B.Sc., MATHEMATICS

COURSE STRUCTURE WITH SYLLABUS

PROGRAMME CODE: 3USMAT

2025-2026

SENGAMALA THAYAAR 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 2025–2026)

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 with in 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 studies in school level or b) Special Tamil if Tamil language was studies upto 10 th & 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

EXAMINATION

Continuous Internal Assessment (CIA):

UG - Distribution of CIA Marks

Passing Minimum: 40 %

Assisgnment-3	=	30%
Test-2	=	50%
Seminar	=	10%
Attendance	=	10%

Question Paper Pattern

Part A:

Part A 1 (10X1=10 marks)
One word question/ Fill in /True or False/ Multiple Choice QuestionsTwo Questions from Each unit

Part A 2 (5X2=10 marks)

Short Answers/ Match the following
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 **II.** (No choice, Two Mark) **ONE** question from each unit	(10x1=10) (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 **PART**	**K1**	**K2**	**K3**	**K4**	**K5**	**K6**	**Total Marks**
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:

$GPA = \dfrac{\sum_{i=1}^{N} C_i G_i}{\sum_{I=1}^{n} C_i}$	$WAM \text{ (Weighted Average Marks)} = \dfrac{\sum_{i=1}^{n} C_i M_i}{\sum_{I=1}^{n} C_i}$
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 pervious semester /s is indicated by **Cumulative Grade Point Average (CGPA).**

Table-3: 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 mediain 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 andto 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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B.Sc.,MATHEMATICS

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

(For the candidates admitted in the academic year 2025 –2026)

ELIGIBILITY: A Pass in10+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	U25LC101	Pothutamil-1 Tamil Ilakkiya varalaru - 1	6	5	1	-	-	3	3	25	75	100
	II	English Language Course-I	U25ELC101	General English-I	6	5	1	-	-	3	3	25	75	100
	III	Core Course-I	U25MA101	Algebra &Trigonometry	5	4	1	-	-	5	3	25	75	100
		Core Course-II	U25MA102	Differential Calculus	4	3	1	-	-	4	3	25	75	100
		Allied Course-I	U25APY101	Allied Physics-I	3	2	1	-	-	2	3	25	75	100
		Allied Practical I	U25APY102P	Allied Physics Practical	2	1	-	1	-	--	--	---	--	--
	IV	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 (i)Basic Tamil if Tamil language was not studied in school level (or) (ii)Special Tamil if Tamil language was studied upto 10th and 12th std. Those Who Choose NCC in Part V must Choose NCC Course as Non-Major Elective.		Non Major Elective-I	2	1	1	-	-	2	3	25	75	100
		Foundation Course	U25FCMA11	Bridge Mathematics	2	1	1	-	-	2	3	25	75	100
				TOTAL	**30**	**22**	**7**	**1**	**-**	**21**	-	-	-	**700**
II	I	Language Course-II	U25LC202	Pothutamil-2 Tamil Ilakkiya varalaru - 2	6	5	1	-	-	3	3	25	75	100
	II	English Language Course-II	U25ELC202	General English-II	6	5	1	-	-	3	3	25	75	100
	III	Core Course–III	U25MA203	Analytical Geometry (Two &Three Dimensions)	5	4	1	-	-	5	3	25	75	100
		Core Course-IV	U25MA204	Integral Calculus	4	3	1	-	-	4	3	25	75	100
		Allied Practical-I	U25APY102P	Allied Physics Practical	2	1	-	1	-	2	3	25	75	100
		Allied Course-II	U25APY203	Allied Physics II	3	2	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	
II	IV	Non Major Elective-II @ 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 (i)Basic Tamil if Tamil language was not studied in school level (or) (ii)Special Tamil if Tamil language was studied up to 10th and 12th std. Those Who Choose NCC in Part V must Choose NCC Course as Non-Major Elective.		Non Major Elective-II	2	1	1	-	-	2	3	25	75	100
		Skill Enhancement Course-I	U25SEMA21	Statistics with SPSS	2	1	1	-	-	2	3	25	75	100
				TOTAL	**30**	**22**	**7**	**1**		**23**	-	-	-	**800**
III	I	Language Course-III	U25LC303	Pothutamil- 3 Tamilaga Varalarum Panpadum	6	5	1	-	-	3	3	25	75	100
	II	English Language Course-III	U25ELC303	General English-III	6	5	1	-	-	3	3	25	75	100
	III	Core Course-V	U25MA305	Vector Calculus and its Applications	4	3	1	-	-	4	3	25	75	100
		Core Course-VI	U25MA306	Differential Equations and Applications	4	3	1	-	-	4	3	25	75	100
		Allied Course-III	U25ACS301	Introduction to Computer and Office Automation	2	2	-	-	-	2	3	25	75	100
		Allied Practical-II	U25ACS302P	Office Automation Lab	2	1	-	1	-	-	--	--	--	--
	IV	Skill Enhancement Course–II	U25SEMA32	Statistics with Excel	2	1	1	-	-	2	3	25	75	100
		Skill Enhancement Course–III	U25SEMA33	Data Analysis using MATLAB	2	1	1	-	-	2	3	25	75	100
	V	Special Course	25UGSC	Health & wellness	2	-	-	2	-	1	-	-	-	-
				TOTAL	**30**	**21**	**6**	**3**		**21**	-	-	-	**700**
IV	I	Language Course-IV	U25LC404	Pothutamil- 4 Tamilum Ariviyalum	6	5	1	-	-	3	3	25	75	100
	II	English Language Course-IV	U25ELC404	General English-IV	6	5	1	-	-	3	3	25	75	100
	III	Core Course-VII	U25MA407	Industry Module-Industrial Statistics	4	3	1	-	-	4	3	25	75	100
		Core Course-VIII	U25MA408	Elements of Mathematical Analysis	5	4	1	-	-	5	3	25	75	100
		Allied Practical-II	U25ACS302P	Office Automation Lab	2	1	-	1	-	2	3	25	75	100
		Allied Course-IV	U25ACS403	Fundamentals of C Programming	3	2	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	
IV	IV	Skill Enhancement Course–IV	U25SEMA44	Bio Statistics	2	1	1	-	-	2	3	25	75	100
		Skill Enhancement Course–V	U25SEMA45	Bio Mathematics	2	1	1	-	-	2	3	25	75	100
				TOTAL	**30**	**21**	**7**	**2**	**-**	**23**	-	-	-	**800**
V	III	Core Course -IX		Abstract Algebra	5	4	1	-	-	5	3	25	75	100
		Core Course–X		Real Analysis	5	3	1	-	1	5	3	25	75	100
		Core Course-XI		Mathematical Modelling	5	4	1	-	-	4	3	25	75	100
		Core Course-XII		Mechanics	5	4	1	-	-	4	3	25	75	100
		Elective Course–I		Numerical Methods with Applications/Introduction to Actuarial Science/Elements of Space	4	3	1		-	3	3	25	75	100
		Elective Course–II		Operations Research /Combinatorial Mathematics/ Computational Geometry	4	3	1	-	-	3	3	25	75	100
	IV	Environmental Studies		Environmental Studies	2	1	-	-	1	2	3	25	75	100
		Internship/Industrial visit/Field visit		Internship/Industrial visit/ Field visit	-	-	-	-	-	2	-			
			TOTAL		**30**	**22**	**6**	**-**	**2**	**28**				**700**
VI	III	Core Course -XIII		Linear Algebra	6	4	1	-	1	4	3	25	75	100
		Core Course -XIV		Complex Analysis	6	4	1	-	1	4	3	25	75	100
		Core Project		Research Methods and Project with viva-voce/Group Project	5	-	1	4	-	5	3	25	75	100
		Elective Course-III		Astronomy/Integral Transforms & Z Transforms / Statistics with R	4	3	1		-	3	3	25	75	100
		Elective Course-IV		Graph Theory and Applications /Algorithms/Set Theory	4	3	1	-	-	3	3	25	75	100
	IV	Value Education		Value Education	2	1	-	-	1	2	3	25	75	100
		Professional Competency Course		Aptitude and Reasoning Skills for Competitive Examinations	2		1	-	1	2	3	25	75	100
	V	Gender Studies		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**	**121**	**39**	**14**	**6**	**141**	-	-	-	**4500**
		*Extra Credit		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		AP (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 Course	1	02
15		Special Course	1	01
16	V	Extension Activity	1	01
17		Gender Studies	1	01
Total			48	141

