

B.Sc., MATHEMATICS

COURSE STRUCTURE WITH SYLLABUS

PROGRAMME CODE: 3USMAT

2026-2027



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 FRAMEWORK (CBCS–LOCF)
(For the candidates admitted in the academic year 2026–2027)**

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.**

Ability Enhancement Courses (AEC): Ability Enhancement Courses are designed to improve students' language proficiency, communication skills, analytical abilities, environmental awareness, and understanding of contemporary issues. These courses aim to enhance the overall academic and professional capabilities of students and facilitate their effective participation in higher education and employment.

Core Courses (CC): A course that is compulsorily studied by a student as a fundamental requirement of the programme is termed a Core Course (CC). These courses provide the basic knowledge and conceptual understanding of the major discipline. Core Courses constitute the foundation of the programme and ensure that all students acquire the essential competencies and academic standards prescribed for the degree. Successful completion of Core Courses is mandatory for the award of the degree.

Core Practical Courses (CP): Core Practical Courses are laboratory-based courses associated with the Core Theory Courses. These courses provide hands-on training, experimental skills, analytical techniques, and practical exposure necessary for understanding the concepts of the discipline. Students are required to successfully complete all prescribed practical courses as part of the programme requirements.

Allied Courses (AC): Allied Courses are courses offered from disciplines other than the major discipline. These courses provide students with opportunities to gain additional knowledge and skills in allied or complementary areas of study. Allied Courses promote multidisciplinary learning and broaden the academic perspective of students. The selection and completion of Allied Courses shall be governed by the regulations of the institution and the curriculum framework.

Allied Practical (AP): Allied Practical are practical components associated with the chosen Allied discipline. These courses provide laboratory or field-based exposure to the concepts learned in the Allied Courses and help students develop practical skills relevant to the selected area of study.

Interdisciplinary Courses (IDC): Interdisciplinary Courses are designed to provide knowledge and skills that integrate concepts from multiple disciplines. These courses encourage students to explore the interrelationship between different fields of study and develop a broader understanding of contemporary issues and applications. Students may choose Interdisciplinary Courses as prescribed in the curriculum and subject to eligibility requirements.

Discipline Specific Elective Courses (DSE): Discipline Specific Elective Courses are elective courses offered by the major discipline. These courses provide students with opportunities to acquire advanced knowledge and specialization in selected areas of the discipline. Students may choose courses from the prescribed list of electives based on their interests, aptitude, and career aspirations. These courses are generally application-oriented and provide in-depth exposure to specific domains of study.

Skill Enhancement Courses (SECs): These courses focus on developing skills or proficiencies of 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.

Value Added Courses (VAC): Value Added Courses are intended to provide additional knowledge, skills, attitudes, and competencies that complement the regular curriculum. These courses focus on holistic development, professional ethics, environmental awareness, personality development, life skills, and emerging areas of knowledge. Successful completion of the prescribed Value Added Courses may be mandatory or optional as specified in the curriculum.

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 training 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.

Project Work: Project Work provides students with an opportunity to apply the knowledge and skills acquired during the programme to investigate a specific problem or research topic. Students shall undertake the project under the guidance of a faculty member and submit a dissertation/report followed by evaluation and viva-voce examination, wherever prescribed.

Extension Activities: Students are encouraged to participate in extension and outreach activities such as National Service Scheme (NSS), National Cadet Corps (NCC), Youth Red Cross (YRC), Red Ribbon Club (RRC), Sports and Games, Fine Arts and Performing Arts, Rotaract, Students' EXNORA, community engagement programmes, environmental awareness campaigns, and other socially relevant activities. Such participation may be recognized through credits, certificates, or awards as prescribed by the institution.

Undergraduate Programme:

Programme Pattern: The Under Graduate degree programme consists of **FIVE** vital components. They are as follows:

Part -I: Ability Enhancement Course (Tamil / Hindi / French / Sanskrit)

Part-II: Ability Enhancement Course (English)

Part-III: Core Course (Theory, Practicals, Allied Courses, Allied Practicals and Group Project)

Part-IV: Skill Enhancement Courses, Discipline Specific Elective Courses, Interdisciplinary Courses, Value Education, Health & Wellness, Introduction to Disaster Management, Summer Internship, Value Added Course, Environmental studies, Gender studies and Extension activity.

EXAMINATION

Continuous Internal Assessment (CIA):

UG - Distribution of CIA Marks

Passing Minimum: 40 %

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

Question Paper Pattern

Section A1 (10x1=10 marks)

One Word Question/ Fill in/ True or False/ Multiple Choice Questions

Two Questions from Each unit

Section A2 (5x2=10 marks)

Short Answers / Match the Following

One Question from Each Unit

Total Marks – 20

Section B: (5x4=20 marks)

Paragraph Answers

Either/ or type, One Question from Each Unit

Section C: (3x10=30)

Essay Type Answers

Answer 3 out of 5 Questions

One Question from Each Unit

Section A1 & A2: K1 Level

Section B: K2, K3 and K4 Level

Section 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/Analyzing	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	20			30		70
Continuous Internal Assessment (CIA)	20	20			30		70
QUESTION PATTERN FOR END SEMESTER EXAMINATION/ Continuous Internal Assessment							
SECTION							MARKS
SECTION – A1 (No choice ,One Mark) TWO questions from each unit (10x1 =10)							20
SECTION –A2 (No choice ,Two Mark) ONE question from each unit (5x2 =10)							
SECTION - B (Either/ or type, 4-Marks) ONE questions from each unit (5x4 =20)							20
SECTION - C (3 out of 5) (10 Marks) ONE question from each unit (3x10 =30)							30
Total							70

BLUE PRINT OF QUESTION PAPER FOR END SEMESTER EXAMINATION							
DURATION: 3. 00 Hours.				Max Mark : 70			
K- LEVELS	K1	K2	K3	K4	K5	K6	Total Marks
SECTION							
SECTION –A1 (1 Mark, No choice) (10x1 =10)	10						10
SECTION –A2 (2-Marks, No choice) (5x2=10)	10						10
SECTION –B (4-Marks) (Either/or type) (5x4=20)		4	8	8			20
SECTION -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	04	08	08	20	10	70

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 semesters 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 <i>(Upon completion of the B.Sc., Degree Programme, the Under graduate will be able to)</i>
PO-1	Disciplinary knowledge: Demonstrate comprehensive knowledge and understanding of one or more disciplines that form a part of an under graduate 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 synthesized 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.

PROGRAM SPECIFIC OUTCOMES (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 2026–2027)

ELIGIBILITY: A Pass in 10 +2 with Mathematics as one of the core subjects

Sem	Part	Courses	Course Code	Title	Ins. Hrs.	Credits	Exam. Hours	Maximum Marks		
								Int.	Ext.	Total
I	I	Ability Enhancement Course-I (AEC-I)	U26TAEC11	(Tamil\$ / Other Languages+, #)	6	3	3	30	70	100
	II	Ability Enhancement Course-II (AEC-II)	U26EAEC11	English Course – I	6	3	3	30	70	100
	III	Core Course-I (CC-I)	U26MA101	Differential Calculus and Trigonometry	4	4	3	30	70	100
		Core Course-II (CC-II)	U26MA102	Integral Calculus with MATLAB	4	4	3	30	70	100
		Allied Course-I (AC-I)	U26APY101	Physics-I	3	3	3	30	70	100
		Allied Practical-I (AP-I)	U26APY102P	Physics-I Practical	3	3	3	40	60	100
	IV	Value Education	26UGVED		2	2	3	30	70	100
		Interdisciplinary Course-I (IDC-I) #			2	2	3	30	70	100
	Total				30	24	--	--	--	800
II	I	Ability Enhancement Course-III (AEC - III)	U26TAEC22	(Tamil\$ / Other Languages+, #)	6	3	3	30	70	100
	II	Ability Enhancement Course –IV (AEC - IV)	U26EAEC22	English Course – II	6	3	3	30	70	100
	III	Core Course- III (CC - III)	U26MA203	Differential Equations	4	4	3	30	70	100
		Core Course- IV (CC - IV)	U26MA204	Laplace Transforms and Fourier Series with SCILAB	4	4	3	30	70	100
		Allied Course-II (AC - II)	U26APY203	Physics-II	3	3	3	30	70	100
		Allied Practical – II (AP-II)	U26APY204P	Physics-II Practical	3	3	3	40	60	100
	IV	Skill Enhancement Course-I (SEC-I) ##	U26SEMA21	Statistics with Excel	2	2	3	30	70	100
		Interdisciplinary Course – II (IDC-II) #			2	2	3	30	70	100
	Total				30	24	--	--	--	800

