MOTHER TERESA WOMEN'S UNIVERSITY
KODAIKANAL- 624101

DEPARTMENT OF MATHEMATICS

B.Sc. MATHEMATICS

Curriculum Framework, Syllabus, and Regulations

(Based on TANSCHE Syllabus under Choice Based Credit System - CBCS)

(For the candidates to be admitted from the Academic Year 2023-24)

NEW INITIATIVE IN MODERNISING

UNDER-GRADUATE PROGRAMMING

MATHEMATICS

Content

Preamble

In pursuit of the Higher Education Department Policy Note 2022-23 Demand 20, Section1.4, TamilNadu State Council for Higher Education too kinitiative to revamp the curriculum. On 27 July 2022, a meeting was convened by the Member-Secretary Dr. S.Krishnasamy enlightening the need of the hour to restructure the curriculum of both Under-graduate and Post-graduate programmes based on the speeches at the TamilNadu Legislative Assembly Budget meeting by the Honourable Higher EducationMinister Dr K. Ponmudy and Honourable Finance Minister Dr. P. Thiagarajan.At present there are three different modes of imparting education in most of the educational institutions throughout the globe. Outcome Based Education, Problem Based Education, and Project Based Education.

Now our Honourable Higher Education Minister announced Industry Aligned Education. During discussion, Member Secretary announced the importance of question papers and evaluation as envisaged by the Honourable Chief Secretary to Government Dr.V.Irai Anbu. This is very well imbedded in Revised Bloom's Taxonomy.

Taxonomy forms three learning domains: the cognitive (knowledge), affective (attitude), and psychomotor (skill). This classification enables to estimate the learning capabilities of students.

Briefly, it is aimed to restructure the curriculum as student-oriented, skill-based, and institution-industry-interaction curriculum with the various courses under

"Outcome Based Education with Problem Based Courses, Project Based Courses, and Industry Aligned Programmes" having revised Bloom's Taxonomy for evaluating student's skills.

Three domains

(i) CognitiveDomain

(Lower levels: K1: Remembering; K2: Understanding; K3: Applying;

Higher levels: K4: Analysing; K5: Evaluating; K6: Creating)

(ii) Affective Domain

(iii) Psychomotor Domain

1. INTRODUCTION

B.Sc. Mathematics: Programme Outcome, Programme Specific Outcome and Course Outcome

Mathematics is the study of quantity, structure, space and change, focusing on problem solving, with wider scope of application in science, engineering, technology, social sciences etc. The key core areas of study in Mathematics include Algebra, Analysis (Real & Complex), Differential Equations, Geometry, and Mechanics. The Bachelor's Degree B.Sc. Mathematics is awarded to the students on the basis of knowledge, understanding, skills, attitudes, values and academic achievements expected to be acquired by learners at the end of the Programme. Learning outcomes of Mathematics are aimed at facilitating the learners to acquire these attributes, keeping in view of their preferences and aspirations for gaining knowledge of Mathematics.

Bachelor's degree in Mathematics is the culmination of in-depth knowledge of algebra, calculus, geometry, differential equations and several other branches of Mathematics. This also leads to study of related areas like Computer science, Financial Mathematics, Statistics and many more. Thus, this programme helps learners in building a solid foundation for higher studies in Mathematics. The skills and knowledge gained have intrinsic aesthetics leading to proficiency in analytical reasoning. This can be utilised in Mathematical modelling and solving real life problems.

Students completing this programme will be able to present Mathematics clearly and precisely, make abstract ideas precise by formulating them in the language of Mathematics, describe Mathematical ideas from multiple perspectives and explain fundamental concepts of Mathematics to non-Mathematicians.

Completion of this programme will also enable the learners to join teaching profession, enhance their employability for government jobs, jobs in banking, insurance and investment sectors, data analyst jobs and jobs in various other public and private enterprises.

UNDER GRADUATE PROGRAMME

Programme Outcomes:

PO1: Disciplinary Knowledge: Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.

PO2: Critical Thinking: Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development.

PO3: Problem Solving: Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's earning to real life situations.

PO4: Analytical Reasoning: Ability to 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.

PO5: Scientific Reasoning: Ability to analyse, interpret and draw conclusions from quantitative / qualitative data; and critically evaluate ideas, evidence, and experiences from an open minded and reasoned perspective.

PO6: Self-directed & Lifelong Learning: Ability to work independently, identify and manage a project. Ability to acquire knowledge and skills, including "learning how to learn", through self-placed and self-directed learning aimed at personal development, meeting economic, social and cultural objectives.

B.Sc. MATHEMATICS

Programme Specific Outcomes:

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.

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)can be carried out accordingly, assigning theappropriate level in the grids:

	POs							PSOs		
	1	2	3	4	5	6	…	1	2	…
CLO1										
CLO2										
CLO3										
CLO4										
CLO5										

Highlights of the Revamped Curriculum:

- Student-centric, meeting the demands of industry & society, incorporating industrial components, hands-on training, skill enhancement modules, industrial project, project with viva-voce, exposure to entrepreneurial skills, training for competitive examinations, sustaining the quality of the core components and incorporating application-oriented content wherever required.
- The Core subjects include latest developments in the education and scientific front, advanced programming packages allied with the discipline topics, practical training, devising mathematical models and algorithms for providing solutions to industry / real life situations. The curriculum also facilitates peer learning with advanced mathematical topics in the final semester, catering to the needs of stakeholders with research aptitude.
- The General Studies and Mathematics based problem solving skills are included as mandatory components in the 'Training for Competitive Examinations' course at the final semester, a first of its kind.
- The curriculum is designed so as to strengthen the industry-Academia interface and provide more job opportunities for the students.
- The Industrial Statistics course is newly introduced in the fourth semester, to expose the students to real life problems and train the students on designing a mathematical model to provide solutions to the industrial problems.
- The Internship during the second-year vacation will help the students gain valuable work experience, that connects classroom knowledge to real world experience and to narrow down and focus on the career path.
- Project with viva-voce component in the fifth semester enables the student, application of conceptual knowledge to practical situations. The state of art technologies in conducting a Explain in a scientific and systematic way and arriving at a precise solution is ensured. Such innovative provisions of the industrial training, project and internships will give students an edge over the counterparts in the job market.
- State-of Art techniques from the streams of multi-disciplinary, cross disciplinary and inter disciplinary nature are incorporated as Elective courses, covering conventional topics to the latest - Artificial Intelligence.

