Manonmaniam Sundaranar University

Tirunelveli

B. Sc. MATHEMATICS

SYLLABUS FROM THE

ACADEMIC YEAR

2026-2027

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OUTCOME BASED EDUCATION - CHOICE BASED CREDIT SYSTEM

I. VISION AND MISSION OF THE UNIVERSITY

Vision

"To provide quality education to reach the un-reached"

Mission

- To conduct research, teaching and outreach programmes to improve conditions of human living
- To offer a wide variety of off-campus educational and training programs, including the use of information technology, to individuals and groups
- To develop partnership with industries and government so as to improve the quality of the workplace and to serve as catalyst for economic and cultural development
- To provide quality / inclusive education, especially for the rural and un-reached segments of economically downtrodden students including women, socially oppressed and differently abled.

II. PREAMBLE

Outcome Based Education (OBE) is the order of the day in all Higher Education Institutions to emphasize quality mandate. Curriculum tailored with Choice Based Credit System (CBCS) for ensuring flexibility; Exposure to learning opportunities using the latest technological advancements to the learners for continuous lifelong learning; and Adoption of Revised Bloom's Taxonomy (RBT) in the assessment mechanism are essential to add value to the existing OBE. The current revision is aimed at providing scope for effective implementation of OBE by including Programme Educational Outcomes, Programme Outcomes, and Programme Specific Outcomes in alignment to the vision and mission of the University. Courses need to be framed and mapped such that the compilation of the Outcomes of all Courses in the programme ensures the attainment of the programme outcomes in terms of RBT.

III. PROGRAMME EDUCATIONAL OUTCOMES (PEO)

In alignment with the Vision and Mission of the University, the following have been defined as the PEO for the graduates.

PEO1: Developing strong positive attitude to learn independently the concepts in the field of study

PEO2: Ensuring confidence among the learners to apply the knowledge and skills gained to solve real life issues

PEO3: Habituating ethical values among the learners to succeed in personal and professional life

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IV. PROGRAMME OUTCOMES (PO)

Programme Outcomes for the Under Graduate Degree Programmes of the University are articulated as under.

After the successful completion of Undergraduate Programme from the University, the learner should be able to

PO1: Comprehend the knowledge acquired and communicate the same to others

PO2: Analyze and compare the factual data / situation to comprehend and to critically evaluate to find solution to the problem ahead

PO3: Apply theories and philosophies learned in solving the problem in scientific manner

PO4: Think reflectively on the earlier activities and attempt for self-directed lifelong learning process

PO5: Understand multicultural existence and identify the means to prolong moral/ethical values in personal and professional life

PO6: Explore through multiple sources and get exposed to the digital technology.

PO7: Act as a responsible member in teams and practice leadership qualities.

V. PROGRAMME SPECIFIC OUTCOMES (PSO)

On completion of the programme, graduates will be able to:

PSO1: Disciplinary Knowledge

Apply fundamental and theoretical knowledge of mathematics, including algebra, analysis, geometry, and statistics, to support higher studies, research, and innovation.

PSO2: Critical Thinking

Analyze mathematical problems critically and evaluate appropriate methods and solutions in academic, industrial, and societal contexts.

PSO3: Problem Solving

Solve mathematical and real-life problems using logical reasoning, analytical thinking, and computational techniques.

PSO4: Analytical Reasoning

Interpret data and mathematical models using quantitative techniques to address scientific and sustainability-related challenges.

PSO5: Research Skills

Demonstrate basic research aptitude by formulating problems, collecting and analyzing data, and presenting findings effectively.

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PSO6: Self-directed Learning

Engage in lifelong learning and adapt to advancements in mathematics, science, and technology.

PSO7: Employability and Entrepreneurship

Develop skills for employability, entrepreneurship, and career readiness in industry, education, and technology-driven sectors.

Each Course has to address a minimum of 4 PSOs

Level of contribution of the Course towards attaining PSOs

0 – No Contribution 1 – Low Level 2 – Medium Level 3 – High Level

VI. COURSE OUTCOMES (CO)

Four Course Outcomes (COs) for each course that can be achieved by the learners on completion of that particular course are as follows:

Considering outcomes related to

i. K1 and K2 level of evaluation in all the Units as CO1

ii. K3 level of evaluation in all the Units as CO2

iii. K4 level of evaluation in all the Units as CO3

iv. K5 and K6 level of evaluation in all the Units as CO4.

All the COs proposed in each of the courses should be mapped with POs based on the relevance.

Level of Correlation between COs and POs

0 – No Correlation 1 – Low 2 – Medium 3 – High

VII. MEASUREMENT OF ATTAINMENT OF COURSE OUTCOME

The Course Outcomes (COs) are measured through the performance of learners by direct and indirect assessment methods for that particular course.

i. Internal Assessment (25 Marks)

Tests – 20 Marks

Seminar / Assignments/Attention (Participation) in Class – 5 Marks

ii. Semester End Examinations (75 Marks)

Written exams, Practical, Project report, and Comprehensive Viva Voce

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Note: In both Internal and Semester End Examinations

Lower Order Thinking (K1, K2, & K3) – 60 % in each part

Higher Order Thinking (K4, K5, & K6) – 40 % in each part

Part I. II, and Part III components will be separately taken into account for CGPA calculation and classification for the undergraduate programme and the other components. IV, V have to be completed during the duration of the programme as per the norms, to be eligible for obtaining the UG degree.

VIII. EVALUATION SCHEME

- The B.Sc curriculum is structured into six semesters, and the courses are offered and studied semester-wise.
- The internal assessments and external examination are the two parts of evaluation scheme.
- The external theory and practical examinations will be conducted by the university at the end of each semester.
- There is a separate passing minimum of 40% for the external and overall components.

IX. DISTRIBUTION OF MARKS BETWEEN INTERNAL AND EXTERNAL ASSESSMENT FOR CORE, SKILL ENHANCEMENT, ELECTIVE, AND ALLIED COURSES

* Theory Marks **25: 75**
* Practical Marks **50: 50**

Pass minimum of 40% for external and overall components.

1. Internal Assessment.

Internal Marks for Theory shall be allotted in the following manner

The average of the best two tests from three compulsory tests. Each test is of one hour duration	20 marks
Seminar / Assignments/Attention (Participation) in Class	05 marks
Total	25 Marks

2. Marks for Practical / Major Project shall be allotted in the following manner

Internal Marks: 50; External Marks: 50

3. External evaluation of Project;

Project report evaluation and Viva-Voce will be conducted by both the External examiner and the Guide at the end of the semester.

4. Internship

Report for Internship / Industrial Visit / Field Visit / Research Institute Visit.

Should be evaluated along with the project at the end of V^{th} semester.

Students should submit a report for internship / industrial visit / field visit / Research institute visit/ knowledge updation activity at the end of the fifth semester with attendance certificate from the concern organisation.

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The duration of internship should be 30 hours.
Internal: 50 marks; External: 50 marks.