Semester	Part	Course	Course Code	Title of The Paper
I	IV	NME-I	U25NMEMA11	Financial Mathematics I
II	IV	NME-II	U25NMEMA22	Financial Mathematics II

SEMESTER III

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI-614 016.

(For the Candidates admitted in the academic year 2025–2026)

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: III – CC - V: VECTOR CALCULUS AND ITS APPLICATIONS

Ins. Hrs./Week:4 **Course Credit**:4 **Course Code**:**U25MA305**

UNIT-I: Scalar and a Vector point functions (12 Hours)

Vector point function - Scalar point function - Derivative of a vector and derivative of a sum ofvectors - Derivative of a product of a scalar and a vector point function - Derivative of a scalarproduct and vector product.

UNIT–II: Divergence and Curl (12 Hours)

The vector operator „del", The gradient of a scalar point function - Divergence of a vector - Curl of a vector - solenoidal and irrotational vectors – simple applications.

UNIT–III: Vector identities (12 Hours)

Laplacian operator, Vector identities - Line integral - simple problems.

UNIT-IV: Applications of Vector Integration (12 Hours)

Surface integral - Volume integral – Applications

UNIT–V: Theorems of Vector Calculus (12 Hours)

Gauss divergence Theorem, Stoke"s Theorem, Green"s Theorem in two dimensions – Applications to real life situations.

Total Lecture Hours-60

COURSE OUTCOME

The students should be able to

1. Find the derivative of vector and sum of vectors, product of scalar and vector point function and to determine derivatives of scalar and vector products.
2. Applications of the operator „del" and to Explain soleonidal and ir-rotational vectors.
3. Solve simple line integrals.
4. Solve surface integrals and volume integrals.
5. Verify the theorems of Gauss, Stoke"s and Green"s (Two Dimension).

TEXT BOOK

1. Khanna. M.L. 2008-2009, "Vector Calculus", 15th Edition. Jai Prakash Nath &Co. Meerut.

UNIT I: Chapter 1 – Sections 1, 2.
Chapter 2 – Section 1 (1, 2).
UNIT II: Chapter 2 – Sections 2, 4, 7, 12.
UNIT III: Chapter 2 – Sections 9, 11 (I to VI).
Chapter 3 – Section 1 (Up to Page 122).
UNIT IV: Chapter 3 – Sections 2 to 4.
UNIT V: Chapter 3 – Sections 5 to 8.

REFERENCE BOOK(S)

1. Susan. J.C., 2022, "Vector Calculus", (5th Edn.), Pearson Education, Boston.
2. Gorguis. A., 2015, "Vector Calculus for College Students", 3rd Ed., Xilbius Corporation.
3. Marsden. J. E. and Tromba. A., 2012, "Vector Calculus", (6thedn.),W.H. Freeman,New York.
4. Steven G. Krantz & Harold R. Parks, 2024, "Vector Calculus (Textbooks in Mathematics Series)", Chapman and Hall/CRC
5. John H. Hubbard & Barbara Burke Hubbard, 2015, "Vector Calculus, Linear Algebra, and Differential Forms: A Unified Approach", 5th Ed., Matrix Editions.

E-RESOURCES

1. www.whitman.edu
2. www.ppup.ac.in
3. http://ppup.ac.in/e-Content/_edetails.php?id=682
4. https://nptel.ac.in

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	2	3	2	1	1	1	1	1	3	3	3	2	1
CLO2	2	2	3	1	1	3	1	2	1	2	3	3	2
CLO3	2	3	3	2	2	1	2	2	2	3	3	1	1
CLO4	2	2	3	2	3	3	1	2	3	2	3	2	1
CLO5	3	2	2	3	3	3	1	2	3	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 2025 – 2026)

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: III -CC-VI: Differential Equations and Applications

Ins. Hrs./Week: 4 **Course Credit**: 4 **Course Code**: **U25MA306**

UNIT-I: **(12 Hours)**

Differential Equations: Variable separable – Homogeneous Equation – Non-Homogeneous Equations of first degree in two variables – Linear Equation – Bernoulli‟s Equation – Exact differential equations.

UNIT-II: **(12 Hours)**

Equation of first order but not of higher degree: Equation solvable for dy/dx – Equation solvable for y-Equation solvable for x – Clairauts‟ form – Linear Equations with constant coefficients-Particular integrals of algebraic, exponential, trigonometric functions and their products.

UNIT-III: **(12 Hours)**

Linear Equations of the Second Order – Complete solution in terms of a known integrals – Reductionto the Normal form – Change of the Independent Variable – Method of Variation of Parameters.

UNIT-IV: **(12 Hours)**

Partial differential equation: Formation of PDE by Eliminating arbitrary constants and arbitrary functions – complete integral – singular integral-General integral-Lagrange‟s Linear Equations – Simple Applications.

UNIT-V: **(12 Hours)**

Special methods – Standard forms – Charpit‟s Methods – Simple Applications.

Total Lecture Hours - 60

COURSE OUTCOME

The students will be able to

1. Determine solutions of homogeneous equations, non-homogeneous equations of degree one in two variables, solve Bernoulli‟s equations and exact differential equations.
2. Find the solutions of equations of first order but not of higher degree and to Determine Particular integrals of algebraic, exponential, trigonometric functions and their products.
3. Find solutions of simultaneous linear differential equations, linear equations of second order and to find solutions using the method of variations of parameters.

4. Form a PDE by eliminating arbitrary constants and arbitrary functions, find complete, Singular and general integrals, to solve Lagrange‟s equations.
5. Explain standard forms and Solve Differential equations using Charpit‟s method.