Value additions in the Revamped Curriculum:

Semester	Newly introduced Components	Outcome / Benefits
I	**Foundation Course** To ease the transition of learning from higher secondary to higher education, providing an overview of the pedagogy of learning abstract Mathematics and simulating mathematical concepts to real world.	• Instil confidence among students • Create interest for the subject
I, II	**Skill Enhancement papers** (Discipline centric / Generic / Entrepreneurial)	• Industry ready graduates • Skilled human resource • Students are equipped with essential skills to make them employable
		• Training on Computing / Computational skills enable the students gain knowledge and exposure on latest computational aspects
		• Data analytical skills will enable students gain internships, apprenticeships, field work involving data collection, compilation, analysis etc.
		• Entrepreneurial skill training will provide an opportunity for independent livelihood • Generates self – employment • Create small scale entrepreneurs • Training to girls leads to women empowerment
		• Discipline centric skill will improve the technical knowhow of solving real life problems using ICT tools

Skills acquired from the Courses	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill

1. Template for Curriculum Design for UG Programme in Mathematics

Credit Distribution for UG Programme in Mathematics

B.Sc Mathematics
First Year
Semester-I

Part	List of Courses	Credit	Hours per week (L/T/P)
Part-I	Language -1-Tamil	3	6
Part-II	Language-2-English	3	6
Part-III	Core Courses 2 (CC1, CC2)	10	10
	Elective Course 1 (Departmental) EC1	3	4
	Skill Enhancement Course SEC-1 (Subject Based)	2	2
Part-IV	Foundation Course FC (Subject Based)	2	2
		23	**30**

Semester-II

Part	List of Courses	Credit	Hours per week (L/T/P)
Part-I	Language -1-Tamil	3	6
Part-II	Language -2-English	3	6
Part-III	Core Courses 2 (CC3, CC4)	10	10
	Elective Course 1 (Departmental) EC2	3	4
	Skill Enhancement Course -SEC-2 (Soft Skills)	2	2
Part-IV	Skill Enhancement Course -SEC-3 (Subject Based)	2	2
		23	**30**

2. Credit Distribution for UG Programme in Mathematics

Sem I	Credit	Sem II	Credit
1.1. Language	3	2.1. Language	3
1.2 English	3	2.2 English	3
1.3 Core Course – CC I	5	2.3 Core Course – CC III	5
1.4 Core Course – CC II	5	2.4 Core Course – CC IV	5
1.5 Elective I Departmental Elective	3	2.5 Elective II Departmental Elective	3
1.6 Skill Enhancement Course SEC-1 (Subject)	2	2.6 Skill Enhancement Course SEC-2 (Soft Skill)	2
		2.7 Skill Enhancement Course –SEC-3 (Subject)	2
1.7 Foundation Course (Subject)	2		
	23		23

3. Consolidated Semester wise and Component wise Credit distribution

Parts	Sem I	Sem II	Sem III	Sem IV	Sem V	Sem VI	Total Credits
Part I	3	3					
Part II	3	3					
Part III	13	13					
Part IV	4	4					
Part V	-	-					
Total	23	23					

- Part I. II, and Part III components will be separately taken into account for CGPA calculation and classification for the under graduate programme and the other components. IV, V haveto be completed

  during the duration of the programme as per the norms, to be eligiblefor obtaining the UG degree.

WRITTEN EXAMINATION QUESTION PAPER PATTERN

Theory Paper (Bloom's Taxonomy based)

(Common for UG, PG, Certificate, Diploma and P.G.Diploma Programmes)

<table>
<tr><td>Intended Learning Skills</td><td>Maximum 75 Marks
Passing Minimum: 50%
Duration: Three Hours</td></tr>
<tr><td rowspan="3">Memory Recall/Example/ Counter Example / Knowledge about the Concepts/Understanding</td><td>Part–A (10x2=20Marks)
Answer ALL questions
Each Question carries 2 marks</td></tr>
<tr><td>Two questions from each Unit</td></tr>
<tr><td>Question 1 toQuestion10</td></tr>
<tr><td rowspan="3">Descriptions/Application (problems)</td><td>Part–B (5x5=25Marks)
Answer ALL questions
Each question carries 5 Marks</td></tr>
<tr><td>Either - or Type
Both parts of each question from the same Unit</td></tr>
<tr><td>Question 11 (a) or 11(b)
to
Question 15(a) or 15(b)</td></tr>
<tr><td rowspan="3">Analysis/Synthesis / Evaluation</td><td>Part-C (3x 10 = 30 Marks)
Answer any THREE questions
Each question carries 10 Marks</td></tr>
<tr><td>There shall be FIVE questions covering all the five units</td></tr>
<tr><td>Question 16 to Question 20</td></tr>
</table>

4. Illustration for B.Sc. Mathematics Curriculum Design

First Year Semester-I

Part	Course Code	Course Title	Credit	Hours per week (L/T/P)	CIA	ESE	Total Marks
Part-I	U23TAL11	Language-1- Tamil	3	6	25	75	100
Part-II	U23ENL21	Language-2- English	3	6	25	75	100
Part-III	U23MAT11	Core 1: Algebra & Trigonometry	5	5	25	75	100
	U23MAT12	Core 2: Differential Calculus	5	5	25	75	100
	U23MAA11	Elective-1: Allied-I : Theory : Physics / Chemistry	3	4	25	75	100
Part-IV	U23MAS11	Skill Enhancement Course SEC-1: Computational Mathematics	2	2	25	75	100
	U23MAF11	Foundation Course FC – Bridge Mathematics	2	2	25	75	100
			23	**30**			

Semester-II

Part	Course Code	List of Courses	Credit	Hours per week (L/T/P)	CIA	ESE	Total Marks
Part-I	U23TAL12	Language-1- Tamil	3	6	25	75	100
Part-II	U23ENL22	Language-2- English	3	6	25	75	100
Part-III	U23MAT23	Core -3: Analytical Geometry (Two & Three Dimensions)	5	5	25	75	100
	U23MAT24	Core 4: Integral Calculus	5	5	25	75	100
	U23MAA22	Elective -2: Allied-II : Theory/ Practical : Physics / Chemistry	3	4	25	75	100
Part-IV	U23MAS22	Skill Enhancement Course – SEC-2(Soft Skill)	2	2	25	75	100
	U23MAS23	Skill Enhancement Course –SEC-3 - Web Designing	2	2	25	75	100
			23	**30**			

CORE COURSE SYLLABUS

Course Learning Outcome

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

CLO 1: Prove the binomial theorem and apply it to find the expansions of any $(x + y)^n$ and also, solve the related problems

CLO 2: Find the various sequences and series and solve the problems related to them. Explain the principle of counting.