5. Extension Activity:

The student should participate in any one of the programme like NSS, NCC, YRC, RRC, games and sports/ youth welfare activity, outreach programmes etc. the examination / report / evaluation will be conducted at the end of sixth semester.

6. Naan Mudhalvan programme is compulsory for all the students. Those who either fail or are absent in the Naan Mudhalvan examination shall be required to appear for the examination in the substitute subject, Mathematics for Competetive Examinations-II*.

7. The question pattern for all theory courses shall be as follows.

Duration of Exam: 3 Hours

Section	Type of questions	Mark Distribution
Part A	Ten Multiple choice question (Two question from each unit compulsory)	10 x1=10 Marks
Part B	Five Internal Choice questions (One question from each unit: either or choice)	5x5=25 marks
Part C	Five Internal Choice questions (One question from each unit: either or choice)	5x8=40 marks
Total		**75 Marks**

Note: For the courses, Mathematics for Competitive Examination I & Mathematics for Competitive Examination II, the question pattern is 75 multiple choice one word questions with time duration 3 hours.

MODEL QUESTION PAPER

ALGEBRA AND TRIGONOMETRY

(For those who joined in July 2026 onwards)

Time: Three hours **Maximum: 75 marks.**

Part-A (10×1=10 marks)

Answer All questions

1. **(K1)** An equation $f(x) = 0$ is called a reciprocal equation if it remains unaltered when x is replaced by:

   a) $-x$ b) $1/x$ c) x^2 d) $x + 1$

2. **(K4)** In a reciprocal equation of the first type and even degree, which of the following is always a root?

   a) 1 b) 0 c) -1 d) None of these

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3. **(K1)** If α, β, γ are roots of $x^3 + px^2 + qx + r = 0$, then $\Sigma\alpha$ is equal to:

   a) p b) $-p$ c) q d) $-r$

4. **(K5)** Evaluate the symmetric function $\Sigma\alpha^2$ for the equation $x^4 + px^3 + qx^2 + rx + s = 0$.

   a) $p^2 - 2q$ b) $q^2 - 2pr$ c) $p^2 + 2q$ d) $r^2 - 2qs$

5. **(K2)** The expansion $(1 - x)^{-1}$ is valid only when:

   a) $x > 1$ b) $|x| < 1$ c) $x = 1$ d) $x = 0$

6. **(K6)** The finite number denoted by 'e' is the limit of $(1 + 1/n)^n$ as n tends to:

   a) 0 b) 1 c) ∞ d) -1

7. **(K3)** According to De Moivre's Theorem, $(\cos\theta + i\sin\theta)^n$ is equal to:

   a) $\cos n\theta + i\sin n\theta$ b) $\sin n\theta + i\cos n\theta$ c) $\cos\theta^n + i\sin\theta^n$ d) $n(\cos\theta + i\sin\theta)$

8. **(K4)** What is the first term in the expansion of $\sin nx$ in powers of $\cos x$ and $\sin x$?

   a) $\cos^n x$ b) $nC_1 \cos^{n-1} x \sin x$ c) $n\cos x$ d) $\sin^n x$

9. **(K2)** The relation between $\cos(ix)$ and hyperbolic functions is:

   a) $i\cosh x$ b) $\cosh x$ c) $i\sinh x$ d) $\cos x$

10. **(K3)** The value of $\cosh^2 x - \sinh^2 x$ is:

    a) 0 b) -1 c) 1 d) $\cosh 2x$

Part- B (5×5 = 25 marks)

Answer all questions.

11. (a) (K3) Decrease the roots of the equation $x^4 - 5x^3 + 7x^2 - 4x + 5 = 0$ by 2.

    OR

    (b) (K3) Remove the second term from the equation $x^3 + 6x^2 + 12x - 19 = 0$.

12. **(a)** (K2) If α, β, γ are the roots of $x^3 + px^2 + qx + r = 0$, find the value of $\sum\alpha^2\beta$ in terms of coefficients. (OR)

    (b) (K2) Form the equation whose roots are the squares of the roots of $x^3 - x^2 + 8x - 6 = 0$.

13. **(a)** (K3) Sum to infinity the series: $1 + \frac{3}{4} + \frac{3\cdot5}{4\cdot8} + \frac{3\cdot5\cdot7}{4\cdot8\cdot12} + \cdots$

    OR

    (b) (K3) Find the sum of the series: $\frac{1}{2\cdot3} + \frac{1}{4\cdot5} + \frac{1}{6\cdot7} + \cdots \infty$ using logarithmic series.

14. **(a)** (K4) Expand $\cos 8\theta$ in terms of $\sin\theta$. (OR)

    (b) (K4) Prove that $2^{n-1}\cos^n\theta = \cos n\theta + n\cos(n-2)\theta + \frac{n(n-1)}{2!}\cos(n-4)\theta + \cdots$

15. **(a)** (K4) If $\cos(x + iy) = \cos\theta + i\sin\theta$, prove that $\cos 2x + \cosh 2y = 2$.

    OR

    (b) (K4) Separate the real and imaginary parts of $\tan(x + iy)$

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Part- C (5×8 = 40 marks)

Answer all questions.

16. **(a)** (K3) Solve the reciprocal equation: $6x^5 + 11x^4 - 33x^3 - 33x^2 + 11x + 6 = 0$.

OR

(b) (K3) Solve the equation $x^4 - 10x^3 + 26x^2 - 10x + 1 = 0$.

17. **(a)** (K6) Find the sum of the fourth powers of the roots of $x^4 - x^3 - 19x^2 + 49x - 30 = 0$ using Newton's theorem.

OR

(b) (K6) Apply Horner's method to find the root of the equation $x^3 - 9x^2 + 23x - 14 = 0$which lies between 4and 5correct to 2places of decimals.

18. **(a)** (K5) Show that $\frac{1}{1\cdot2\cdot3} + \frac{1}{3\cdot4\cdot5} + \frac{1}{5\cdot6\cdot7} + \cdots = \log 2 - \frac{1}{2}$.

OR

(b) (K5) If x is large, prove that $\left(\frac{n+1}{n-1}\right)^n = e^2\left(1 + \frac{2}{3n^2}\right)$ approximately.

19. **(a)** (K1) Prove that the equation $\frac{ah}{cos\theta} - \frac{bk}{sin\theta} = a^2 - b^2$ has four roots and that the sum of the four values of θ which satisfy it is equal to an odd multiple of π radians.

OR

(b) (K1) Expand $\sin^7\theta$ in a series of sines of multiples of θ.

20. **(a)** (K2) If $\sin(A + iB) = x + iy$, prove that $\frac{x^2}{\cosh^2 B} + \frac{y^2}{\sinh^2 B} = 1$ and $\frac{x^2}{\sin^2 A} - \frac{y^2}{\cos^2 A} = 1$.

OR

(b) (K2) If $\log\cos(\theta + i\phi) = \alpha + i\beta$, prove that $2e^{2\alpha} = \cosh 2\phi + \cos 2\theta$.

