

B.Sc., MATHEMATICS

COURSE STRUCTURE WITH SYLLABUS

PROGRAMME CODE : 3USMAT

2024-2025



**SENGAMALA THAYAR EDUCATIONAL TRUST
WOMEN'S COLLEGE (AUTONOMOUS)**

(Affiliated to Bharathidasan University, Tiruchirappalli)

Accredited by NAAC

SUNDARAKKOTTAI, MANNARGUDI-614016.

TAMILNADU, INDIA.



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B.Sc., MATHEMATICS

**CHOICE BASED CREDIT SYSTEM- LEARNING OUTCOMES BASED CURRICULUM FRAME WORK
(CBCS-LOCF)**

(For the candidates admitted in the academic year 2024-2025)

CHOICE BASED CREDIT SYSTEM

The credit based semester system provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching. The choice based credit system provides a “cafeteria” type approach in which the students can take courses of their choice, learn at their own pace, undergo additional courses and acquire more than the required credits, and adopt an interdisciplinary approach to learning. Our College has moved to CBCS and implemented the grading system.

OUTCOME-BASED EDUCATION (OBE)

LEARNING OUTCOME-BASED CURRICULUM FRAMEWORK (LOCF)

The fundamental premise underlying the learning outcomes-based approach to curriculum planning and development is that higher education qualifications are awarded on the basis of demonstrated achievement of outcomes (expressed in terms of knowledge, understanding, skills, attitudes and values) and academic standards expected of graduates of a programme of study. Learning outcomes specify what graduates completing a particular programme of study are expected to know, understand and be able to do at the end of their programme of study. The expected learning outcomes are used as reference points that would help to formulate graduate attributes, qualification descriptors, programme learning outcomes and course learning outcomes which in turn will help in curriculum planning and development, and in the design, delivery and review of academic programmes. They provide general guidance for articulating the essential learnings associated with programmes of study and courses within a programme, maintain national standards and international comparability of learning outcomes and academic standards to ensure global competitiveness, and to facilitate student / graduate mobility and provide higher education

institutions an important point of reference for designing teaching-learning strategies, assessing student learning levels, and periodic review of programmes and academic standards.

Some important aspects of the Outcome Based Education Course: is defined as a theory, practical or theory cum practical subject studied in a semester.

Course Outcomes (COs): are statements that describe significant and essential learning that learners have achieved, and can reliably demonstrate at the end of a course. Generally three or more course outcomes may be specified for each course based on its weightage.

Programme: is defined as the specialization or discipline of a Degree.

Programme Outcomes (POs): Programme outcomes are narrower statements that describe what students are expected to be able to do by the time of graduation. POs are expected to be aligned closely with Graduate Attributes.

Programme Specific Outcomes (PSOs): PSOs are what the students should be able to do at the time of graduation with reference to a specific discipline.

Some important terminologies repeatedly used in LOCF.

Core Courses (CC) A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course. These are the courses which provide basic understanding of their main discipline. In order to maintain a requisite standard certain core courses must be included in an academic program. This helps in providing a universal recognition to the said academic program.

Discipline Specific Elective Courses (DSE) Elective course may be offered by the main discipline / subject of study is referred to as Discipline Specific Elective (DSE). These courses offer the flexibility of selection of options from a pool of courses. These are considered specialized or advanced to that particular programme and provide extensive exposure in the area chosen; these are also more applied in nature.

Generic Elective Courses An elective course chosen generally from an **unrelated discipline / subject**, with an intention to seek exposure is called a Generic Elective. Generic Elective courses are designed for the students of **other disciplines**. Thus, as per the CBCS policy, the students pursuing particular disciplines would have to opt Generic Elective courses offered by other disciplines, as per the basket of courses offered by the college. The scope of the Generic Elective (GE) Courses is positively related to the diversity of disciplines in which programmes are being offered by the college.

Non Major Elective (NME). A student shall choose at least two Non-Major Elective Courses (NME) from outside his / her department. Non-Major Elective I-Those who choose Tamil in Part I

can choose a non–major elective course offered by other departments. Those who do not choose Tamil in Part I must choose either a) Basic Tamil if Tamil language was not studied in school level or b) Special Tamil if Tamil language was studied upto 10th & 12th std. **Skill Enhancement Courses (SECs)** These courses focus on developing skills or proficiencies in the student, and aim at providing hands-on training. Skill enhancement courses can be opted by the students of any other discipline, but are highly suitable for students pursuing their academic programme. These courses may be chosen from a pool of courses designed to provide value-based and / or skill-based knowledge.

Field Study / Industrial Visit / Case Study: It has to be completed during the fifth semester of the degree programme. Credit for this course will be entered in the fifth semester's marks statement.

Internship: Students must complete internship during summer holidays after the fourth semester. They have to submit a report of internship training with the necessary documents and have to appear for a viva-voce examination during fifth semester. Credit for internship will be entered in the fifth semester's mark statement.

Extra Credit Courses: In order to facilitate the students, gaining knowledge / skills by attending online courses MOOC, credits are awarded as extra credits, the extra credit are at three semesters after verifying the course completion certificates. According to the guidelines of UGC, the students are encouraged to avail this option of enriching their knowledge by enrolling themselves in the Massive Open Online Courses (MOOC) provided by various portals such as SWAYAM, NPTEL etc.

Undergraduate Programme:

Programme Pattern: The Under Graduate degree programme consists of **FIVE** vital components.

They are as follows:

Part -I : Languages (Tamil / Hindi / French / Sanskrit)

Part-II : General English

Part-III: Core Course (Theory, Practicals, Generic Elective courses, Discipline Specific Elective courses, Compulsory and Optional Allied courses, Project)

Part-IV: Non Major Elective, Foundation Course, Value Education, Environmental studies, Skill Enhancement Courses / Soft Skills, Internship / field visit / industrial visit/ Case Study), Professional Competency Course

Part –V

Extension activity, Gender studies, Health & Wellness

EXAMINATION

Continuous Internal Assessment (CIA):

UG - Distribution of CIA Marks

Passing Minimum: 40 %

Assignment-3	=	30%
Test-3 (Best 2 out of 3)	=	50%
Seminar	=	10%
Attendance	=	10%

Question Paper Pattern Part A:

Part A 1 (10X1=10 marks)

One word question / Fill in / Match the following / True or False / Multiple Choice Questions

Two Questions from Each unit

Part A 2 (5X2=10 marks)

Short Answers One question from Each unit

Total Marks – 20

Part B: (5X5=25 marks)

Paragraph Answers Either / or type, One Question from each unit

Part C: (10X3=30)

Essay Type Answers Answer 3 out of 5 Questions One Question from each unit

Part A: K1 Level

Part B: K2, K3 and K4 Level

Part C: K5 and K6 Level

Knowledge levels for assessment of Outcomes based on Blooms Taxonomy

S. No.	Level	Parameter	Description
1	K1	Knowledge / Remembering	It is the ability to remember the previously learned
2	K2	Comprehension / Understanding	The learner explains ideas or concepts
3	K3	Application / Applying	The learner uses information in a new way
4	K4	Analysis / Analysing	The learner distinguishes among different parts
5	K5	Evaluation / Evaluating	The learner justifies a stand or decision
6	K6	Synthesis / Creating	The learner creates a new product or point of view

WEIGHTAGE of K – LEVELS IN QUESTION PAPER

(Cognitive Level) K-LEVELS →	Lower Order Thinking			Higher Order Thinking			Total
	K1	K2	K3	K4	K5	K6	
END SEMESTER EXAMINATIONS (ESE)	20	25			30		75
Continuous Internal Assessment (CIA)	20	25			30		75

QUESTION PATTERN FOR END SEMESTER EXAMINATION / Continuous Internal Assessment	
PART	MARKS
PART –A I. (No choice ,One Mark) TWO questions from each unit (10x1=10) II. (No choice, Two Mark) ONE question from each unit (5x2=10)	20
PART –B (Either / or type,5-Marks) ONE question from each unit (5x5=25)	25
PART –C (3 out of 5) (10Marks) ONE question from each unit (3x10=30)	30
Total	75

BLUE PRINT OF QUESTION PAPER FOR END SEMESTER EXAMINATION							
DURATION: 3.00 Hours.				Max Mark :75			
K-LEVELS	K1	K2	K3	K4	K5	K6	Total Marks
PART							
PART –A (One Mark, No choice) (10x1=10)	10						10
(2-Marks,Nochoice) (5x2=10)	10						10
PART –B (5-Marks)(Either / or type) (5x5=25)		5	10	10			25
PART –C (10 Marks) (3 out of 5) (3x10=30) Courses having only K5, K6 levels, K5 level- 3 Questions, K6 level- 2 Questions (One K6 level question is compulsory)					20	10	30
Total	20	05	10	10	20	10	75

EVALUATION

GRADING SYSTEM

Once the marks of the CIA and the end-semester examination for each of the courses are available, they will be added and converted as final mark. The marks thus obtained will then be graded as per the scheme provided in Table-1.

Grade Point Average (GPA) will be calculated from the first semester onwards for all semester. From the second semester onwards, the total performance within a semester and the continuous performance starting from the first semester are indicated by semester Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA), respectively. These two are calculated by the following formulae:

$\text{GPA} = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i}$	$\text{WAM (Weighted Average Marks)} = \frac{\sum_{i=1}^n C_i M_i}{\sum_{i=1}^n C_i}$
Where, C_i is the Credit earned for the Course i G_i is the Grade Point obtained by the student for the Course i M_i is the marks obtained for the course i and n is the number of Courses Passed in that semester.	

CGPA: Average GPA of all the Courses starting from the first semester to the current semester.

CLASSIFICATION OF FINAL RESULTS:

1. For each of the first three parts, there shall be separate classification on the basis of CGPA, as indicated in Table – 2.
2. For the purpose of declaring a candidate to have qualified for the Degree of Bachelor of Arts / Science / Commerce / Management as Outstanding / Excellent / Very Good / Good / Above Average / Average, the marks and the corresponding CGPA earned by the candidate in Part – III alone will be the criterion, provided the candidate has secured the prescribed passing minimum in the all the Five parts of the Programme.
3. Grade in Part – IV and Part – V shall be shown separately and it shall not be taken into account for classification.
4. A Pass in PART- V will be mandatory although the marks will not count for the calculation of the CGPA.
5. Absence from an examination shall not be taken an attempt.

Table-1: Grading of the Courses - UG

Marks Range	Grade Point	Corresponding Grade
90 and above	10	O
80 and above and below 90	9	A+
70 and above and below 80	8	A
60 and above and below 70	7	B+
50 and above and below 60	6	B
40 and above and below 50	5	C
Below 40	NA	RA

The candidate's performance in every current semester is indicated by **Semester Grade Point Average (SGPA)** and from the second semester onwards, the continuous performance including previous semester's is indicated by **Cumulative Grade Point Average (CGPA)**.

Table-2: Final Result

CGPA	Corresponding Grade	Classification of Final Result
9.00 and above	O	Outstanding
8.00 to 8.99	A+	Excellent
7.00 to 7.99	A	Very Good
6.00 to 6.99	B+	Good
5.00 to 5.99	B	Above Average
4.00 to 4.99	C	Average
Below 4.00	RA	Re-appearance

The candidates who have passed in the first appearance and within the prescribed duration of the UG programme are eligible. If the candidate's Grade is O/A+ with more than one attempt, the performance is fixed as "Very Good".

VISION

Promoting the arithmetic skill in the minds of the women students who hail from the rural and economically weaker section of the society, as Mathematics is the queen of Sciences.

MISSION

- To promote the analytical thinking through logical reasoning
- To create a mind set for quick arithmetic calculations

PROGRAMME OUTCOMES FOR B.Sc., DEGREE PROGRAMMES

PO No.	Programme Outcomes (Upon completion of the B.Sc. Degree Programme, the Undergraduate will be able to)
PO-1	Disciplinary knowledge: Demonstrate comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate program of study in Bachelor of Science.
PO-2	Critical thinking, Problem Solving and Reflective thinking: think critically about the issues and identify, critically analyze and solve problems from the disciplines of concern using appropriate tools and techniques and the knowledge, skills and attitudes acquired and extrapolate the same to real life situations; show critical sensibility to life experiences, with self awareness and reflexivity of both self and society.
PO-3	Analytical & Scientific Reasoning: evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples and addressing opposing viewpoints; critically evaluate ideas, evidence, and experiences from an open minded and reasoned perspective.
PO-4	Research-related Skills: develop a sense of capability for relevant/appropriate inquiry and asking questions, synthesize, articulate and report results and to recognize and predict cause and effect relationships, define problems, formulate and establish hypothesis, analyze and interpret and draw conclusions from data, execute and report the results of an experiment or investigation.
PO-5	Digital literacy and Effective Communication: use ICT in a variety of learning situations and speak, read, write and listen clearly in person and through electronic media in English and in one or more Indian languages, and make meaning of the world by connecting people, ideas, books, media and technology; efficiently communicate thoughts and ideas in a clear and concise manner.
PO-6	Individual and Team Work: effectively accomplish tasks individually as well as work effectively and respectfully as member or leader with diverse teams, facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interest so for a common cause and work efficiently as a member of a team.

PO-7	Multicultural Competence and Social Interaction: understand the values and beliefs of multiple cultures, global perspectives, engage and interact respectfully with diverse groups and elicit views of others, mediate disagreements and help reach conclusions in group settings.
PO-8	Awareness of Ethical issues, Human values and Gender Issues: embrace moral / ethical values in conducting one's life, formulate a position / argument about an ethical issue from multiple perspectives, and use ethical practices in all work and understand the value of relationship between self and the community and aware of the various issues concerning women and society.
PO-9	Awareness of Environment and Sustainability: understand the impacts of technology and business practices in societal and environmental contexts, and sustainable development.
PO-10	Self directed and Lifelong learning: acquire knowledge and skills, including learning "how to learn", that are necessary for participating in learning activities throughout life and to engage in independent and life – long learning in the broadest context of socio – technological changes.

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO No.	Program Specific Outcomes (B.Sc., Mathematics)
PSO1	Acquire good knowledge and understanding, to solve specific theoretical & applied problems in different area of mathematics & statistics.
PSO2	Understand, formulate, develop mathematical arguments, logically and use quantitative models to address issues arising in social sciences, business and other context / fields.
PSO3	To prepare the students who will demonstrate respectful engagement with other's ideas, behaviors, beliefs and apply diverse frames of references to decisions and actions. To create effective entrepreneurs by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate startups and high potential organizations.