CLO 3: Find the number of permutations and combinations in different cases. Apply the principle of counting to solve the problems on permutations and combinations.

CLO 4: Explain various trigonometric ratios and find them for different angles, including sum of the angles, multiple and sub multiple angles, etc. Also, they can solve the problems using the transformations.

CLO 5: Find the limit and derivative of a function at a point, the definite and indefinite integral of a function.Find the points of min/max of a function.

Mapping of Course Learning Outcomes (CLOs) with Programme Learning Outcomes(PLOs)and Programme Specific Outcomes(PSOs)

	POs						PSOs	
	1	2	3	4	5	6	1	2
CLO1	1	1	1	1	1	1	1	1
CLO2	2	1	1	2	2	1	2	1
CLO3	2	1	1	2	2	1	2	1
CLO4	1	1	1	1	1	1	2	1
CLO5	1	1	1	1	1	1	2	1

<table>
<tr><td colspan="2">Title of the Course</td><td colspan="8">U23MAT11 - ALGEBRA & TRIGONOMETRY</td></tr>
<tr><td colspan="2">Paper Number</td><td colspan="8">CORE 1</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>I</td><td rowspan="2">Credits</td><td rowspan="2">5</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>I</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours perweek</td><td colspan="2">Lecture</td><td colspan="2">Tutorial</td><td colspan="2">Lab Practice</td><td>Total</td></tr>
<tr><td colspan="2">4</td><td colspan="2">1</td><td colspan="2">--</td><td>5</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="8">12th Standard Mathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="8">• Basic ideas on the Theory of Equations, Matrices and Number Theory.
• Knowledge to find expansions of trigonometry functions, solve
The oretical and applied problems.</td></tr>
<tr><td colspan="2" rowspan="3">Course Outline</td><td colspan="8">UNIT I: Reciprocal Equations-Standard form–Increasing or decreasing the roots of a given equation- Removal of terms, Approximate solutions of roots of polynomials by Horner’s method–related problems.
Chapter-6 Section-16, 16.1, 16.2, 17, 19, 30</td></tr>
<tr><td colspan="8">UNIT II: Summation of Series: Binomial– Exponential –Logarithmic series (Theoremswithoutproof)–Approximations-relatedproblems.
Chapter-3 Section-10
Chapter-4 Sections-3.1, 3.5, 3.6, 3.7</td></tr>
<tr><td colspan="8">UNIT III: Characteristic equation –Eigen values and EigenVectors-Similar matrices -Cayley –Hamilton Theorem (Statementonly)-Finding powers of square matrix, Inverse of a square matrix up to order 3, Diagonalization of square matrices -related problems.
Chapter 2-Sections-16, 16.1 to 16.4</td></tr>
</table>

	UNIT IV: Expansions of sinnθ, cosnθ in powers of sinθ, cosθ - Expansion of tannθ in terms of tan θ, Expansions of $\cos^n\theta$, $\sin^n\theta$, $\cos^m\theta\sin^n\theta$ –Expansions of tan $(\theta_1+\theta_2+\ldots+\theta_n)$-Expansions of sinθ, cosθ and tanθ in terms of θ - related problems. **Chapter 2 Sections 2.1, 2.1.1, 2.1.2** **Chapter 3 Sections 3.1, 3.1.1 to 3.4.3**
	Unit V: Hyperbolic functions – Relation between circular and hyperbolic functions Inverse hyperbolic functions, Logarithm of complex quantities, Summation of trigonometric series - related problems. **Chapter 4 Sections 4.1 to 4.7 Chapter 5-Sec 5.3** **Chapter 6 Sections 6.1.to 6.6**
Extended Professional Component (is apart of internal component only, not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC / TNPSC / others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this course	Knowledge, problem solving, analytical ability, professional competency, professional communication and transferable skill.
Textbooks	1. Algebra, Volume I by T.K. Manicavachagom Pillay, T. Natarajan, K.S.Ganapathy,ViswanathanPublication2007, **Unit–1 and Unit–2.**
	2. Algebra, Volume II by T.K.Manicavachagom Pillay,T.Natarajan,K.S.Ganapathy,ViswanathanPublication2008 **Unit-3.**
	3. Trigonometry by P.Duraipandian and KayalalPachaiyappa,Muhilpublishers, **Unit–4, Unit–5.**

Reference Books	1.Burnstine and A.W. Panton, Theory of equations 2. David C. Lay, Linear Algebra and its Applications, 3rd Ed., Pearson Education Asia, Indian Reprint, 2007. 3. B. Thomas and R.L. Finney, Calculus, 9th Ed., Pearson Education, Delhi, 2005. 4.Durell and A. Robson, Advanced Trigonometry, Courier Corporation, 2003. 5. Stewart, L. Redlin, and S. Watson, Algebra and Trigonometry, Cengage Learning, 2012. 6. Calculus and Analytical Geometry, G.B. Thomas and R. L. Finny, Pearson Publication, 9th Edition, 2010. .
Website and e-Learning Source	https://www.mathwarehouse.com/ https://www.mathhelp.com/ https://www.mathsisfun.com/

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO 1: Classify and Solve reciprocal equations

CLO 2: Find the sum of binomial, exponential and logarithmic series

CLO 3: Find Eigen values, eigen vectors, verify Cayley – Hamilton theorem and diagonalize a given matrix

CLO 4: Expand the powers and multiples of trigonometric functions in terms of sine and cosine

CLO 5: Determine relationship between circular and hyperbolic functions and the summation of trigonometric series