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X. Template for Curriculum Design 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	3	6
Part-II	English	3	6
Part-III	Core Courses 2 (CC1, CC2)	8	10
	Elective Course1(Generic/ Discipline Specific) EC1	5	6
Part-IV	Skill Enhancement Course SEC1	2	2
		21	**30**

Semester-II

Part	List of Courses	Credit	Hours per week(L/T/P)
Part-I	Language	3	6
Part-II	English	3	4
Part-III	Core Courses 2 (CC3, CC4)	8	10
	Elective Course 1(Generic/Discipline Specific)EC2	5	6
Part-IV	Skill Enhancement Course-SEC2	2	2
	Naan Mudhalvan	2	2
		23	**30**

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XI. Credit Distribution for UG Programme in Mathematics

Sem I	Credit	Sem II	Credit	Sem III	Credit	Sem IV	Credit	Sem V	Credit	Sem VI	Credit
1.1.Language	3	2.1.Language	3								
1.2.English	3	2.2.English	3								
1.3.Core Course CC1	4	2.3.Core Course CC3	4								
1.4.Core Course CC2	4	2.4.Core Course CC4	4								
1.5. Elective EC1	5	2.5. Elective EC2	5								
1.6. Skill Enhancement Course SEC1	2	2.6. Skill Enhancement Course SEC2	2								
-	-	2.7. Naan Mudhalvan 1	2								
-	-	-	-								
Total Credits	**21**		**23**								

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XII. 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	2	4					
Part V	-	-					
Total	21	23					

***Part I. II, and Part III components will be separately taken into account for CGPA calculation and classification for the undergraduate programme and the other components IV, V have to be completed during the duration of the programme as per the norms, to be eligible for obtaining the UG degree.**

XIII. Courses Structure

First Year Semester-I

Part	List of Courses	Credit	Hoursper week(L/T/P)
Part-I	1.1.Language–Tamil	3	6
Part-II	1.2.Language–English	3	6
Part-III	1.3. Core Course CC1: Algebra &Trigonometry	4	5
	1.4.CoreCourse CC2: Differential Calculus	4	5
	1.5.Elective Course EC1:Choose anyone from the following: 1.Programming Language C with Practical* 2. Allied Physics I with Practical 3. Allied Chemistry I with Practical	T–3 P –2	6
Part-IV	1.6.Skill Enhancement Course SEC1 Mathematics for Competitive Examination - I	2	2
		21	**30**

***Should be handled by Mathematics department staff only.**
T – Theory and P – Practical

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Semester-II

Part	List of Courses	Credit	Hours per week(L/T/P)
Part-I	2.1. Language–Tamil	3	6
Part-II	2.2.Language–English	3	4
Part-III	2.3.Core Course CC3:Analytical Geometry(Two & Three Dimensions)	4	5
	2.4.Core Course CC4: Integral Calculus	4	5
	2.5. Elective Course EC2: Choose any one from the following: 1. Programming Language C++ with Practical* 2. Allied Physics II with Practical 3. Allied Chemistry II with Practical	T–3 P –2	6
	2.6.Skill Enhancement Course SEC2:LaTeX (Practical only)	2	2
	2.7. Naan Mudhalvan –I (Substitute Course: Mathematics for Competitive Examination II)	2	2
		23	**30**

***Should be handled by Mathematics department staff only**

T– Theory and P–Practical

 # The Naan Mudhalvan substitute course for semesters II through VI is only available to individuals who is absent or fail, and they have to appear for external exams for 100 marks.

Courses - PSOs mapping

Title of the course	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	Total score
Algebra & Trigonometry	3	2.5	2.3	2.3	1.8	2.3	2	16.2
Differential Calculus	3	2.3	2.3	2.3	1.8	2.3	2	16
Programming Language C with Practical	2.3	2.3	2.3	2	1.8	2.3	2	15
Mathematics for competitive Examination – I (SEC1)	2.5	2.3	2.5	2.3	1.8	2.3	2	15.7
Algebra and Differential Equations (Allied Mathematics – I)	3	2.5	2.3	2.3	1.8	2.3	2.3	16.5
Analytical Geometry(Two and Three dimensions)	3	2.5	2.3	2.3	1.8	2.3	2	16.2
Integral Calculus	3	2.3	2.3	2.3	1,8	2.3	2	16
Programming in C^{++} with Practical	3	2.3	2.3	2.3	1.8	2.3	2.5	16.5
LaTeX (SEC2)	2.5	2.3	2	2	1.8	2.3	2.5	15.4
Vector Calculus and Fourier Series (Allied Mathematics – II)	3	2.3	2.3	2.3	1.8	2.3	2.5	16.5
Naan Mudhalvan –I (Mathematics for Competetive Examinations – II)	3	2.3	2.3	2.3	1.8	2.3	2.5	16.5
Total score of all courses contributing to PSO	31.3	25.9	25.2	24.7	19.8	25.3	24.3	176.5

Each Course has to address a minimum of 4 PSO. Level of contribution of the Course towards attaining PSOs. *0 –NoContribution 1–LowLevel 2–MediumLevel 3–HighLevel*

Syllabus for different Courses of B.Sc .Mathematics

Title of the Course	ALGEBRA & TRIGONOMETRY						
Paper Number	CORE M1						
Category: Core	Year: I		Credits: 4		Course Code		
	Semester: I						
Instructional Hours per week	Lecture: 5	Tutorial: --	Lab Practice: --	Total: 5			

Course Outcome:

On completion of this course, Students will be able to

CO1: K1, K2 (Remember, Understand) **Describe** the fundamental properties of reciprocal equations, symmetric functions, and series summations, and **explain** the relationships between circular and hyperbolic functions.

CO2: K3 (Apply) **Apply** Horner's method, Newton's theorem, and series expansion techniques to solve polynomial equations and evaluate trigonometric power series.

CO3: K4 (Analyze) **Analyze** the behavior of roots through transformations and **examine** the convergence of binomial, exponential, and logarithmic series in the context of mathematical approximations.

CO4: K5, K6 (Evaluate, Create) **Evaluate** complex quantities using logarithmic and inverse hyperbolic functions, and **construct** generalized solutions for cubic equations and complex trigonometric expansions.