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CHOICE BASED CREDIT SYSTEM – LEARNING OUTCOMES BASED CURRICULUM FRAME WORK
(CBCS – LOCF)

(For the candidates admitted in the academic year 2024 – 2025) **ELIGIBILITY:** A Pass in 10+2 with Mathematics as one of the core subject

Sem	Part	Nature of the Course	Course Code	Title of the Paper	Ins. Hours / Week	Ins. Hours / Week				Credit	Exam Hours	Marks		Total
						L	T	P	O/S			CIA	ESE	
I	I	Language Course-I	U24LC101	Pothutamil- 1 Tamil Ilakkiya varalaru - 1	6	5	1	-	-	3	3	25	75	100
	II	English Language Course-I	U24ELC101	General English-I	6	5	1	-	-	3	3	25	75	100
	III	Core Course-I	U24MA101	Algebra & Trigonometry	5	4	1	-	-	5	3	25	75	100
		Core Course-II	U24MA102	Differential Calculus	4	3	1	-	-	4	3	25	75	100
		Allied Course-I	U24APY101	Allied Physics- I	3	2	1	-	-	2	3	25	75	100
		Allied Practical I	U24APY102P	Allied Physics Practical	2	1	-	1	-	--	--	---	--	--
	IV	Non Major Elective-I			2	1	1	-	-	2	3	25	75	100
		Foundation Course	U24FCMA11	Bridge Mathematics	2	1	1	-	-	2	3	25	75	100
TOTAL					30	22	7	1	-	21	-	-	-	700
II	I	Language Course- II	U24LC202	Pothutamil - 2 Tamil Ilakkiya varalaru - 2	6	5	1	-	-	3	3	25	75	100
	II	English Language Course-II	U24ELC202	General English-II	6	5	1	-	-	3	3	25	75	100
	III	Core Course–III	U24MA203	Analytical Geometry (Two & Three Dimensions)	5	4	1	-	-	5	3	25	75	100
		Core Course –IV	U24MA204	Integral Calculus	4	3	1	-	-	4	3	25	75	100
		Allied Practical –I	U24APY102P	Allied Physics Practical	2	1	-	1	-	2	3	25	75	100
		Allied Course-II	U24APY203	Allied Physics- II	3	2	1	-	-	2	3	25	75	100
	IV	Non Major Elective-II			2	1	1	-	-	2	3	25	75	100
		Skill Enhancement Course-I	U24SEMA21	Mathematics for Competitive Examinations	2	1	1	-	-	2	3	25	75	100
Total					30	22	7	1	-	23	-	-	-	800

Sem	Part	Nature of the Course	Course Code	Title of the Paper	Ins. Hours / Week	Ins. Hours / Week				Credit	Exam Hours	Marks		Total
						L	T	P	O/S			CIA	ESE	
III	I	Language Course- III	U24LC303	Pothutamil- 3 Tamilaga Varalarum Panpadum	6	5	1	-	-	3	3	25	75	100
	II	English Language Course-III	U24ELC303	General English-III	6	5	1	-	-	3	3	25	75	100
	III	Core Course -V	U24MA305	Vector Calculus and its Applications	4	3	1	-	-	4	3	25	75	100
		Core Course -VI	U24MA306	Differential Equations and Applications	4	3	1	-	-	4	3	25	75	100
		Allied Course-III	U24ACS301	Introduction to Computer Office Automation	2	2	-	-	-	2	3	25	75	100
		Allied Practical -II	U24ACS302P	Office Automation Lab	2	1	-	1	-	--	--	--	--	--
	IV	Skill Enhancement Course –II	U24SEMA32	Quantitative Reasoning – I	2	1	1	-	-	2	3	25	75	100
		Skill Enhancement Course –III	U24SEMA33	Quantitative Reasoning – II	2	1	1	-	-	2	3	25	75	100
	V	Special Course	24UGSC	Health & Wellness	2	-	-	2	-	1	-	-	-	-
TOTAL					30	21	6	3	-	21	-	-	-	700
IV	I	Language Course- IV	U24LC404	Pothutamil- 4 Tamilum Ariviyalum	6	5	1	-	-	3	3	25	75	100
	II	English Language Course-IV	U24ELC404	General English-IV	6	5	1	-	-	3	3	25	75	100
	III	Core Course - VII	U24MA407	Industry Module-Industrial Statistics	4	3	1	-	-	4	3	25	75	100
		Core Course - VIII	U24MA408	Elements of Mathematical Analysis	5	4	1	-	-	5	3	25	75	100
		Allied Practical - II	U24ACS302P	Office Automation Lab	2	1	-	1	-	2	3	25	75	100
		Allied Course-IV	U24ACS403	Fundamentals of C Programming	3	2	1	-	-	2	3	25	75	100
	IV	Skill Enhancement Course–IV	U24SEMA44	Probability and Statistics	2	1	1	-	-	2	3	25	75	100
		Skill Enhancement Course –V	U24SEMA45	Computational Mathematics	2	1	1	-	-	2	3	25	75	100
TOTAL					30	22	7	1	-	23	-	-	-	800
V	III	Core Course - IX	U24MA509	Abstract Algebra	5	4	1	-	-	5	3	25	75	100
		Core Course –X	U24MA510	Real Analysis	5	3	1	-	1	5	3	25	75	100
		Core Course -XI	U24MA511	Mathematical Modelling	5	4	1	-	-	4	3	25	75	100
		Core Course - XII	U24MA512	Mechanics	5	4	1	-	-	4	3	25	75	100
		Elective Course–I	U24MAE51A/ U24MAE51B/ U24MAE51C	Numerical Methods with Applications / Difference equations with applications/ Introduction to Sagemath	4	3	1		-	3	3	25	75	100
			U24MAE52A/ U24MAE52B/ U24MAE52C	Operations Research / Number Theory and Cryptography / Introduction to MATLAB	4	3	1	-	-	3	3	25	75	100
	IV	Environmental Studies	24UGCES	Environmental Studies	2	1	-	-	1	2	3	25	75	100

Sem	Part	Nature of the Course	Course Code	Title of the Paper	Ins. Hours / Week	Ins. Hours / Week				Credit	Exam Hours	Marks		Total
						L	T	P	O/S			CIA	ESE	
		Internship / Industrial visit / Field visit	U24MAI51	Internship / Industrial visit / Field visit	-	-	-	-	-	2	-	-	-	-
TOTAL					30	22	6	-	2	28		-	-	700
VI	III	Core Course -XIII	U24MA613	Linear Algebra	6	4	1	-	1	4	3	25	75	100
		Core Course -XIV	U24MA614	Complex Analysis	6	4	1	-	1	4	3	25	75	100
		Core Project	U24MAPW	Research Methods and Project with viva- voce / Group Project	5	-	1	4	-	5	3	25	75	100
		Elective Course -III	U24MAE63A/ U24MAE63B/ U24MAE63C	Astronomy / Discrete Mathematics / Introduction to LaTeX	4	3	1		-	3	3	25	75	100
		Elective Course -IV	U24MAE64A/ U24MAE64B/ U24MAE64C	Graph Theory and Applications / Fuzzy Sets and its Applications / Introduction to R – Programming	4	3	1	-	-	3	3	25	75	100
	IV	Value Education	24UGVED	Value Education	2	1	-	-	1	2	3	25	75	100
		Professional competencyCourse	U24PCMA61	Aptitude and Reasoning Skills for Competitive Examinations	2		1	-	1	2	3	25	75	100
	V	Gender Studies	24UGGS	Gender Studies	1	1	-	-	-	1	3	25	75	100
		Extension activity		Extension activity	-	-	-	-	-	1	-	-	-	-
				TOTAL	30	16	6	4	4	25	-	-	-	800
GRAND TOTAL					180	125	39	10	6	141	-	-	-	4500
*Extra Credit			U24MAVA53	Value Added Courses (Atleast One Per Year)						2	-	-	-	-

L-Lecture

T-Tutorial

P-Practical

S-Seminar

Credit Distribution for B.Sc., Mathematics

S.No	Part	Subject	No. of Courses	Total Credits
1	I	Language	4	12
2	II	English	4	12
3	III	Core Course –Theory	14	61
4		Core Project	1	05
5		AC (Elective Generic/ Discipline Specific Elective -I) -Theory	4	08
6		AC (Elective Generic/ Discipline Specific Elective -I) - Practical	2	04
7		Elective Course-Theory	4	12
8	IV	Non-Major Elective	2	04
9		Foundation Course – FC	1	02
10		Skill Enhancement Course	5	10
11		Internship/ Industrial visit/ Field visit	1	02
12		Environmental Studies	1	02
13		Value Education	1	02
14		Professional competency skill	1	02
15	V	Special Course	1	01
16		Extension Activity	1	01
17		Gender Studies	1	01
Total			48	141

NON MAJOR ELECTIVE (NME) OFFERED BY THE DEPARTMENT

Semester	Part	Course	Course Code	Title of The Paper
I	IV	NME-I	U24NMEMA11	Business Mathematics I
II	IV	NME-II	U24NMEMA22	Business Mathematics II

SEMESTER V

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2024– 2025)

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS



Semester: V-CC-IX: ABSTRACT ALGEBRA

Ins. Hrs./Week: 5

Course Credit: 5

Course Code: U24MA509

UNIT-I: Group Theory (15 Hours)

Introduction to groups - Subgroups - cyclic groups and properties of cyclic groups – Lagrange's Theorem - A counting principle – Examples

UNIT-II: Group Theory Continued (15 Hours)

Normal subgroups and Quotient group – Homomorphism - Automorphism - Examples.

UNIT-III: Group Theory Continued (15 Hours)

Cayley's Theorem - Permutation groups - Examples

UNIT-IV: Ring Theory (15 Hours)

Definition and examples of ring - Some special classes of rings – homomorphism of rings - Ideals and quotient rings - More ideals and quotient rings.

UNIT-V: Ring Theory Continued (15 Hours)

The field of quotients of an integral domain - Euclidean Rings - A particular Euclidean Ring – Examples

Total Lecture Hours –75

COURSE OUTCOME

The students should be able to

1. Explain groups, subgroups and cyclic groups
2. Explain about Normal subgroup, Quotient groups, Homomorphisms and Automorphisms and verify the functions for homomorphism and automorphism properties
3. Explain Permutation groups and apply Cayley's theorem to problems
4. Explain Rings, Ideals and Quotient Rings and examine their structure
5. Discuss about the field of quotient of an integral domain and to Explain in detail about Euclidean Rings

TEXT BOOKS

1. I.N.Herstein, 2006. Topics in Algebra (II Edition) Wiley Eastern Limited, New Delhi.
UNIT- I Chapter 2 :Sec. 2.1 to 2.5
UNIT – II Chapter 2 :Sec. 2.6 to 2.8
UNIT - III Chapter 2 :Sec. 2.9 to 2.10
UNIT - IV Chapter 3 :Sec. 3.1 to 3.5
UNIT - V Chapter 3 :Sec. 3.6 to 3.8

REFERENCE BOOK(S)

1. John B. Fraleigh, 2020, A First Course in Abstract Algebra, 8th Edition, Pearson.
2. M. Artin, 2011, Abstract Algebra, 2nd Ed., Pearson.
3. Joseph A Gallian, 2024, Contemporary Abstract Algebra, 11th Edition, Routledge.
4. P.B.Bhattacharya, S.K.Jain, and S.R.Nagpaul, 1997, Basic Abstract Algebra (II Edition) Cambridge University Press. (Indian Edition)
5. I.S.Luther and I.B.S.Passi, 2013, Algebra, Vol. I – Groups (1996); Vol. II Rings, Narosa Publishing House, New Delhi.

E-RESOURCES

1. <http://mathforum.org>,
2. <http://ocw.mit.edu/ocwwweb/Mathematics>,
3. <http://www.opensource.org>,
4. www.algebra.com

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	3	3	1	2	2	2	3	2	1
CLO2	3	1	2	1	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	3	2	3	2	1	3	2	3	2	1
CLO4	2	3	1	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1

Strong: 3 Medium: 2

Low: 1

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2024 – 2025)

DEPARTMENT OF MATHEMATICS
B.Sc., MATHEMATICS

Semester: V- CC-X : REAL ANALYSIS

Ins. Hrs./Week: 5

Course Credit: 5

Course Code: U24MA510

UNIT-I: Real Number

(15 Hours)

Introduction to Real Number system-Field axioms-Theorems about field properties-Order in $\mathbb{R}$ - Absolute value of a real number & its properties- Completeness- Supremum & Infimum, Examples-Order completeness-Some important subsets of $\mathbb{R}$ -Intervals-Countable & Uncountable sets.

UNIT-II: Neighbourhoods and Limits

(15 Hours)

Introduction-Neighbourhoods-Open sets-Closed sets-Limit point of a set -Definitions and theorems-Limit of a function -Definitions, Examples, Theorems-One sided limits-Limit x approaches c - Algebra of limits, Definitions and theorems- Infinite limits, Examples.

UNIT-III: Continuous Functions

(15 Hours)

Continuous functions -Definitions, Theorems - Types of discontinuities, Examples-Algebra of continuous functions -Boundedness of continuous functions, Theorems-Intermediate value theorem – Inverse function Theorem – Uniform continuity.

UNIT-IV: Derivability

(15 Hours)

Introduction -Derivability on an open interval- Derivability on closed interval-Derivability & Continuity -Algebra of derivatives -Chain rule-Inverse Function theorem for derivatives – Darboux's theorem for derivatives.

UNIT-V: Mean Value Theorems

(15 Hours)

Rolle's theorem – Examples on Rolle's theorem –Lagrange's Mean value theorem-Examples on Lagrange's Mean Value theorem – Cauchy's Mean value theorem- Taylor's Theorem with Lagrange form of remainder-Taylor's theorem with Cauchy form of remainder.

Total Lecture Hours- 75

COURSE OUTCOME

The students will be able to

1. Acquire knowledge about basic properties of real number system.
2. Gain about the knowledge of Neighbourhood and limit of a function.
3. Enhance about the concept of continuous and discontinuous functions.
4. Develop the knowledge of derivability.
5. Assimilate the concept of Mean value theorems.

