concepts in Graph theory	K-1
CO 2	Understand the concepts of Connectedness in graph	K-2
CO 3	Know about Eulerian and Hamiltonian Graphs and Examples of the same	K-2
CO 4	Obtain the knowledge about trees	K-2
CO 5	Acquire the concepts of Directed Graphs and analyse the classifications of Directed Graphs and Matrices	K-4

Mapping of COs with POs and PSOs :

PO/ PSO CO	PO									PSO				
	PO 1	PO 2	PO 3	PO 4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	L	L	L	L	L	L	S	L	L	L	L	L	L
CO2	M	M	S	S	S	M	S	S	S	S	M	M	S	S
CO3	M	S	M	S	S	M	S	S	S	S	S	M	S	S
CO4	M	S	M	S	S	M	S	S	S	S	S	M	S	S
CO5	S	S	S	S	S	S	S	S	S	S	S	S	S	S

S - Strong, M - Medium, L – Low

SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS), SALEM – 16
B.Sc. MATHEMATICS - SEMESTER VI
NON MAJOR SKILL BASED II –MATHEMATICAL MODELING WITH R
PROGRAMMING - PRACTICAL (18UMANSQC2)
For candidates admitted from 2018 - 2019 onwards

2 Hours\Week

2 Credits

1. Creating Vectors and Matrices
2. Extrinsication of Vectors and Matrices
3. Elementary operations on Vectors and Matrices
4. Big Data Analysis
5. Control Structures

Books for Reference:

Big data Analytics by David Loshin, MK Publications, USA.

Course Outcomes (CO) : On completion of the course, students should be able to

CO Number	CO Statement	Knowledge Level
CO 1	Understand the difference between creating a vector and matrix in R studio	K-2
CO 2	Apply the basics of R studio to extract necessary elements from a vector and matrix	K-3
CO 3	Compute basic arithmetic operations on vectors and matrices with the aid of R studio	K-3
CO 4	Analyse and Identify data frames and basics of Big Data using R Studio	K-4
CO 5	Creation of patterns and structures with the aid of R studi	K-5

K-1:Recall, K-2 :Understand, K-3 :Apply, K-4 :Analyse, K-5 :Evaluate, K-6 :Create