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO1	3	1	3	-	-	-	3	2	1
CLO2	2	1	3	1	-	-	3	2	1
CLO3	3	1	3	1	-	-	3	2	1
CLO4	3	1	3	-	-	-	3	2	1
CLO5	3	1	3	-	-	-	3	2	1

<table>
<tr><td colspan="2">Title of the Course</td><td colspan="6">U23MAT12 - DIFFERENTIAL CALCULUS</td></tr>
<tr><td colspan="2">Paper Number</td><td colspan="6">CORE 2</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>I</td><td rowspan="2">Credits</td><td rowspan="2">5</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>I</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours Perweek</td><td colspan="2">Lecture</td><td colspan="2">Tutorial</td><td>Lab Practice</td><td>Total</td></tr>
<tr><td colspan="2">4</td><td colspan="2">1</td><td>--</td><td>5</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">12th Standard Mathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">• The basic skills of differentiation, successive differentiation, and their applications.
• Basic knowledge on the notions of curvature, evolutes, involutes and polar co-ordinates and in solving related problems.</td></tr>
<tr><td colspan="2" rowspan="3">Course Outline</td><td colspan="6">UNIT- I: Successive Differentiation: Introduction (Review of basic concepts) – The n^{th} derivative – Standard results – Fractional expressions – Trigonometrical transformation – Formation of equations involving derivatives – Leibnitz formula for the n^{th} derivative of a product – Feynman’s method of differentiation.
Chapter 3 Sections 1.1– 1.6 and Section2.1and 2.2</td></tr>
<tr><td colspan="6">UNIT- II: Partial Differentiation: Partial derivatives – Successive partial derivatives – Function of a function rule – Total differential coefficient – A special case – Implicit Functions.
Chapter 8 Sections 1.1 –1.5</td></tr>
<tr><td colspan="6">UNIT- III: Partial Differentiation (Continued): Homogeneous functions – Partial derivatives of a function of two variables – Maxima and Minima of functions of two variables - Lagrange’s method of undetermined multipliers.
Chapter 8 Sections 1.6, 1.7, Sections 4 and 5</td></tr>
</table>

	UNIT- IV: Envelope: Method of finding the envelope – Another definition of envelope – Envelope of family of curves which are quadratic in the parameter. **Chapter 9 Sections 1.1–1.4**
	UNIT- V: Curvature: Definition of Curvature – Circle, Radius and Centre of Curvature – Evolutes and Involutes – Radius of Curvature in Polar Co-ordinates. **Chapter 9 Sections 2.1, 2.2** and **2.5 –2.7**
Extended Professional Component (is a part of internal component only, not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC/ /TNPSC / others to be solved (To be discussed during theTutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferable Skill
Textbook	1.S. Narayanan and T.K. Manickavachagom Pillay, CalculusVolumeI-S. Viswanathan Publishers Pvt. Ltd.2006
ReferenceBooks	1. G.B.Thomas and R.L.Finney,Calculus,PearsonEducation,2010. 2. M.J.Strauss,G.L.Bradley and K.J.Smith,Calculus, 3rdEd., Dorling Kindersley (India) P.Ltd. (Pearson Education), Delhi, 2007. 3. R.Courant and F.John, Introduction to Calculus and Analysis (Volumes I & II), Springer-Verlag, NewYork, Inc., 1989. 4. T.Apostol,Calculus,Volumes I and II.
Website and e-Learning Source	https://nptel.ac.in https://www.mathwarehouse.com/ https://www.mathhelp.com/

Course Learning Outcome (for Mapping with PLOs and PSOs)

Students will be able to

CLO 1: Find the nth derivative, form equations involving derivatives and apply Leibnitz formula

CLO 2: Find the partial derivative and total derivative coefficient

CLO 3: Determine maxima and minima of functions of two variables and to use the Lagrange's method of undetermined multipliers

CLO 4: Find the envelope of a given family of curves

CLO 5: Find the evolutes and involutes and to find the radius of curvature using polar co-ordinates

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO1	3	1	3	-	-	-	3	2	1
CLO2	2	1	3	-	-	-	3	2	1
CLO3	3	2	3	2	-	-	3	2	1
CLO4	3	2	3	2	1	-	3	2	1
CLO5	3	2	3	2	1	-	3	2	1

<table>
<tr><td colspan="2">Title of the Course</td><td colspan="8">ANALYTICAL GEOMETRY (Two &Three Dimensions)
U23MAT23</td></tr>
<tr><td colspan="2">Paper Number</td><td colspan="8">CORE 3</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>I</td><td rowspan="2">Credits</td><td rowspan="2">5</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>II</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours
Per week</td><td colspan="2">Lecture</td><td colspan="2">Tutorial</td><td colspan="2">Lab Practice</td><td>Total</td></tr>
<tr><td colspan="2">4</td><td colspan="2">1</td><td colspan="2">--</td><td>5</td></tr>
<tr><td colspan="2">Pte-requisite</td><td colspan="8">12th Standard Mathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="8">• Necessary skills to analyze characteristics and properties of two- and three-dimensional geometric shapes.
• To present mathematical arguments about geometric relationships.
• To solve real world problems on geometry and its applications.</td></tr>
<tr><td colspan="2" rowspan="4">Course Outline</td><td colspan="8">UNIT- I: Pole, Polar - conjugate points and conjugate lines – diameters – conjugate diameters of an ellipse - semi diameters- conjugate diameters of hyperbola...
Text Book 1- Chapter 7: Sections 7.1 to 7.3, Chapter 8 Section 8.1 to 8.5.</td></tr>
<tr><td colspan="8">UNIT-II: Polar coordinates: General polar equation of straight line – Polar equation of a circle given a diameter, Equation of a straight line, circle, conic – Equation of chord, tangent, normal. Equations of the asymptotes of a hyperbola.
Text Book 1- Chapter 10: Sec 10.1 to 10.8.</td></tr>
<tr><td colspan="8">UNIT- III: System of Planes-Length of the perpendicular–Orthogonal projection.
Text Book 1- Chapter 2: Sec 2.1 to 2.10</td></tr>
<tr><td colspan="8">UNIT- IV: Definitions of a cone, vertex, guiding curve, generators, Equation of the cone with a given vertex and guiding curve. Enveloping cone of a sphere, Equations of cones with vertex at orgin are homogeneous – Condition that the general equation of the second degree should represent a cone-Condition that a cone may have three mutually perpendicular</td></tr>
</table>