Units	Contents
I	Reciprocal Equations – Standard form – Increasing or decreasing the roots of a given equation – Removal of terms –Related problems. (Book 1- Chapter 6: Sections - 16 to 19)
II	Symmetric function of roots – Sum of powers of the roots of an equation – Newton's theorem – Approximate solutions of roots of polynomials – Horner's method – General solutions of the cubic equation. (Book 1: Chapter 6: Sections - 12 to 14, 30)
III	Summation of Series: Binomial – Exponential–Logarithmic series (Theorems without proof) – Approximations – Related problems. (Book 1- Chapter 3: Sections -10, 14: Chapter 4: Sections -3, 5, 7, 9, 11)
IV	Expansions of $\sin n\theta$, $\cos n\theta$ in powers of $\sin\theta$, $\cos\theta$ -Expansion of $\tan n\theta$ in terms of $\tan\theta$, Expansions of $\cos^n\theta$, $\sin^n\theta$, $\cos^m\theta \sin^n\theta$– Expansions of $\tan(A+B+C+\cdots)$ – Expansions of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in terms of θ - related problems. (Book 2 - Chapter 3: Sections 1 to 4))
V	Hyperbolic functions – Relation between circular and hyperbolic functions Inverse hyperbolic functions, Logarithm of complex quantities–Related problems. (Book 2 - Chapter 4, Chapter 5: Section - 5)

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Recommended Text	1. T.K.Manicavachagom Pillay, T.Natarajan and KS.Ganapathy, Algebra Vol I, S. Viswanathan (Printers & Publishers) Pvt. Ltd., 2017. 2. S. Narayanan and T.K.Manicavachagom Pillay, Trigonometry, S. Viswanathan (Printers & Publishers) Pvt. Ltd., 2009.
Reference Books	1.W. S.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. J.Stewart, L.Redlin, and S.Watson, Algebra and Trigonometry, Cengage Learning, 2012.
Websiteand e-LearningSource	https://nptel.ac.in

CO–PO–PSO Mapping (Course Articulation Matrix)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	1	2	0	1	1	3	2	1	2	1	2	1
CO2	2	3	3	2	0	1	1	3	2	3	2	1	2	2
CO3	2	3	2	3	0	2	1	3	3	2	3	2	2	2
CO4	2	3	3	3	0	2	2	3	3	3	2	3	3	3
Total	9	11	9	10	0	6	5	12	10	9	9	7	9	8

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Title of the Course		DIFFERENTIAL CALCULUS					
Paper Number		CORE M2					
Category	Core	Year	I	Credits	4	Course Code	
		Semester	I				

Instructional Hours Per week	Lecture	Tutorial	Lab Practice	Total
	5	--	--	5

Course Outcome

On completion of this course, Students will be able to

CO1: (K1, K2)Recall standard n^{th} order derivatives and **describe** the fundamental concepts of partial differentiation, envelopes, curvature, and singular points.

CO2: (K3) Execute successive differentiation and partial derivative rules to solve problems involving total differentials, implicit functions, and the radius of curvature in various coordinate systems.

CO3: (K4) Analyze the geometric properties of curves by examining the relationships between families of curves, their envelopes, and the nature of singular points.

CO4: (K5, K6) Evaluate the curvature of complex functions and **construct** the equations for evolutes, involutes, and envelopes for given families of quadratic parameters.

Units	Contents
I	**Successive Differentiation**: Introduction (Review of basic concepts) – The n^{th} derivative – Standard results – Trigonometrical transformation – Formation of equations involving derivatives. (Chapter 3: Sections - 1.1 to 1.6)
II	**Partial Differentiation**: Partial derivatives – Successive partial derivatives – Function of a function rule – Total differential coefficient – A special case – Implicit functions – Homogeneous functions. (Chapter 8: Sections - 1.1 to 1.6)
III	**Envelope:** Method of finding the envelope–Another definition of envelope – Envelope of family of curves which are quadratic in the parameter. (Chapter 10: Sections - 1.1 to 1.4)
IV	**Curvature:** Definition of Curvature – Circle, Radius of curvature - Radius of Curvature in Polar co-ordinates – p-r equation. (Chapter 10: Sections - 2.1 to 2.3, 2.6, 2.7)
V	Centre of Curvature – Evolutes and Involutes – Singular Points. (Chapter 10: Sections - 2.4, 2.5 & Chapter 12)

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Recommended Text	1. S.Narayanan and TK.ManicavachagomPillay,Calculus,Vol1, S.Viswanathan (Printers &Publication)PVT. LID.2015.
ReferenceBooks	1. R.Courant and F.John, Introduction to Calculus and Analysis (Volumes I & II), Springer- Verlag, New York, Inc., 1989. 2. T.Apostol, Calculus, Volumes I and II. 3. S.Goldberg, Calculus and mathematical analysis. 4. G. B.ThomasandR.L.Finney,Calculus,PearsonEducation,2010.
Websiteand e-LearningSource	https://nptel.ac.in

CO–PO–PSO Mapping (Course Articulation Matrix)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	1	2	0	1	1	3	1	1	2	1	2	1
CO2	2	3	3	2	0	1	1	3	2	3	2	1	2	2
CO3	2	3	2	3	0	2	1	3	3	2	3	2	2	2
CO4	2	3	3	3	0	2	2	3	3	3	2	3	3	3
Total	9	11	9	10	0	6	5	12	9	9	9	7	9	8

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Title of the Course	PROGRAMMING LANGUAGE C WITH PRACTICAL						
Paper Number	ELECTIVE EC1						
Category: Elective	Year	I	Credits	5	Course Code		
	Semester	II					
Instructional Hours Per week	Lecture	Tutorial	Lab Practice	Total			
	4	--	2	6			

Course Outcome:

On completion of this course, Students will be able to

CO1: (K1, K2) Recall C tokens, data types, and operators, and **explain** the fundamental concepts of control structures, array handling, and function definitions.

CO2: (K3)Apply appropriate operators, input/output functions, and decision-making statements to solve computational problems using arrays and strings.

CO3: (K4) Analyze the flow of control in branching and looping structures and **examine** the efficiency of using multi-dimensional arrays versus string-handling functions.

CO4: (K5, K6) Evaluate the performance of recursive versus nested functions and **construct** robust C programs that integrate user-defined functions and complex data structures.

Units	Contents
I	Introduction – Character set – C Tokens – Key words and Identifiers – Constants – Variables – Data types. (Chapter 2: Sections - 2.1 to 2.7)
II	Operators: Arithmetic – Relational – Logical – Assignment – Increment and Decrement – Conditional – Bitwise – Special – Precedence of Arithmetic operators – Managing input and output operation: Reading and writing a character – Formatted input and output. (Chapters 3 and 4: Sections - 3.1 to 3.9, 3.12, 4.2 to 4.5)
III	Decision making and branching: Statements: IF, IF … ELSE, Nesting of IF … ELSE, ELSE IF Ladder and Switch statements – The ?:operator – The GOTO statement – Decision making and looping: The WHILE, DO and FOR statements – Jumps in loops. (Chapters 5 & 6: Sections - 5.3 to 5.9, 6.2 to 6.5)
IV	Array: One dimensional and two dimensional arrays – Declaration, Initialization of arrays – Multidimensional arrays - Character arrays and strings: Declaring and initializing string variables – Reading and writing of strings – String handling functions. (Chapters 7 & 8: Sections 7.1 to 7.7, 8.1 to 8.8)
V	User defined functions: Definition of function –Return values and their types – Function calls – Function declaration – Category of functions – Nesting of functions – Recursion. (Chapter 9: Sections 9.5 to 9.9, 9.15, 9.16)

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Recommended Text	E.Balaguruswamy-Programming in ANSI C–Tata McGraw Hill Publishing company limited –III Edition, 2017.
Reference Books	1. C.Reema Thareja, Programming in C-Oxford University Press, 2018. 2. Ramasamy et.al. – Programming in C- Scetech Publication (INDIA) Pvt. Ltd. II Edition, 2015. 3. Ashok N.Kamathane-Programming with Ansi and Turbo C– Dorling Kindersley (India) Pvt. Ltd., 2009.
Website and e-Learning Source	https://nptel.ac.in

List of Practical:

1. Programtoprinttheevennumbersfrom1to100.
2. Programtoreadthreevaluesusingscanstatementandprintthefollowingresults:
   a)Sum of the values b)Average of the three values c) Largest of the three
3. Program to read and display the following table of data:

Name	Code	Price
Fan	67831	1234.50
Motor	450	5786.70

   The name and code must be left justified and price must be right justified.