TEXT BOOKS

1. Singhal.M.K & Asha rani Singhal, 2020, A First Course in Real Analysis, 34th edition R.Chand & Co., New Delhi.

UNIT- I Chapter 1 : Sec. 1 to 10

UNIT- II Chapter 2 : Sec.2 to 5 & Chapter 5 : Sec. 1.1 to 1.6

UNIT -III Chapter 5 : Sec. 2 to 8

UNIT -IV Chapter 6 : Sec. 1 to 5

UNIT- V Chapter 7 : Sec. 1 to 4

REFERENCE BOOK(S)

1. Apostol .T.M., 1974, Mathematical analysis, Second Edition ,Addison-Wesley.
2. Malik, Arrora, 2024. Mathematical analysis, 7th Edition ,New Age International Pvt Ltd
3. Shanthi Narayan, P.K. Mittal, 2013. A Course of Mathematical Analysis, 29th Revised Edition , Chand & Co .
4. Sunil k.Mittal, 2021. Real analysis, 13th Edition , Pragathi Pragasam publications.
5. Walder Rudin, 1976. Principles of Mathematical analysis, 3rd Edition , McGraw-Hill Education.

E- RESOURCES

1. https://www.math.ucdavis.edu/~hunter/intro_analysis_pdf/intro_analysis.pdf
2. http://pdvpmtasgaon.edu.in/uploads/dptmaths/Real_AnalysisBySizweMabizela.pdf
3. <https://www.math.ucla.edu/~awertheim/Bootcamp/Notes/Real%20Analysis%20Lectupdf>
4. http://pdvpmtasgaon.edu.in/uploads/dptmaths/Real_AnalysisBySizweMabizela.pdf
5. <https://www.jirka.org/ra/realanal.pdf>

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	3	3	1	2	2	2	3	2	1
CLO2	3	1	2	1	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	3	2	3	2	1	3	2	3	2	1
CLO4	2	3	1	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1

Strong: 3 Medium: 2

Low: 1

**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2024 – 2025)

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: V – CC - XI: MATHEMATICAL MODELLING

Ins. Hrs./Week: 5

Course Credit: 4

Course Code: U24MA511

UNIT-I: Mathematical Modelling (15 Hours)

Simple situations requiring mathematical modelling- Some characteristics of mathematical models.

UNIT –II: Mathematical Modelling through Ordinary differential Equations of First order: (15 Hours)

Mathematical Modelling through differential Equations-Linear Growth and Decay Models-Non-Linear growth and decay models-Compartment models.

UNIT–III: Mathematical Modelling through systems of Ordinary differential equations of the first order: (15 Hours)

Mathematical Modelling in Population Dynamics- Mathematical Modelling in Economics through systems of Ordinary differential equations of first order.

UNIT-IV: Mathematical Modelling through Ordinary differential Equations of second order: (15 Hours)

Mathematical Modelling of Planetary Motions - Mathematical Modelling of Circular Motion and Motion of Satellites - Mathematical Modelling through Linear Differential Equations of Second Order.

UNIT-V: Mathematical Modelling through difference equations: (15 Hours)

The Need for Mathematical Modelling Through Difference Equations: Some Simple Models-Basic Theory of Linear Difference Equations with Constant Coefficients- Mathematical Modelling Through Difference Equations in Economics and Finance.

Total Lecture Hours - 75

COURSE OUTCOME

The students should be able to

1. Explain simple situations requiring Mathematical Modelling and to determine the characteristics of such models
2. Model using differential equations in-terms of linear growth and Decay models
3. Model using systems of ordinary differential equations of first order, to discuss about various models under the categories „Epidemics“ and „Medicine“
4. Explain in detail about difference equations
5. Model using difference equations

TEXT BOOKS

1. J N Kapur, 2023,Mathematical Modeling,(II Edition) New Age International Pvt Ltd.

UNIT I : Chapter - 1 : Sections 1.1 & 1.4

UNIT II : Chapter - 2 : Sections 2.1 to 2.4

UNIT III : Chapter - 3: Sections 3.1 & 3.4

UNIT IV : Chapter - 4 : Sections 4.1 to 4.3

UNIT V : Chapter - 5 : Sections 5.1 to 5.3

REFERENCE BOOK(S)

1. Bimalk. Mishra and Dipak K.Satpathi(2023) Mathematical Modeling(Third Edition) Ane Books Pvt. Ltd
2. Sandip Banerjee,(2022) Mathematical Modeling Models, Analysis and Applications,(1 st Edition) CRC Press, Taylor & Francis group.
3. Geogebra(2017) Mathematical Modeling applications (second Edition) by Jonas Hall & Thomas Ligefjard, John Wiley & Sons.
4. Mark M. Meerschaert(2013) Mathematical Modeling,(fourth Edition) Elsevier Publications.,
5. Edward A. Bender(2000) An introduction to mathematical Modeling,(1st Edition) CRC Press.

E-RESOURCES

1. <http://mathforum.org>
2. <http://ocw.mit.edu/ocwweb/Mathematics>,
3. <http://www.opensource.org>,

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	3	3	1	2	2	2	3	2	1
CLO2	3	1	2	1	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	3	2	3	2	1	3	2	3	2	1
CLO4	2	3	1	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1

Strong: 3 Medium: 2

Low: 1

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE



(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2024– 2025)

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: V- CC-XII: MECHANICS

Ins. Hrs./Week: 5

Course Credit: 4

Course Code: U24MA512

UNIT-I: Force

(15 Hours)

Force: Newton's laws of motion – Resultant of two forces on a particle - Equilibrium of a Particle: Equilibrium of a particle – Limiting equilibrium of a particle on an inclined plane.

UNIT-II: Forces on a Rigid Body

(15 Hours)

Forces on a Rigid Body: Moment of a Force – General motion of a rigid body – Equivalent systems of forces- Parallel Forces – Forces along the sides of a Triangle - A specific reduction of Forces: Reduction of coplanar forces into a force and couple – Problems involving frictional forces.

UNIT-III: Work, Energy and Power

(15 Hours)

Work, Energy and Power: Work – Conservative field of force – Power -Rectilinear Motion under Varying Force: Simple Harmonic Motion -S.H.M along a horizontal line –S.H.M along a vertical line.

UNIT – IV: Projectiles

(15 Hours)

Projectiles: Forces on a projectile – Projectile projected on an inclined plane

UNIT-V: Central Orbits

(15 Hours)

Central Orbits: General orbits – Central orbit – Conic as a centred orbit.

Total Lecture Hours -75

COURSE OUTCOME:

The students will be able to

1. Understand the types of forces and its examples.
2. Define Moment of a force and Couple with examples
3. Analyse work, energy, power, rectilinear motions under varying forces
4. Find the direct and oblique impact of smooth elastic spheres
5. Learn central orbits, explain conic as centred orbits and solve problems related to central orbits.

TEXT BOOK(S):

1. Duraipandian.P, Laxmi Duraipandian, Muthamizh Jayapragasam, 2014, Mechanics, S. Chand & Company Pvt. Ltd., Ram Nagar, New Delhi 110055.

UNIT–I Chapter 2: Sec 2.1, 2.2
Chapter 3: Sec 3.1, 3.2

UNIT–II	Chapter 4: Sec 4.1 to 4.5 Chapter 5: Sec 5.1, 5.2
UNIT – III	Chapter 11: Sec 11.1 to 11.3 Chapter 12: Sec. 12.1 to 12.3
UNIT – IV	Chapter 13: Sec. 13.1 to 13.2
UNIT –V	Chapter 16: Sec. 16.1 to 16.3

REFERENCE BOOK(S):

1. Kaushal Kumar Singh, 2011, Textbook of Dynamics, PHI Learning Pvt. Ltd., New Delhi.
2. Raisinghania. M.D, 2013, Dynamics, S. Chand & Company, Pvt. Ltd., New Delhi.
3. Ray. M, Sharma. G.C, 2006, A Textbook on Dynamics, S. Chand & Company, Pvt. Ltd., New Delhi.
4. Venkataraman. M.K, 2014, Statics, Agasthiar Publications, Trichy.
5. Venkataraman. M.K, 2009, Dynamics, Agasthiar Publications, Trichy.

E-RESOURCES:

1. https://www.fisica.net/mecanicaclassica/introduction_to_statics_and_dynamics_by_rudra_pratap.pdf
2. <http://ruina.tam.cornell.edu/Book/RuinaPratap-Jan-20-2015.pdf>
3. https://www.academia.edu/36036711/Statics_and_Dynamics_11th_Edition_Jhonston
4. <http://aghababaie.usc.ac.ir/files/1506464236211.pdf>
5. https://www.researchgate.net/publication/334443002_Lectures_on_Engineering_Mechanics_Statics_and_Dynamics

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	3	3	1	2	2	2	3	2	1
CLO2	3	1	2	1	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	3	2	3	2	1	3	2	3	2	1
CLO4	2	3	1	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1

Strong: 3 Medium: 2

Low: 1



SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2024– 2025)

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: V-EC-I(1):NUMERICAL METHODS WITH APPLICATIONS

Ins. Hrs./Week:4

Course Credit:3

Course Code: U24MAE51A

UNIT-I: Solutions of Algebraic and Transcendental Equations (12 Hours)

Introduction on Algebraic and Transcendental Equations - The Solution of Algebraic and Transcendental Equations-Bisection method, Steps for finding roots of equations using bisection method-Newton Raphson method-Theory and problems.

UNIT-II: Interpolation (12 Hours)

Introduction on Interpolation -Finite differences - Formula for finding Forward differences-Formula for finding Backward differences-Some basic problems-Formula for finding Newton's forward and backward Interpolation-Problems based on Newton forward and backward interpolation-Lagrange's Interpolation formula-Theory and problems.

UNIT-III: Numerical Integration (12 Hours)

Basic Formulae on Integration-Numerical Integration: Trapezoidal Rule-Simpson's $1/3^{\text{rd}}$ Rule, Simpson's $3/8^{\text{th}}$ Rule.

UNIT-IV: Solutions of Linear Systems (12 Hours)

Formulation of Linear Systems - Solutions of linear systems- Theory and problems of linear systems using Gauss Elimination Method – Theory and problems of linear systems using Gauss Jacobi Method–Theory and problems of linear systems using Gauss Seidel Method.

UNIT-V: Numerical Solutions of Ordinary Differential Equations (12 Hours)

Formation of Ordinary Differential Equations-Method of finding Solution of ordinary differential equations by Taylor's Series -Formula for Euler's method- Runge Kutta Second and Fourth order method, Theory and Problems.

Total Lecture Hours-60

COURSE OUTCOME

The Students should be able to

1. Gain knowledge about Algebraic and Transcendental Equations.
2. Analyze the Polynomial interpolation problems.
3. Understand the concepts of numerical differentiation and integration.
4. Develop the knowledge on the theory, problems and solutions of linear systems.
5. Integrate the concept of numerical solutions of ordinary differential equations.

TEXT BOOK

1. Sastry S.S., 2012. A First Course in Introductory Methods of Numerical Analysis, Fifth Edition, PHI Learning Private Limited, New Delhi.

UNIT-I :Chapter 2:Sec.2.1,2.2,2.5

UNIT-II : Chapter 3:Sec.3.1,3.3(3.3.1&3.3.2),3.6,3.9.1

UNIT-III: Chapter 5:Sec.5.4(5.4.1,5.4.2,5.4.3)

UNIT-IV: Chapter 6:Sec.6.3,6.3.2,6.4

UNIT-V : Chapter 7:Sec.7.1,7.2,7.4,7.5

REFERENCE BOOK(S)

1. Arumugam S, Thangapandi Issac and Somasundaram A. 2015. Numerical Methods, 2nd Edition, Scitech Publications, Chennai.
2. David Kincaid, Ward Cheney, 2009, Numerical Analysis 3rd Edition, Brooks/Cole Publishing Company, USA.
3. Jain M.K, Iyengar S.R.K and Jain R.K. 2023. Numerical Methods for Scientific and Engineering Computation. 8th Edition, New Age International Private Limited, Bangalore.
4. Mathew J.H. 1992. Numerical Methods for Mathematics Science and Engineering, 2nd Edition, Prentice Hall, New Delhi.
5. Veerarajan T and Ramachandran T. 2008. Numerical Methods with programming in C MCGraw Hill Education, New York.

E- RESOURCES

1. <http://www.math.iitb.ac.in/~baskar/book.pdf>
2. <http://spartan.ac.brocku.ca/~jvr/bik/MATH2P20/notes.pdf>
3. <https://www.math.ust.hk/~machas/numerical-methods.pdf>
4. <https://rahulpatel121.files.wordpress.com/2018/07/s-s-sastry-introductory-methods-of-numerical-analysis-2012-phi-learning-pvt-ltd.pdf>
5. <https://authors.library.caltech.edu/25061/1/NumMethChE84.pdf>

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	3	3	1	2	2	2	3	2	1
CLO2	3	1	2	1	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	3	2	3	2	1	3	2	3	2	1
CLO4	2	3	1	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1

Strong: 3 Medium: 2

Low: 1

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE



(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI-614 016.

(For the Candidates admitted in the academic year 2024–2025)

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: V-EC-I(2):DIFFERENCE EQUATIONS WITH APPLICATIONS

Ins. Hrs./Week:4

Course Credit:3

Course Code: U24MAE51B

UNIT-I: Basics of Difference Equations

(12 Hours)

Introduction to Difference Equations – Formation of Difference Equations - Order and Degree - Types of Difference Equations: Linear and Nonlinear - Basic Properties and Solutions of First Order Difference Equations.

UNIT-II: First Order Difference Equations and Applications

(12 Hours)

Solution methods: Iteration, Direct Computation, Graphical Methods – Stability of Equilibria – Applications to Population Models, Economics and Finance – Case Studies: Simple growth models and bank interest problems.

UNIT-III: Higher Order Linear Difference Equation

(12 Hours)

Homogeneous Difference Equations with Constant Coefficients – Particular Solutions by the Method of Undetermined Coefficients – General Solution of Non-Homogeneous Linear Equations – Applications in Discrete Dynamic Systems.

UNIT-IV: Systems of Difference Equations

(12 Hours)

System of First Order Linear Difference Equations – Matrix Methods: Eigen values and Stability – Applications to Biological Systems and Economic Models – Modeling and Solving Real-world systems.

UNIT-V:Z-Transforms and Advanced Applications

(12 Hours)

Definition and Properties of Z-Transform – Solving Difference Equations using Z-Transforms – Convolution Theorem – Applications in Signal Processing and Control Systems.

Total Lecture Hours-60

COURSE OUTCOME

The Students should be able to

1. Gain knowledge in basics of Difference Equations.
2. Understand the First Order Difference Equations with Applications.
3. Analyze the concepts of Higher Order Linear Difference Equations.
4. Develop the knowledge on systems of Difference Equations.
5. Learn the concepts of Z-Transforms.

TEXT BOOK

1. Walter G.Kelley and Allan C.Peterson, 2001, Difference Equations: An Introduction with Applications, 2nd Edition, Academic Press.