	generators-Intersection of a line and a quadrio cone. Tangent lines and tangent plane at a point, Condition that a plane may touch a cone. Reciprocal cones- Intersection of two cones with a common vertex- Right circular cone. Equation of the right circular cone with a given vertex, axis and semi-vertical angle. **Text Book 2- Chapter 7: Sec 7.1 to 7.6**
	UNIT- V: Definitions of a cylinder. Equation to the cylinder whose generators intersect a given conic and are parallel to a given line. Enveloping cylinder of a sphere- The right circular cylinder. Equations of the right circular cylinder with a given axis and radius. **Text Book 2- Chapter: Sec 7.7 to 7.8**
Extended Professional Component (is a part of internal component only, not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC / TNPSC / others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill.
TextBooks	1. Analytical Geometry of 2D by P. Duraipandian-Muhil publishers for Unit–1 and 2. 2. Analytical Solid Geometry of 3D by Shanthi Narayan and Dr.P.K. Mittal-S. Chand & amp; Co.Pvt.Ltd.-for Unit –3 to 5.
Reference Books	1. S.L. Loney, Co-ordinate Geometry. 2. Robert J.T. Bell, Co-ordinate Geometry of Three Dimensions. 3. Calculus and Analytical Geometry, G.B. Thomas and R.L. Finny, Pearson Publication,9thEdition,2010. 4. WilliamH. McCrea, Analytical Geometry of Three Dimensions, Dover Publications, Inc, NewYork, 2006. 5. John F. Randelph, Calculus and Analytic Geometry, Wadsworth Publishing Company, CA, USA, 1969.

	6. Ralph Palmer Agnew, Analytic Geometry and Calculus with Vectors, McGraw-Hill Book Company, Inc. New York,1962.
Website and e-Learning Source	https://nptel.ac.inhttps://www.mathwarehouse.com/https://www.mathhelp.com/ https://www.mathsisfun.com/

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO 1: Find pole, polar for conics, diameters, conjugate diameters for ellipse and hyperbola

CLO 2: Find the polar equations of straight line and circle, equations of chord, tangent and normal and to find the asymptotes of hyperbola

CLO 3: Explain in detail the system of Planes

CLO 4: Explain in detail the system of Straight lines

CLO 5: Explain in detail the system of Spheres

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO1	2	2	2	1	-	-	3	2	1
CLO2	2	2	2	1	-	-	3	2	1
CLO3	3	2	2	1	-	-	3	2	1
CLO4	3	2	3	1	-	-	3	2	1
CLO5	3	2	3	1	-	-	3	2	1

<table>
<tr><td colspan="2">Title of the Course</td><td colspan="6">U23MAT24 - INTEGRAL CALCULUS</td></tr>
<tr><td colspan="2">Paper Number</td><td colspan="6">CORE 4</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>I</td><td rowspan="2">Credits</td><td rowspan="2">5</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>II</td></tr>
<tr><td colspan="2" rowspan="2">InstructionalHours Per week</td><td colspan="2">Lecture</td><td colspan="2">Tutorial</td><td>Lab Practice</td><td>Total</td></tr>
<tr><td colspan="2">4</td><td colspan="2">1</td><td>--</td><td>5</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">12th StandardMathematics</td></tr>
<tr><td colspan="2">Objectives of theCourse</td><td colspan="6">• Knowledge on integration and its geometrical applications, double, triple integrals and improper integrals.
• Knowledge about Beta and Gamma functions and their applications.
• Skills to Determine Fourier series expansions.</td></tr>
<tr><td colspan="2" rowspan="4">CourseOutline</td><td colspan="6">UNIT- I: 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, Feyman’s technique of integration.
Chapter 1 Section 13, 13.1 to 13.10, 14, 15.1</td></tr>
<tr><td colspan="6">UNIT- II: Multiple Integrals - definition of double integrals - evaluation of double integrals – double integrals in polarcoordinates-Change o forder of integration.
Chapter 5 Sections 1, 2.1, 2.2, 3.1.</td></tr>
<tr><td colspan="6">UNIT- III: Triple integrals –applications of multiple integrals -volumes of solids of revolution - areas of curved surfaces–changeofvariables-Jacobian. Chapter 5 Sections 4, 5.1 to 5.3, 6.1 to 6.3 & Section 7
Chapter 6 Sections 1.1, 1.2, 2.1 to 2.4</td></tr>
<tr><td colspan="6">UNIT- IV: Beta and Gamma functions – infinite integral -definitions– recurrence formula of Gamma functions –properties of Beta and Gamma functions- relation between Beta and Gamma functions - Applications.
Chapter 7 Sections 1.1 to 1.4, 2.1, 2.3, 3 to 6</td></tr>
</table>

	UNIT-V: Geometric and Physical Applications of Integralcalculus. **Chapter 2 Sections 1.4, 2.1, 2.2, 4, 4.1, 4.2 & 5** **Chapter 3 Sections 1.1 to 1.5, 2.1 to 2.7**
Extended Professional Component (is a part of internal component only, not to be included in the External Examination question paper).	Questions related to the above topics, from various competitive examinations UPSC / TNPSC / others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Textbook	1. Calculus, Volume II, by S. Narayanan and T.K. Manicavachagom Pillay. –S. Viswanathan, Publishers-2007.
Reference Book	1. H. Anton, I. Birens and S. Davis, Calculus, John Wiley and Sons, Inc., 2002. 2. G.B. Thomas and R.L. Finney, Calculus, Pearson Education, 2007. 3. P. Dyke, An Introduction to Laplace Transforms and Fourier Series, Springer Undergraduate Mathematics Series, 2001(second edition). 4. D.Chatterjee, Integral Calculus and Differential Equations, Tata-McGraw Hill Publishing Company Ltd.
Website and e-Learning Source	https://nptel.ac.in https://www.mathwarehouse.com/ https://www.mathhelp.com/ https://www.mathsisfun.com/

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO 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

CLO 2: Applications of the operator ‘del’ and to Explain soleonidal and ir-rotational vectors

CLO 3: Solve simple line integrals

CLO 4: Solve surface integrals and volume integrals

CLO 5: Verify the theorems of Gauss, Stoke’s and Green’s (Two Dimension)