TEXT BOOKS

1. Raisinghania M. D., 2013, "Ordinary and Partial Differential Equations", 15th Ed., S. Chand & Company Ltd, New Delhi.

UNIT I Chapter 2 : Sections 2.1 to 2.4, 2.8 to 2.14 (Part I)

UNIT II Chapter 7: Sections 7.3 to 7.7, 7.9 to 7.10 (Part I)
Chapter 4: Sections 4.2, 4.6 to 4.19 (Part I)
UNIT III Chapter 4 : Full. (Part II)
UNIT IV Chapter 1: Sections 1.1 to 1.5 (Part III)
Chapter 2: Sections 2.1 (Part III)
UNIT V Chapter 2: Sections 2.2 to 2.7. (Part III)

REFERENCE BOOK(S)

1. Sneddon, 2006, "Elements of Partial Differential Equations", Dover Publications Inc.
2. Simmons .G.F., 2017, "Differential equations with applications and historical notes", 3rd Ed, CRC Press.
3. Murray. D.A., "Introductory course in Differential Equations", Orient and Longman.
4. Braun, M. 1983, "Differential Equations and their Applications", (4 Edn.), Springer- Verlag, New York.
5. Tyn Myint-U and Lognath Debnath., 2007, "Linear Partial Differential Equations for Scientists and Engineers", (4th Edn.) Birhauser, Berlin.

E-RESOURCES

1. https://www.britannica.com/science/differential-equation
2. https://www.youtube.com/watch?v=oZZNhUCs0CA
3. https://byjus.com/maths/second-order-linear-differential-equations-variable-coefficients/
4. https://www.sciencedirect.com/topics/mathematics/partial-differential-equation#:~:text=A%20partial%20differential%20equation%20is%20an%20equation%20containing%20an%20unknown,of%20the%20highest%2Dorder%20derivatives.

Course Learning Outcome (for Mapping with POs and PSOs)

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

Strong: 3 Medium: 2 Low:1

Semester: III - ALLIED COURSE-III: Introduction to Computer and Office Automation

Ins. Hrs. /Week: 2 **Course Credit:2** **Course Code: U25ACS301**

UNIT- I: Fundamentals of computer (8 Hours)

Introduction - Characteristics of Computers - Evolution Of Computers - **Generation of computers**: First Generation-Second Generation-Third Generation-Fourth Generation-Fifth Generation-Types of computers and its features – Applications of computer - Functional Components of a computer.

UNIT –II: Hardware and Software (8 Hours)

Block diagram of computer - **Hardware and its Types:** Input and Output devices- Different type of printers - Memory and storage devices-Classification of Storage Device-Characteristics of Storage devices -Different ports and its uses – **Software and its classification**: Application Software-System Software **- Networks** : LAN- WAN - Client-Server.

UNIT- III: Word Processing (10 Hours)

Typing- Editing- Proofing & Reviewing- Formatting Text & Paragraphs Automatic Formatting and Styles - Working with Tables - Tables – Columns – Labels - Plotting, editing and Filling drawing objects Bookmark – Header & Footer - Graphics and Frames - Mail Merge – Formatted output and Report generation Printing Documents-Working with Internet.

UNIT- IV: Excel Spreadsheet (10 Hours)

Designing a Work Sheet and Work Books-Working & Editing in Workbooks-Applying Formulas-Compute sums, averages, min, max, percentages - Creating Formats & Links –Apply Conditional Formatting- Formatting a Worksheet & creating graphic objects - Creating Charts (Graphs) - Formattingand analyzing data - Organizing Data in a List Sharing & Importing Data - Printing.

UNIT- V: PowerPoint Presentations (9 Hours)

Getting started in PowerPoint- Create a new presentation-Modify presentation themes-Add and edit text to slides-Add new slides to a presentation.–Designing slides- Insert clipart images and shapes to slides-Insert and modify tables and charts- Previewing a slide show - Adding picture & graph - Addingsound & video - Adding auto shape – Animating objects.

Total Lecture Hours-45

COURSE OUTCOME

Upon successful completion of this course, students will be able to

1. Understand the basics of computers
2. Create documents using MS Word
3. Work with tables, graphs in MS-Office
4. Gain practical exposure on spread sheet
5. Operate with MS-office Power point

TEXT BOOKS

1. Michael Miller 2010, Absolute Beginner"s Guide to Computer Basics, 5th Edition Prentice Hall, United States.
2. Ram . B and Sanjay Kumar 2018, Computer Fundamentals: Architecture and Organization, 6th Edition New Age International Publisher, New Delhi.

REFERENCE BOOKS

1. Deborah Hinkle 2003, Microsoft Office 2003 PowerPoint: A Professional Approach, comprehensive w/ Student CD, McGraw-Hill/Irwin- New Delhi.
2. Nellai Kannan .C 2002, MS-Office, Nels Publications, Tamil Nadu.
3. Pasewark / Pasewark, Robin Romer.M, Jessica Evans , Katherine Pinard.T , Rachel Biheller Bunin 2010, Microsoft Office 2010: Introductory -1st Edition Published by Cengage Learning, India.

E-RESOURCES

1. https://ptgmedia.pearsoncmg.com/images/9780735623026/samplepages/ 9780735623026.pdf
2. https://www.dit.ie/media/ittraining/msoffice/MOAC_Excel_2016_Core.pdf
3. https://ptgmedia.pearsoncmg.com/images/9780735697799/samplepages /9780735697799.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	2	3	2	2	2	2	3	1	3	3	2	2	1
CLO2	2	3	3	3	2	2	2	3	2	1	3	2	1
CLO3	3	3	2	3	3	2	1	2	3	2	3	1	1
CLO4	2	3	3	2	3	2	2	2	3	2	3	2	1
CLO5	3	3	2	3	2	2	2	2	3	1	3	2	1

Strong: 3 Medium: 2 Low:1

Semester: III & IV - ALLIED PRACTICAL-II: Office Automation Lab

Ins. Hrs. /Week: 2 **Course Credit: 2** **Course Code: U25ACS302P**

I. MS-WORD

1. Text Manipulation: Write a paragraph about your institution and Change the font size and type, Spell check, Aligning and justification of Text
2. Bio data: Prepare a Bio-data.
3. Find and Replace: Write a paragraph about yourself and do the following. Find and Replace - Use Numbering Bullets, Footer and Headers.
4. Tables and manipulation: Creation, Insertion, Deletion (Columns and Rows). Create a mark sheet.
5. Mail Merge: Prepare an invitation to invite your friends to your birthday party. Prepare minimum five letters.

II. MS-EXCEL

1. Data sorting-Ascending and Descending (both numbers and alphabets)
2. Mark list preparation for a student
3. Individual Pay Bill preparation.
4. Invoice Report preparation.
5. Drawing Graphs. Take your own table.