REFERENCE BOOK(S)

- 1.S.N.Elaydi,2013,An Introduction to Difference Equations, 2nd Edition,Springer.
2. George F.Simmons,2016,Differential Equations with Applications and Historical Notes, published by CRC press.
3. Mickens R.E., 2015,Difference Equations:Theory and Applications, 3rd Edition, CRC Press.
4. V.Lakshmikantham and D.Trigiant,2002,Theory of Difference Equations: Numerical Methods and Applications, 2nd Edition , CRC Press.

E- RESOURCES

1. https://people.math.aau.dk/~cornean/IMM_E12/notes2011a.pdf
2. <https://www.geeksforgeeks.org/first-order-differential-equation/>
3. [https://math.libretexts.org/Bookshelves/Differential_Equations/Differential_Equations_for_Engineers_\(Lebl\)/2%3A_Higher_order_linear_ODEs/2.3%3A_Higher_order_linearODEs](https://math.libretexts.org/Bookshelves/Differential_Equations/Differential_Equations_for_Engineers_(Lebl)/2%3A_Higher_order_linear_ODEs/2.3%3A_Higher_order_linearODEs)

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	3	3	1	2	2	2	3	2	1
CLO2	3	1	2	1	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	3	2	3	2	1	3	2	3	2	1
CLO4	2	3	1	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1

Strong: 3 Medium: 2 Low: 1

SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE



(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI-614 016.

(For the Candidates admitted in the academic year 2024–2025)

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: V-EC-I(3): INTRODUCTION TO SAGEMATH

Ins. Hrs./Week:4

Course Credit:3

Course Code: U24MAE51C

UNIT-I: Basics of SageMath

(12 Hours)

Introduction to SageMath: History, Purpose and Features – Installing and using SageMath – Basic Commands and Syntax – Working with Variables, Expressions and Functions – Arithmetic and Algebraic Computations.

UNIT-II: Matrices, Vectors and Linear Algebra in SageMath

(12 Hours)

Creating and Manipulating Matrices and Vectors – Matrix Operations: Addition, Multiplication, Inverse, Determinant – Solving Systems of Linear Equations – Eigen Values and Eigen Vectors – Applications in Linear Algebra.

UNIT-III: Calculus using SageMath

(12 Hours)

Limits, Derivatives and Integrals – Partial Derivatives and Multivariable Calculus – Series Expansion and Taylor Series – Plotting Functions: 2D and 3D Graphs – Solving Differential Equations.

UNIT-IV: Discrete Mathematics and Programming with SageMath

(12 Hours)

Working with Sets, Lists, Tuples and Dictionaries – Graph Theory Basics: Creating and Analyzing Graphs – Basic Programming in SageMath: Loops, Conditionals, Functions – Introduction to Combinatorics in SageMath.

UNIT-V: Advanced Features and Applications

(12 Hours)

Symbolic Computations and Simplifications – Number Theory Functions and Applications – Introduction to Group Theory and Algebraic Structures – Using SageMath for Data Visualization and Basic Statistics.

Total Lecture Hours-60

COURSE OUTCOME

The Students should be able to

1. Understand Symbolic Computation.
2. Learn Numerical Computation.
3. Do Graphing and Visualization.
4. Analyze Algebraic Structures and Number Theory.
5. Gain knowledge in Programming and Automation.

TEXT BOOK

1. Gregory Bard, 2022, Sage for Undergraduates, 2nd Edition, American Mathematical Society.

REFERENCE BOOK(S)

1. William Stein, 2020, Sage Mathematics Software (Version 9.0): The Sage Developer's Manual, The Sage Developers.
2. Craig Finch, 2011, Getting Started with SageMath, Packt Publishing.
3. Puran Lukhele, 2019 Mathematics with Sage.

E- RESOURCES

1. <https://trytrova.io/api/search?q=short+link+for+sagemath&searchsource=58&n=3000&gclid=RD1002693&d=112619>
2. <https://doc.sagemath.org/html/en/reference/>

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	3	3	1	2	2	2	3	2	1
CLO2	3	1	2	1	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	3	2	3	2	1	3	2	3	2	1
CLO4	2	3	1	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1

Strong: 3 Medium: 2

Low: 1



SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2024 – 2025)
DEPARTMENT OF MATHEMATICS
B.Sc., MATHEMATICS

Semester: V-EC- II (1) :OPERATIONS RESEARCH

Ins. Hrs./Week:4

Course Credit:3

Course Code: U24MAE52A

UNIT –I: Linear programming problem (12 Hours)

Linear programming problem - Mathematical formulation – Illustrations on Mathematical formulation on Linear Programming Problems – Graphical solution method - some exceptional cases – Canonical and standard forms of Linear Programming Problem .

UNIT –II Artificial variables (12 Hours)

Simplex method-Use of Artificial Variables (Big M method - Two phase method) – Duality in Linear Programming - General primal-dual pair - Formulating a Dual problem - Primal-dual pair in matrix form - Dual simplex method.

UNIT –III: Transportation and Assignment Problem (12 Hours)

Transportation problem - LP formulation of the TP - Solution of a TP - Finding an initial basic feasible solution (NWCM-LCM-VAM) – Degeneracy in TP -Transportation Algorithm (MODI Method) - Assignment problem – Solution methods of assignment problem – special cases in assignment problem.

UNIT – IV: Sequencing Problem (12 Hours)

Sequencing Problem - Processing n jobs through two machines - Processing n jobs through K Machines - Processing two jobs through K machines - Queuing Theory – Queuing system – classification of Queuing models - Poisson Queuing system Model I (M/M/1):(∞/FIFO) –Model II (M/M/1):(∞/SIRO) - Model III (M/M/1):(N/FIFO) – Model IV (Generalized Model).

UNIT – V: PERT and CPM (12 Hours)

PERT and CPM – Basic components – logical sequencing – Rules of network construction- Critical path analysis – Probability considerations in PERT.

Total Lecture Hours – 60

COURSE OUTCOME

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

1. Identify and develop operational research models from the verbal description of the real system.
2. Understand the mathematical tools that are needed to solve Optimization problems.
3. Formulate and solve problems as networks and graphs.
4. Develop a report that describes the model and solving technique, analyze the results and propose recommendations in language understandable to the decision making processes in management engineering.
5. Use CPM and PERT techniques, to plan, schedule and control project activities.

TEXT BOOKS

1. Kanti Swarup, Gupta.P.K and ManMohan, 2022, Operations Research, 20 th Edition, Sultan Chand and Sons.

- UNIT-I :Chapter 2 : Sec. 2.1 to 2.4
Chapter 3: Sec 3.2 to 3.5
- UNIT-II :Chapter 4 : Sec. 4.3 to 4.4
Chapter 5 : Sec. 5.2 to 5.4, 5.9
- UNIT – III :Chapter 10 : Sec. 10.1 to 10.9,10.12,10.13
Chapter 11 : Sec. 11.1 to 11.4
- UNIT – IV :Chapter 12 : Sec. 12.1 to 12.6
Chapter 21 : Sec.21.1 to 21.9
- UNIT-V :Chapter 25 : Sec. 25.1 to 25.7

REFERENCE BOOK(S)

1. Prem Kumar Gupta and Hira.D.S, Operations Research, 2010, Sultan Chand and sons Educational publishers, New Delhi.
2. Hamdy A. Taha, 2022. Operations Research, 11 th Edn. Prentice Hall of India Private Limited, New Delhi.
3. Kalavathy.S, 2013. Operations Research, Fourth Edition, Vikas Publishing House Pvt. Ltd, 2007.
4. Frederick S. Hillier and Gerald J. Lieberman,2024,Introduction to Operations Research, 11 th Edition,Mc Graw Hill Publication Limited.
- 5.Sharma.J.K, 2016, Operations Research:Theory and Applications,6 th edition,Laxmi Pulications Private Limited.

E_RESOURCES

1. https://www.researchgate.net/publication/333748649_Chapter_-01_Operations_Research.
2. https://www.researchgate.net/publication/297715752_Linear_Programming.
3. <https://www.gatexplore.com/transportation-problem-study-notes/>.
4. https://www.researchgate.net/publication/325223720_An_Assignment_Problem.
5. <http://ndl.ethernet.edu.et/bitstream/123456789/90288/6/operations%20research>.

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	3	3	1	2	2	2	3	2	1
CLO2	3	1	2	1	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	3	2	3	2	1	3	2	3	2	1
CLO4	2	3	1	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1

Strong: 3 Medium: 2

Low: 1



**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**

SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2024 – 2025)

**DEPARTMENT OF MATHEMATICS
B.Sc., MATHEMATICS**

Semester: V-EC- II (2) : NUMBER THEORY AND CRYPTOGRAPHY

Ins. Hrs./Week:4

Course Credit:3

Course Code: U24MAE52B

UNIT I: Elementary Number theory (12 Hours)

Time estimates for doing arithmetic – divisibility and the Euclidean algorithm

UNIT II: Elementary Number theory (12 Hours)

Congruences – Some applications to factoring

UNIT III: Finite Fields and Quadratic Residues (12 Hours)

Finite Fields - Quadratic residues and reciprocity

UNIT IV: Cryptography (12 Hours)

Some simple cryptosystems – Enciphering matrices.

UNIT V: Public Key Cryptography (12 Hours)

The idea of Public key cryptography – RSA

Total Lecture Hours:60

COURSE OUTCOME

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

- 1.Explain the divisibility and the Euclidean Algorithm.
- 2.Solve the congruences and factoring.
- 3.Explain the Finite fields.
- 4.Discuss the Simple cryptosystems.
- 5.Discuss the Public Keys.

TEXT BOOK:

1. Neal Koblit, 2012 ,A course in Number Theory and Cryptography, 2 nd Edition, Springer – Verlag,New York,

UNIT I: Chapter 1:Section 1 & 2.

UNIT II: Chapter 1:Section 3 & 4.

UNIT III: Chapter 2:Section 1 & 2.

UNITIV: Chapter 3:Section 1 & 2.

UNIT V: Chapter 4:Section 1 & 2.

REFERENCES BOOKS:

1. I. Niven and H. S. Zuckermann, 1976, An Introduction to Theory of Numbers, 3 rd Edition Wiley Eastern Ltd, New Delhi.
2. D. M. Burton, 2010,Elementary Number Theory, 7 th Edition,Brown Publishers, Iowa.
3. K. Ireland and M. Rosen, A classic Introduction to Modern Number Theory, Springer – Verlag.
4. N. Koblit, 1998, Algebraic Aspects of Cryptography, Springer-Verlag.

E_RESOURCES

1. https://www.google.com/search?q=divisiblity+rules+in+cypography&rlz=1C1YTUH_.
2. https://www.google.com/search?q=congruences+in+crptography&rlz=1C1YTUH_
3. https://www.google.com/search?q=finite+fields+in+cryptography&rlz=1C1YTUH_
4. https://www.google.com/search?q=some+simple+cryptosystems&rlz=1C1YTUH_
5. https://www.google.com/search?q=public+key+cryptography&rlz=1C1YTUH_.

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	3	3	1	2	2	2	3	2	1
CLO2	3	1	2	1	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	3	2	3	2	1	3	2	3	2	1
CLO4	2	3	1	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1

Strong: 3 Medium: 2

Low: 1



**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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(For the Candidates admitted in the academic year 2024 – 2025)

DEPARTMENT OF MATHEMATICS
B.Sc., MATHEMATICS

Semester: V-EC- II (3) :INTRODUCTION TO MATLAB

Ins. Hrs./Week:4

Course Credit:3

Course Code: U24MAE52C

UNIT - I: Solving Problems in MATLAB

(12 Hours)

MATLAB Environment: Getting Started – MATLAB Windows – Solving Problems in MATLAB – Variables – Working with Matrices – Scalar Operations – Array Operations –Scientific Notation – Display Format - Saving your work –Saving Variables – Script M- Files- Predefined MATLAB Functions – Using Predefined Functions – Elementary Math Functions– Trigonometric Functions – Data Analysis Functions – Simple Analysis – Maximum and Minimum – Mean and Median – Sums and Products – Random Numbers – Uniform Random Numbers – Gaussian Random Numbers – Computational Limitations - Special Values and Functions.

UNIT – II: Plotting

(12 Hours)

Introduction to Plotting – Two Dimensional Plots – Basic Plotting – Annotating Plots – Other Types of Two Dimensional Plots – Polar Plots – Logarithmic Plots – Bar Graphs and Pie Charts – Histograms – Subplots - Three Dimensional Plotting – Three Dimensional Line Plot– Surface Plots – Mesh Plots – Surf Plots – Contour Plots - Editing Plots from the Menu Bar –Programming in MATLAB: Introduction – Problems with two Variables – Input /Output –User defined Input – Output Options – Formatted Output – Functions – Syntax – Local Variables – Naming Function M-files – Rules for Writing and Using Function M-files.

UNIT – III: Differentiation and Integration

(12 Hours)

Introduction to Differentiation and Integration – Differentiation – Integration – Numerical Integration – Trapezoidal Rule and Simpson's Rule – MATLAB Quadrature Functions -Numerical Differentiation – Difference Expressions – diff. Function.

UNIT-IV: Desktop, Variables, and Data Types

(12 Hours)

Introduction to MATLAB-Creating Variables-Some Useful MATLAB Functions-Data Types-Script File S-Plotting-One dimensional plots and Two dimensional Plots.

UNIT V:Arrays

(12 Hours)

Introduction to Arrays-Graphing- Graphing Functions Using MATLAB- Conditional Statements: Logical Operators-Conditional Statements: if, else, and else if.

Total Lecture Hours-60

COURSE OUTCOME

The students will be able to

1. Explain the basic properties of MATLAB.
2. Describe the concepts of Plotting.
3. Discuss the concepts of Numerical Differentiation and Integration.
4. Discuss the Types of Data Types.
5. Explain the Array Operators.

TEXT BOOKS

1. Delores M. Etter, David C. Kuncicky, Holly Moore, 2009, Introduction to MATLAB 7, Published by Dorling Kindersley (India) Pvt. Ltd., licenses of Pearson Education in South Asia (For Units I to III).
2. Stormy Attaway, Elsevier, 2013, MATLAB: A Practical Introduction to Programming and Problem Solving, 3rd edition, Stormy Attaway, Elsevier, 2013.

UNIT I Chapter 2 : Sec. 2.1 to 2.3

Chapter 3 : Sec. 3.1, 3.3, 3.4 of (1)

UNIT II Chapter 4 : Sec. 4.1 to 4.3

Chapter 5 : Sec. 5.1 to 5.3 of (1)

UNIT III Chapter 7 : Sec. 7.3.