4. Program to compute the real roots of a quadratic equation.
5. Program to evaluate the investment equation V =$V = P(1 + r)^n$ and print the tables which would give the value of V for various combination of the following values of P, r and n. n.

   P : 1000, 2000, . . . , 10000: r : 0.10,0.11, . . . , 0.20: n : 1, 2, . . . , 10
6. Program to print all integers that are not divisible by either 2 or 3 and lie between 1 and100and also should account the number of sets integers and print the result.
7. Program to merge two given one dimensional arrays A and B (which are sorted in ascending order) into a single sorted array C which is in ascending order.
8. Program to read a string from the keyboard and determine whether the string is a palindrome or not.
9. Develop a modular interactive program using functions that reads the value of three sides of a triangle and displays either its area or its perimeter as per the request of the user. Given the three sides a,b and c, perimeter is a + b + c and area is $\sqrt{s(s-a)(s-b)(s-c}$ where S = $s = (a + b + c)/2$.
10. Develop your own functions for performing following operations in strings.
    a) Copying one string to another
    b) Comparing two stings
    c) Adding a string to the end of another string

    Write a program to test your functions.

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CO–PO–PSO Mapping (Course Articulation Matrix)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	1	1	2	1	2	1	3	1	1	1	1	2	1
CO2	2	2	3	2	0	2	2	2	2	3	2	1	2	2
CO3	2	3	2	3	0	2	1	2	3	2	3	2	2	2
CO4	2	3	3	3	1	3	2	2	3	3	2	3	3	3
Total	9	9	9	10	2	9	6	9	9	9	8	7	9	8

MSU

Title of the Course		MATHEMATICS FOR COMPETETIVE EXAMINATION- I					
Paper Number		SEC I					
Category	Skill Enhance-ment Course	Year	I	Credits	2	Course Code	
		Semester	I				

Instructional Hours per week	Lecture	Tutorial	Lab Practice	Total
	2	--	--	2

Course Outcome

On completion of this course, Students will be able to

CO1: (K1, K2) Recall the fundamental formulae for time-work relationships, speed-distance ratios and interest rates and explain the core principles of simplification, averages, and ratio-based reasoning.

CO2: (K3) Solve numerical problems by applying techniques of simplification and calculating averages, percentages, and proportions in real-world scenarios.

CO3: (K4) Analyze the operational efficiency of pipes and cisterns and **examine** the differences between linear interest growth versus the compounding effect in various financial scenarios.

CO4: (K5, K6) Evaluate the financial viability of business partnerships based on profit-sharing ratios and **develop** strategic mathematical models to solve complex multi-step quantitative problems.

Units	Contents
I	Simplification – Averages.
II	Problems on Numbers.
III	Ratio and Proportion
IV	Time, Work & Distance
V	Simple Interest & Compound Interest
Reference Books	R. S. Agarwal – Objective arithmetic, Published by S. Chand &Co Ltd., 2018.
Recommended Text	1. R. S. Agarwal –Arithmetic subjective and Objective, Published by S. Chand &Co Ltd., Revised Edition, 2017. 2. Rajesh Verma, Fast track Objective arithmetic, Arihant Publications India Limited Fourth Edition, 2018.
Websiteand e-LearningSource	https://nptel.ac.in

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CO–PO–PSO Mapping (Course Articulation Matrix)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	1	1	2	0	1	1	3	1	2	1	1	2	1
CO2	2	2	3	2	0	1	1	3	2	3	2	1	2	2
CO3	2	3	2	3	0	1	1	2	3	2	3	2	2	2
CO4	2	3	3	3	0	2	2	2	3	3	3	3	3	3
Total	9	9	9	10	0	5	5	10	9	10	9	7	9	8

MSU

Title of the Course		**ALGEBRA AND DIFFERENTIAL EQUATIONS**					
Paper Number		**ALLIED MATHEMATICS – I**					
Category	Allied	**Year**	I	**Credits**	5	**Course Code**	
		Semester	I				

Instructional Hours per week	**Lecture**	**Tutorial**	**Lab Practice**	**Total**
	5	1	--	6

Pre-requisite	12thStandardMathematics

Course Outcome

On completion of this course, Students will be able to

CO1: (K1, K2) Recall the fundamental properties of equations, matrices, and differential operators, and **explain** the conceptual basis of Eigen values, Cayley-Hamilton theorem, and Laplace transforms.

CO2: (K3) Apply Horner's and Newton's methods for root approximation, and **use** Matrix algebra and Laplace transformations to solve linear and differential systems.

CO3: (K4) Analyze the relationships between roots and coefficients in reciprocal equations and **examine** the structural formation of first-order higher-degree and partial differential equations.

CO4: (K5, K6) Evaluate the validity of solutions for complex differential equations and **construct** generalized mathematical models by integrating Inverse Laplace transforms and characteristic matrix equations.

Units	**Contents**
I	Theory of Equations – Formation of Equations – Relation between roots and coefficients–Reciprocal equations.
II	Transformation of Equations– Approximate solutions to equations –Newton's method and Horner's method.
III	Matrices–Characteristic equation of a matrix –Eigen values and Eigen vectors – Cayley Hamilton theorem and simple Problems.
IV	Differential equation of first order but of higher degree – Equations solvable for p, x, y–Partial differential equations –formations– solutions – Standard form $Pp + Qq = R$.
V	Laplace transformation–Inverse Laplace transform.
Recommended Text	Dr. S. Arumugam and A. Thangapandi Isaac–Allied Mathematics Paper-I,New Gamma Publishing House, 2012.
ReferenceBooks	S. NarayananandT. K. ManikavachagomPillay - Differential Equations and its applications, S. Viswanathan Printers Pvt. Ltd, 2006.
Websiteand e-LearningSource	https://nptel.ac.in

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CO–PO–PSO Mapping (Course Articulation Matrix)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	1	1	0	1	1	3	2	1	1	1	2	1
CO2	2	3	3	2	0	1	2	3	2	3	2	1	2	3
CO3	2	3	2	3	0	2	1	3	3	2	3	2	2	2
CO4	3	3	3	3	1	2	2	3	3	3	3	3	3	3
Total	10	11	9	9	1	6	6	12	10	9	9	7	9	9

MSU

Title of the Course		**ANALYTICAL GEOMETRY (Two & Three Dimensions)**					
Paper Number		**CORE M 3**					
Category	Core	**Year**	I	**Credits**	4	**Course Code**	
		Semester	II				

Instructional Hours Per week	**Lecture**	**Tutorial**	**Lab Practice**	**Total**
	5	--	--	5

Course Outcome

On completion of this course, Students will be able to

CO1: (K1, K2) Describe the properties of conjugate diameters, poles, and polars, and **explain** the fundamental equations of lines, planes, and spheres in both Cartesian and polar coordinate systems.