III	I	Ability Enhancement Course–V (AEC-V)		(Tamil\$ / Other Languages+, #)	6	3	3	30	70	100
	II	Ability Enhancement Course–VI (AEC-VI)		English Course – III	6	3	3	30	70	100
	III	Core Course-V (CC-V)		Classical Algebra and Theory of Numbers	4	4	3	30	70	100
		Core Course-VI (CC-VI)		Vector Calculus with MATLAB	4	4	3	30	70	100
		Allied Course–III (AC-III)		Introduction to Computer and Office Automation	3	3	3	30	70	100
		Allied Practical-III (AP-III)		Office Automation Lab	3	3	3	40	60	100
	IV	Skill Enhancement Course-II (SEC-II) ##		Artificial Intelligence in Mathematics	2	2	3	30	70	100
		Interdisciplinary Course–III (IDC-III) #			2	2	3	30	70	100
		Health & Wellness @			--	1	--	20	80	100
			Total	30	25	--	--	--	900	
IV	I	Ability Enhancement Course–VII (AEC-VII)		(Tamil\$ / Other Languages+, #)	6	3	3	30	70	100
	II	Ability Enhancement Course–VIII (AEC-VIII)		English Course – IV	6	3	3	30	70	100
	III	Core Course-VII (CC-II)		Operations Research	4	4	3	30	70	100
		Core Course–VIII (CC-VIII)		Analytical Geometry (Three Dimensions) with MATLAB	4	4	3	30	70	100
		Allied Course–IV (AC-IV)		Fundamentals of C Programming	3	3	3	30	70	100
		Allied Practical-IV (AP-IV)		C Programming Lab	3	3	3	40	60	100
	IV	Skill Enhancement Course–III (SEC-III) ##		Vedic Mathematics	2	2	3	30	70	100
		Interdisciplinary Course–IV (IDC-IV) #			2	2	3	30	70	100
				Total	30	24	--	--	--	800
Summer Internship / Industrial Activity during the Summer Vacation after II Year										
V	III	Core Course-IX (CC-IX)		Abstract Algebra	4	4	3	30	70	100
		Core Course-X (CC-X)		Real Analysis	5	4	3	30	70	100
		Core Course-XI (CC-XI)		Statics	5	4	3	30	70	100
		Core Course-XII (CC-XII)		Numerical Methods	5	4	3	30	70	100
		Core Practical–I (CP-I)		Numerical Methods with MATLAB Programming (P)	5	4	3	40	60	100
	IV	Skill Enhancement Course-IV (SEC-IV) ##		Mathematical Modelling	2	2	3	30	70	100
		Discipline Specific Elective Course-I (DSEC-I)		Research Methodology/ Combinatorial Mathematics/ Computational Geometry	2	2	3	30	70	100
		Introduction to Disaster Management			2	2	3	30	70	100
		Summer Internship / Industrial Activity @@		Summer Internship with Viva-Voce	--	2	--	20	80	100
				Total	30	28	--	--	--	900

VI	III	Core Course-XIII (CC-XIII)		Linear Algebra	4	4	3	30	70	100
		Core Course-XIV (CC-XIV)		Complex Analysis	5	4	3	30	70	100
		Core Course-XV (CC-XV)		Dynamics	5	4	3	40	60	100
		Core Project Work (CPW) @@		Project Work (with Viva-Voce)	6	4	3	20	80	100
	IV	Skill Enhancement Course-V (SEC-V) ##		Mathematics Skill for Competitive Examination	2	2	3	30	70	100
		Discipline Specific Elective Course-II (DSEC-II)		Graph Theory and Applications /Algorithms/ Set Theory	2	2	3	30	70	100
		Environmental Studies			2	2	3	30	70	100
		Gender Studies			2	1	3	30	70	100
		Value Added Course		General Studies for Competitive Examinations	2	2	-	30	70	100
		Extension Activities *			--	1	--	--	--	--
		Total			30	26	--	--	--	900
Grand Total			180	151	--	--	--	5100		

ALLIED COURSE

S.No	Semester	Paper Name
1	I	Physics-I
2	I	Physics-I Practical
3	II	Physics-II
4	II	Physics-II Practical
5	III	Introduction to Computer and Office Automation
6	III	Office Automation Lab
7	IV	Fundamentals of C Programming
8	IV	C Programming Lab

SKILL ENHANCEMENT COURSE (SEC)		
S.No	Semester	Title of the paper
1	II	SEC-I Statistics with Excel
2	III	SEC-II Artificial Intelligence in Mathematics
3	IV	SEC-III Vedic Mathematics
4	V	SEC-IV Mathematical Modelling
5	VI	SEC-V Mathematics Skill for Competitive Examination

DISCIPLINE SPECIFIC ELECTIVE COURSE (DSEC)		
S.No	Semester	Title of the paper
1	V	DSEC-I Research Methodology Combinatorial Mathematics Computational Geometry
2	VI	DSEC-II Graph Theory and Applications Algorithms Set Theory

INTERDISCIPLINARY COURSE(IDC)			
S.No	Semester	Course Code	Title of the Course
1.	I	U26IDMA11	Mathematics in the Modern World
2.	II	U26IDMA22	Mathematics for Business Decision Making
3.	III		Quantitative Aptitude – I
4.	IV		Quantitative Aptitude - II

VALUE ADDED COURSE * (VAC)**

Semester	Course	Course Code	Title of the Course
II	VAC - I	U26MAVA21	Indian Knowledge System in Ancient Indian Mathematics
IV	VAC - II		Data Science Using Python and R Programming

INTERDISCIPLINARY COURSE (IDC)# FOR WHO HAVE NOT OPT TAMIL AS PART - I		
Those who have studied Tamil upto 10 th +2 but opt for other languages in degree	1 st Semester	Special Tamil - I
	2 nd Semester	Special Tamil - II
Those who have not studied Tamil in school level	1 st Semester	Basic Tamil - I
	2 nd Semester	Basic Tamil – II

INTERDISCIPLINARY COURSE(IDC) \$\$ FOR NCC CADETS ONLY	
NCC Course is a Compulsory Course for the NCC Cadets in the 3rd Semester:	NCC Course is a Compulsory Course for the NCC Cadets in the 4th Semester:
Introduction to NCC	1. Special Subject Army (or) 2. Special Subject Navy (or) 3. Special Subject Air force

SUMMARY OF CURRICULUM STRUCTURE OF UG PROGRAMMES –SCIENCE

Sl. No.	Part	Types of the Courses	No. of Courses	Credits for each Course	Total Credits	Marks
1.	I	Ability Enhancement Course (AEC-Tamil)	4	3	12	400
2.	II	Ability Enhancement Course (AEC-English)	4	3	12	400
3.	III	Core Course (CC)	15	4	60	1500
4.		Core Practical (CP)	1	4	4	100
5.		Allied Course (AC)	4	3	12	400
6.		Allied Practical (AP)	4	3	12	400
7.		Core Project Work (CPW)	1	4	4	100
8.	IV	Skill Enhancement Course (SEC)	5	2	10	500
9.		Discipline specific Elective Course (DSEC)	2	2	4	200
10.		Interdisciplinary Course (IDC)	4	2	8	400
11.		Value Education	1	2	2	100
12.		Health and Wellness	1	1	1	100
13.		Introduction to Disaster Management	1	2	2	100
14.		Summer Internship / Industrial Activity	1	2	2	100
15.		Value Added Course	1	2	2	100
16.		Environmental Studies	1	2	2	100
17.		Gender Studies	1	1	1	100

18.		EXTENSION ACTIVITIES (NCC / NSS / SPORTS / ANTI DRUG CELL / YRC & Any Other Activities)	--	1	1	--
Total			51	-	151	5100
Additional Value Added Course in semester II and IV**			2**	2	4**	200
MOOC-SWAYAM/NPTEL Courses						

Not included in the CGPA

\$	For those who have studied Tamil upto 10 th +2 (Regular Stream)																
+	Syllabus for other Languages should be on par with Tamil at degree level																
#	Those who have studied Tamil up to 10 th +2 but opt for other languages in degree level under Part-I should study special Tamil and those who have not studied Tamil in the school level should study Basic Tamil in Part-IV under the Interdisciplinary Course.																
**	Examination at the end of the next semester																
\$\$	NCC Course is one of the Choices in the Interdisciplinary Course. Only the NCC Cadets are eligible to choose this course. However, NCC Course is a Compulsory Course for the NCC Cadets.																
@	Health and Wellness: Assessments: • Use self-reflective worksheets to assess their understanding • submit the worksheets to internal audit / external audit • Every student's activity report should be documented and the same have to be assessed by the Physical Director with Mentor. The evaluation should be for 100 marks. No examination is required. Scheme of Evaluation: <table border="1"> <thead> <tr> <th>Part</th><th>Description</th><th>Marks</th></tr> </thead> <tbody> <tr> <td>A</td><td>Report</td><td>40</td></tr> <tr> <td>B</td><td>Attendance</td><td>20</td></tr> <tr> <td>C</td><td>Activities (Observation During Practice)</td><td>40</td></tr> <tr> <td colspan="2">Total</td><td>100</td></tr> </tbody> </table>		Part	Description	Marks	A	Report	40	B	Attendance	20	C	Activities (Observation During Practice)	40	Total		100
Part	Description	Marks															
A	Report	40															
B	Attendance	20															
C	Activities (Observation During Practice)	40															
Total		100															

@@	Summer Internship / Industrial Activity							
	Internship will be carried out during the summer vacation after the second year. Viva-Voce will be conducted by the college and Marks shall be sent to the University and the same will be included in the 5 th semester Mark Statement.							
	Summer Internship / Industrial Activity& Project Work							
	Scheme of Evaluation:							
	<table><tr><th>Description</th><th>Marks</th></tr><tr><td>Report</td><td>80</td></tr><tr><td>Viva-Voce</td><td>20</td></tr><tr><td>Total</td><td>100</td></tr></table>	Description	Marks	Report	80	Viva-Voce	20	Total
Description	Marks							
Report	80							
Viva-Voce	20							
Total	100							
*	Extension Activities shall be outside instruction hours.							