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO1	3	1	3	-	-	-	3	2	1
CLO2	3	1	3	-	-	-	3	2	1
CLO3	3	1	3	-	-	-	3	2	1
CLO4	3	1	3	-	-	-	3	2	1
CLO5	3	1	3	-	2	1	3	2	1

DEPARTMENTAL ELECTIVE COURSES

ALLIED MATHEMATICS

Syllabus

Course Code EC 1	ALLIED MATHEMATICS –I U23MAA11		Credits 3
Year & Semester: I YEAR & I SEMESTER	**Course Category**	**ELECTIVE**	**Total:(L+T+P) Per week: 3+1= 4**

Course Objectives

- To explore the fundamental concepts of Mathematics.
- To acquire knowledge about finding approximate rootsof the polynomial equations.
- To improve students' ability in applications of matrices and calculus.
- Students are exposed to understanding the concept of derivatives and their applications.
- To exposed on able and triple integrals and their applications.

UNIT	Details	No. of Hours
I	**SOLUTIONS OF TRANSCENDENTAL AND ALGEBRAIC EQUATIONS** Iteration method, Bisection method, Newton's method - RegulaFalsi method, Horner's method (without proof) (Simple problemsonly) **Chapter1** **Text Book 1**	**12**
II	**SOLUTIONS OF SIMULTANEOUSE QUATIONS** Gauss Elimination method - Gauss Jordan method –GaussSeidel Iterative method - Gauss Jacobi method (Restricted tothree variablesonly)(Simpleproblemsonly) **Chapter2** **Text Book 1**	**12**
III	**MATRICES** Characteristic equation of a square matrix– Eigen values andeigen vectors – Cayley – Hamilton theorem [without proof] – Verificationand computationofinversematrix. **Chapter1-Sec– 1.1.1,1.1.2,1.2,1.4.3**	**12**

	Text Book 2	
IV	**DIFFERENTIAL CALCULUS** n-th derivatives – Leibnitz theorem [without proof] andapplications–Jacobians–Curvatureand radius ofcurvatureinCartesian co-ordinatesand polar co-ordinates. **Chapter2 Sec–2.7,4.1,4.1.1,4.2** **Text Book 2**	**12**
V	**APPLICATION OF INTEGRATION** Evaluation of double, triple integrals – Simple applications toarea,volume, and centroid. **Chapter3 Sec-3.4,3.4.1,3.5.1,3.5.2,3.6** **Text Book 2**	**12**
	Total	**60**

Course Outcomes	
CO	On completion of this course, students will able to
1	Find out the approximate roots of polynomial equations.
2	Develop the skills of finding roots of simultaneous equations
3	Demonstrate knowledge about matrices and their applications
4	Carryout calculations of problems related to curvature and radius of curvature.
5	Evaluate double and triple Integrals, and enabled to underst and the Applications of integration in real-life situations.
Text Book	
1	P. Kandasamy, K. Thilagavathy, Calculus of Finite differences & Numerical Analysis, S. Chand& CompanyLtd.,NewDelhi-55, 2003
2	P. Duraipandian and Dr.S. Udayabaskaran, Allied Mathematics,VolI&II. Chennai: Muhil Publishers 1997.
Reference Books	
1	S.J. Venkatesan,"AlliedMathematics-I", SriKrishnaPublications,Chennai.
2	P.R. Vittal (2003),"AlliedMathematics",MarghamPublication,Chennai.
3	A. Singaravelu, "NumericalMethods", MeenakshiPublications.
Web Resources	
1.	https://www.mathwarehouse.com/
2.	https://www.mathhelp.com/

3.	https://www.mathsisfun.com/

Course Outcome:

On the successful course completion, students will be able to:		Cognitive Level
CO1	Find out the approximate roots of polynomial equations.	K1
CO2	Develop the skills of finding roots of simultaneous equations	K2
CO3	Demonstrate knowledge about matrices and their applications	K3
CO4	Carryout calculations of problems related to curvature and radius of curvature.	K4
CO5	Evaluate double and triple Integrals, and enabled to underst and the Applications of integration in real-life situations.	K4, K5

K1- Remember; K2- Understand; K3-Apply; K4- Analyse; K5- Evaluate; K6- Create

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	S	M	S	S	S	M	M
CO2	M	M	S	M	S	M	S	M	M	S
CO3	S	S	M	M	S	S	M	S	M	M
CO4	S	M	M	S	M	M	S	S	M	M
CO5	M	S	S	M	S	M	S	M	M	S

*S-Strong; M-Medium; L-Low

Course Code EC 2	ALLIEDMATHEMATICS -II		Credits 3
Year & Semester: **I YEAR & II SEMESTER** **B.Sc. Physics / Chemistry**	**Course Category**	**ELECTIVE**	**Total:(L+T+P)** **Perweek:** **3+1= 4**

Course Objectives

Objectives:

- This course is designed for the students to expose the to pics such as expansions of trigonometric functions, partial differential equations,and integration.
- To gain knowledge of expansions of trigonometric functions.
- To acquire the knowledge of solving partial differential equations.
- Basic knowledge of vector calculus.
- To understand and carryout the calculations of a given set of data.

UNIT	Details	No. of Hours
I	**Vector Calculus:** Introduction about Vector Calculus – Gradient, Divergence and curl (probl only). Integration of vectors: Integration of vector functions, Line integral Surface integrals – Green's theorem in the plane (statement only) – G Divergence theorem (statement only) – Problems – Stoke's theorem (statem only) – Problems **Text Book 1**	**12**
II	**Partial differential equation** Introduction of Partial differential equation from differential equations - Forma of Partial differential equations by eliminating arbitrary constants and arbit functions* – Solutions of standard types of first order equations- f (p, q) = 0, f(x, p, q)=0, f(y, p, q)=0, f(z, p, q)=0, $f_1(x, p) = f_2(y, q)$, z = px+q (p, q) , Clairaut's form– Lagrange method of solving linear partial differer equations P p + Q q = R. (problems only) **Text Book 2**	**12**
III	**Total differential equations:** Introduction of total differential equations - Bessel's equations: Bessel's equati Solutions of Bessel's general differential equations (derivations not includ General solution of Bessel's equations - Recurrence formulae (derivation included) – Simple problems using Recurrence relation. **Text Book 1**	**12**