Chapter 8 : Sec. 8.4 & 8.5 of (1)

UNIT IV Chapter 1-4 of (2)

UNIT V Chapter 5-6 of (2)

REFERENCE BOOK(S)

1. Amos Gilat, 2014. Matlab: An Introduction with Applications, 5th Edition, John Wiley, New York.
2. George Lindfield, John Penny, 2018. Numerical Methods: Using Matlab, 4th Edition. Academic Press, U.S.
3. Rudra Pratap, 1996. Getting Started with MATLAB, South Asia Edition, OXFORD University Press, England.
4. Sankara Rao K, 2004. Numerical Methods for Scientists and Engineers, Second Edition, Prentice-Hall of India Pvt. Ltd, New Delhi.
5. Saumyen Guha, Rajesh Srivastava, 2010. Numerical Methods: For Engineering and Science, OXFORD University Press, England.

E-RESOURCES

1. <http://www.uop.edu.pk/ocontents/A%20Guide%20to%20MATLAB.pdf>
2. http://mayankagr.in/images/matlab_tutorial.pdf
3. https://www.mathworks.com/help/pdf_doc/matlab/matlab_prog.pdf
4. <https://perhuman.files.wordpress.com/2014/07/metodos-numericos.pdf>
5. <https://www.coursehero.com/file/28550858/numerical-analysis-1pdf>

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	3	3	1	2	2	2	3	2	1
CLO2	3	1	2	1	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	3	2	3	2	1	3	2	3	2	1
CLO4	2	3	1	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1

Strong: 3 Medium: 2

Low: 1

SEMESTER VI

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2024 – 2025)

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS



Semester: VI - CC-XIII: LINEAR ALGEBRA

Ins. Hrs./Week: 6

Course Credit: 4

Course Code: U24MA613

UNIT-I: Vector Spaces & Elementary Matrix Operations and Systems of Linear Equations

(18 Hours)

Vector spaces – Subspaces – Linear Combinations and linear span - Systems of Linear equations — Elementary Matrix Operations and Elementary Matrices – The Rank of a Matrix and Matrix Inverses.

UNIT-II: Vector Spaces Continued

(18 Hours)

Linear Dependence and Linear independence – Bases – Dimensions

UNIT-III: Linear Transformations and Matrices

(18 Hours)

Linear transformations, null spaces and ranges – Matrix representation of a linear transformation – invertibility and isomorphisms – dual spaces

UNIT – IV: Diagonalization

(18 Hours)

Eigenvalues, Eigenvectors, Diagonalizability – invariant subspaces – Cayley– Hamilton theorem

UNIT-V: Inner Product Spaces

(18 Hours)

Inner products and norms – Gram Schmidt Orthogonalization Process - Orthogonal complements

Total Lecture Hours –90

COURSE OUTCOME

The students should be able to

1. Acquire a detailed knowledge about vector spaces and subspaces
2. Explain the concepts of Linear Dependence, Linear Independence, Bases and Dimension of basis
3. Explain the concept of Linear Transformations, their Matrix representation and the notion of dual spaces
4. Find the Eigen values and Eigen vectors, to apply the concepts for diagonalisation
5. Explain about Inner product and norms and to apply Gram Schmidt Orthogonalization Process to problems on inner product spaces.

TEXT BOOKS

1. Stephen H Friedberg, Arnold J Insel and Lawrence E Spence , 2018, Linear Algebra (5th edition) , Pearson.

UNIT- I Chapter 1 :Sec. 1.1 to 1.4 & Chapter 3 :Sec. 3.1 & 3.2

UNIT – II Chapter 1 :Sec. 1.5 & 1.6

UNIT – III Chapter 2 :Sec. 2.1 , 2.2, 2.4 & 2.6

UNIT - IV Chapter 5 :Sec. 5.1 , 5.2 & 5.4

UNIT - V Chapter 6 :Sec. 6.1 & 6.2

REFERENCE BOOK(S)

1. I.N.Herstein, 2006, Topics in Algebra, Wiley Eastern Ltd. Second Edition.
2. N.S.Gopalakrishnan, University Algebra, New Age International Publications, Wiley Eastern Ltd.
3. John B.Fraleigh, 2023, First course in Algebra, 8th Edition, Pearson India.
4. Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence, 2018, Linear Algebra, 5th Ed., Pearson.
5. David C. Lay, 2014, Linear Algebra and its Applications, 5th Ed., Pearson Education Asia, Indian Reprint.
6. S. Lang, 2005, Introduction to Linear Algebra, 2nd Ed., Springer.
7. Gilbert Strang, 2007, Linear Algebra and its Applications, Thomson.

E-RESOURCES

1. <http://mathforum.org>,
2. <http://ocw.mit.edu/ocwweb/Mathematics>,
3. <http://www.opensource.org>,
4. www.algebra.com

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	3	3	1	2	2	2	3	2	1
CLO2	3	1	2	1	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	3	2	3	2	1	3	2	3	2	1
CLO4	2	3	1	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1

Strong: 3 Medium: 2

Low: 1

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

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DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS



Semester: VI - CC- XIV – COMPLEX ANALYSIS

Ins. Hrs./Week: 6

Course Credit: 4

Course Code: U24MA614

UNIT- I: Analytic Functions

(20 Hours)

Functions of a Complex variable – Rational Function – Complex Valued Function - Limits – Theorems on Limits – Continuous Functions – Differentiability – Cauchy-Riemann Equations – C-R Equations in polar coordinates - Analytic Functions – Harmonic functions – Milne-Thompson Method.

UNIT - II : Bilinear Transformations

(16 Hours)

Introduction - Elementary Transformations – Translation – Rotation – Magnification – Inversion – Bilinear Transformations – Cross Ratio – Fixed Points of Bilinear Transformation – Some Special Bilinear Transformations – Related Theorems and Problems in all these.

UNIT – III: Complex Integration

(18 Hours)

Complex Integration – Definite Integral – Cauchy's Theorem – Cauchy's Theorem for Simply Connected Regions - Cauchy's Theorem for Multiply Connected Regions - Cauchy's Integral Formula – Maximum Modulo Theorem – Circular Disc - Higher Derivatives – Cauchy's Inequality Theorem – Liouville's Theorem – Morera's Theorem.

UNIT – IV: Series Expansion

(17 Hours)

Series Expansion – Taylor's Series – Maclaurin's Series - Laurant's Series – Zeroes of an Analytic Functions – Singularities – Isolated Singularity - Removable Singularity – Poles – Essential Singularity – Meromorphic Function - Riemann's Theorem - Related Theorems and Problems in all these.

UNIT – V: Calculus of Residues

(19 Hours)

Residues – Lemma on Residues - Cauchy's Residue Theorem – Argument Theorem – Rouchy's Theorem - Fundamental Theorem of Algebra - Evaluation of Definite Integrals - Related Theorems and Problems in all these.

Total Lecture Hours- 90

COURSE OUTCOME

The students will be able to

1. Learn the concept of analytic functions.
2. Understand the concept of a simple and multiple connected regions.
3. Analyze Cauchy's theorem.
4. Learn the concepts of Taylor series and Laurent series.
5. Analyze Cauchy's Residue theorem.

TEXT BOOKS

1. Arumugam.S, Thangapandi Issac.A & Somasundaram.A, 2015, "Complex Analysis", New Scitech Publications Pvt. Ltd., India.

UNIT I Chapter 2 : Sec. 2.1 to 2.8

UNIT II Chapter 3 : Sec. 3.1 to 3.5

UNIT III Chapter 6 : Sec. 6.1 to 6.4

UNIT IV Chapter 7 : Sec. 7.1 to 7.4

UNIT V Chapter 8 : Sec. 8.1 to 8.3

REFERENCE BOOK(S)

1. Joseph Bak & Donald J. Newman, 2010, "Complex Analysis", Third Edition, Springer.
2. Karunakaran.V, 2005. Complex Analysis, Second Edition, Narosa Publishing House Pvt. Ltd.
3. Lars V. Ahlfors, 2021, "Complex Analysis: An Introduction to the Theory of Analytic Functions of One Complex Variable", Third Edition, AMS Chelsea Publishing.
4. Manickavachaagam Pillai. T.K, 2009, "Complex Analysis", S.Viswanathan Publishers Pvt. Ltd.
5. Sharma J.N, 2023, "Functions of a Complex variable", 56th Edition. Krishna Prakasan Media(P) Ltd.

E_RESOURCES

1. <http://www.maths.lth.se/matematiklu/personal/olofsson/CompHT06.pdf>
2. <https://www.math.ucla.edu/~honda/math520/notes.pdf>
3. <https://www.freebookcentre.net/Mathematics/ComplexAnalysis-Books-Download.html>
4. <http://www.math.chalmers.se/Math/Grundutb/CTH/mve025/1415/Dokument/komplexbokBeck.pdf>
5. <https://www.math.ucla.edu/~honda/math520/notes.pdf>

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	3	3	1	2	2	2	3	2	1
CLO2	3	1	2	1	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	3	2	3	2	1	3	2	3	2	1
CLO4	2	3	1	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1

Strong: 3 Medium: 2 Low: 1

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE



(AUTONOMOUS)
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DEPARTMENT OF MATHEMATICS
B.Sc., MATHEMATICS

Semester: VI-EC- III (1) ASTRONOMY

Ins. Hrs./Week: 4

Course Credit: 3

Course Code: U24MAE63A

UNIT – I: (12 Hours)

Relevant properties of sphere and formulae in spherical trigonometry (proof not needed for theorems) - Celestial sphere and diurnal motion - Celestial coordinates-sidereal time.

UNIT – II: (12 Hours)

Morning and evening stars -circumpolar stars- diagram of the celestial sphere - zones of earth -perpetual day-dip of horizon-twilight.

UNIT – III: (12 Hours)

Refraction - laws of refraction - tangent formula-Cassini's formula - horizontal refraction - geocentric parallax - horizontal parallax.

UNIT – IV: (12 Hours)

Kepler's laws - verification of 1st and 2nd laws in the case of earth - Anomalies - Kepler's equation - Seasons -causes -kinds of years.

UNIT – V: (12 Hours)

Moon-sidereal and synodic months - elongation - phase of moon - eclipses-umbra and penumbra - lunar and solar eclipses - ecliptic limits - maximum and minimum number of eclipses near a node and in a year - Saros.

Total Lecture Hours - 60

COURSE OUTCOMES:

Students will be able to

1. The Learner will acquire basic knowledge about morning, evening stars, circumpolar stars.
2. Solve the problems with scientific reasoning and critical thinking skills.
3. Calculation to prepare calendar and conservation of time.
4. Identify and describe different celestial phenomena such as morning and evening stars, circumpolar stars, twilight, and perpetual day, along with Earth's zones and the concept of dip of the horizon.
5. Describe the motion of the Moon, distinguish between sidereal and synodic months, explain the phases of the Moon, and understand the mechanics of solar and lunar eclipses along with the Saros cycle.

TEXT BOOK:

1. Kumaravel, S. and Susheela Kumaravel, 2004, *Astronomy*, 8th Edition, SKV Publications.

UNIT – I : Chapter I : Sec 1 to 17

Chapter II: Sec 39 to 69

UNIT – II : Chapter II: Sec 80 to 86,

Chapter III: Sec 87 to 90, 106 to 116

UNIT – III: Chapter IV: Sec 117 to 134

Chapter V: Sec 135 to 145

UNIT – IV: Chapter VI: Sec 146 to 162,

Chapter VII: Sec 173 to 178

UNIT – V : Chapter XII: Sec 229 to 241,

Chapter XII: Sec 256 to 275

REFERENCE BOOKS:

1. W.M. Smart, 1977, "A Textbook of Spherical Astronomy" 6th Ed., Cambridge University Press.
2. Baidyanath Basu (Revised by Tanuka Chattopadhyay and S.N. Biswas), 2010, "An Introduction to Astrophysics" 2nd Ed., PHI Learning Pvt. Ltd., New Delhi.
3. A.E. Roy and D. Clarke, 2003, "Astronomy: Principles and Practice" 4th Ed., Institute of Physics (IOP) Publishing.
4. Das Gupta. M, 2012, "TEXTBOOK on Astronomy", Revised Edition, Kalyani Publishers.
5. Ball, R.S. 2013, "A Treatise on Spherical Astronomy", Cambridge University Press, Reprint Edition, (Original 1908).

E_RESOURCES :

1. https://www.youtube.com/watch?v=lhiHj6vlO_w
2. <https://www.youtube.com/watch?v=0rHUDWjR5gg&t=86s>
3. <https://www.youtube.com/shorts/Zcxq2jjXvpY>
4. <https://www.youtube.com/watch?v=EYMQ4Xw9PsE>

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	3	3	1	2	2	2	3	2	1
CLO2	3	1	2	1	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	3	2	3	2	1	3	2	3	2	1
CLO4	2	3	1	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1

Strong: 3 Medium: 2

Low: 1



**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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DEPARTMENT OF MATHEMATICS
B.Sc., MATHEMATICS

Semester: VI-EC- III (2) DISCRETE MATHEMATICS

Ins. Hrs./Week: 4

Course Credit: 3

Course Code: U24MAE63B

UNIT I: (12 Hours)

Propositional Logic – Applications of Propositional Logic – Propositional Equivalences.

UNIT II: (12 Hours)

Predicates and Quantifiers – Nested Quantifiers – Rules of Inference.

UNIT III: (12 Hours)

Sets – Set operations – Functions - Sequences and Summations – Cardinality Sets – Matrices.

UNIT IV: (12 Hours)

Algorithms – The Growth of Functions – Complexity of Algorithms.

UNIT V: (12 Hours)

Mathematical Induction – Strong Induction and well-ordering – Recursive definitions and Structural Induction – Recursive Algorithms.

Total Lecture Hours - 60.

COURSE OUTCOME

The students will be able to

1. Understand and apply the fundamental principles of propositional logic, including logical operators, truth tables, and equivalences, to analyze and solve logical problems.
2. Explain and use predicate logic, quantifiers (including nested quantifiers), and rules of inference to construct valid logical arguments.
3. Apply set theory, perform operations on sets, understand and use functions, sequences, summations, and matrices to solve mathematical and computational problems.
4. Analyze algorithms, understand asymptotic notation, and evaluate the time and space complexity of algorithms.
5. Use mathematical induction, strong induction, and structural induction to prove statements; understand and apply recursive definitions and recursive algorithms.