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2026 – 2027)

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS



Semester: I-CC- I: Differential Calculus and Trigonometry

Ins. Hrs./Week:4

Course Credit:4

Course Code: U26MA101

COURSE OBJECTIVES:

- To understand the fundamental concepts of functions, limits, and their behavior in mathematical analysis.
- To develop skills in differentiation techniques including successive differentiation and Leibnitz's theorem, and to analyze increasing and decreasing functions.
- To study the geometric properties of curves such as curvature, radius of curvature, evolutes, and involutes in Cartesian and polar forms.
- To learn and apply trigonometric expansions of functions such as $\sin(nx)$, $\cos(nx)$, $\tan(nx)$, and powers of trigonometric functions.
- To understand hyperbolic functions, their relations with circular functions, and inverse hyperbolic functions and their applications.

UNIT – I:

(12 Hours)

Functions and Limits: Constants and variables – Functions – Classification of functions - Limits.

UNIT – II:

(12 Hours)

Methods of Successive Differentiation – Leibnitz's Theorem and its applications- Increasing & Decreasing functions –Maxima and Minima of functions of two variables.

UNIT – III:

(12 Hours)

Curvature – Radius of curvature in Cartesian and Polar Coordinates – Centre of curvature–Radius of curvature – Evolutes & Involutives.

UNIT – IV:

(12 Hours)

Expansions of $\sin(nx)$, $\cos(nx)$, $\tan(nx)$ – Expansions of $\sin^n x$, $\cos^n x$ –Expansions of $\sin(x)$, $\cos(x)$, $\tan(x)$ in powers of x .

UNIT – V:

(12 Hours)

Hyperbolic functions – Relation between hyperbolic & Circular functions- Inverse hyperbolic functions.

UNIT – VI: Current Contour (For Continuous Internal Assessment Only– self study)
The Double angle formulas and The Half-angles identities.

Total Lecture Hours-60

COURSE OUTCOMES:

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

1. Explain the fundamental concepts of functions, limits, and classification of functions in mathematical analysis.
2. Apply successive differentiation techniques and Leibnitz's theorem to solve problems and analyze the behavior of functions.
3. Determine and analyze curvature, radius of curvature, centre of curvature, evolutes, and involutes in Cartesian and polar coordinates.
4. Expand trigonometric functions such as $\sin(nx)$, $\cos(nx)$, $\tan(nx)$, and powers of trigonometric functions using series expansions.
5. Understand hyperbolic functions, their relation with circular functions, and evaluate inverse hyperbolic functions.
6. Apply differential calculus and trigonometric concepts in solving mathematical and applied science problems.

TEXT BOOKS

1. S.Narayanan and T.K. Manicavachagam Pillai, Calculus Volume I, S. Viswanathan (Printers & Publishers) Pvt. Limited , Chennai -2011.
2. S.Arumugam & others, 1999. Trigonometry and Fourier series, New Gamma Publications .

UNIT – I	: Chapter I Sections 1 to 10 of [1]
UNIT – II	: Chapter III Sections 1.1 to 2.2, Chapter IV Section 2.1, 2.2 & Chapter V 1.1 to 1.5 of [1]
UNIT – III	: Chapter X Sections 2.1 to 2.6 of [1]
UNIT – IV	: Chapter 1 Section 1.2 to 1.4 of [2]
UNIT – V	: Chapter 2 Section 2.1 & 2.2 of [2]

REFERENCE BOOK(S)

1. S. Arumugam and Isaac, Calculus, Volume1, New Gamma Publishing House, 1991.
2. S. Narayanan, T.K. Manichavasagam Pillai, Trigonometry, S. Viswanathan Pvt. Limited, and Vijay Nicole Imprints Pvt. Ltd, 2004.
3. G.B. Thomas and R.L. Finney, 2022, Calculus, 15th Ed., Pearson Education, Delhi.
4. C. V. Durell and A. Robson, 2003 ,Advanced Trigonometry, Dover Publications.
5. Dr.M.K. Venkataraman, Mrs. Manorama Sridhar, 2005, Differential Calculus and Trigonometry, First Edition Agasthiar Publications, Chennai.

E-RESOURCES

1. <http://skssartscollege.com/wp-content/uploads/2022/09/dc.pdf>
2. <https://www.scribd.com/document/817081585/Mathematics-Differential-Calculus-trigonometry>
3. <https://gpgejoshimath.org/wp-content/uploads/2023/05/mathematics-1.pdf>
4. www.youtube.com/watch?v=Pp2VkZQ_GOs

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	2	3	3	1	3	3	2	2	1
CLO2	2	1	3	1	1	3	1	3	1	1	3	2	1
CLO3	3	2	3	1	3	2	1	2	3	2	3	1	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
CLO6	3	3	3	3	3	3	3	3	3	3	3	3	3

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 2026 – 2027)

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: I-CC-II: Integral Calculus with MATLAB

Ins. Hrs. /Week: 4

Course Credit: 4

Course Code: U26MA102

COURSE OBJECTIVES:

- To understand and apply reduction formulae for integrating algebraic, trigonometric, and logarithmic functions.
- To develop the ability to evaluate double integrals and perform change of order of integration in Cartesian and polar coordinates.
- To analyze and compute triple integrals, Jacobians, and coordinate transformations for solving geometrical and physical problems.
- To implement MATLAB programs for solving problems related to reduction formulae and integration techniques.
- To apply MATLAB tools for evaluating double and triple integrals, polar transformations, and related applications in mathematics and engineering.

UNIT-I:

(12 Hours)

Reduction formulae – Types, integration of product of powers of algebraic and trigonometric functions, integration of product of powers of algebraic and logarithmic functions- Bernoulli's formula.

UNIT-II:

(12 Hours)

Multiple Integrals - definition of double integrals - evaluation of double integrals – double integrals in polar coordinates - Change of order of integration.

UNIT-III:

(12 Hours)

Triple integrals – applications of multiple integrals - volumes of solids of revolution – Two important results regarding Jacobians – Transformation from Cartesian to polar co-ordinates - Transformation from Cartesian to spherical polar co-ordinates.

UNIT- IV:

(12 Hours)

1. MATLAB Program for Reduction Formula of $\int \sin^n x \, dx$.
2. MATLAB Program for Reduction Formula of $\int \cos^n x \, dx$.
3. MATLAB Program for Integration of Product of Powers of Algebraic Functions.
4. MATLAB Program for Integration of Product of Powers of Trigonometric Functions.
5. MATLAB Program for Bernoulli's Formula.

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

1. MATLAB Program for Evaluation of Double Integral.
2. MATLAB Program for Double Integral in Polar Coordinates.
3. MATLAB Program for Change of Order of Integration.
4. MATLAB Program for Triple Integral.
5. MATLAB Program for Transformation from Cartesian to Polar Coordinates.

UNIT-VI: Current Contours (Continuous Internal Assessment Only-Self Study)

Applications of Integration, Double and Triple Integrals, Jacobians, Beta and Gamma Functions and MATLAB Applications.

Total Lecture Hours – 60**COURSE OUTCOMES:**

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

1. Derive reduction formula and thereby evaluate some standard integrals.
2. Explain the properties of Beta and Gamma functions and apply it to compute the integral.
3. Apply change of variable method to evaluate double integral.
4. Utilize double and triple integral to compute area and volume of a solid.
5. Develop problem solving skills through MATLAB-based applications in calculus.
6. Apply integration techniques, double and triple integrals, Jacobians, Beta and Gamma functions, and MATLAB tools to solve mathematical and engineering problems effectively.

TEXT BOOK(S)

1. Narayanan S, and Manicavachagom Pillay T. K, 2011, Calculus Volume II, S. Viswanathan (Printers & Publishers) Pvt. Limited, Chennai.