III. MS-POWERPOINT

1. Create a slide show presentation for a seminar.
2. Preparation of Organization Charts
3. Create a slide show presentation to displaypercentage of marks in each semester for all students
   a) Use bar chart (X-axis: Semester, Y-axis: % marks).
   b) Use different presentation template different transition effect for each slide.

COURSE OUTCOME

Upon successful completion of this course, students will be able to

1. Exhibit improved understanding of computer operations
2. Create professional word documents
3. Design the excel spread sheets
4. Draw charts and graphs
5. Design their own power point presentations

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	2	2	2	3	1	3	3	2	2	3
CLO2	2	3	3	3	2	1	2	3	1	1	3	2	2
CLO3	3	3	3	2	3	2	1	2	3	2	3	3	2
CLO4	2	3	3	2	3	2	2	2	3	2	3	2	1
CLO5	3	3	2	3	2	1	3	2	3	1	3	2	2

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 2025–2026)

DEPARTMENTOF MATHEMATICS

B.Sc., MATHEMATICS

Semester: III- SEC- II: Statistics With Excel

Ins.Hrs./Week:2 **Course Credit**: 2 **Course Code**:**U25SEMA32**

UNIT-I: Introduction to Statistics and Excel (6 Hours)

Meaning and scope of Statistics – Types of data – Collection and classification of data – Tabulation Frequency distribution – Introduction to Microsoft Excel – Entering and formatting data – Basic Excel formulas and functions.

UNIT-II: Measures of Central Tendency using Excel (6 Hours)

Arithmetic Mean, Median and Mode – Combined mean – Weighted mean – Computation of statistical measures using Excel functions – Preparation of tables and charts in Excel.

UNIT-III: Measures of Dispersion and Correlation (6 Hours)

Range – Quartile deviation – Mean deviation – Standard deviation – Coefficient of variation – Introduction to correlation – Scatter diagram – Karl Pearson's correlation coefficient – Excel applications for dispersion and correlation.

UNIT – IV: Graphical Representation and Data Analysis (6 Hours)

Bar diagram – Pie chart – Histogram – Frequency polygon – Ogive curves – Line graphs – Data visualization using Excel charts – Interpretation of statistical graphs.

UNIT – V: Probability and Regression using Excel (6 Hours)

Probability Distribution-Equation for Regression-Regression Lines-Regression Analysis using Excel

Total Lecture Hours- 30

COURSE OUTCOMES

The Students will be able to:

1. Organize and present statistical data systematically.
2. Compute statistical measures using Excel functions.
3. Analyze dispersion and correlation in datasets.
4. Create statistical charts and graphical representations in Excel.
5. Apply probability and regression techniques using Excel tools.

TEXT BOOK(S)

Gupta.S.P. *Statistical Methods*, 46 th Edition, Sultan Chand & Sons.

UNIT I : Chapter 1 & Chapter 6
UNIT II : Chapter 9
UNIT III : Chapter 10 & Chapter 12
UNIT IV : Chapter 8
UNIT V : Chapter 13 & Chapter 18

REFERENCE BOOK(S) :

1. Liu, C.L, 2017. Elements of Statistics, 4th Edition, McGraw-Hill.
2. K.D Joshi. 2023. Foundations of Statistics,3rd Edition, New Age International Private

Limited.
3. Kapur.J.N. and Saxena.H.C. 2005, Mathematical Statistics, S.Chand Publishing.
4. Sharma.J.K, 2017, Business Statistics, Pearson Education India Limited.
5. Gupta S.C. and V.K. Kapoor, 2020, 12 th Edition, Fundamentals of Applied Statistics,Sultan Chand & Sons Ltd.

E-RESOURCES

1. https://www.freebookcentre.net/Mathematics/Discrete Mathematics-Books-Download.html
2. https://www.cs.yale.edu/homes/aspnes/classes/202/notes
3. https://www.cs.yale.edu/homes/aspnes/statistics/202/notes
4. https://www.cs.yale.edu/business statistics/notes
5. https://www.maths.edu/basic concepts/excel

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	1	3	2	3	3	3	1	2	3	3	2	1
CLO2	2	1	3	1	3	3	2	3	1	1	3	2	1
CLO3	3	2	3	1	3	3	1	2	3	2	3	2	1
CLO4	1	2	3	2	3	3	1	2	3	2	3	2	1
CLO5	3	1	2	3	3	3	1	2	3	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 2025 – 2026)

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: III -SEC- III: **Data Analysis Using MATLAB**

Ins. Hrs./Week: 2 **Course Credit**: 2 **Course Code**:U25SEMA33

UNIT-I : **(6 Hours)**

MATLAB ENVIRONMENT - Getting Started- Student Edition of MATLAB -MATLAB Windows

UNIT-II : **(6 Hours)**

Solving Problems in MATLAB - Variables - Working with Matrices - Number Display

UNIT-III : **(6 Hours)**

Saving Your Work - Saving Variables - Script M-Files

UNIT-IV : **(6 Hours)**

Predefined MATLAB Functions - Using the Help Feature - Elementary Math Functions - Trigonometric Functions - Data Analysis Functions -Random Numbers

UNIT-V: **(6 Hours)**

Manipulating Matrices - Defining Matrices - Using the Colon Operator - Computational Limitations - Special Values and Functions

Total Lecture Hours- 30

COURSE OUTCOME

The students should be able to

1. Understand the MATLAB environment and basic commands for scientific computation.
2. Apply MATLAB tools to solve mathematical and matrix-based problems.
3. Create and execute script files for data processing and computation.
4. Utilize built-in MATLAB functions for mathematical and data analysis applications.
5. Perform matrix manipulations and analyze computational techniques using MATLAB.

TEXT BOOKS

1. Delores M. Etter. David C. Kuncicy & Holly Moore. 2005,
   Introduction to MATLAB 7 (II Edition),Dorling Kindersley (India) Pvt. Ltd.,
   UNIT I : Chapter 2: Sections 2.1(2.1.1 & 2.1.2)

UNIT II : Chapter 2: Section 2.2 (2.2.1, 2.2.2 &2.2.3)
UNIT III : Chapter 2: Sections 2.3(2.3.1 & 2.3.2)
UNIT IV : Chapter 3 : Sections 3.1 (3.1.1, 3.1.2, 3.1.3, 3.1.4 & 3.1.5)
UNIT V : Chapter 3 : Sections 3.2(3.2.1 & 3.2.2) to 3.4

REFERENCE BOOK(S)

1. Amos Gilat, 2017, (VI Edition), MATLAB: An Introduction with Applications, Wiley India.
2. Delores M. Etter, 2005, (II Edition), Programming and Problem Solving with MATLAB, Pearson Education.
3. Holly Moore, 2018, (V Edition), MATLAB for Engineers, Pearson Education.
4. Rudra Pratap, 2010, Getting Started with MATLAB, Oxford University Press, New Delhi.
5. Steven C. Chapra, 2018, Applied Numerical Methods with MATLAB, McGraw Hill Education.Bottom of Form

E-RESOURCES

1. MATLAB Official Documentation
2. MATLAB Online Courses – MathWorks Academy
3. NPTEL MATLAB Programming Course
4. MIT OpenCourseWare – MATLAB Tutorials
5. MATLAB Central File Exchange

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	1	3	2	3	3	3	1	2	3	3	2	1
CLO2	2	1	3	1	3	3	2	3	1	1	3	2	1
CLO3	3	2	3	1	3	3	1	2	3	2	3	2	1
CLO4	1	2	3	2	3	3	1	2	3	2	3	2	1
CLO5	3	1	2	3	3	3	1	2	3	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 from the academic year 2025 -2026)
DEPARTMENT OF MATHEMATICS

Semester: III – Special Course – Health & Wellness

Ins.Hrs. / Week: 2 **Course Credit: 1** **Course Code: 25UGSC**

UNIT I Introduction to Holistic Well – being:

1. Introduce the core components of Health & Well – being namely Physical, mental and emotional well – being.

2. Provide worksheets on all the four components individually and explain the interconnectedness to give an overall understanding.