TEXT BOOK(S) :

1. Kenneth H. Rosen, 2019, Discrete Mathematics and its Applications, 8th Ed., McGraw- Hill Education.

UNIT–I Chapter 1 : Sec. 1.1 to 1.3

UNIT–II Chapter 1 : Sec. 1.4 to 1.6

UNIT–III Chapter 2 : Sec. 2.1 to 2.6

UNIT–IV Chapter 3 : Sec. 3.1 to 3.3

UNIT–V Chapter 5 : Sec. 5.1 to 5.4

REFERENCE BOOK(S) :

1. Trembly. J.P & Manohar. R, 2008, “Discrete Mathematical Structures with Applications to Computer Science”, 35th reprint Ed., McGraw- Hill.
2. Liu, C.L, 2017, “Elements of Discrete Mathematics”, 4th Ed., McGraw-Hill Book co.
3. K.D Joshi, 2023, “Foundations of Discrete Mathematics”, 3rd Ed., Wiley Eastern Limited.
4. Ralph P. Grimaldi, 2004, “Discrete and Combinatorial Mathematics: An Applied Introduction”, 5th Edition, Pearson Education.
5. Susanna S. Epp, 2019, “Discrete Mathematics with Applications”, 5th Edition, Cengage Learning.

E_RESOURCES :

1. [https://www.freebookcentre.net/Mathematics/Discrete Mathematics-Books-Download.html](https://www.freebookcentre.net/Mathematics/Discrete%20Mathematics-Books-Download.html)
2. <https://www.cs.yale.edu/homes/aspnes/classes/202/notes>

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	3	3	1	2	2	2	3	2	1
CLO2	3	1	2	1	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	3	2	3	2	1	3	2	3	2	1
CLO4	2	3	1	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1

Strong: 3 Medium: 2

Low: 1



**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: VI-EC- III (3) INTRODUCTION TO LaTeX

Ins. Hrs./Week: 4

Course Credit: 3

Course Code: U24MAE63C

UNIT – I: (12 Hours)

Preparing an Input File - The Input - Running LATEX.

UNIT – II: (12 Hours)

Changing the Type Style - Symbols from Other Languages - Mathematical Formulas.

UNIT – III: (12 Hours)

Defining Commands and Environments - Figures and Other Floating Bodies - Lining It Up in Columns.

UNIT – IV: (12 Hours)

The Table of Contents - Cross-References - Bibliography and Citation.

UNIT – V: (12 Hours)

Splitting Your Input - Making an Index or Glossary - Keyboard Input and Screen Output –
Sending Your Document.

Total Lecture Hours - 60

COURSE OUTCOMES:

The students will be able to

1. Prepare and structure LaTeX input files and compile LaTeX documents effectively.
2. Apply various type styles, use special symbols, and create mathematical formulas in LaTeX documents.
3. Define custom commands and environments, manage floating bodies like figures and tables, and align content using columns.
4. Generate and manage a table of contents, apply cross-referencing, and prepare bibliographies with proper citations.
5. Organize large LaTeX projects by splitting input files, create indexes or glossaries, handle keyboard inputs and screen outputs, and manage document distribution.

TEXT BOOKS:

1. Leslie Lamport. 1994, “LATEX: A Document Preparation System”, 2nd edition, Addison- Wesley, Reading, Massachusetts.

UNIT – I : Chapter 2 : Sec 2.1 to 2.3

UNIT – II : Chapter 3 : Sec 3.1 to 3.3

UNIT – III: Chapter 3: Sec 3.4 to 3.6

UNIT – IV: Chapter 4: Sec 4.1 to 4.3

UNIT – V : Chapter 4: Sec 4.4 to 4.7

REFERENCE BOOKS:

1. Frank Mittelbach and Michel Goossens, 2023, "The LaTeX Companion", 3rd Ed., Addison-Wesley.
2. Tobias Oetiker, Hubert Partl, Irene Hyna and Elisabeth Schlegl., The (Not So) Short Introduction to LATEX2e, Samurai Media Limited.
3. LATEX Tutorials - A Primer, Indian TeX Users Group,
4. H. J. Greenberg. A Simplified introduction to LATEX.
5. Amsmath and geometry package available in Ctan.org.

E_RESOURCES :

1. <http://mirrors.ctan.org/info/lshort/english/lshort.pdf>
2. <https://www.tug.org/twg/mactex/tutorials/ltxprimer-1.0.pdf>
3. <https://www.ctan.org/tex-archive/info/simplified-latex/>
4. <https://docs.kde.org/trunk4/en/extragear-office/kile/quick-using.htm>

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	3	3	1	2	2	2	3	2	1
CLO2	3	1	2	1	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	3	2	3	2	1	3	2	3	2	1
CLO4	2	3	1	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1

Strong: 3

Medium: 2 Low: 1

**SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2024 – 2025)

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: VI-EC-IV (1): GRAPH THEORY AND APPLICATIONS

Ins. Hrs./Week: 4

Course Credit: 3

Course Code: U24MAE64A

UNIT -I: Graphs and Subgraphs (15 Hours)

Graphs and Subgraphs : Definitions – Graph – Adjacent Points – Adjacent Lines – Loop – Multigraph – Pseudo Graph – Complete Graph – Null Graph – Bigraph – Complete Bigraph – Degrees – Isolated Point – End Point – Related Theorems and corollaries – Definitions – Regular Graph – Cubic Graph – Related Problems. Subgraphs: Definitions – Subgraph – Super Graph – Spanning Subgraph – Induced Subgraph – Removal of the Point – Addition of the Line – Related Theorems – Isomorphism - Automorphism – Complement G – Self Complementary Graph – Related Theorems and Problems - Independent Sets and Coverings – Independence Number – Covering Number – Line Covering Number – Line Independence Number – Related Theorems - Intersection Graphs and Line Graphs.

UNIT –II: Connectedness (10 Hours)

Matrices – Adjacency matrix – Incidence Matrix - Operations on Graphs – Union, Sum, Product and Composition – Related Theorems - Connectedness: Walks, Trails, Paths and Cycles – Related Theorems and Problems – Connectedness and Components – Definitions – Connected – Disconnected – Components(Cut point Bridge) – Related Theorems – Blocks - Connectivity-Definitions – Related Theorems.

UNIT –III: Trees (15 Hours)

Eulerian Graphs: Definitions - Eulerian Graphs – Arbitrarily Traversable Graph – Related Theorems. Hamiltonian Graphs: Definition – Hamiltonian cycle – Hamiltonian Graph – Theta Graph – Closure – Related Theorems and Corollaries (Omit Chavatal Theorem 5.10) – Related Problems. Trees: Characterization of Trees – Definition – A cyclic Group – Tree – Forest – Related Theorems and Corollaries– Centre of a Tree – Definition – Eccentricity – Radius central point – Centre – Related theorem.

UNIT- IV: Planarity (10 Hours)

Planarity: Definition and Properties – Planar graph – Non Planar graph – Plane graph – Faces – Exterior face – Boundary – Steriographic Projection – Polyhedral – Related Theorems and Corollaries - Characterization of Planar Graphs – Maximal Planar graph – Geometric Dual – Contractible - Related theorems and corollaries – Euler formula – Related Problems – Thickness, Crossing and Outer Planarity: Definition – Crossing Number – Outer Planar – Maximal outer Planar – Genus.

UNIT –V: Directed Graphs

(10 Hours)

Directed Graphs: Definitions and Basic Properties – Directed Graph – Indegree – Outdegree – Degree Pair – Subdigraph – Induced Subdigraph – Underlying Graph – Converse Digraph – Complete Digraph – Functional Digraph – Related Theorems – Paths and Connections – Digraphs and Matrices - Some Applications : Connector Problem – Weighted Graph - Kruskal's algorithm - Shortest Path Problem – Dijkstra's algorithm for finding a shortest path between two points.

Total Lecture Hours - 60

COURSE OUTCOME

The students will be able to

1. Understand the basic definitions of graphs and its applications of graphs.
2. Recognize the Characteristics of graph.
3. List and relate special graphs
4. Learn about Planar and Non Planar Graphs.
5. Understand the concepts of graph theory as an application of mathematics in information technology and its related fields.

TEXT BOOKS

1. Arumugam.S and Ramachandran.S, 2015, Invitation to Graph Theory, Scitech Publications (India) Pvt. Ltd., Kolkata .

UNIT – I Chapter 2 : Sec. 2.1, 2.2, 2.3, 2.4, 2.6,2.7

UNIT – II Chapter 2 : Sec. 2.8, 2.9

Chapter 4 : Sec 4.1 to 4.4

UNIT – III Chapter 5 : Sec 5.1,5.2

Chapter 6 : Sec 6.1, 6.2

UNIT-IV Chapter 8 : Sec 8.1,8.2, 8.3

UNIT-V Chapter 10: Sec 10.1 to 10.3

Chapter 11: Sec 11.1,11.2

REFERENCE BOOK(S)

1. Balakrishnan.R and K.Ranganathan.K, 2012,A Textbook of Graph Theory, Second Edition Universitext, Springer – Verlog, New York.
2. Bondy.J.A and Murthy.U.S.R, 2025. Graph Theory with Applications, Revised Edition , Wiley-VCH.
3. Gary Chartrand and Ping Zhang, 2004. Introduction to Graph Theory, Tata McGraw-Hill Edition.
4. Narsingh Deo, 2004. Graph Theory with applications to Engineering and Computer Science, Prentice Hall of India.
5. Robin Wilson.J,2010,Introduction to Graph Theory,5th edition, Pearson Education.

E-RESOURCES

1. <https://www.maths.ed.ac.uk/~v1ranick/papers/wilsongraph.pdf>
2. https://logic.pdmi.ras.ru/~gravin/storage/GT_Bondy_Murty_3.pdf
3. <http://meskc.ac.in/wp-content/uploads/2018/12/A-Textbook-of-Graph-Theory-R.-Balakrishnan-K.Ranganathan.pdf>
4. <https://www.zib.de/groetschel/teaching/WS1314/BondyMurtyGTWA.pdf>
5. https://www.math.kit.edu/iag6/lehre/graphtheo2015w/media/lecture_notes.pdf

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	3	3	1	2	2	2	3	2	1
CLO2	3	1	2	1	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	3	2	3	2	1	3	2	3	2	1
CLO4	2	3	1	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1

Strong: 3 Medium: 2 Low: 1

SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2024 – 2025)

DEPARTMENT OF MATHEMATICS
B.Sc., MATHEMATICS

Semester: VI-EC-IV (2): FUZZY SETS AND ITS APPLICATIONS

Ins. Hrs./Week: 4

Course Credit: 3

Course Code: U24MAE64B

UNIT –I: From Classical Sets to Fuzzy Sets

(13 Hours)

Introduction of Fuzzy Sets – Fuzzy sets- Basic types – Fuzzy power sets - Fuzzy sets: Basic Concepts - Related Theorem – Cut worthy property – Strong Cut worthy property – Fuzzy Sets Versus Crisp Sets- Additional Properties of α -cuts – Related Theorems – Extension Principle for Fuzzy sets – Related Theorems.

UNIT – II: Operations on Fuzzy Sets

(12 Hours)

Types of Operations – Fuzzy Complements – First Characterization Theorem of Fuzzy Complements – Second Characterization Theorem of Fuzzy Complements – Fuzzy Intersections- t- Norms – Characterization Theorem of t-Norms - Fuzzy Unions- t-Conorms - Characterization Theorem of t-Conorms – Combinations of Operations – Theorems on Combinations of Operations.

UNIT – III: Fuzzy Arithmetic

(11 Hours)

Fuzzy Numbers – Theorems on Fuzzy Numbers - Linguistic variables – Arithmetic operations on intervals – Properties of Arithmetic operations – Arithmetic operations on Fuzzy numbers – Related Theorems on Arithmetic operations on Fuzzy numbers - Lattice of Fuzzy numbers – Related Theorems on Lattice of Fuzzy numbers.

UNIT – IV: Fuzzy Relations

(12 Hours)

Binary Fuzzy Relations – Binary Relations on a Single Set – Reflexive - Irreflexive – Antireflexive – symmetric – Antisymmetric – Strictly Antisymmetric – Transitive – Nontransitive – Antitransitive - Fuzzy Equivalence Relations – Fuzzy Compatibility Relations – Fuzzy Ordering Relations – Fuzzy Morphisms.

UNIT – V: Fuzzy Decision Making

(12 Hours)

Individual Decision Making – Multiperson Decision Making – Fuzzy Ranking Methods –Fuzzy Linear Programming – Cost vector – Constraint matrix – Right-hand side vector – Related problems in all these.

Total Lecture Hours- 60

COURSE OUTCOME

The students should be able to

1. Discuss the Fuzzy sets and properties of α - cuts.
2. Understand the Fuzzy Sets Operations.
3. Recognize the concept of Fuzzy Arithmetic.
4. Describe the Binary Fuzzy Relations & Fuzzy compatibility Relations.
5. Compute the Ranking methods & Fuzzy Linear Programming.

TEXT BOOKS

1. George J.Klir and Bo Yuan,2015,Fuzzy Sets and Fuzzy Logic Theory and Applications,Second Edition, published by Pearson India.

UNIT - I Chapter 1 : Sec. 1.1,1.3, 1.4 &
Chapter 2 : Sec. 2.1 and 2.3

UNIT -II Chapter 3 : Sec. 3.1 to 3.4

UNIT -III Chapter 4 : Sec. 4.1 to 4.5

UNIT -IV Chapter 5 : Sec. 5.3 to 5.8

UNIT -V Chapter 15 : Sec. 15.2, 15.3, 15.6, 15.7

REFERENCE BOOK(S)

1. Ganesh. M. 2006.Introduction to Fuzzy Sets and Fuzzy Logic, Prentice Hall of India.
2. George J. Klir. and Bo Yuan. 1996. Fuzzy Sets, Fuzzy Logic and Fuzzy Systems, World Scientific Publishing, Co. Pvt. Ltd., Singapore.
3. Lotfi A Zadeh and Rafik A Aliev. 2019. Fuzzy Logic Theory and Applications (Part I and Part II), World Scientific Publishing, Co. Pte. Ltd., Singapore.
4. Timothy J. Ross. 2016. Fuzzy Logic with Engineering Applications, 4th edition ,Wiley India Pvt. Ltd, New Delhi.
5. Zimmermann H.J. ,2001. Fuzzy Set Theory and its Applications,4th edition , Springer.