UNIT – I: Chapter 1 Section 13, 14 & 15.1

UNIT – II: Chapter 5 Section 2.1, 2.2, 3.1

UNIT – III: Chapter 5 Section 4, 5.1, 5.2, 6.1, 7&
Chapter 6 Section 1.1, 1.2, 2.3 2.4

REFERENCE BOOK(S)

1. Mittal P.K, 2020, Integral Calculus, Eleventh Edition, Vikas Publishing House, New Delhi -110044.
2. Courant R. and John F, 1989, Introduction to Calculus and Analysis (Volumes I & II), Springer- Verlag, New York, Inc.
3. Sharma A.K, 2005, Text book of Integral Calculus, Discovery Publishing Pvt Ltd, New Delhi -110002.
4. Cesar Perez Lopez, 2014, MATLAB Differential and Integral Calculus, Apress Berkeley, CA.
5. Dingyu Xue, 2020, Calculus Problem Solutions with MATLAB, Tsinghua University Press, China.

E-RESOURCES

1. <https://www.amazon.in/calculus-iii-narayanan-t-k-manicavachagom-pillay/dp/b0cp3pfmv8>
2. <https://tutorial.math.lamar.edu/classes/calci/multipleintegralsintro.aspx>
3. <https://www.mathworks.com/help/symbolic/integration.html>
4. <https://link.springer.com/book/10.1007/978-1-4842-0304-0>
5. www.mathworks.com/help/matlab/mathematics.html

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	2	3	3	1	3	3	3	1	2
CLO2	3	3	2	2	3	1	3	2	1	1	3	2	2
CLO3	3	3	2	2	2	3	1	3	2	2	3	2	3
CLO4	2	3	2	3	2	1	2	3	1	1	2	2	3
CLO5	2	2	2	2	3	1	1	2	1	1	1	3	2
CLO6	2	2	1	1	3	1	1	2	2	3	2	3	3

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 2026 – 2027)

DEPARTMENT OF PHYSICS

(For the students of I B.Sc. Mathematics)

Semester: I - AC- I: Physics - I

Ins. Hrs./Week: 3

Course Credit: 3

Course Code: U26APY101

COURSE OBJECTIVES:

- To know the elastic nature of materials, analyze the expression for Young's modulus and comprehend about viscosity and surface tension of fluids.
- To acquire knowledge of the centre of gravity, states of equilibrium of rigid bodies and stability of floating bodies.
- To understand the laws of thermodynamics, thermal conductivity and blackbody radiation.
- To familiarize the concepts of interference and diffraction.
- To know the formation, characteristics and applications of diodes and transistors.

UNIT-I: Properties of Matter

(14 Hours)

Elasticity: Stress–Strain–Young's modulus–stress-strain Diagram–Bending of beams–Expression for the bending moment–Measurement of Young's modulus by bending of a beam–Non-uniform bending and uniform bending.

Viscosity: Streamline flow and Turbulent Flow–Critical velocity–Poiseuille's formula –Determination of Coefficient of Viscosity of a liquid (Variable Pressure head)

Surface Tension: Definition–Drop Weight method of determining the surface tension of a Liquid–Experiment to determine the interfacial tension

UNIT-II: Mechanics

(10 Hours)

Centre of Gravity – Introduction- Centre of Gravity of a Solid Hemisphere–Hollow Hemisphere–Centre of Gravity of a Solid Cone

States of Equilibrium: Equilibrium of a rigid body – Stable, unstable and neutral equilibrium – Example.

Stability of Floating bodies – Metacentre – Determination of Metacentric height of a ship.

UNIT-III: Thermal Physics

(12 Hours)

Thermodynamics: Laws of thermodynamics – Reversible and irreversible process – Heat engine – Carnot's theorem.

Radiation: Black body – Stefan's law – Newton's law of cooling – Newton's law of cooling from Stefan's law – Experimental determination of Stefan's constant –Wien's displacement law –Rayleigh - Jean's law – Planck's law.

Heat Conduction: Coefficient of Thermal Conductivity – Determination of Thermal Conductivity of a bad Conductor by Lee's disc method.

UNIT-IV: Optics

(12 Hours)

Interference: Superposition of waves –Principle of interference – Air wedge – Newton's rings.

Diffraction: Introduction –Plane diffraction Grating – Theory of plane transmission Grating.

Fiber Optic communication: Introduction – Optic Fiber – Numerical Aperture – Coherent bundle – Fiber optic communication System and its advantages.

UNIT-V: Electronics

(12 Hours)

Intrinsic and extrinsic semiconductor – PN Junction diode – Biasing of PN junction – V-I characteristics of junction diode – Rectifiers – Half wave – Full wave and Bridge rectifiers – Zener diode – Characteristics of Zener diode – Voltage regulator – Transistor –Characteristics of transistor – CB and CE mode –Transistor as an amplifier.

UNIT – VI: CURRENT CONTOURS (For Continuous Internal Assessment only – Self Study)

Reinforced concrete–Advanced Nano photonics–Surface tension of thermal fluids–Nano fluids–Low Viscous silicon liquid immersed transformers – Bio diesel – fueled diesel engines –Electronic transformers.

Total Lecture Hours - 45

COURSE OUTCOME

Upon successful completion of this course the students would be able:

1. Apply the concepts of elasticity, viscosity and surface tension to solve problems encountered in everyday life.
2. Understand the centre of gravity, states of equilibrium of rigid bodies and also stability of floating bodies.
3. Understand the laws of thermodynamics, thermal conductivity and black body radiation.
4. Understand the theories and experiments on interference and diffraction using air wedge, Newton's ring and grating.
5. Know the formation, characteristics and applications of diodes and transistor.
6. Understand the principles and applications of semiconductor devices.

TEXT BOOK(S)

1. R. Murugesan, Properties of matter, Chand & Co. Pvt.Ltd., Revised edition, 2023.
2. Narayanamoorthy and N. Nagarathinam, Mechanics-Part II, The National Publishing Company, Chennai, 2022.
3. Dr.N.Subramaniam,Brijlal and Dr.M.N.Avathanulu, Optics, S. Chand&Co. Pvt.Ltd.-
25th revised edition, New Delhi, 2024.
4. V.Vijayendran,S.Viswanathan,.DigitalFundamentals, Printers & Publishers Private Ltd, Chennai, 2021.
5. A.B.Gupta and H.P.Roy Thermal physics,Books&Allied (P) Ltd.,kolkatta, 2022.

REFERENCE BOOK (S)

1. R.L. Saihgal, A Text Book of Sound, S. Chand & Co. Pvt. Ltd, New Delhi, 2022.
2. D.S. Mathur, Mechanics, S. Chand & Company Ltd., New Delhi ,2018.
3. K.Mehta and Rohit Mehta, 2017.Principles of Electronics, Chand & Co. Pvt.Ltd., Revised edition
4. Brijlaland Subramaniam,.Heat and Thermodynamics & Statistical physics, S. Chand & Co, 2023.
5. P.Duraipandian & Muthamizh Jayapragasam, Chand&Co. Pvt.Ltd., Revised edition,2022.

E- RESOURCES

1. <https://cutt.ly/Vhlco3J>
2. <https://youtu.be/amGa5RRrCcss>
3. <http://shorturl.at/dkux4>
4. <http://shorturl.at/lmBFL>
5. <https://youtu.be/G0iSEDyJKDo>

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	3	2	2	3	3	3	3	3	3	3	3	2	3
CO2	2	2	3	3	2	2	3	2	3	3	3	3	3	3	2	3
CO3	3	2	3	3	2	2	3	2	2	3	3	3	3	3	2	2
CO4	3	3	2	3	2	2	3	2	3	3	3	3	3	3	3	3
CO5	3	3	2	3	2	2	3	3	3	3	3	3	3	3	3	2
CO6	2	2	3	3	2	1	3	2	2	2	2	3	2	2	2	2

S-Strong (3) M-Medium (2) L-Low (1)

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI – 614016

(For the Candidates admitted in the academic year 2026 – 2027)

DEPARTMENT OF PHYSICS

(For the students of I B.Sc. Mathematics)



Semester: I - AP- I: PHYSICS – I PRACTICAL

Ins. Hrs. /Week: 3

Course Credit: 3

Course Code: U26APY102P

COURSE OBJECTIVES

1. To develop practical skills in measuring the elastic properties of materials, including Young's modulus and rigidity modulus, using standard experimental techniques.
2. To understand and determine the physical properties of liquids and solids such as surface tension, viscosity, specific heat capacity, and thermal conductivity through laboratory experiments.
3. To study the principles of oscillations, vibrations, and wave phenomena using experiments involving torsional oscillations and the sonometer.
4. To investigate optical phenomena and determine optical constants such as refractive index, wavelength of light, radius of curvature, and thickness of thin objects using optical instruments.
5. To enhance experimental competence in data collection, error analysis, observation, and interpretation of results using precision laboratory equipment.