IV	**Laplace Transforms:** Introduction of Laplace Transforms- Definition – Laplace Transform of e^{at}, cos sin at, cosh at, sinh at, t^n,n,apositiveinteger –e^{at}f(t),t^nf(t),f⃞(t),f⃞(t InverseLaplaceTransformofstandard functions – Solving differential equations Second order with constant coefficients using Laplace Transform. **Text Book 3**	**12**
V	**Fourier Series:** Introduction of Fourier Series: Definition- Dirchlet's conditions- Fourier series of periodicity 2π and 2l - Odd and even functions –Root mean square value of a function Half range series: Introduction- Half range series –Cosin series- sin series – Parseval's theorem - Harmonic analysis. **Text Book 2**	**12**
	Total	**60**

Course Outcomes

CO	Understand the I and II integrals
1	Understand properties of integrals, Laplace transform.
2	Understand first order differential equations.
3	Analysis Theorems and proves.
4	Evaluate the importance of shifting properties.

Text Book

1	**P.Kandasamy and K.Thilagavathy**. "Mathematics for B. Sc., Br. -I, Volume-II and Volume-III", S.Chand & Company Ltd, First edition, 2004.
2	**S.Narayanan and T.K. Manickavasagam Pillai**," Calculus Vol. III ", S.Viswanathan (Printers and Publishers, (P)Ltd, Chennai, 2010.
3	**S. Narayanan and T. K. Manickavasagam Pillai**, "Calculus Vol. III " S.Viswanathan (Printers and Publishers, (P)Ltd, Chennai, 1997.

References Book

1 .**P. Kandasamy and K.Thilagavathy**, "Mathematics, Vol Iv", S.Chand And Company Ltd.,- 2004

2. **Shanti Narayan**, "Differential Calculus", Shyamlal Charitable Trust, New Delhi,2004.
3. **P.N.Chatterji**,"Vector Calculus ", 1st Edition, Rajhans Prakahan Publishers, Chennai,1998.

Web Resources

1.	https://ocw.mit.edu/courses/mathematics/18-336-numerical-methods-for-partial-differential-equations-spring-2009/
2.	https://www.mathworks.com

Course Outcome:

On the successful course completion, students will be able to:		Cognitive Level
CO1	Find out the approximate roots of polynomial equations.	K1
CO2	Develop the skills of finding roots of simultaneous equations	K1,K2
CO3	Demonstrate knowledge about matrices and their applications	K2,K3
CO4	Carryout calculations of problems related to curvature and radius of curvature.	K4
CO5	Evaluate double and triple Integrals, and enabled to underst and the Applications of integration in real-life situations.	K4, K5

K1- Remember; K2- Understand; K3-Apply; K4- Analyse; K5- Evaluate; K6- Create

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	S	M	S	S	S	M	M
CO2	M	M	S	M	S	M	S	M	M	S
CO3	S	S	M	M	S	S	M	S	M	M
CO4	S	M	M	S	M	M	S	S	M	M
CO5	M	S	S	M	S	M	S	M	M	S

*S-Strong; M-Medium; L-Low

B.Sc. Mathematics

SKILL ENHANCEMENTCOURSES

[DISCIPLINE /SUBJECT SPECIFIC]

Syllabus

Course Code: U23MAS11 SEC1	COMPUTATIONAL MATHEMATICS		Credits 2
Year & Semester: I YEAR & I SEMESTER	Course Category	SEC 1	Total:(L+T+P) Perweek:1+1= 2

Course Objective

1. To introduce students to computational mathematics and its applications in solving mathematical problems.
2. To familiarize students with the basics of Scilab programming language and its use in numerical computations.
3. To teach student show to implement numerical algorithms for solving mathematical problems using Scilab.
4. To enable students to use computational methods to solve mathematical problems and interpret the results obtained

UNIT	Details	No. of Hours
I	**Introduction to Scilab** Scilab Environment Manipulating the command line - Variables in Memory - Startup Commands – The Scilab Menu Bar–Tool boxes **Vectors** Initialising vectors in Scilab -Mathematical operations on vectors - Relational operations on vectors - Logical operations on vectors **Functions** Built-in logical functions -Elementary Mathematical Functions – Mathematical functions on scalars **Chapter 2–2.1, 2.2, 2.5, 2.8, 2.9: Chapter 3– 3.2 to 3.8** **Text Book :1**	**5**
II	**Matrices:** Introduction - Arithmetic operators for Matrices – Basic matrix processing **Programming in Scilab:**	**5**

	Introduction - Variables & Variable names - Assignment statements - Arithmetic, Relational & Logical operators - Input & Output - Flow control/branching /conditional statements – Break and continue- Handling Matrices with Loops. **Chapter 4–4.1, 4.2, 4.3; Chapter 5–5.1 to 5.8** **Text Book :1**	
III	Scripts - The Concept of Functions - User Defined Functions -Special Function command. Graphic output: Introduction - 2d Plotting - - Function versions for graphic commands -3d plotting **Chapter 5–5.9 to 5.12: Chapter 8 –8.1– 8.4** **Text Book :1**	**4**
IV	Numerical Methods using SCILAB [Concepts, Problem &Scilab code] Solution of Algebraic and Transcendental Equation: Bisection method - Newton-Raphson method –Regula Falsi method -Secant method. Interpolation: Finite Difference Operators – Newton's Gregory Forward Interpolation Method, - Newton's Gregory backward Interpolation Method – Lagrange interpolation method **Chapter 1 &2** **Text Book :2**	**8**
V	Numerical Differentiation: Equal interval –Un equal Interval Numerical Integration: Newton Cotes formula – Trapezoidal rule-Simpson's1/3 rule–Simpson's 3/8 rule – Monte Carlo method **Chapter 4 & 5** **Text Book :2**	**8**
	Total	**30**

Course Outcomes	
CO	On completion of this course, students will
1	Develop an understanding of numerical methods for solving mathematical problems.