E-RESOURCES

1. <https://cours.etsmtl.ca/sys843/REFS/Books/ZimmermannFuzzySetTheory2001.pdf>
2. <file:///C:/Users/ELCOT/Desktop/FUZZY%20MATHEMATICS.pdf>
3. <https://www.iitk.ac.in/eeold/archive/courses/2013/intel-info/d1pdf3.pdf>
4. https://www.mv.helsinki.fi/home/niskanen/zimmermann_review.pdf
5. https://www.myreaders.info/06-Fuzzy_Set_Theory.pdf

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	3	3	1	2	2	2	3	2	1
CLO2	3	1	2	1	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	3	2	3	2	1	3	2	3	2	1
CLO4	2	3	1	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1

Strong: 3 Medium: 2 Low: 1

SENGAMALA THAYAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAL, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2024 – 2025)

DEPARTMENT OF MATHEMATICS
B.Sc., MATHEMATICS

Semester: VI-EC-IV (3): INTRODUCTION TO R-PROGRAMMING

Ins. Hrs./Week: 4

Course Credit: 3

Course Code: U24MAE64C

UNIT –I: GETTING STARTED (13 Hours)

How to Run R - A First R Session -Introduction to Functions- Preview of Some Important R Data Structures- Extended Example: Regression Analysis of Exam Grades- Startup and Shutdown.

UNIT – II: VECTORS (12 Hours)

Scalars, Vectors, Arrays, and Matrices – Declarations- Recycling- Common Vector Operations- Using all() and any()-Vectorized Operations- NA and NULL Values.

UNIT – III: MATRICES AND ARRAYS (11 Hours)

Creating Matrices - General Matrix Operations- Applying Functions to Matrix Rows and Columns- Adding and Deleting Matrix Rows and Columns.

UNIT – IV: LISTS (12 Hours)

Creating Lists - General List Operations -Accessing List Components and Values- Applying Functions to Lists.

UNIT–V: DATA FRAMES (12 Hours)

Creating Data Frames - Other Matrix-Like Operations- Merging Data Frames- Applying Functions to Data Frames.

Total Lecture Hours- 60

COURSE OUTCOME

The students should be able to

1. Discuss the R environment and R packages.
2. Understand the Loops in R.
3. Recognize the concept of Data Reshaping and Manipulating Strings.
5. Describe the Simple and Multiple regression.
6. Compute the Clustering using in R.

TEXT BOOKS

1. Norman Matloff, 2011, The Art of R Programming, no starch press, San Francisco.

UNIT - I Chapter 1 : Sec. 1.1 to 1.6

UNIT -II Chapter 2 : Sec. 2.1 to 2.7

UNIT -III Chapter 3 : Sec. 3.1 to 3.4

UNIT -IV Chapter 4 : Sec. 4.1 to 4.4

UNIT -V Chapter 5 : Sec. 5.1 to 5.4

REFERENCE BOOK(S)

1. Jared P.L., R for Everyone, 2017, Advanced Analytics and Graphics, Addison Wesley Data and Analytics series.
2. Sandip Rakshit, 2017, R Programming for Beginners, McGraw Hill Education.
3. Andrie de Vries & Joris Meys, 2015, R Programming For Dummies, 2nd Edition, Wiley India.
4. K.G. Srinivasa, G.M. Siddesh, Chetan Shetty, Sowmya B.J., 2017, Statistical Programming in R, Oxford University Press.
5. Richard Cotton, 2013, Learning R: A Step-by-Step Function Guide to Data Analysis, Packt Publishing.

E-RESOURCES

1. <https://www.scribd.com/document/844324599/Syllabus-R-Programming>
2. <https://www.amazon.in/R-Programming-Beginners-Sandip-Rakshit/dp/9352604555>
3. <https://www.mheducation.co.in/r-for-beginners-9789352604555-india>
4. <https://home.iitk.ac.in/~shalab/swayamprabha/rsw/sp-rsw-lect-4.pdf>
5. <https://www.uu.se/en/study/syllabus?query=44324>

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos										PSOs		
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	3	2	3	3	3	1	2	2	2	3	2	1
CLO2	3	1	2	1	3	2	2	2	2	2	3	2	1
CLO3	3	2	2	3	2	3	2	1	3	2	3	2	1
CLO4	2	3	1	2	3	2	2	3	1	2	3	2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1

Strong: 3 Medium: 2

Low: 1

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE



(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI-614 016.

(For the Candidates admitted in the academic year 2024–2025)

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester :VI -PCC : APTITUDE AND REASONING SKILLS FOR COMPETITIVE EXAMINATIONS

Ins. Hrs./Week:2

Course Credit:2

Course Code: U24PCMA61

UNIT-I:

(6 Hours)

Simplification

UNIT-II:

(6 Hours)

Square Roots and Cube Roots

UNIT-III:

(6 Hours)

Calendar

UNIT IV:

(6 Hours)

Clocks

UNIT V:

(6 Hours)

Odd Man Out and Series

Total Lecture Hours-30

COURSE OUTCOME

The students should be able to

- 1.Improve their Numerical Ability.
- 2.Enhance their Logical and Analytical Thinking.
- 3.Have better Time management in Competitive Exams.
- 4.Get Stronger Problem Solving Skills.
- 5.Get Higher Competitive Exam Scores.

TEXT BOOK

- 1.Dr.R.S.Aggarwal, 2022, Quantitative Aptitude for Competitive Examinations, S.Chand Publishing.

UNIT I : Section I : Chapter-4

UNIT II : Section I : Chapter-5

UNIT III: Section I : Chapter-27

UNIT IV: Section I : Chapter-28

UNIT V: Section I : Chapter-35

REFERENCE BOOK(S)

1. Abhijit Guha, 2020 Quantitative Aptitude for All Competitive Examinations, McGraw Hill Education, 7th Edition.
2. Rajesh Verma, 2020, Fast Track Objective Arithmetic, Arihant Publications India Ltd., 4th Edition.
3. Arun Sharma, 2022, How to Prepare for Quantitative Aptitude for the CAT, McGraw Hill Education, 10th Edition.
4. Dinesh Khattar, 2020, Quantitative Aptitude for Competitive Examinations, Pearson Education, 4th Edition.
5. Dr. R. S. Aggarwal, 2024, A Modern Approach to Verbal and Non-Verbal Reasoning, S. Chand Publishing.

E-RESOURCES

1. <https://www.indiabix.com/aptitude/simplification/>
2. <https://leverageedu.com/discover/indian-exams/exam-prep-square-root-and-cube-root/>
3. <https://www.indiabix.com/aptitude/calendar/>
4. <https://www.geeksforgeeks.org/clock-questions-aptitude/>
5. <https://www.indiabix.com/aptitude/odd-man-out-and-series/>

COMMON COURSE



PART-IV ENVIRONMENTAL STUDIES COURSE

**FOR ALL UG ARTS, SCIENCE, COMMERCE AND MANAGEMENT
CHOICE BASED CREDIT SYSTEM – LEARNING OUTCOMES BASED
CURRICULUM FRAMEWORK (CBCS - LOCF)**

(Applicable to the candidates admitted from the academic year 2022-2023 onwards)

First Year	PART-IV ENVIRONMENTAL STUDIES	Semester-II
Code:	(Theory)	Credit: 2

COURSE OBJECTIVES:

- To appreciate the scope of Environmental Studies, Community ecology and the interdisciplinary nature of environmental issues
- To have a basic knowledge of Natural resources its classification, concepts, and natural resources of India.
- The course designed to gain knowledge on values of biodiversity and conservation on global, national, and local scales
- To study about sources and effects of environmental pollution like air, water, soil, thermal, marine, nuclear and noise
- To understand the concerns related to Sustainable Development on environment and health
- To introduce the students in the field of Law and Policies and Acts both at the national and international level relating to environment.

UNIT-1: The Multidisciplinary nature of environmental studies
Definition, scope and importance. (2 lectures)
Need for public awareness

UNIT-2: Natural Resources:
Renewable and non-renewable resources:
Natural resources and associated problems.

- a) Forest resources: use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
- b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.
- c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

- d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
 - e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.
 - f) Land resources: Land as a resources, land degradation, man induced Landslides, soil erosion and desertification.
- Role of an individual in conservation of natural resources.
 - Equitable use of resources for sustainable lifestyles.

(8 lectures)

Unit: 3 Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers
- Energy flow in the ecosystem
- Ecological succession.
- Food chains, food webs and ecological pyramids
- Introduction, types, characteristic features, structure and function of the following ecosystem:-
- a. Forest ecosystem
- b. Grassland ecosystem
- c. Desert ecosystem
- d. Aquatic ecosystems, (ponds, streams, lakes, rivers, oceans, estuaries)

(6 lectures)

Unit: 4 Biodiversity and its conservation

- Introduction – Definition : Genetic, species and ecosystem diversity
- Biogeographical classification of India
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values
- Biodiversity at global, National and local levels
- India as a mega-diversity nation
- Hot-spots of biodiversity
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
- Biological Diversity Act 2002/ BD Rules, 2004

(8 lectures)

Unit: 5 Environmental Pollution

Definition

Causes, effects and control measures of :

- a. Air Pollution
- b. Water Pollution
- c. Soil Pollution
- d. Marine Pollution
- e. Noise pollution
- f. Thermal Pollution
- g. Nuclear hazards

- Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution
- Pollution case studies
- Disaster management: floods, earthquake, cyclone and landslides.
- Ill-Effects of Fireworks: Firework and Celebrations, Health Hazards, Types of Fire, Firework and Safety

(8 lectures)

Unit: 6 Social Issues and the Environment

- From Unsustainable to Sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, watershed management.
- Resettlement and rehabilitation of people; its problems and concerns.

Case studies

- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and Control of Pollution) Act.
- Wildlife Protection Act.
- Forest Conservation Act.
- Issues involved in enforcement of environmental legislation
- Public awareness.

(7 lectures)

Unit: 7 Human Population and the Environment

- Population growth, variation among nations.
- Population explosion – Family Welfare Programmes
- Environment and human health
- Human Rights - Value Education

- HIV/ AIDS - Women and Child Welfare
- Role of Information Technology in Environment and human health
- Case studies.

Unit: 8 Field Work

- Visit to a local area to document environmental assets-river / forest/ grassland/ hill / mountain

References:

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Public Ltd Bikaner.
 2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt Ltd, Ahamedabad – 380013, India, E-mail: mapin@icenet.net(R)
 3. Brunner R.C. 1989, Hazardous Waste Incineration, McGraw Hill Inc 480 p
 4. Clark R.S. Marine Pollution, Clanderson Press Oxford (TB)
 5. Cunningham, W.P.Cooper, T.H.Gorhani E & Hepworth, M.T. 2001.
 6. De A.K. Environmental Chemistry, Wiley Eastern Ltd
 7. Down to Earth, Centre for Science and Environment (R)
 8. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford University, Press 473p.
 9. Hawkins, R.E. Encyclopedia of India Natural History, Bombay Natural History Society, Bombay (R)
 10. Heywood, V.H & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge University Press 1140 p.
 11. Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws Himalaya Pub. House, Delhi 284 p.
 12. Mckinney, M.L. & Schoch R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition 639 p.
 13. Mhaskar A.K. Matter Hazardous, Techno-Science Publications (TB)
 14. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
 15. Odum, E.P. 1971 Fundamentals of Ecology. W.B. Saunders Co. USA. 574 p
 16. Rao MN & Datta, A.K. 1987 Waste Water treatment, Oxford & IBH Publication Co. Pvt Ltd 345 p.
 17. Sharma B.K. 2001 Environmental chemistry Goel Publ House, Meerut.
 18. Survey of the Environment, The Hindu (M).
 19. Townsend C. Harper, J and Michael Begon, Essentials of Ecology, Blackwell science (TB)
 20. Trivedi R.K. Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media (R).
 21. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science Publications (TB).
 22. Wagner K.D. 1998 Environmental Management. W.B. Saunders Co. Philadelphia USA 499 p
- (M) Magazine (R) Reference (TB) Textbook
23. <http://nbaindia.org/uploaded/Biodiversityindia/Legal/33%20Biological%20Diversity%20>

COURSE OUTCOMES:

- Understand the environmental importance including interactions across local to global scales.
- The learners to update and analyze environmental relationships and interactions of environmental components
- The student to gain knowledge on importance of natural resources in a systematic way.
- The course content is introduce the concept of renewable and non-renewable energy resources and its scenario in India and at global level
- The students will know the relationship between biodiversity and ecosystem functions, direct and indirect values of biodiversity resources and their bioprospecting opportunities.
- The learners can gain awareness related on environmental pollution, causes and pollution control with case studies.
- Student to obtain the environmental ethics and gain knowledge about the sustainable development.
- Learners should realize the environmental legislation and policies of national and international regime and know the regulations applicable to industries and other organizations with significant Environmental aspects

**PART-IV VALUE EDUCATION COURSE****FOR ALL UG ARTS, SCIENCE, COMMERCE AND MANAGEMENT
CHOICE BASED CREDIT SYSTEM – LEARNING OUTCOMES BASED
CURRICULUM FRAMEWORK (CBCS - LOCF)**

(Applicable to the candidates admitted from the academic year 2022-2023 onwards)

First Year**PART-IV
VALUE EDUCATION****Semester-I****Code:****(Theory)****Credit: 2****OBJECTIVES:**

- To understand the philosophy of life and values through Thirukural
- To analyse the components of values education to attain the sense of citizenship
- To understand different types of values towards National Integration and international understanding
- To learn yoga as value education to promote mental and emotional health
- To understand human rights, women rights and other rights to promote peace and harmony

UNIT I : PHILOSOPHY OF LIFE AND SOCIAL VALUES:

Human Life on Earth (Kural 629) -Purpose of Life (Kural 46) -Meaning and Philosophy of Life (Kural 131, 226) -Family (Kural 45), Peace in Family (Kural 1025) Society (Kural 446), The Law of Life (Kural 952), Brotherhood (Kural 807) Five responsibilities / duties of Man (a) to himself (b) to his family (c) to his environment (d) to his society, (e) to the Universe in his lives (Kural 43, 981).

UNIT-II – HUMAN VALUES AND CITIZENSHIP

Aim of education and value education: Evolution of value oriented education, Concept of Human values: types of Values- Character Formation – Components of Value education- A P J Kalam's ten points for enlightened citizenship- The role of media in value building

UNIT-III VALUE EDUCATION TOWARDS NATIONAL AND GLOBAL DEVELOPMENT:

Constitutional or national values: Democracy, socialism, secularism, equality, Justice, liberty, freedom and fraternity - Social Values: Pity and probity, self-control, universal brotherhood - Professional Values - Knowledge thirst, sincerity in profession, regularity, punctuality and faith -Religious Values: Tolerance, wisdom, character - Aesthetic Values- Love and appreciation of literature and fine arts and respect for the same-National Integration and International Understanding.