List of Experiments (Any Seven Experiments):

1. Determination of Young's modulus by Non-Uniform bending using Pin and Microscope.
2. Determination of Young's modulus by Uniform bending using Scale and Telescope.
3. Surface tension and Interfacial Surface tension by Drop weight Method.
4. Coefficient of viscosity of a liquid –Variable Pressure head Method.
5. Rigidity modulus by torsional oscillations without mass
6. Verification of laws of transverse vibrations using sonometer.
7. Specific heat capacity of a liquid by Newton's law of cooling Method.
8. Thermal conductivity of a bad conductor by Lee's disc Method.
9. Spectrometer–Refractive index of a solid prism.
10. Spectrometer–Finding the wavelength of spectral lines using Grating–Normal incidence method.
11. Newton's Rings–Determination of radius of curvature of a long focus lens.
12. Air wedge –Thickness of the given thin wire.

Total Lecture Hours - 45

COURSE OUTCOMES

Upon successful completion of this course the students would be able:

1. Understand the Laboratory techniques.
2. Evaluate a process based on the results obtained from the experiments quantitatively and qualitatively.
3. Extend the scope of investigation as expected.
4. Communicate a process with help of the outcomes of an experiment.
5. Develop the skill of conducting an experiment collaboratively and ethically.
6. Understand the experimental skills in precision measurement, observation, and data analysis.

TEXT BOOK(S)

1. Dr. S. Somasundaram, Practical Physics, Apsara Publications, Tiruchirappalli, 2023.
2. R. Sasikumar, Practical Physics, PHI Learning Pvt. Ltd, New Delhi 2022.
3. C. L. Arora, *B.Sc. Practical Physics*, S. Chand & Company Pvt. Ltd., New Delhi, 2023.

4. S. L. Gupta and V. Kumar, *Practical Physics*, Pragati Prakashan, Meerut, 2022.
5. Indu Prakash and Ramakrishna, *A Text Book of Practical Physics*, Kitab Mahal Publishers, Allahabad, 2021.
6. Sanjay Sharma, *Basic Electronics and Linear Circuits Laboratory Manual*, Katson Books, New Delhi, 2021.

REFERENCE BOOK(S)

1. S. Srinivasan, *A Text Book of Practical Physics.*, Sultan Chand Publications, 2022.
2. P. R. Sasi Kumar, *Practical Physics*, PHI Learning Pvt. Ltd., New Delhi, 2022.
3. N. Subrahmanyam and Brij Lal, *A Textbook of Optics*, S. Chand & Company Pvt. Ltd., New Delhi, 2023.
4. M. N. Avadhanulu and P. G. Kshirsagar, *A Textbook of Engineering Physics*, S. Chand & Company Pvt. Ltd., New Delhi, 2023.
5. A. P. Malvino and D. P. Leach, *Digital Principles and Applications*, McGraw-Hill Education, New York, 2024.
6. David J. Griffiths, *Introduction to Electrodynamics*, Pearson Education, New Delhi, 2015.

E - RESOURCES

1. <https://youtu.be/Q8Otf6k3uGk>
2. <https://youtu.be/8DhfUz0idwM>
3. https://youtu.be/TZWk5-8R5tc?si=ZFPUBa-FyFzH3z_R
4. <https://youtu.be/PlrpxROzgVg?si=lgZfsbiViyBPDcbV>
5. https://youtu.be/jPU_UzPYeCA?si=n_5VhjL-S5irHvFJ

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	3	2	2	3	3	3	3	3	3	3		2	3
CO2	2	2	3	3	2	2	3	2	3	3	3	3	3	3	2	3
CO3	3	2	3	3	2	2	3	2	2	3	3	3	3		2	2
CO4	3	3	2	3	2	2	3	2	3	3	3	3	3	3	3	3
CO5	3	3	2	3	2	2	3	3	3	3	3	3	3		3	2
CO6	2	2	3	3	2	1	3	2	2	2	2	3	2	2	2	2

S-Strong (3) M-Medium (2) L-Low (1)

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI-614016.

(For the Candidates admitted in the academic year 2026–2027)



DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Ins.Hrs./Week:2

Semester : I -VE: Value Education

Course Credit:2

Course Code:26UGVED

UNIT-I:PHILOSOPHY OF LIFE AND SOCIAL VALUES

Human Life on Earth(Kural629)-Purpose of Life(Kural46)-Meaning and Philosophy of Life (Kural 131, 226) -Family (Kural 45), Peace in Family (Kural1025) Society(Kural446), The Law of Life (Kural 952),Brotherhood(Kural807)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(Kural43,981).

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- APJ 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.

UNITV: HUMAN RIGHTS

Concept of Human Rights: Indian and international perspectives- Evolution of Human Rights- definitions under Indian and International documents -Broad classificationofHumanRightsandRelevantConstitutionalProvisions:Rightto Life, liberty ad 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

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
- Besecular, self-control, sincere, respectful and moral.
- Master yoga, asana and meditation to promote mental health
- Be attitudinal to follow the constitutional rights

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. Leah Levin, Human Rights, NBT, 1998
3. V.R.KrishnaIyer, Dialectics and Dynamics of Human Rights in India, Tagore Law Lectures.
4. Yogic Thearpy – Swami Kuvalayananda and Dr.S.L.Vinekar, Government of India, Ministry of Health, New Delhi.
5. SOUND HEALTH THROUGH YOGA-Dr.K.Chandrasekaran, Prem Kalyan Publications, Sedaptti, 1999.
6. Grose.D.N–“A text book of Value Education’ New Delhi(2005)
7. Gawande . EN – “Value Oriented Education” – Vision for better living. New Delhi (2002) Saruptsons
8. Brain Trust Aliyar- “Value Education for Health, Happiness and Harmony” Erode (2004) Vethathiri publications.



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

SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2026 – 2027)

DEPARTMENT OF MATHEMATICS
INTERDISCIPLINARY COURSE

Semester: I-IDC-I: Mathematics in the Modern World

Ins. Hrs. /Week: 2

Course Credit: 2

Course Code: U26IDMA11

COURSE OBJECTIVES:

- To introduce students to the fundamental principles of counting techniques, permutations, and combinations and their applications in solving practical problems.
- To develop an understanding of matrix algebra, including various types of matrices and matrix operations, and to apply these concepts in mathematical and real-life situations.
- To familiarize students with methods of data organization, graphical representation, and statistical measures of central tendency for effective data analysis and interpretation.
- To provide a foundation in Operations Research by explaining its scope, models, phases, and role in scientific decision-making and problem-solving.
- To impart knowledge of Game Theory concepts, including payoff structures, strategic decision-making, and solution methods for competitive situations.

UNIT-I: Permutations and Combinations

(5 Hours)

Factorial Notation – Permutations – Combinations.

UNIT-II: Algebra of matrices

(7 Hours)

Introduction – Definition – Difference between Matrix and a Determinant – Various types of matrices – Addition of matrices – Properties of matrix Addition – Subtraction of matrices – Scalar multiplication of matrices – Matrix multiplication – Reversal law – Properties of matrix multiplication.

UNIT-III: Data management and statistics

(7 Hours)

Introduction – Frequency Distribution – Continuous Frequency Distribution – Graphic Representation of a frequency distribution – Histogram – Frequency Polygon – Averages – Requisites for an ideal measure of central tendency – Arithmetic Mean – Weighted Mean – Median – Median for continuous frequency distribution – Mode– Mode for Continuous Frequency Distribution.

UNIT-IV: Basis of operation research

(5 Hours)

Introduction – Definitions- Scope of operation research – Phases of operation research – Models in operation research – classification of models – uses and limitations of operation research – operation research and decision making.

UNIT-V: Game Theory

(6 Hours)

Introduction – Definition – Pay-off – Types of games- The Maximin- Minimax principle – Games without saddle points.

UNIT-VI: Current Contour (For Continuous Internal Assessment Only– self study)

Mathematical Applications in Modern Technology and Business:

Introduction to Mathematical Applications – Mathematics in Business and Industry – Mathematics in Banking and Finance – Applications of Probability and Statistics in Decision Making –Role of Operations Research in Supply Chain Management – Mathematical Tools for Optimization Problems – Case Studies and Real-Life Applications.

Total Lecture Hours – 30

COURSE OUTCOMES:

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

1. Apply the principles of counting, permutations, and combinations to solve mathematical and real-life problems.
2. Perform matrix operations and utilize the properties of matrices in mathematical and applied contexts.
3. Organize, represent, and analyze data using frequency distributions, graphical methods, and measures of central tendency.
4. Explain the fundamental concepts, models, and methodologies of Operations Research and their role in decision making.
5. Analyze and solve simple game-theoretic problems using Maximin and Minimax strategies.
6. Demonstrate an understanding of the applications of mathematical concepts in modern technology, business, optimization, and data-driven decision-making.

TEXT BOOK(S)

1. Dr. Srivastava P.K, Dr. Singh V.P, 2013, Applied Mathematics – I, Vayu Education of India, New Delhi – 110 002.
2. Dr. Srivastava P.K, 2013, Applied Mathematics – II, Vayu Education of India, New Delhi – 110 002.
3. Gupta S.C, Kapoor V.K, 2007, Fundamentals of Mathematical Statistics, Sultan Chand & Sons, Educational Publishers, New Delhi – 110 002.
4. Kalavathy S, 2013, Operations Research, Vikas Publishing House Pvt Ltd. Noida – 201301.