CO2: (K3) Apply polar equations and 3D geometric formulas to **calculate** the length of perpendiculars, angles between spatial elements, and shortest distances between skew lines.

CO3: (K4) Analyze the geometric relationships between coplanar lines and **examine** the conditions for orthogonality and intersection between planes and spheres.

CO4: (K5, K6) Evaluate the relative positions of spheres and planes and **construct** general equations for tangent planes and circles resulting from the intersection of solid figures.

Units	**Contents**
I	Pole, Polar- conjugate points and conjugate lines – diameters –conjugate diameters of an ellipse – Semi diameters – Conjugate diameters of hyperbola – Related problems only. (Book 1: Chapter 7: Sections – 7, 8 & 16, Chapter 8 : Section 9)
II	Polar coordinates: General polar equation of straight line – Polar equation of a circle given a diameter, Equation of a straight line, circle, conic. (Book 1: Chapter 9: Sections 1 to 10)
III	System of Planes – Length of the perpendicular – Orthogonal projection. **(**Book 2: Chapter 2: Sections 1 to 11)
IV	Representation of line – Angle between a line and a plane – coplanar lines – Shortest distance between two skew lines– Length of the perpendicular. (Book 2: Chapter 3: Sections - 1 to 8)
V	Equation of a sphere - General equation – Section of a sphere by a plane – Equation of the circle – Tangent plane – Angle of intersection of two spheres – Condition for the orthogonality. (Book 2: Chapter 4: Sections - 1 to 8)

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Recommended Text	1. T.K. Manicavachagam Pillay and T. Natarajan, Analytical Geometry (Part I -Twodimensions),S.ViswanathanPrinters and Publishers Pvt. Ltd., 2012. 2. T. K. Manicavachagam Pillay and T. Natarajan, Analytical Geometry (Part II- Threedimensions),S.Viswanathan(Printers andPublishers) Pvt. Ltd., 2012.
Reference Books	1. William F. Osgood and William C. Graustein, Plane and Solid Analytic Geometry, Macmillan Company, New York, 2016. 2. Calculus and Analytical Geometry, G.B.Thomas and R.L.Finny, Pearson Publication, 9th Edition, 2010. 3. Robert C.Yates, Analytic Geometry with Calculus, Prentice Hall, Inc., New York, 1961. 4. William H.M. Crea, Analytical Geometry of Three Dimensions, Dover Publications, Inc, New York, 2006.
Websiteand e-LearningSource	https://nptel.ac.in

CO–PO–PSO Mapping (Course Articulation Matrix)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	1	1	0	1	0	3	2	1	1	1	2	1
CO2	2	2	3	2	0	1	1	3	2	3	2	1	2	2
CO3	2	3	2	2	0	1	1	3	3	2	3	2	2	2
CO4	2	3	3	3	1	2	2	3	3	3	3	3	3	3
Total	9	10	9	8	1	5	4	12	10	9	9	7	9	8

MSU

Title of the Course	INTEGRAL CALCULUS					
Paper Number	CORE M 4					
Category: Core	Year: I	Credits: 4	Course Code:			
	Semester: II					

Instructional Hours per week	Lecture	Tutorial	Lab Practice	Total
	5	--	--	5

Course Outcome

On completion of this course, Students will be able to

CO1: (K1, K2) Recall reduction and Bernoulli's formulas and **explain** the concepts of multiple integrals, Jacobians, and the properties of Beta and Gamma functions.

CO2: (K3) Solve problems by evaluating double and triple integrals and **apply** recurrence relations of Beta and Gamma functions to simplify complex infinite integrals.

CO3: (K4) Analyze the behavior of functions through change of variables and change of of integration and **examine** the relationships between algebraic and transcendental integral forms.

CO4: (K5, K6) Evaluate the area of curved surfaces and volumes of solids and **construct** mathematical solutions for the arc length and surface area of complex geometric curves.

Units	Contents
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. (Chapter 1: Sections -13 to 15)
II	Multiple Integrals – Definition of double integrals– Evaluation of double integrals – Double integrals in polar coordinates – Change of order of integration. (Chapter 5: Sections - 1, 2.1, 2.2, 3.1, 3.2)
III	Triple integrals – Area of curved surfaces – Change of variables– Jacobian. (Chapter 5: Sections – 4 & 7; Chapter 6: Sections - 1, 2)
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 - 2.1 to 2.3 and 3 to 6)
V	Geometrical Applications of Integral calculus: Area – Volume – Length of a curve. (Chapter 2:Sections - 1.1 to 1.4, 3, 4)
Recommended Text	S.Narayanan and T.K.ManicavachagomPillay, Calculus Vol II, S. Viswanathan (Printers and Publishers) Pvt. Ltd., 2012.

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Reference Books	1. H. Anton,I.Birens and S. Davis, Calculus, John Wiley and Sons, Inc., 2002. 2. D.Chatterjee, Integral Calculus and Differential Equations, Tata-McGraw Hill Publishing Company Ltd. 3. P.Dyke, An Introduction to Laplace Transforms and Fourier Series, Springer Undergraduate Mathematics Series, 2nd Edition, 2001.
Websiteand e-LearningSource	https://nptel.ac.in

CO–PO–PSO Mapping (Course Articulation Matrix)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2	1	1	0	1	0	3	1	1	1	1	2	1
CO2	2	2	3	2	0	1	1	3	2	3	2	1	2	2
CO3	2	3	2	2	0	1	1	3	3	2	3	2	2	2
CO4	2	3	3	3	1	2	2	3	3	3	3	3	3	3
Total	9	10	9	8	1	5	4	12	9	9	9	7	9	8

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Title of the Course	PROGRAMMING IN C++ WITH PRACTICAL						
Paper Number	ELECTIVE EC2						
Category: Elective	Year: I	Credits: 5	Course Code:				
	Semester: II						
Instructional Hours perweek	Lecture: 4	Tutorial: --	Lab Practice: 2	Total: 6			

Course Outcome

On completion of this course, Students will be able to

CO1: (K1, K2) Recall C++ tokens, data types, and storage classes, and **explain** the core principles of classes, objects, constructors, and inheritance types.

CO2: (K3) Execute programs using function prototyping, call-by-reference, and recursion, and **apply** static memory allocation and friend functions within a class structure.

CO3: (K4) Analyze the behavior of multiple constructors and destructors in dynamic object initialization and **examine** the impact of different operator overloading rules on program logic.