UNIT IV : YOGA AND HEALTH:

Definition, Meaning, Scope of Yoga - Aims and objectives of Yoga - Yoga Education with modern context - Different traditions and schools of Yoga - Yoga practices: Asanas, Pranayama and Meditation.

UNIT V : HUMAN RIGHTS:

Concept of Human Rights: Indian and international perspectives- Evolution of Human Rights- definitions under Indian and International documents -Broad classification of Human Rights and Relevant Constitutional Provisions: Right to Life, liberty and Dignity- Right to equality- Right against exploitation- Cultural and Educational Right- Economic Rights- Political Rights- Social Rights - Human Rights of Women and Children – Peace and harmony.

UNIT - VI: CURRENT CONTOURS: (for continuous internal assessment only):

BOOKS FOR REFERENCES:

1. Thirukkural with English Translation of Rev. Dr. G.U. Pope, Uma Publication, 156, Serfoji Nagar, Medical College Road, Thanjavur 613 004
2. jUfFws - [p.A.Nghg - Mqfy nkhoahffjJLd ckh E}y> ntsaLLfk jQrhT:H>
3. Leah Levin, Human Rights, NBT, 1998
4. V.R. Krishna Iyer, Dialectics and Dynamics of Human Rights in India, Tagore Law Lectures.
5. Yogic Therapy - Swami Kuvalayananda and Dr.S.L.Vinekar, Government of India, Ministry of Health, New Delhi.
6. SOUND HEALTH THROUGH YOGA - Dr.K.Chandrasekaran, Prem Kalyan Publications, Sedapatti, 1999.
7. Grose. D. N - "A text book of Value Education' New Delhi (2005)
8. Gawande . EN - "Value Oriented Education" - Vision for better living. New Delhi (2002) Saruptsons
9. Brain Trust Aliyar- "Value Education for Health, Happiness and Harmony" Erode (2004) Vethathiri publications

COURSE OUTCOMES: After completion of the course, the student will be able to:

- Apply the values in thirukural to be peaceful, dutiful and responsible in family and society
- Develop character formation and sense of citizenship
- Be secular, self-control, sincere, respectful and moral.
- Master yoga, asana and meditation to promote mental health
- Be attitudinal to follow the constitutional rights



PART-V GENDER STUDIES COURSE

**FOR ALL UG ARTS, SCIENCE, COMMERCE AND MANAGEMENT
CHOICE BASED CREDIT SYSTEM – LEARNING OUTCOMES BASED
CURRICULUM FRAMEWORK (CBCS - LOCF)**

(Applicable to the candidates admitted from the academic year 2022-2023 onwards)

Third Year

**PART-V
GENDER STUDIES**

Semester-VI

Code:

(Theory)

Credit: 2

OBJECTIVES:

- To make students to aware of Gender constructions and gendering Process
- To explore existing gender biases in the society and to understand the need to work towards the inclusive society
- To inculcate sensitivity and build gender perspectives.
- To use the course to bring attitudinal cum behavioral change towards gender neutral ambience and promote the humanistic values

UNIT- I INTRODUCTION TO GENDER STUDIES CONCEPTS

Gender Spectrum.-Sex – Gender distinction – Biological Determinism – Patriarchy – Feminism –Gender Socialization and Stereotyping-Gender Discrimination – Gender Division of labour and roles– Gender Sensitivity and awareness – Gender Equity – Equality – Gender Main streaming and Gender Analysis.

UNIT- II UGC INITIATIVES ON WOMEN'S STUDIES

Definition of Women's Studies –Gender Studies –UGC Initiatives and guidelines on Women's Studies - Beijing Conference, UN Initiatives – Convention on Elimination of All forms of

Discrimination Against Women (CEDAW)- Sustainable Development Goals on Gender Equality (SDG 5) and targets

UNIT- III AREAS OF GENDER DISCRIMINATION

Gender Socialization- Sex Ratio– Health and Nutrition– – Literacy and Education - Employment- Governance – participation in decision making- politics- property rights and access to credit- gender based violence- Social institutions –Family, Caste, Class, religion, gender, State. Market – Media – Politics – Judiciary

UNIT -IV WOMEN DEVELOPMENT AND GENDER EMPOWERMENT

Towards Equality Report of Status of Women in India 1974 – International Women’s Decade – International Women’s Year –National Policy for Empowerment of Women 2001

UNIT -V WOMEN’S MOVEMENTS AND SAFEGUARDING MECHANISM :

In India National /State Commission for Women(NCW) – All Women Police Station – Family Court Legislations safeguarding women –Transgender Policy—Constitutional amendments for women’s political participation

UNIT - VI CURRENT CONTOURS: (for continuous internal assessment only):

Tamil Nadu State Policy for Women 2021- National Policy for Women 2015 – Prevention of Sexual Harassment at Work places Act 2013- Protection of Children from Sexual Offences Act, 2012 - Analysis of regressive and progressive High court and supreme court judgments- women proactive policies, programmes, interventions

REFERENCE :

1. Bhasin Kamala, Understanding Gender : Gender Basics , New Delhi : Women Unlimited , 2004
2. Bhasin Kamala, Exploring Masculinity: Gender Basics , New Delhi: Women Unlimited ,2004
3. Bhasin Kamala , What is Patriarchy? : Gender Basics, New Delhi :Women Unlimited ,1993
4. Arya Sadhna Women ,Gender Equality and the State ,New Delhi :Deep &Deep Publication ,2000
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6. Mishra .O.P, Law Relating to Women &Child ,Allahabad :Central Law Agency ,2001
7. Uma Chakravarti, Gendering Caste Through a Feminist Lens, Sage Publication 2003

8. Bhattacharya Malini , Sexual Violence and Law ,Kolkata; West Bengala Commission for Women ,2002
9. Sexual Harassment at the Workplace – A Guide , New Delhi ;Sakshi,1999
10. அஜிதா, குடும்ப வன்முறையிலிருந்து பெண்களை பாதுகாக்கும் சட்டம் 2005, மதுரை : ஏக்தா 2005
11. பொன்.கிருஷ்ணசாமி,ஜே.பால் பாஸ்கர்&ஆ.ஜான் வின்சென்ட், பெண்களும் உச்ச நீதிமன்றமும், மதுரை :சோக்கோ வாசகர் வட்டம், 2004
12. குடும்ப வன்முறையிலிருந்து பெண்களை பாதுகாக்கும் சட்டம் 2005- கையேடு, திருச்சி: Women's Integrated National Development Trust
13. <https://www.schooloflegaleducation.com/women-and-law-in-india-e-book/>

COURSE OUTCOMES:

- Students would have gained a perspective and understood the social reality of gender society understood the differences of gender and sex and may resort to building alternative perspectives and critical thinking.
- Gained knowledge on the various social institutions governing gender and the intersectionality.
- Exposed to the kind of initiatives of the State towards gender equality



PART-V GENDER STUDIES COURSE

FOR ALL UG ARTS, SCIENCE, COMMERCE AND MANAGEMENT CHOICE BASED CREDIT SYSTEM – LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (CBCS - LOCF)

(Applicable to the candidates admitted from the academic year 2022-2023 onwards)

Third Year

PART-V
பாலின சமத்துவம்
(Theory)

Semester-**VI**

Code:

Credit: 2

நோக்கம் :

- பாலின கட்டமைப்புகள் மற்றும் பாலினச்செயல்முறைகள் குறித்து மாணவர்களுக்கு விழிப்புணர்வு ஏற்படுத்துதல்
- சமூகத்தில் உள்ளடக்கிய தேவையைப் புரிந்து கொள்வதற்காக வெளியேறும் பாலின பிரச்சனைகள் ஆராய்தல்
- பாலின சமத்துவ சமூகதாயத்தை உருவாக்குவதற்கான உணர்திறனை உருவாக்குதல்
- பாலின நடுநிலை சூழலை உருவாக்கப் பாலின முன்னோக்கு, அணுகுமுறை, நடத்தை மாற்றங்கள் மற்றும் மனிதநேய மதிப்புகளை மேம்படுத்துதல்

அலகு -I பாலினம் தொடர்பான கோட்பாடுகள்:

பாலினப்பார்வை -பால் - பாலின வித்தியாசம் - உடற்கூறுரீதியாக நிர்ணயித்தல் - ஆணாதிக்கம் - பெண்ணியம் - பாலின சமூகமயமாக்கல் மற்றும் ஒருபடித்தானவைகள் - பாலின பாகுபாடு - பாலின வேலைப்பாகுபாடு மற்றும் பங்குகள் - பாலின உணர்வூட்டல் மற்றும் விழிப்புணர்வு- பாலின சமன்நிலை மற்றும் சமத்துவம் - பாலின மைய நீரோட்டமாக்கல் - பாலின பகுப்பாய்வு

அலகு -II மகளிரியல் ஏன பாலின சமத்துவக்கல்வி:

மகளிரியல் - பாலினவியல் வரையரை- பல்கலைக்கழக மானியக்குழுவின் மகளிரியலுக்கான தலையீடுகள் மற்றும் வழிக்காட்டுதல்கள் - பெய்ஜிங் மாநாடு- ஐக்கிய நாடுகள் சபையின் தலையீடுகள் மற்றும் பெண்களுக்கு எதிரான அனைத்து பாகுபாடுகளையும் ஒழிப்பதற்கான சர்வதேச உடன்படிக்கை — நீடித்த நிலையான வளர்ச்சி இலக்குகளில் பாலின சமத்துவம் (SDG 5) மற்றும் இலக்குகள்

அலகு -III பாலியல் பாகுபாட்டிற்கான தளங்கள் :

பாலின விகிதாச்சாரம் - ஆரோக்கியம் மற்றும் ஊட்டச்சத்து- கல்வியறிவு மற்றும் கல்வி — வேலைவாய்ப்பு- ஆளுகை- முடிவெடுத்தல்- அரசியல் -சொத்துரிமை - நிதியை கையாளுதலில் பங்கேற்றல்- பாலின ரீதியாக வன்முறைகள்- சமூக நிறுவனங்கள் - குடும்ப, சாதி, வர்க்கம், மதம், பாலினம், அரசு,சந்தை, ஊடகங்கள், மற்றும் நீதி துறை

அலகு -IV பெண்கள் மேம்பாடு மற்றும் பாலின சமத்துவ மேம்பாடு

Towards Equality Report of Status of Women in India 1974 - சர்வதேச பெண்களுக்கான தசாப்தம் - சர்வதேச பெண்கள் ஆண்டு — பெண்களை அதிகாரப்படுத்துதலுக்கான தேசிய கொள்கை 2001

அலகு-V பெண்கள் இயக்கங்கள் மற்றும் பாதுகாப்பு வழிமுறைகள்

தேசிய மற்றும் மாநில மகளிர் ஆணையம் - அனைத்து மகளிர் காவல் நிலையங்கள் - குடும்ப நீதி மன்றங்கள் - மாற்றுப்பாலினத்தவர்களுக்கான கொள்கை- பெண்களின் அரசியல் பங்கேற்பிற்கான அரசியல் சாசன சட்டதிருத்தங்கள்

அலகு- VI தற்போதைய வரையறைகள் - அகமதிப்பீட்டிற்கு மட்டும்: (Current Contours - For Continuous Internal Assessment Only)

தமிழக அரசின் பெண்களுக்கான கொள்கை 2021- பெண்களுக்கான தேசிய கொள்கை 2015 - பணியிடங்களில் பெண்கள் மீதான பாலியல் துன்புறுத்தல்களை தடுப்பதற்கான சட்டம் 2013 - பாலியல் குற்றங்களிலிருந்து பெண் குழந்தைகள் பாதுகாக்கும் சட்டம் 2012 — உயர் நீதி மன்ற மற்றும் உச்ச நீதி மன்ற தீர்ப்புகள், கொள்கைகள் திட்டங்கள் மற்றும் தலையீடுகளை பகுப்பாய்வு செய்தல்

REFERENCE :

1. Bhasin Kamala, Understanding Gender : Gender Basics , New Delhi : Women Unlimited , 2004
2. Bhasin Kamala, Exploring Masculinity: Gender Basics , New Delhi: Women Unlimited ,2004
3. Bhasin Kamala , What is Patriarchy? : Gender Basics, New Delhi :Women Unlimited ,1993
4. Arya Sadhna Women ,Gender Equality and the State ,New Delhi :Deep &Deep Publication ,2000
5. பாலியலை புரிந்து கொள்வோம், மதுரை :ஏக்தா,.....
6. Mishra .O.P, Law Relating to Women &Child ,Allahabad :Central Law Agency ,2001
7. Uma Chakravarti, Gendering Caste Through a Feminist Lens, Sage Publication 2003
8. Bhattacharya Malini , Sexual Violence and Law ,Kolkata; West Bengala Commission for Women ,2002

9. Sexual Harassment at the Workplace – A Guide , New Delhi ;Sakshi,1999
10. அஜிதா, குடும்ப வன்முறையிலிருந்து பெண்களை பாதுகாக்கும் சட்டம் 2005, மதுரை : ஏக்தா 2005
11. பொன்.கிருஷ்ணசாமி,ஜே.பால் பாஸ்கர்&ஆ.ஜான் வின்சென்ட், பெண்களும் உச்ச நீதிமன்றமும், மதுரை :சோக்கோ வாசகர் வட்டம், 2004
12. குடும்ப வன்முறையிலிருந்து பெண்களை பாதுகாக்கும் சட்டம் 2005- கையேடு, திருச்சி: Women's Integrated National Development Trust
13. <https://www.schooloflegaleducation.com/women-and-law-in-india-e-book/>

பாடநெறி முடிவுகள் மாணவர்கள் இந்த பாடத்தில் பயின்ற பிறகு:

- மாணவர்கள் சமூகத்தில் காணப்படுகின்ற பால் மற்றும் பாலின ரீதியான வித்தியாசங்களை புரிந்து கொள்வதோடு மாற்றுச்சிந்தனைகள் மற்றும் விமர்சன கண்ணோட்டங்களை பெற இயலும்.
- பாலின மற்றும் பாலின உட்கூறுகளை ஆளுகைக்கு உட்படுத்துகின்ற பல்வேறு சமூக நிறுவனங்களை பற்றிய அறிவை பெறுவார்கள்
- பாலின சமத்துவத்தை அடைவதற்கான அரசின் பல்வேறு தலையீடுகள் பற்றி அறிந்திருப்பார்கள்