UNIT I: Chapter 1 Section 1.1, 1.3, 1.4 [1]

UNIT II: Chapter 1 Section 1.1 to 1.11 [2]

UNIT III: Chapter 2 Section 2.1, 2.2, 2.2.1, 2.3, 2.3.1, 2.3.2, 2.4, 2.4.1 [3]

UNIT IV: Chapter 1 Section 1.1 to 1.7 [4]

UNIT V: Chapter 19 Section 19.1 to 19.5.1 [4]

REFERENCE BOOK(S)

1. Pillai R.S.N, Bagavathi V, 2005, Statistics, S. Chand & Company Ltd., New Delhi – 110055.
2. Manicavachagom Pillay T.K, Natarajan T, Ganapathy K.S, 2008, S. Viswanathan (Printers & Publishers) Pvt. Ltd., Chennai.
3. Pannerselvam R, 2013, Operation research, PHI Learning Private Limit Delhi – 110092.
4. Ramesh Chandra, 2005, Permutation and Combinations, Notion Press Media Pvt. Ltd., Chennai – 600095.
5. Ganesan R, Sreenivasaiah P. V, 2014, Textbook of Statistics, Write & Print Publications, New Delhi – 110052.

E-RESOURCES

1. <https://testbook.com/maths/permutations-and-combinations>
2. <https://www.statlect.com/matrix-algebra/>
3. <https://www.sciencedirect.com/science/article/pii/S0749208123000293>
4. <https://www.slideshare.net/slideshow/operations-research-unit1-notes/231340272>
5. www.pbs.org/wgbh/americanexperience/features/nash-game/

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	1	1	3	2	2	1	3	3	1
CLO2	3	3	2	3	2	1	3	2	2	2	3	2	2
CLO3	3	3	3	3	2	1	3	2	2	2	3	3	2
CLO4	3	3	3	3	2	1	1	3	2	3	2	3	3
CLO5	3	3	3	3	2	1	1	3	2	3	2	3	3
CLO6	2	2	3	2	3	2	1	1	3	3	3	2	3

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 2026–2027)

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester :II-CC-III: Differential Equations

Ins.Hrs./Week:4

Course Credit:4

Course Code: U26MA203

COURSE OBJECTIVES:

- To understand the basic concepts and solution methods of first-order differential equations, including separable, homogeneous, linear, Bernoulli's, and exact differential equations.
- To learn techniques for solving first-order higher-degree differential equations and special forms such as Clairaut's equation and homogeneous equations in two variables.
- To study second-order linear differential equations with constant and variable coefficients and apply methods such as particular integrals and variation of parameters.
- To understand the formation and solution of partial differential equations, including general, particular, and complete integrals using Lagrange's and Charpit's methods.
- To learn methods for solving second-order partial differential equations with constant coefficients and apply differential equation techniques to simple real-life and engineering problems.

UNIT-I :

(12 Hours)

Equations of the first order and first degree – Variable separable – Homogeneous, Non-homogeneous, Linear equations – Bernoulli's equation – Exact differential equations: Sufficient condition for exact differential equations – Practical rules for solving exact differential equations.

UNIT-II:

(12 Hours)

First order, higher degree differential equations– Equations solvable for dy/dx , solvable for y , solvable for x , Clairaut's form – Homogeneous equations in x and y – simple problems.

UNIT-III :

(12 Hours)

Particular integrals of second order differential equations with constant coefficients – Linear equations with variable coefficients – Method of Variation of Parameters (Omit third & higher order equations).

UNIT-IV :

(12 Hours)

Formation of Partial Differential Equation – General, Particular & Complete integrals – Solution of PDE of the standard forms - Lagrange's method - Charpit's method and few standard forms.

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

PDE of second order homogeneous equation with Constant coefficients – Particular integrals of the forms e^{ax+by} , $\sin(ax+by)$, $\cos(ax+by)$, $x^r y^s$ and $e^{ax+by}.f(x,y)$.

UNIT – VI Current Contours (For Continuous Internal Assessment Only – self study)

Applications of differential equations – Simple real-life problems using differential equations – Basic applications of PDE – Review of important methods from all five units.

Total Lecture Hours-60**COURSE OUTCOMES:**

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

1. Explain the fundamental concepts of first-order differential equations and solve separable, homogeneous, linear, Bernoulli's, and exact differential equations.
2. Analyze and solve first-order higher-degree differential equations, including equations solvable for Clairaut's form, and homogeneous equations.
3. Apply methods for obtaining complementary functions and particular integrals of second-order linear differential equations with constant coefficients and solve equations with variable coefficients.
4. Solve linear differential equations using the method of variation of parameters and interpret the obtained solutions.
5. Analyze the formation and solution of partial differential equations using general, particular, and complete integrals, Lagrange's method, and Charpit's method.
6. Apply techniques for solving second-order partial differential equations with constant coefficients and use differential equations to model and solve simple real-life problems.

TEXTBOOKS

1. T.K. Manicavachagam Pillay & S. Narayanan, Differential Equations, S. Viswanathan Publishers Pvt. Ltd., 1996.
2. Arumugam & Isaac, Differential Equations, New Gamma Publishing House, Palayamkottai, 2003.

UNIT – I : Chapter II – Sections 1,2,3,4,5,6 of [1]

UNIT – II : Chapter IV – Sections 1,2,3 & 4 of [1]

UNIT – III : Chapter V – Sections 1,2,3,4 & 5, Chapter VIII – Section 4 of [1]

UNIT – IV : Chapter XII – Sections 1 – 6 of [1]

UNIT – V : Chapter V of [2]

REFERENCE BOOKS:

1. M.D. Raisinghania , Ordinary and Partial Differential Equations, S. Chand & Co.
2. M.K. Venkatraman, Engineering Mathematics, S.V. Publications, 1985 Revised Edition.
3. Ross, S.L., 2014. Differential Equations. 3rd Edition. Wiley India Pvt. Ltd., New Delhi.

4. Simmons, G.F., 2017. Differential Equations with Applications and Historical Notes. 3rd Edition. CRC Press, Boca Raton.
5. Zill, D.G., 2018. A First Course in Differential Equations with Modeling Applications. 11th Edition. Cengage Learning, Boston.

E-RESOURCES

1. <https://nptel.ac.in>
2. www.math.hkust.edu.hk/~machas/differential-equations.pdf
3. https://en.wikipedia.org/wiki/Differential_equation
4. <https://link.springer.com/journal/10625/volumes-and-issues>

Course Learning Outcome (for Mapping with POs and PSOs)

	Pos												
	1	2	3	4	5	6	7	8	9	10	1	2	3
CLO1	3	1	3	2	3	3	2	1	2	3	3	1	1
CLO2	2	1	3	1	3	3	2	2	1	1	3	2	1
CLO3	3	2	3	1	2	3	1	2	2	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
CLO6	3	3	3	3	3	3	3	3	3	3	3	3	3

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 2026 – 2027)

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: II-CC- II: Laplace Transforms and Fourier Series with SCILAB

Ins. Hrs./Week: 4

Course Credit: 4

Course Code: U26MA204

COURSE OBJECTIVES:

- To understand the fundamental concepts and properties of Laplace transforms and their applications.
- To learn the techniques of inverse Laplace transforms and their use in solving differential equations.
- To study the convolution theorem, derivatives, and integrals in the context of Laplace transforms.
- To understand Fourier series, Fourier coefficients, and the representation of periodic functions.
- To develop computational skills in solving problems involving Laplace transforms and Fourier series using SCILAB.

UNIT-I:

(12 Hours)

Definition of Laplace transforms – Linearity property – Laplace transforms of standard functions – First shifting theorem – Change of scale property – Problems based on Laplace transforms.

UNIT-II:

(12 Hours)

Inverse Laplace transforms – Properties of inverse Laplace transforms – Convolution theorem – Laplace transforms of derivatives and integrals – Applications to simple differential equations.

UNIT-III:

(12 Hours)

Periodic functions – Fourier constants – Fourier series of functions with period 2π and $2l$ – Even and odd functions – Half range sine and cosine series – Simple problems.

UNIT-IV:

(12 Hours)

1. SCILAB Program for Laplace Transform of Standard Functions.
2. SCILAB Program for Verification of the Linearity Property of Laplace Transforms.
3. SCILAB Program for Laplace Transform using the First Shifting Theorem.
4. SCILAB Program for Inverse Laplace Transform.
5. SCILAB Program for Solving Simple Differential Equations using Laplace Transforms.

UNIT-V:

(12 Hours)

1. SCILAB Program for Finding Fourier Constants.
2. SCILAB Program for Fourier Series Expansion of a Function with Period 2π .
3. SCILAB Program for Fourier Series Expansion of a Function with Period $2l$.