UNIT II Wellness Wheel Exercise (Overall Analysis)

Guide students to assess their well – being in various life dimensions through exercises on various aspects of well – being and explain the benefits of applying wellness wheel.

Introduce Tech Tools.

Explore the use of technology to support well – being.

Introduce students to apps for meditation, sleep, tracking or health recipe inspiration.

UNIT III Breaking Bad Habits (Overall Analysis)

- Open a discussion on bad habits and their harmful effects.
- Provide a worksheet to the students to identify their personal bad habits.
- Discuss the trigger, cause, consequence and solution with examples.
- Guide them to replace the bad habits with good ones through worksheets.

UNIT IV Physical Well – being

1. Fitness

Introduce the different types of fitness activities such as basic exercises, cardiovascular exercises, Strength training exercises, flexibility exercise, so on and so forth. (Include theoretical explanations and outdoor activity)

2. Nutrition

Facilitate students to reflect on their eating habits, their body type, and to test their knowledge on nutrition, its sources and the benefits.

3. Yoga & Meditation

Discuss the benefits of yoga and Meditation for one"s overall health.

Demonstrate different yoga postures and their benefits on the body through visual(Picture or videos)

4. Brain Health

Discuss the importance of brain health for daily life.

Habits that help for brain health(irregular sleep, eating, screen time).

Benefits of breathing exercises and meditation for healthy Lungs.

5. Healthy Lungs

Discuss the importance of lung health for daily life.

Habits that help for lung health(Smoking, lack of exercises)

Benefits of breathing exercises for healthy Lungs.

6. Hygiene and Grooming

Discuss the importance of hygienic habits for good oral, vision, hearing and skin health.

Discuss the positive effects of grooming on one‟s confidence level and professional growth.

Suggested Activities (sample):

Nutrition

Invite a nutritionist to talk among the students on the importance of nutrition to the body or Show similar videos shared by experts on social media. Organize a „Stove less/ fireless cooking competition‟ for students where they are expected to prepare a nutritious dish and explain the nutritive values in parallel.

UNIT V Emotional Well -being

1. Stress Management

Trigger a conversation or provide self-reflective worksheets to identify the stress factors in daily life and their impact on students‟ performance.

Introduce different relaxation techniques like deep breathing, progressive muscle relaxation or guided Imagery. (use audio recordings visuals to guide them through these techniques).

After practicing the techniques, have them reflect on how these methods can help manage stress in daily life.

2. Importance of saying 'NO'

Explain the students that saying „NO‟ is important for their physical and mental well-being, Academic Performance, Growth and Future, Confidence, Self – respect, Strong and Healthy Relationships, building Reputation for self and their family(avoid earning a bad name).

Factors that prevent them from saying „NO‟

3. Body Positivity and self – acceptance

Discuss the following with the students.

- What is body positivity and self – acceptance?
- What is it important?
- Be kind to yourself.
- Understand that everyone‟s unique.

Suggested Activities(Sample)

(Importance of saying „NO".

Provide workshees to self – reflect on….

How they feel when they should say „no" to them

The situations where they should say „no"

Challenge students to write a song or rap about the importance of saying no and how to do it effectively.

Students can perform their creations for the class.

UNIT VI Social Well – Being

1. **Practicing Gratitude**

Discuss the importance of practicing gratitude for building relationships with family, friends, relatives, mentors and colleagues. Discuss how one can show gratitude through words and deeds.

Explain how practicing gratitude can create „ripple effect".

2. **Cultivating kindness and compassion.**

Define and differentiate between kindness and compassion. Explore practices that cultivate these positive emotions. Self – Compassion as the Foundation. The power of small gestures.

Understanding another"s perspective. The fruits of Compassion.

3. **Practising Forgiveness**

Discuss the concept of forgiveness and its benefits. Forgiveness: What is it? And What it isn"t? Benefits of forgiveness. Finding forgiven practices.

4. **Celebrating Differences**

Appreciate the value of individual differences and foster inclusivity. The world: A Tapestry of Differences (Cultures, backgrounds, beliefs, abilities and appearances). Finding strength in differences (diverse perspectives and experiences lead to better problem solving and innovation). Celebrating differences, not ignoring them (respecting and appreciating the unique qualities). Activities for celebrating differences (share culture, learn about others, embrace new experiences).

5. **Digital Detox**

Introduce the students to:

The concept of a digital detox and its benefits for social well-being. How to disconnect from devices more often to strengthen real – world connections.

Suggested Activities (Sample)

Practicing Gratitude)

Provide worksheets to choose the right ways to express gratitude. Celebrate „gratitude day" in the college and encourage the students to honour the house keeping staff in some way to express gratitude for their service

UNIT VII Intellectual Well – being

1. Being a lifelong Learner

Give students an understanding on:

The relevance of intellectual well – being in this 21 st century to meet the expectations in personal and professional well – being. The importance of enhancing problem solving skills. Cultivating habits to enhance the intellectual well-being (using the library extensively, participating in extra – curricular activities, reading newspapaer etc.)

2. Digital Literacy

Discuss:

The key aspects of digital literacy and its importance in today‟s world. It is more than just liking and sharing on social media. The four major components of digital literacy (critical thinking, communication, problem – solving, digital citizenship). Why is digitalmliteracy important? Boosting one‟s digital skills.

3. Transfer of Learning

Connections between different subjects – How knowledge gained in one area can be applied to others.

Suggested Activities (Sample)

Intellectual well – being. Provide worksheet to students for teaching them how to boost intellectual well – being. Ask the students to identify long – standing problem in their locality and come up with a solution and present it in the classroom. Also organize an event like idea Expo‟ to display the designs, ideas and suggestions, to motivate the students to improve their intellectual well – being.

UNIT VIII Environmental Well - being

1. The importance of initiating a change in the environment.

The Session could be around:

Defining Environmental well – being (physical, chemical, biological, social and psychosocial factors) – people‟s behavior, crime, pollution, political activities, infra – structure, family situation etc.