CO4: (K5, K6) Evaluate the efficiency of various inheritance models (Single, Multiple, Hybrid) and **construct** robust, modular applications using function overloading, virtual functions, and custom-defined operator behaviors.

Units	Contents
I	Introduction, Tokens, Keywords, Identifiers and constants, Basic data types ,User defined data types, storage classes, Derived data types, Symbolic constants.
II	Introduction, The main function, function prototyping, Call by reference, Return by references, Inline functions, Default arguments, constant Arguments, Recursion, Function overloading, Friend and virtual functions, Math library functions, C structures Revisited, Specifying a class, Defining member functions, A C++ program with class, Making an outside functions inline, Nesting member functions, Private member functions, Arrays within a class, Memory allocation for objects, Static memberfunctions,Arrayofobjects,objectsasfunctionarguments,Friend functions, Returning objects.
III	Introduction, Constructors, Parameterized constructors, Multiple constructors in a class, Constructors with default arguments, Dynamic initialization of objects, Copy constructor, Constructing Two- dimensional arrays, constant objects, Destructors.
IV	Introduction, Defining operator overloading, Overloading unary operator, Overloading Binary operator, Overloading Binary operators using Friends, Manipulation of strings using operators, Some other operator overloading examples, Rules for Overloading Operators
V	Introduction, Defining Derived classes, Single inheritance, Making a private member inheritable, Multilevel inheritance, Multiple inheritance, Hierarchical inheritance, Hybrid inheritance.

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Recommended Text	1.E. Balagurusamy, Object Oriented Programming with C++, Tata Mc Graw Hill Education Private Limited, New Delhi (Fifth Print 2012).
ReferenceBooks	1. Reema Thareja, Object Oriented Programming with C++, Oxford University Press (January 2018)
Websiteand e-LearningSource	https://nptel.ac.in

List of Practical:

1. Program to print the following output using for loops

1
22
333
4444
55555
……

2. Program to calculate the variance and standard deviation of N numbers.

Variance = $\frac{1}{N}\sum_{i=1}^{N}(X_i - \bar{X})^2$ and Standard Deviation = $\sqrt{\frac{1}{N}\sum_{i=1}^{N}(X_i - \bar{X})^2}$ where x =$\bar{x} = \frac{1}{N}\sum_{1}^{N} x_i$

3. Write a program to read a matrix of size m x n from the keyboard and display the same on the screen using functions.
4. Write a function power power () to raise a number m to a power n n. The function takes a double value for m and int value for n and returns the result Correctly: Use a default value of 2 for n to make the function to calculate Squares when this argument is Omitted. Write a main that gets the values of m and n from the user to test the function.
5. Write a class to represent a vector (a series of float values) Include member function "to perform the following tasks:

a)To create the vector b)to modify the value of a given element

c) To multiply by a Scalar value d) To display the vector in the form (10,20,30,...)

Write a progam to test your class.

6. Create two classes DM and DB to Store the value of distances. DM. Stores distances in meters and centimeters and DB in feet and inches. Write a program that can read values for the class objects and add One object of DM with another object of DB. Use a friend function to carry out the additions operation, The object that Stores the results may be a DM object or DB object, depending on the units in which the results are required. The display should be in the format of Feet and inches or meters and Centimeters depending on the object on display.

7. Define a class String that Could work as a user-defined String type. Include

Constructers that will enable us to create an uninitialized String S1;// String with length 0 and also to

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initialize an object with a String Constant at the time of constant at the time of creation like string S2 (“Welldone!”);Include a function

That adds two strings to make a third string, Write a complete program to test your class to see that it does the following tasks:

a) Create uninitialized string objects

b) Create object with string constants

c) Concatenate two strings properly

d) Displays desired String object

Create a class FLOAT Hat contains one float data member. Overload all the four arithmetic operators So that they operate on the objects of FLOAT.

8. Define a class string. Write a program to compare two strings by using overload = = operator.

CO–PO–PSO Mapping (Course Articulation Matrix)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	1	1	1	0	2	0	3	1	1	1	1	2	2
CO2	2	2	3	2	0	3	1	3	2	3	2	1	2	3
CO3	2	3	2	2	0	3	1	3	3	2	3	2	2	2
CO4	2	3	3	3	1	3	2	3	3	3	3	3	3	3
Total	9	9	9	8	1	11	4	12	9	9	9	7	9	10

MSU

Title of the Course		**LaTeX**					
Paper Number		**SEC- 2**					
Category	Skill Enhance-ment Course	**Year**	I	**Credits**	2	**Course Code**	
		Semester	II				

Instructional Hours per week	**Lecture**	**Tutorial**	**Lab Practice**	**Total**
	--	--	2	2

Course Outcome

On completion of this course, Students will be able to

CO1: (K1, K2) Recall LaTeX keyboard symbols and productivity tools, and **explain** the anatomy of a LaTeX article including sectioning, error messages, and math environments.

CO2: (K3)Execute the editing cycle to type text, format paragraphs, and **use** specific font characteristics and special characters in a document.

CO3: (K4) Analyze the structure of different text environments, such as lists and tabular forms, and **examine** the use of proclamations and proof environments in academic writing.

CO4: (K5, K6) Evaluate the placement of delimiters and operators in complex math equations and **construct** complete, error-free technical articles using advanced typesetting constructs.

Units	Contents
I	LaTeX – Sample Files, Editing Cycle, Three productivity tools, Typing text, Typing Math, Anatomy of an article, Sectioning, Invoking proclamations, Inserting references, LaTeX error messages. **(**Chapter 1: Sections - 1.2 to 1.4; Chapter 2: Sections - 2.1 to 2.4; Chapter 3: Sections - 3.1 to 3.4; Chapter 4: Sections - 4.1, 4.2.2 to 4.2.4, 4.3.1)
II	Typing Text: The keyboard, Word Sentences and paragraphs, Symbols not on the keyboard (Quotation marks, Dashes, Special Characters – only), Comments and footnotes. **(**Chapter 5: Sections - 5.1, 5.2, 5.4.1, 5.4.2, 5.4.4, 5.5)
III	Typing Text: Changing Font Characteristics, Lines paragraphs and pages. (Chapter 5: Sections - 5.6, 5.7)
IV	Text Environments: Some general rules for displayed text environments, Lists environments, Style and size environments, Proclamations (theorem-like structures), Proof environments, Tabular environments. (Chapter 6: Sections - 6.1 to 6.6)
V	Typing Math: Math environments, Spacing Rules, Equations, Basic Constructs, Delimiters, Operators. (Chapter 7: Sections - 7.1 to 7.6)

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Recommended Text	George Gratzer, More Math into LaTeX, 4th Edition, Springer, 2007.
ReferenceBooks	1. Helmut Kopka and Patric W. Daly, A guide to LaTeX, Fourth edition, Addison-Wesley. 2. DavidR. Wilkins,Getting started with LaTeX, Second Edition.
Websiteand e-LearningSource	https://nptel.ac.in

List of Practicals:

Unit-I: Introduction to LaTeX

1. Compile a simple "Hello World" document and identify and correct errors in a given faulty LaTeX code snippet.
2. Create a LaTeX document containing three sections and two subsections with title, author name, and date using appropriate commands.
3. Create a document that contains theorem and proof environments that includes both text and mathematical expressions.