4. SCILAB Program for Half-Range Sine Series.
5. SCILAB Program for Half-Range Cosine Series.

UNIT–VI: Current Contours (For Continuous Internal Assessment Only – self study)

Applications of Laplace Transforms and Fourier Series in signal processing, communication systems, control systems, image processing, heat transfer, vibration analysis and electrical engineering. Use of SCILAB for mathematical modelling and scientific computation.

Total Lecture Hours - 60

COURSE OUTCOMES:

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

1. Explain the concepts and properties of Laplace transforms and standard Laplace transforms of functions.
2. Apply inverse Laplace transforms, convolution theorem, and transform techniques to solve differential equations.
3. Analyze periodic functions and determine Fourier constants for Fourier series expansions.
4. Compute Fourier series of functions with period 2π and Period $2l$, including even and odd functions.
5. Construct half-range sine and cosine series for given functions.
6. Apply Laplace transforms and Fourier series to solve problems in mathematics, science, and Engineering using SCILAB.

TEXT BOOKS

1. Narayanan S and T.K. Manicavachagom Pillay, 2014, Calculus Volume III, S. Viswanathan Publishers.

UNIT – I Chapter 5: Sec. 5.1 to 5.5

UNIT – II Chapter 5: Sec. 5.6 to 5.11

UNIT – III Chapter 6: Sec. 6.1 to 6.6

REFERENCE BOOKS

1. Veerarajan T., 2019, *Engineering Mathematics*, McGraw Hill Education, New Delhi.
2. B.S. Grewal, 2020, *Higher Engineering Mathematics*, Khanna Publishers.
3. Murray R. Spiegel, 2018, *Laplace Transforms (Schaum's Outline Series)*, McGraw Hill.
4. Churchill and Brown, 2017, *Fourier Series and Boundary Value Problems*, McGraw Hill.
5. Serge Steer, 2021, *Introduction to SCILAB*, Scilab Enterprises.

E-RESOURCES

1. <https://nptel.ac.in>
2. <https://www.youtube.com/watch?v=XVJVuA4JiZo>
3. <https://www.youtube.com/watch?v=btPoJyLnnH4>
4. www.youtube.com/watch?v=czoZA3raJik

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	2	2	3	3	1	3	2	3	3	2	1
CLO2	1	2	3	1	3	3	1	1	2	3	3	3	1
CLO3	3	2	3	1	3	3	1	2	3	2	3	3	1
CLO4	2	3	1	2	3	3	1	3	2	2	3	2	1
CLO5	1	3	2	3	1	3	3	2	3	1	3	3	1
CLO6	3	3	3	3	3	3	3	3	3	3	3	3	3

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 2026 – 2027)

DEPARTMENT OF PHYSICS
(For the students of I B.Sc. Mathematics)

Semester: II - AC- II: Physics - II

Ins. Hrs. /Week: 3

Course Credit: 3

Course Code: U26APY203

COURSE OBJECTIVES:

- To understand the Coulomb's law and Gauss theorem and to gain a brief knowledge of capacitors.
- To acquire the knowledge on properties, types of magnetic materials and hysteresis of ferromagnetic material.
- To know atom models and understand the properties, types of x-rays and Crystal structure.
- To study the basics of nucleus and their properties, nuclear reaction, nuclear models and elementary particles.
- To learn the binary number system, binary arithmetic operations, logic gates and De-Morgan's theorem.

UNIT - I ELECTROSTATICS:

(12 Hours)

Coulomb's inverse square law – Gauss theorem and its applications - Intensity at a point due to a charged sphere and cylinder – Principle of a capacitor – Capacity of a spherical and cylindrical capacitors–Energy stored in a capacitor–Loss of energy due to sharing of charges – Capacitors in series and parallel–Types of capacitors.

UNIT – II MAGNETISM:

(11 Hours)

Intensity of magnetization – Susceptibility – Types of magnetic materials – Properties of para, dia and ferromagnetic materials– Cycle of magnetization – Hysteresis – B-H curve –Applications of B-Hcurve–Magnetic energy per unit volume–Ferro magnets and their applications.

UNIT - III ATOMIC PHYSICS:

(13 Hours)

Atom Models: Summerfield's and Vector atom Models – Pauli's exclusion principle –Various quantum number sand quantization of orbits.

X-rays: Continuous and Characteristic X-rays – Mosley's Law and its importance –Bragg's law – Miller indices – Determination of Crystal Structure by Laue's Powder photo graph method.

UNIT - IV NUCLEAR PHYSICS:

(11 Hours)

Introduction–Nucleus–Classification of Nuclei – Nuclear Size – Charge – Mass and Spin – Liquid drop model –Nuclear Radiations and their properties-Particle accelerators – Betatron – Proton Synchrotron – Four types of reactions –Elementary particles and their classifications.

UNIT - V DIGITAL ELECTRONICS:

(13 Hours)

Decimal–Binary Octal and Hexa Decimal number systems and their Mutual Conversions – 1's and 2's complement of a Binary number and Binary arithmetic (Addition, Subtraction, Multiplication and Division) – Binary Subtraction by 1's and 2's complement method – Basic logic gates –AND, OR, NOT – NAND, NOR and EX-OR gates – NAND and NOR as universal gates –De-Morgan's Theorems.

UNIT – VI: CURRENT CONTOURS (For Continuous Internal Assessment only – Self Study)

Magnetic and electromagnetic components- Atom interferometer- Nuclear reactor simulations – Cold fusion – Artificial intelligence – Electronic School books.

Total Lecture Hours - 45

COURSE OUTCOMES:

Upon completion of this course, the student would be able to

1. Understand Coulomb's law, Gauss theorem and gain a brief knowledge of capacitors.
2. Understand the properties, types of magnetic materials and hysteresis of ferromagnetic material.
3. Acquire the knowledge of atom models and X rays.
4. Know the basics of nucleus and their properties, nuclear reaction, nuclear models and elementary particles.
5. Learn the binary number system, binary arithmetic operations, logic gates and De-Morgan's Theorem.
6. Understand the knowledge of functions of logic gates.

TEXT BOOK(S)

1. R.Murugesan, Er.Kiruthiga Sivaprasath, *Modern Physics*, S.Chand & Co, New Delhi, First edition, 2024.
2. R.Murugesan, *Electricity and Magnetism*, S.Chand & Co, New Delhi, Third Revised Edition, 2022.
3. Brijlal & Subramanian, *Electricity and Magnetism*, Ratan Prakashan Mandir, 2023.
4. R.S.Sedha, *A text book of Digital Electronics*, S.Chand & Co, New Delhi, First Edition, 2021.

5. R.Murugesan, *Allied Physics Paper I and II*, S.Chand & Co, New Delhi, Revised Edition, 2022.
6. Arthur Beiser, Mahajan, Choudhury, *Concepts of Modern Physics*, Pustakkosh Publications, India, 2023.

REFERENCE BOOK(S)

1. Gurbinder Kaur, Gary R Pickrell, *Modern Physics*, Tata Mcgraw Hill Educational (P) Ltd, India, 2018.
2. Narayanamurthi, *Electricity and Magnetism*, The National Publishing Co, First Edition, 2021.
3. J.B.Rajam, *Atomic Physics*, S.Chand & Company Limited, New Delhi, First Edition, 2019.
4. B.N.Srivastava, *Basic Nuclear Physic*, Pragati Prakashan, Meerut, 2020.
5. Donald P.Leach, Albert Paul Malvino, Goutam Saha, *Digital principle and Applications*, Mc Graw-Hill Publishing Company, 6th Editions, New York, 2024.

E - RESOURCES

1. <https://wepdf.com/al/allied-physics>
2. <https://youtu.be/ufPSAYbyLhg?si=xBN6DXE8sAw8rBg4>
3. <https://nptel.ac.in/courses>
4. https://youtu.be/OzTUa4r0_M8?si=x-L1WJXw6V1cOUGR
5. <https://www.atoptics.co.uk/atoptics/blsky.htm>

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	3	2	2	3	3	3	3	3	3	3	3	2	3
CO2	2	2	3	3	2	2	3	2	3	3	3	3	3	3	2	3
CO3	3	2	3	3	2	2	3	2	2	3	3	3	3	3	2	2
CO4	3	3	2	3	2	2	3	2	3	3	3	3	3	3	3	3
CO5	3	3	2	3	2	2	3	3	3	3	3	3	3	3	3	2
CO6	2	2	3	2	1	2	2	1	3	2	2	3	3	3	2	2

S-Strong (3) M-Medium (2) L-Low (1)

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI – 614016

(For the Candidates admitted in the academic year 2026 – 2027)

DEPARTMENT OF PHYSICS

(For the students of I B.Sc. Mathematics)



Ins. Hrs. /Week: 3

Semester: II - AP- II: PHYSICS - II PRACTICAL

Course Credit: 3

Course Code: U26APY204P

COURSE OBJECTIVES

1. To understand the principles of electrical measurements and determine the specific resistance of materials using bridge circuits such as Meter Bridge and Carey Foster's Bridge.
2. To develop skills in the use of potentiometers for precision measurements, calibration of instruments, and determination of thermoelectric emf.
3. To study the characteristics and applications of semiconductor devices such as PN junction diodes and Zener diodes.
4. To design, construct, and analyze regulated power supply circuits using Zener diodes and integrated circuits.
5. To understand and verify the fundamental concepts of digital electronics through logic gates, universal gates, and Boolean algebra theorems.