Suggesting different ways of initiating changes in the environment (taking responsibility, creating awareness, volunteering, approaching administration).

Suggested Activities (sample):

Providing worksheets to self – reflect on how the environment affects their life and the ways to initiate a change. Dedicate a bulletin board or wall space (or chart work) in the classroom for students to share their ideas for improving environmental well – being. Creating a volunteers club in the college and carrying out monthly activities like campus cleaning, awareness campaigns against noise pollution, (loud speakers in public places), addressing antisocial behavior on the campus or in their locality.

UNIT IX Mental Well – being

1. Importance of self – reflection

Discuss

Steps involved in achieving mental well – being (self – reflection, self – awareness, applying actions, achieving mental well – being). Different ways to achieve mental well – being (finding purpose, coping with stress, moral compass, connecting for a common cause). The role of journaling in mental well-being.

2. Mindfulness and Meditation Practices

Benefits of practicing mindful habits and meditation for overall well – being.

1. Connection with nature

Practicing to be in the present moment – Nature walk, feeling the sun, listening to the natural sounds.

Exploring with intention – Hiking, gardening to observe the nature. Reflecting on the emotions and feeling kindled by nature.

2. Serving people

Identifying the needs of others. Helping others. Volunteering your time, skills and listening ear. Finding joy in giving.

3. Creative Expressions

Indulging in writing poems, stories, music making / listening, creating visual arts to connect with inner selves.

Suggested Activities (Sample) :

(Mindfulness and Mediation) – Conducting guided mediation everydayfor 10 minutes and directing the students to record the changes they observe.

UNIT X Situational Awareness (Developing Life Skills)

1. Being Street smart

Discuss:

Who are street smarts?

Whyis it important to be street smart?

Characteristics of a street smart person: Importance of acquiring life skills to become street smart – (General First – aid procedure, CPR procedure, Handling emergency situations like fire, flood etc).

2. Digital Awareness

Discuss:

Cyber Security. Information Literacy. Digital Privacy, Fraud Detection.

Suggested Activities (Sample)

(Street Smart) Inviting professionals to demonstrate the CPR procedure. Conducting a quiz on Emergency Numbers.

UNIT XI Understanding Addiction

Plan this session around:

Identifying the environmental cues, triggers that lead to picking up this habit. Knowing the impact of substance abuse – Adverse health conditions, social isolation, ruined future, hidden financial loss and damaging the family reputation. Seeking help to get out of this addiction.

Suggested Activities:

Provide Worksheets to check the student"s level of understanding about substance addiction and their impacts. Share case studies with students from real – life. Play / share awareness videos on addiction / de – addiction, experts talk.

Conduct awareness programmes on Drugs and its ill effects. (Arrange Experts from the concerned government departments and NGOs working in drug addiction issues) and maintain the documents of the program.

Assessments:

- Use Self – reflective worksheets to assess their understanding.
- Submit the worksheets to internal audit / external audit.
- Every student"s activities report should be documented and the same have to be assessed by the physical Director with the mentor. The evaluation should be for 100 marks. No examination is required.

References / Resource Materials :

The Course acknowledge that individual needs for references and resources may vary. However, here are some general reference materials and resources that may be helpful.

1. The Well – Being Wheel:

2. Facilities & Spaces :

Some activities may require access to specific facilities, resources or space. Students mayneed to coordinate with the college administration to reserve these are required.

3. Online Resources :

1. United Nations Sustainable Development Goals – Goal 3 – Good Health & Well – Being :

https://www.un.org/sustainabledevelopment/health/

2. Mindfulness and Meditation : Stanford Health Library offers mindfulness and meditation resources : https://healthlibrary.stanford.edu/books-resources/mindfulness-meditation.html
3. Breaking Bad Habits: James Clear provides a guide on how to build good habits and break bad ones: https://jamesclear.com/habits
4. 6 ways to keep Your Brain Sharp
   https://www.lorman.com/blog/post/hou-to-keep-your-brain-sharp
5. What is Social Wellbeing? 12+ Activities for Social Wellness
   https://positivepsychology.com/social-wellbeing/
6. How does Your Environment Affect Your Mental Health?
   https://www.Verywellmind.com/how-your-environment-affects-your-mental-health-5093687
7. How to sayno to others (and why you shouldn‟t feel guilty)
   https://www.betterup.com/blog/how-to-say-no

COURSE OUTCOMES

Upon completion of the Health & Wellness course, students will be able to:

- Demonstrate proficiency in sports training and physical fitness practices.
- Improve their mental and emotional well-being, fostering a positive outlook on health and life
- Develop competence and commitment as professionals in the field of health and wellness.
- Awareness on drug addiction and its ill effects.

SEMESTER IV

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2025– 2026)

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: IV-CC-VII: INDUSTRY MODULE-INDUSTRIAL STATISTICS

Ins. Hrs./Week:4 **Course Credit:4** **Course Code: U25MA407**

UNIT -I: SCOPE AND DEFINITION OF STATISTICS (12 Hours)

Definition and scope of statistics – Limitations of statistics – Distrust of statistics – Role of Computers in solving Statistics problems – Frequency distributions – Graphic representation of a frequency distribution – Histogram – Frequency Polygon.

UNIT-II: STATISTICAL METHODS (12 Hours)

Arithmetic mean – Properties of arithmetic mean – Merits and Demerits – Weighted mean – Median-Median for continuous Frequency Distribution – Merits and demerits of median – Mode – Mode for continuous Frequency distribution.

UNIT–III: CORRELATION (12 Hours)

Introduction – Meaning of Correlation-Scatter diagram – Karl Pearson‟s coefficient of correlation – Rankcorrelation – Spearman‟s rank correlation coefficient.

UNIT-IV: MOMENT GENERATING FUNCTION (12 Hours)

Moment generating function – Some limitations of Moment generating function – Properties of MGF – Cumulants – Characteristic function – Multivariate Characteristic function – Multivariate Moment Generating function.

UNIT-V: DISTRIBUTION FUNCTION (12 Hours)

Random variables – Definition – Properties of Distribution function – Discrete random variable – Probability Mass function – Discrete Distribution function – Probability Density function – Continuous Distribution Function.

Total Lecture Hours –60

COURSE OUTCOME

The students should be able to

1. Explain in detail about distribution function and correlation coefficients.
2. Explain the skewness and kurtosis.
3. Explain the histogram.
4. Classify the scatter disgram and its uses.
5. To know about discrete and continuous function.

TEXT BOOKS

1. Gupta.S.C. and Kapoor.V.K., 2020, "Fundamentals of Mathematical Statistics", 12th Ed., Sultan Chand & Sons, New Delhi.

UNIT- I Chapter 1 : Sec 1.1 to 1.6 and
Chapter 2 : Sec 2.1 to 2.3

UNIT – II Chapter 2 : Sec 2.5 to 2.7, 2.7.1(only).

UNIT - III Chapter 10 : Sec 10.1 to 10.4.2,10.7 to 10.7.1.

UNIT - IV Chapter 7 : Sec 7.1 to 7.3.