Unit-II: Basic Text Formatting

1. Format a short essay with headings, paragraphs, foot notes and use quotation marks correctly in LaTeX.
2. Type a paragraph with proper spacing rules in LaTeX and differentiate between hyphen, en-dash and em-dash with examples.
3. Insert accented characters, special foreign characters and insert special symbols such as %, $, #, -, {, }.

Unit-III: Advanced Text Formatting

1. Change text into bold, italic and underlined formats and use small, caps and typewriter fonts.
2. Change font sizes for different portions of text and create left-aligned, centered and right-aligned text.
3. Design a one-page resume using different fonts and alignments.

Unit-IV: Text Environments

1. Create ordered, unordered and nested lists.
2. Construct a table with rows and columns and add borders to tables.
3. Create a timetable using tabular environments.

Unit-V: Mathematical Typesetting

1. Write basic algebraic expressions in inline math mode and write displayed equations using equation environment.
2. Use fractions, roots, superscripts, subscripts and write matrices using LaTeX.
3. Write trigonometric and logarithmic operators and align multiple equations using align environment.

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CO–PO–PSO Mapping (Course Articulation Matrix)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	1	1	1	0	3	0	2	1	1	1	1	2	2
CO2	2	2	2	2	0	3	1	2	2	2	1	1	2	3
CO3	2	3	2	2	0	3	1	3	3	2	3	2	2	2
CO4	3	3	3	3	1	3	2	3	3	3	3	3	3	3
Total	10	9	8	8	1	12	4	10	9	8	8	7	9	10

MSU

Title of the Course		**VECTOR CALCULUS AND FOURIER SERIES**					
Paper Number		**ALLIED MATHEMATICS -II**					
Category	Allied	**Year**	I	**Credits**	5	**Course Code**	
		Semester	II				

Instructional Hours perweek	**Lecture**	**Tutorial**	**Lab Practice**	**Total**
	5	1	--	6

Course Outcome

On completion of this course, Students will be able to

CO1: (K1, K2) Recall the definitions of gradient, divergence, and curl, and **explain** the fundamental concepts of vector integration and Fourier expansion for even and odd functions.

CO2: (K3)Solve problems involving double and triple integrals and **apply** vector differential operators to scalar and vector fields.

CO3: (K4) Analyze the relationships between line, surface, and volume integrals and **examine** the convergence properties of half-range Fourier series.

CO4: (K5, K6) Evaluate physical quantities using Green's, Stoke's, and Gauss Divergence theorems and **construct** Fourier series representations for various periodic functions.

Units	**Contents**
I	Vector differentiation–Gradient–Divergence and curl.
II	Evaluation of double and triple integrals
III	Vector integration – Line, surface and volume integrals.
IV	Green's, Stoke's and Divergence theorems (without proof)– Simple problems.
V	Fourier series – Even and odd functions – Half range Fourier series.
Recommended Text	1. S. Arumugam and A. Thangapandi Isaac, Allied Mathematics Paper-II, New Gamma Publishing House, Palayamkottai, 2012. 2. T. K. Manicavachagom Pillay, Calculus(Vol II), S. Vishvanathan Printer and Publisher PVT. LTD, 2012.
ReferenceBooks	1. S. Arumugam and others, Analytical Geometry 3D &Vector Calculus,New Gamma Publishing House, Palayamkottai, 2017. 2. J. C. Susan, Vector Calculus (4th Edition), Pearson Education, Boston, 2012. 3. Murray Spiegel, Vector analysis, Schaum Publishing company, New York, 2009.
Websiteand e-LearningSource	https://nptel.ac.in

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CO–PO–PSO Mapping (Course Articulation Matrix)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	1	1	1	0	1	0	3	1	1	1	1	2	2
CO2	2	2	3	2	0	1	1	3	2	3	2	1	2	3
CO3	2	3	2	2	0	1	0	3	3	2	3	2	2	2
CO4	2	3	3	3	1	2	2	3	3	3	3	3	3	3
Total	9	9	9	8	1	5	3	12	9	9	9	7	9	10

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Semester II: Naan Mudhalvan- 1

<table>
<tr><td colspan="2">Title of the Course</td><td colspan="6">MATHEMATICS FOR COMPETETIVE EXAMINATIONS -II</td></tr>
<tr><td colspan="2">Paper Number</td><td colspan="6">NAAN MUDHALVAN -1</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">SEC</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"></td></tr>
<tr><td>Semester</td><td>II</td></tr>
<tr><td colspan="8">Course Outcome
On completion of this course, Students will be able to
CO1: (K1, K2) Recall foundational formulas and explain quantitative concepts related to roots, time-speed-distance, age variations, and geometric dimensions.
CO2: (K3) Compute exact numerical solutions for mathematical puzzles involving powers, train metrics, chronological data, and structural boundaries.
CO3: (K4) Deconstruct complex quantitative scenarios into structured mathematical equations to compare rates, age ratios, and dimensional proportions.
CO4: (K5, K6) Appraisethe validity of quantitative solutions in mensuration, rate-based problems, and root evaluations, and formulate generalized shortcut algorithms to solve complex aptitude scenarios efficiently.</td></tr>
<tr><td colspan="2">Units</td><td colspan="6">Contents</td></tr>
<tr><td colspan="2">I</td><td colspan="6">Square root and cube root.</td></tr>
<tr><td colspan="2">II</td><td colspan="6">Trains.</td></tr>
<tr><td colspan="2">III</td><td colspan="6">Problems on age.</td></tr>
<tr><td colspan="2">IV</td><td colspan="6">Area.</td></tr>
<tr><td colspan="2">V</td><td colspan="6">Volume & Surface area.</td></tr>
<tr><td colspan="2">Recommended Text</td><td colspan="6">R.S. Agarwal –Objective Arithmetic, Published by S. Chand & Co, Ltd., Edition, 2018.</td></tr>
<tr><td colspan="2">Reference Books</td><td colspan="6">1. Rajesh Verma- Fast track Objective arithmetic, Arihant Publications (India) Limited., Fourth Edition 1st January 2018.
2. R.S. Aggarwal, Arithmetic Subjective and objective, Published by S. Chand and Co. Ltd. Revised Edition.1st April 2017.</td></tr>
<tr><td colspan="2">Website and e-Learning Source</td><td colspan="6">https://nptel.ac.in</td></tr>
</table>

ASC

CO–PO–PSO Mapping (Course Articulation Matrix)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	1	1	1	0	1	0	3	1	1	1	1	2	2
CO2	2	2	3	2	1	1	1	3	2	3	2	1	2	3
CO3	2	3	2	2	0	1	0	3	3	2	3	2	2	2
CO4	2	3	3	3	1	2	2	3	3	3	3	3	3	3
Total	9	9	9	8	2	5	3	12	9	9	9	7	9	10

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