2	Acquire knowledge of programming concepts and the basics of Scilab language.
3	Apply numerical algorithms to solve mathematical problems using Scilab.
4	Implement and test numerical algorithms using Scilab.
5	Analyze and interpret the results of numerical differentiation and integerations
Text Book	
1. SCILAB (A Free Software to MATLAB)-Author: AchuthsankarSNair& Hema Ramchandran-: S. Chand Publishing-:2012.	
2. Numerical Method Skit: Format lab, Scilab and octave users by RohanVerma.	
REFERENCE BOOK	
1	Introduction to Scilab: For Engineers and Scientists. -SandeepNagar
2.	Computing in Scilab-Chetana Jain –Cambridge University
3.	Computer-Based Numerical & Statistical Techniques - M. Goyal- Infinity Science Press Llc
Web Resources	
1.	https://www.scilab.org/tutorials-**Scilab Tutorials**
2	https://egyankosh.ac.in/bitstream/123456789/88092/1/Unit-15.pdf
3	https://www.edx.org/course/scilab-programming-for-beginners
4	https://www.scilab.org/sites/default/files/Scilab_beginners.pdf
5	https://spoken-tutorial.org/tutorial-search/?search_foss=Scilab&search_language=English **Scilab Spoken Tutorials**

Course Code: U23MAS23	WEB DESIGNING		Credits 2
Year & Semester: I YEAR & II SEMESTER	Course Category	SEC 3	Total:(L+T+P) Per week:1+1= 2

Learning Objectives

- Understand the fundamentals of web design and electronic publishing
- Learn how to create lists and nested lists using HTML
- Learn how to create webpage layouts and designs using CSS
- Learn how to work with block elements, objects, lists, and tables using CSS
- Understand the usage of themes, div, span, tables, and frames in web design.

Unit	Contents	No. of Hours
I	**Introduction to Web Design & HTML Basics** -WWW, Website, Working of Websites, Web pages, Front End, Back End, Client and Server Scripting Languages, Responsive Web Designing, Types of Websites (StaticandDynamicWebsites)–Free Editors –Notepad++ **HTML Basics**: Introduction, Basic Structure of HTML **Chapter 1–1.4 to 1.7: Chapter 2 – 2.1, 2.2**	6
II	Formatting Tags – HTML Tables – HTML Lists – HTML Forms – HTML -HTML 5 Introduction- HTML embed multimedia-HTML Layout **Chapter 2–2.3 to 2.12**	6
III	**Introduction to CSS**: Types of CSS, CSS Properties, Border Properties **Chapter 3–3.1 to 3.5**	6
IV	Block properties, Positioning Properties, CSS Lists, CSS Tables, CSS Menu Design CSS Image Gallery **Chapter 3–3.6 to 3.11**	6
V	**JavaScript**: Introduction to Client-Side Scripting Language, Variables in JavaScript, Operators in JS, Conditions Statements, JS Popup Boxes, JS Events, Basic Form Validations in JavaScript.	6

	Chapter 5–5.1 to 5.9	
	TOTAL	**30**
	Course Outcomes	
CO1	Students will be able to design and publish their own webpages using HTML.	
CO2	Students will be able to define styles using pseudo-elements and link a style sheet to an HTML document.	
CO3	Students will be able to create webpage layouts and designs using CSS, and style various elements such as background, text, and font.	
CO4	Students will be able to design and implement forms and form elements in their webpages.	
CO5	Students will be able to create a well-structured website with appropriate titles and themes.	
Text books		
1	Web Designing & Publishing–Satishjain, M. GeethaIyer, BPBPublications –2022.	
Reference Books		
1	Hirdesh Bharadwaj, Web designing, PaperBack, 2016.	
2	Brain D. Miller, Principles of webdesign, All worth Publications, 2022.	
Web Resources		
1	https://digital.com/wp-content/uploads/html-cheat-sheet.pdf	
2	https://tutorial.techaltum.com/webdesigning.html-**WebDesigning Tutorial**	
3	https://www.w3schools.com/html/-**HTMLtutorial**	
4	https://www.w3schools.com/css/default.asp-**CSSTutorial**	
5	https://www.w3schools.com/css/default.asp-**Javascript Tutorial**	

DEPARTMENTAL FOUNDATION COURSE

[SUBJECT BASED]

Syllabus

<table>
<tr><td colspan="2">Title of the Course</td><td colspan="6">U23MAF11 - Foundation course - Bridge Mathematics</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">FC</td><td>Year</td><td>I</td><td rowspan="2">Credits</td><td rowspan="2">2</td><td rowspan="2">Course Code</td><td rowspan="2">FC</td></tr>
<tr><td>Semester</td><td>I</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours Perweek</td><td>Lecture</td><td colspan="2">Tutorial</td><td>Lab Practice</td><td colspan="2">Total</td></tr>
<tr><td>2</td><td colspan="2">-</td><td>--</td><td colspan="2">2</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">12th StandardMathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">• To bridge the gap and facilitate transition from higher secondary to tertiary education;
• To instill confidence among stakeholders and inculcate interest for Mathematics;</td></tr>
<tr><td colspan="2" rowspan="5">CourseOutline</td><td colspan="6">UNIT-I: Algebra: Binomial theorem, General term, middle term, problems based on these concepts</td></tr>
<tr><td colspan="6">UNITII: Sequences and series (Progressions). Fundamental principle of counting. Factorial n.</td></tr>
<tr><td colspan="6">UNITIII: Permutations and combinations, Derivation of formulae and their connections, simple applications, combinations with repetitions, arrangements within groups, formation of groups.</td></tr>
<tr><td colspan="6">UNITIV: Trigonometry: Introduction to trigonometric ratios, proof of sin(A+B), cos(A+B), tan(A+B) formulae, multiple and sub multiple angles, sin(2A), cos(2A), tan(2A) etc., transformations sum into product and product into sum formulae, inverse trigonometric functions, sine rule and cosine rule</td></tr>
<tr><td colspan="6">UNIT V: Calculus: Limits, standard formulae and problems, differentiation, first principle, uv rule, u/v rule, methods of differentiation, application of derivatives, integration - product rule and substitution method.</td></tr>
</table>

Recommended Text	**1.** NCERTclass XI and XII textbooks. **2.** AnyStateBoardMathematicstextbooksofclassXIandXII
Website and e-LearningSource	https://www.aicte-india.org/sites/default/files/ final%20maths https://egyankosh.ac.in/ bitstream/123456789/13834/1/Unit-1.pdf