UNIT - V Chapter 5 : Sec 5.1 to 5.4 (5.4.1, 5.4.3).

REFERENCE BOOK(S)

1. Lehmann, E. L., and George Casella, 1998, "Theory of Point Estimation", second edition, Springer.
2. Lehmann, E. L., and Joseph P. Romano, 2022, "Testing Statistical Hypotheses", 5th edition, Springer.
3. Stuart, A. and Ord, J. K., 2010, "*Kendall's Advanced Theory of Statistics*", 6th ed., John Wiley & Sons,Inc., New York.
4. Schervish, Mark J., 1995, "Theory of Statistics", 1 Ed., Springer.
5. Kapur J. N., 2010, "Mathematical Statistics", S. Chand & Co. Ltd., New Delhi.

E-RESOURCES

1. https://www.investopedia.com/terms/r/random-variable.asp
2. https://en.wikipedia.org/wiki/Moment-generating_function
3. https://asq.org/quality-resources/scatter-diagram

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	3	2	2	3	3	1	3	3	2	2	2
CLO2	2	2	3	2	2	2	3	3	1	1	3	2	3
CLO3	3	2	3	3	3	1	2	2	3	2	3	3	1
CLO4	2	2	3	2	2	3	1	2	3	2	3	2	3
CLO5	3	3	2	3	1	3	2	2	3	1	3	2	3

Strong: 3 Medium: 2 Low:1

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DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: IV-CC-VIII: ELEMENTS OF MATHEMATICAL ANALYSIS

Ins. Hrs./Week:5 **Course Credit**:5 **Course Code**: **U25MA408**

UNIT -I: Sets and Functions **(15 Hours)**

Sets and elements- Operations on sets- functions- real valued functions- equivalence-countability- real numbers- least upper bounds.

UNIT –II: Sequences of Real Numbers **(15 Hours)**

Definition of a sequence and subsequence-limit of a sequence – convergent sequences–divergent sequences- bounded sequences-monotone sequences.

UNIT–III: Operations on Sequences **(15 Hours)**

Operations on convergent sequences – operations on divergent sequences – limit superior and limit inferior-Cauchy sequences.

UNIT-IV: Series of Real Numbers **(15 Hours)**

Convergence and divergence – series with non – negative terms-alternating series-conditional convergence and absolute convergence- tests for absolute convergence.

UNIT-V: Limits and Metric Spaces **(15 Hours)**

Limit of a function on a real line - Metric spaces - Limits in metric spaces – Continuous Functions on Metric Spaces: Function continuous at a point on there a line-Function continuous on a metric space.

Total Lecture Hours –75

COURSE OUTCOME

The students should be able to

1. Explain in detail about sets and functions, equivalence and countability and the LUB axiom.
2. Explain Sequence and Subsequence of real numbers and to find the limit of sequence to test for convergent, divergent, bounded and monotone sequences.
3. Explain the operations on convergent and divergent sequences and to explain the concepts of limit superior and limit inferior and the notion of Cauchy sequences.
4. Classify the series of real numbers and the alternating series and their convergence and divergence, the conditional convergence and absolute convergence.
5. Explain about the metric spaces and functions continuous on a Metric space.

TEXT BOOK

1. Richard R.Goldberg, 2019, "Methods of Real Analysis", Oxford & IBH Publishing, New Delhi.

UNIT- I Chapter 1 : Sec 1.1 to 1.7
UNIT – II Chapter 2 : Sec 2.1 to 2.6
UNIT – III Chapter 2 : Sec 2.7 to 2.10
UNIT -IV Chapter 3 : Sec 3.1 to3.4,3.6
UNIT - V Chapter 4 : Sec 4.1 to 4.3
Chapter 5 : Sec 5.1, 5.3

REFERENCEBOOK(S)

1. Apostol T. M., 2002, "Calculus (Vol. I)", John Wiley and Sons (Asia) P. Ltd.
2. Bartle. R.G. and Sherbert. D. R, 2011, "Introduction to Real Analysis", 4th Ed., John Wiley and Sons (Asia) P.Ltd.
3. Fischer E., Reprint 2012, "Intermediate Real Analysis", Springer Verlag.
4. Ross K.A., 2013, "Elementary Analysis- The Theory of Calculus Series - Undergraduate Texts in Mathematics", 2nd Ed., Springer Verlag.
5. John P. R. Christensen, 2019, "Elements of Mathematical Analysis", 1st Ed., Springer.

E-RESOURCES

1. https://www.math.ucdavis.edu/~hunter/intro_analysis_pdf/ch1.pdf
2. https://www.ms.uky.edu/~droyster/courses/fall06/PDFs/Chapter06.pdf
3. https://math.libretexts.VectorSpacesandMetricSpaces/_OperationsonConvergentSequ ences.
4. https://home.iitm.ac.in/naru/ma1010/notes/MA1010-Note001.pdf
5. https://people.math./Lectures/MetricSpaceLimits.html#:~:.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	1	2	2	3	2	1	3	3	2	1	3
CLO2	2	2	3	2	2	3	3	3	1	1	3	2	2
CLO3	3	3	1	3	3	1	2	2	3	2	3	3	3
CLO4	2	2	3	2	3	3	3	2	3	2	3	1	2
CLO5	3	3	2	3	3	3	2	2	3	1	3	2	3

Strong: 3 Medium: 2 Low:1

Semester: IV - ALLIED COURSE – IV: Fundamentals of C Programming

Ins. Hrs. /Week: 3 **Course Credit: 2** **Course Code: U25ACS403**

UNIT- I: Overview of C (10 Hours)

History of C - Importance of C - Basic structure of C programs- Character set - **C Tokens:** Keywords and identifiers - Constants - Variables - Data types - Declaration of variables - Declaration of storage classes - Assigning values to variables- Defining symbolic constants-**Operators and expression:** - Types of Operators -Arithmetic Expressions - Evaluation of expressions - Precedence of arithmetic operators - Type conversions in expressions - Operator precedence and associativity

UNIT-II: Decision making and Branching (9 Hours)

Simple IF, IF-ELSE, Nesting of IF-ELSE, ELSE-IF ladder, Switch statements - GOTO statements- **Decision making and looping:** WHILE statement - DO statement - FOR statement - Jumps in loops- **Arrays:** Definition & Declaration - One dimensional - Two dimensional - Multi dimensional arrays - Dynamic arrays.

UNIT- III: Character arrays and strings (8 Hours)

Introduction - Declaring and initializing string variables - Reading strings from terminal - Writing strings to screen - String handling functions - Table of strings- **User Defined functions:** Introduction - Need for user - Defined function - Elements of user Defined function - Definition of functions - Return values and their types - Function calls – Function declaration - All category of functions - Nesting of functions - Recursion.

UNIT- IV: Structures and Unions (9 Hours)

Introduction - Defining a structure - Declaring structure variables - Accessing structure members - Structure initialization - Copying and comparing structure variables - Arrays of structures - Arrays within structures - Structures within structures - Structures and functions – Defining and accessing Unions .