List of Experiments (Any Seven Experiments):

1. Meter bridge–Determination specific resistance of a coil.
2. Carry Foster's Bridge – Determination of specific resistance of a coil.
3. Potentiometer – Calibration of a Low range voltmeter.
4. Construction of Zener/IC regulated power supply.
5. Determination of thermo emf using potentiometer
6. Characteristics of a Junction diode–Forward resistance and knee voltage.
7. Characteristics of a Zener diode – Break down voltage.
8. Basic logic gates – AND, OR and NOT gates using discrete components.
9. Basic logic gates – AND, OR and NOT gates using ICs.
10. Realizing NAND as a Universal gate.
11. Realizing NOR as a Universal gate.
12. Verification of De-Morgan's theorem.

Total Lecture Hours - 45

COURSE OUTCOMES

Upon successful completion of this course the students would be able:

1. Understand the Laboratory techniques.
2. Evaluate a process based on the results obtained from the experiments quantitatively and qualitatively.
3. Extend the scope of investigation as expected.
4. Communicate a process with help of the outcomes of an experiment.
5. Develop the skill of conducting an experiment collaboratively and ethically.
6. Understand the experimental skills in precision measurement, observation, and data analysis.

TEXT BOOK(S)

1. Dr. S. Somasundaram, Practical Physics, Apsara Publications, Tiruchirappalli, 2023.
2. R. Sasikumar, Practical Physics, PHI Learning Pvt. Ltd, New Delhi 2022.
3. C. L. Arora, *B.Sc. Practical Physics*, S. Chand & Company Pvt. Ltd., New Delhi, 2023.
4. S. L. Gupta and V. Kumar, *Practical Physics*, Pragati Prakashan, Meerut, 2022.
5. Indu Prakash and Ramakrishna, *A Text Book of Practical Physics*, Kitab Mahal Publishers, Allahabad, 2021.
6. Sanjay Sharma, *Basic Electronics and Linear Circuits Laboratory Manual*, Katson Books, New Delhi, 2021.

REFERENCE BOOK(S)

1. S. Srinivasan, A Text Book of Practical Physics., Sultan Chand Publications, 2022.
2. P. R. Sasi Kumar, *Practical Physics*, PHI Learning Pvt. Ltd., New Delhi, 2022.
3. N. Subrahmanyam and Brij Lal, *A Textbook of Optics*, S. Chand & Company Pvt. Ltd., New Delhi, 2023.
4. M. N. Avadhanulu and P. G. Kshirsagar, *A Textbook of Engineering Physics*, S. Chand & Company Pvt. Ltd., New Delhi, 2023.
5. A. P. Malvino and D. P. Leach, *Digital Principles and Applications*, McGraw-Hill Education, New York, 2024.
6. David J. Griffiths, *Introduction to Electrodynamics*, Pearson Education, New Delhi, 2015.

E - RESOURCES

1. <https://youtu.be/Q8Otf6k3uGk>
2. <https://youtu.be/8DhfUz0idwM>
3. https://youtu.be/TZWk5-8R5tc?si=ZFPUBa-FyFzH3z_R
4. <https://youtu.be/PlrpxROzgVg?si=lgZfsbiViyBPDcbV>
5. https://youtu.be/jPU_UzPYeCA?si=n_5VhjL-S5irHvFJ

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	3	2	2	3	3	3	3	3	3	3	1	2	3
CO2	2	2	3	3	2	2	3	2	3	3	3	3	3	3	2	3
CO3	3	2	3	3	2	2	3	2	2	3	3	3	3	1	2	2
CO4	3	3	2	3	2	2	3	2	3	3	3	3	3	3	3	3
CO5	3	3	2	3	2	2	3	3	3	3	3	3	3	1	3	2
CO6	2	2	3	3	2	1	3	2	2	2	2	3	2	2	2	2

S-Strong (3) M-Medium (2) L-Low (1)

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI-614 016

(For the Candidates admitted in the academic year 2026–2027)

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS



Semester: II- SEC- I: Statistics With Excel

Ins.Hrs./Week:2

Course Credit: 2

Course Code: U26SEMA21

COURSE OBJECTIVES:

1. To introduce the fundamental concepts, scope, and applications of Statistics and develop basic skills in data collection, classification, and tabulation.
2. To enable students to compute and interpret measures of central tendency and prepare statistical tables and charts using Microsoft Excel.
3. To develop the ability to analyse variability and relationship between variables through measures of dispersion and correlation with Excel applications.
4. To provide knowledge in graphical representation and visualization of statistical data for effective interpretation and decision-making using Excel tools.
5. To familiarize students with basic concepts of probability and regression analysis and apply Excel techniques for statistical computations and data analysis.

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

UNIT-VI: CURRENT CONTOUR (For Continuous Internal Assessment Only):

Study on Graphical Representation of Data-Coefficient of Correlation-Data Interpretation

Total Lecture Hours- 30

COURSE OUTCOMES:

After the completion of the course, 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.
6. Analyze statistical role in excel functions.

TEXT BOOK

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.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
CLO6	2	3	4	1	2	1	1	2	1	2	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 2026–2027)

DEPARTMENT OF MATHEMATICS
INTERDISCIPLINARY COURSE

Semester: II-IDC- II: Mathematics for Business Decision Making

Ins. Hrs./Week:2

Course Credit: 2

Course Code:U26IDMA22

Course Objectives

- To introduce mathematical techniques used in business decision making.
- To develop analytical and logical thinking skills.
- To apply quantitative methods in commercial and managerial situations.
- To enhance problem-solving abilities related to finance and business operations.
- To familiarize students with basic concepts of mathematical skills.

UNIT-I: Fundamentals of Business Mathematics (6 Hours)

Ratio and proportion – Percentage – Profit and loss – Discount – Commission and brokerage – Simple business applications and commercial calculations.

UNIT-II: Financial Mathematics (6 Hours)

Simple interest – Compound interest – Present value and future value – Annuities – Installment buying – Applications of financial mathematics in banking and commerce.

UNIT-III: Quantitative Techniques for Decision Making (6 Hours)

Average – Partnership – Time and work – Time, speed and distance – Mixture and allegation – Business problems using quantitative techniques.

.UNIT – IV: Data Analysis and Interpretation (6 Hours)

Collection and presentation of data – Tabulation – Bar charts and pie diagrams – Measures of central tendency: Mean, Median and Mode – Interpretation of business data and reports

UNIT – V: Logical Reasoning and Business Applications (6 Hours)

Number series – Coding and decoding – Blood relations – Direction sense test – Logical sequences – Analytical reasoning and decision-making problems in business situations.

UNIT-VI: CURRENT CONTOUR (For Continuous Internal Assessment Only-self-study):

Study on Graphical Representation of Data-Coefficient of Correlation-Data Interpretation-Basics of Decision Making-Quantitative Techniques-Central Tendency-Simple Interest and Compound Interest.

Total Lecture Hours- 30

COURSE OUTCOMES

After the completion of the course, the Students will be able to:

1. Apply basic business mathematics concepts to solve commercial problems.
2. Perform financial calculations related to interest, annuities, and investments.
3. Use quantitative techniques for business problem-solving and decision-making.
4. Analyze and interpret business data using statistical tools and graphical methods.
5. Develop logical reasoning and analytical skills for effective business decisions.
6. Execute the Role of Business Mathematics in all ways.

TEXT BOOK

1. Sancheti .D. C. and Kapoor. V. K. 2018, Business Mathematics, Sultan Chand & Sons.
2. Nishit K. Sinha , Logical Reasoning and Data Interpretation for CAT, Sixth Edition, Pearson India Education Services Private Limited.

UNIT I : Chapter 2, 3, 4, 5, and 6 of (1)

UNIT II : Chapter 7, 8, 9, and 10 of (1)

UNIT III : Chapter 1, 11, 12, 13, and 14 of (1)

UNIT IV : Chapter 15, 16, 17 of (1)

UNIT V : Chapter 1, 7, 8 of (2)

REFERENCE BOOK(S) :

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

E-RESOURCES

1. <https://www.khanacademy.org>
2. <https://nptel.ac.in>
3. <https://openstax.org/subjects/business>
4. <https://ocw.mit.edu>
5. <https://www.coursera.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	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
CLO6	2	3	4	1	2	1	1	2	1	2	3	2	1

Strong: 3

Medium: 2

Low: 1