UNIT- V: Pointers (9 Hours)

Pointers: Introduction – Understanding pointers - Accessing the address of a variable - Initializing of pointer variables. Chain of pointers - Pointer expressions - Arraysof pointers - Pointers to functions - Pointer and structures.

Total Lecture Hours-45

COURSE OUTCOME

Upon successful completion of this course, students will be able to

1. Understand the basic terminology used in computer programming
2. Design programs involving decision structures, loops and operators
3. Understand the use of functions in programming and Arrays
4. Understand the dynamics of memory by the use of pointers and Structures
5. Use different data structures and create/update basic data files

TEXT BOOKS

1. Balagurusamy E. 2018, Programming in ANSI C, Eighth Edition, McGraw-Hill, New Delhi, India.
2. Deitel. H.M 2010, C:How to program, 7th Edition, Pearson Education, London, England.

REFERENCE BOOKS

1. Bichkar.R.S 2012. Programming with C, University Press,Cambridge,England.
2. Herbert Schildt 2017. C, The Complete Reference, Fourth Edition ,McGraw Hill Education, New Delhi, India.
3. Mike Mcgrath 2018. C Programming in Easy Steps, ,Fifth Edition ,In Easy Steps Limited, Leamington Spa, Warwickshire.

E-RESOURCES

1. https://cutt.ly/pbhDNFx
2. https://www.learnpick.in/prime/documents/ppts/details/42/structures-in-c
3. http://www.d.umn.edu/~rmaclin/cs1622/Chapter09-10/Chapter09-10.PPT

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	3	2	2	3	2	1	3	3	2	1	3
CLO2	2	3	3	2	2	3	3	2	1	1	3	2	2
CLO3	3	3	2	3	3	3	2	2	3	2	1	3	3
CLO4	2	3	3	2	2	3	1	2	3	2	3	1	2
CLO5	3	3	2	3	3	3	2	2	3	1	2	2	3

Strong: 3 Medium: 2 Low:1

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

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DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: IV- SEC-III : Bio Statistics

Ins. Hrs./Week: 2 **Course Credit**:2 **Course Code**:**U25SEMA44**

UNIT I **(6 Hours)**

Introduction to Biostatistics – Scope and applications in Biology and Medicine.

UNIT II **(6 Hours)**

Probability concepts – Addition and multiplication theorems – Conditional probability.

UNIT III **(6 Hours)**

Sampling techniques – Sampling distributions.

UNIT IV **(6 Hours)**

Correlation and regression – Rank correlation.

UNIT V **(6 Hours)**

Design of experiments – Completely Randomized Design (CRD).

Total Lecture Hours - 30

COURSE OUTCOME:

The students will be able to

1. Understand the basic concepts and applications of Biostatistics.
2. Apply probability distributions in biological and medical data analysis.
3. Perform statistical hypothesis testing and ANOVA.
4. Analyze correlation, regression and vital statistics.
5. Apply experimental design techniques in biological research.

TEXT BOOK

1. Bernard Rosner, 2015, *Fundamentals of Biostatistics*, 8th Ed., Cengage Learning.

UNIT I : Chapter 1: Sections 1.1 to 1.2
UNIT II : Chapter 2: Sections 2.1 to 2.3
UNIT III : Chapter 3: Sections 3.1 to 3.2
UNIT IV : Chapter 4: Sections 4.1 to 4.2
UNIT V : Chapter 5: Sections 5.1 to 5.2

REFERENCE BOOKS

1. Wayne W. Daniel, 2010, *Biostatistics: A Foundation for Analysis in the Health Sciences*, 9th Ed. Wiley.
2. B. K. Mahajan, 2017, *Methods in Biostatistics*, Jaypee Brothers Medical Publishers.
3. S. P. Gupta, 2018, *Statistical Methods*, Sultan Chand & Sons.
4. Jerrold H. Zar, 2014, *Biostatistical Analysis*, 5th Ed., Pearson.
5. Marcello Pagano and Kimberlee Gauvreau, 2018, *Principles of Biostatistics*, 2nd Ed., CRC Press.

RESOURCES :

1. https://www.cdc.gov/
2. https://www.who.int/
3. https://onlinecourses.nptel.ac.in/
4. https://www.statlect.com/
5. https://swayam.gov.in/
6. https://ocw.mit.edu/

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

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DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: IV- SEC-IV : Bio Mathematics

Ins. Hrs./Week: 2 **Course Credit**: 2 **Course Code**: **U25SEMA45**

UNIT I **(6 Hours)**

Introduction to Bio mathematics – Mathematical models in Biology – Population growth models

UNIT II **(6 Hours)**

Differential equations in biological systems – Predator-prey models

UNIT III **(6 Hours)**

Genetics and Biomathematics – Mendelian inheritance – Probability models in genetics.

UNIT IV **(6 Hours)**

Matrices and applications in Biology – Leslie matrix models .

UNIT V **(6 Hours)**

Optimization techniques in biological systems – Mathematical modelling in medicine .

Total Lecture Hours - 30

COURSE OUTCOME:

The students will be able to

1. Understand mathematical models used in biological sciences.
2. Apply differential equations to biological and ecological systems.
3. Analyze genetic models using mathematical techniques.
4. Use matrices and stochastic models in population studies.
5. Apply bio mathematical techniques in medicine and bioinformatics.

TEXT BOOK

1. J. D. Murray, 2002, *Mathematical Biology*, 3rd Ed., Springer.

UNIT I: Chapter 1: Sections 1.1 to 1.3
UNIT II: Chapter 2: Sections 2.1 to 2.2
UNIT III: Chapter 3: Sections 3.1 to 3.3
UNIT IV: Chapter 4: Sections 4.1 to 4.2
UNIT V: Chapter 5: Sections 5.1 to 5.2

REFERENCE BOOKS

1. Fred Brauer and Carlos Castillo-Chavez, 2012, *Mathematical Models in Population Biology and Epidemiology*, Springer.
2. E. C. Pielou, 1977, *Mathematical Ecology*, Wiley.
3. Nicholas F. Britton, 2003, *Essential Mathematical Biology*, Springer.
4. Sarah P. Otto and Troy Day, 2011, *A Biologist's Guide to Mathematical Modeling in Ecology and Evolution*, Princeton University Press.
5. James Keener and James Sneyd, 2009, *Mathematical Physiology*, Springer.

RESOURCES :

1. https://www.cdc.gov/
2. https://www.who.int/
3. https://onlinecourses.nptel.ac.in/
4. https://www.statlect.com/
5. https://swayam.gov.in/
6. https://ocw.mit.edu/

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		2	1
CLO2	3	1	2	1	3	2	2	2	2	2		2	1
CLO3	3	2	2	3	2	3	2	1	3	2		2	1
CLO4	2	3	1	2	3	2	2	3	1	2		2	1
CLO5	3	2	2	2	3	3	2	2	2	1	3	2	1

Strong: 3 Medium: 2 Low: 1