

(For students admitted from 2023- 2024)

Title of the Course		ALGEBRA AND TRIGONOMETRY					
Paper Number		CORE 1					
Category	Core	Year	I	Credits	4	Course Code	T1MA1
		Semester	I				
Instructional Hours per week	Lecture		Tutorial		Lab Practice		Total
	4		-		-		4
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		1.Basic ideas on the Theory of Equations, Matrices and Number Theory. 2.Knowledge to find expansions of trigonometry functions, solve theoretical and applied problems.					
Course outline		Unit-I Reciprocal Equations-Standard form-Increasing or decreasing the roots of a given equation - Form of the quotient and remainder when a polynomial is divided by a binomial, Removal of terms-related problems.					
		Unit -II Binomial Theorem (statement only) Binomial: Application of the Binomial Theorem to the summation of series -Approximate Values - Exponential and logarithmic series: Exponential Limit - Exponential Theorem (Statement only)- Summation -Logarithmic series (Statement only) -Modification of the Logarithmic series - Problems using the Different Forms of Logarithmic series.					
		Unit-III Characteristic equation -Eigen values and Eigen Vectors-Similar matrices - Cayley -Hamilton Theorem (Statement only) - Finding powers of square matrix, Inverse of a square matrix up to order 3, Diagonalization of square matrices - related problems.					
		Unit -IV Expansion for $\sin^n\theta$, $\cos^n\theta$, $\tan^n\theta$ - Expansions for $\sin^n\theta$, and $\cos^n\theta$ -Expansions of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in powers of θ - related problems.					
		Unit -V Hyperbolic functions - Relation between hyperbolic functions and circular trigonometry functions-Inverse hyperbolic functions-Logarithm of complex number.					
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/TRB/NET/UGC - CSIR/ GATE/ TNPSC/ others to be solved (To be discussed during the Tutorial hour)					
Skills acquired from the course		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill					
Recommended Text		1. Algebra (Volume 1)T.K.Manickavachagompillai, T.Natarajan and K.S.Ganapathy, S.Viswanathan PVT.LTD,(2008).					

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
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	<p>Unit I - Chapter 6(Sec 16,17,18,19) Unit II - Chapter.3(Sec 10,14) Chapter 4(Sec1-3,5-7)</p> <p>2. Algebra (Volume II)T.K.Manickavachagompillai, T.Natarajan and K.S.Ganapathy,S.Viswanathan PVT.LTD,(2004).</p> <p>Unit III- Chapter 2(sec 16 full)</p> <p>3. Trigonometry, S.Narayanan and T.K.Manickavachagompillai, S.Viswanathan PVT.LTD</p> <p>Unit IV –Chapter 3(full) Unit V- Chapter 4(full) & chapter -5(sec 5)</p>
Reference Books	<p>1. W.S. Burnstine and A.W. Panton, Theory of equations (for Unit I)</p> <p>2. David C. Lay, Linear Algebra and its Applications, 3rd Ed., Pearson Education Asia, Indian Reprint, 2007 (for Unit III)</p> <p>3. C.V.Durell and A. Robson, Advanced Trigonometry, Courier Corporation, 2003, (for Unit II, IV & V)</p>
Web resources	<p>https://nptel.ac.in/ https://www.mathsisfun.com/</p>

Course Outcomes:

Students will be able to

CO1:classify and Solve reciprocal equations

CO2:find the sum of binomial, exponential and logarithmic series

CO3:find Eigen values, eigen vectors, verify Cayley– Hamilton theorem and diagonalize a given matrix

CO4:expand the powers and multiples of trigonometric functions in terms of sine and cosine

CO5: determine relationship between circular and hyperbolic functions and the summation of trigonometric series

Mapping of Cos with POs and PSOs:

PO	POs						PSOs		
CO	1	2	3	4	5	6	1	2	3
CO1	3	1	3	-	-	-	3	2	1
CO2	2	1	3	1	-	-	3	2	1
CO3	3	1	3	1	-	-	3	2	1
CO4	3	1	3	-	-	-	3	2	1
CO5	3	1	3	-	-	-	3	2	1

Question Paper Pattern


Maximum Marks: 75


Examination Duration:3Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/or type–One question from each unit)


Part C: $3 \times 10 = 30$ (Three out of Five –One question from each unit)

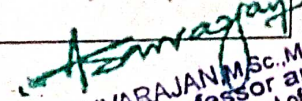

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(For students admitted from 2023-2024)

Title of the Course		DIFFERENTIAL CALCULUS					
Paper Number		CORE 2					
Category	Core	Year	I	Credits	4	Course Code	T1MA2
		Semester	I				
Instructional Hours per week	Lecture		Tutorial		Lab Practice		Total
	4		-		-		4
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		1.The basic skills of differentiation, successive differentiation, and their applications. 2.Basic knowledge on the notions of curvature, evolutes, involutes and polar co-ordinates and in solving related problems.					
Course outline		<p>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 .</p> <p>Unit-II Partial Differentiation Partial derivatives – Successive partial derivatives – Function of a function rule – Total differential coefficient – A special case – Implicit Functions.</p> <p>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.</p> <p>Unit -IV Curvature Definition of Curvature – Circle, Radius and Centre of Curvature – Evolutes and Involutives</p> <p>Unit -V Envelope Method of finding the envelope – Another definition of envelope – Envelope of family of curves which are quadratic in the parameter.</p>					
Extended Professional Component		Questions related to the above topics, from various competitive examinations UPSC/TRB/NET/UGC – CSIR/ GATE/ TNPSC/ others to be solved (To be discussed during the Tutorial hour)					
Skills acquired from the course		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill					
Recommended Text		1. Calculus(volume-I),S.Narayanan and T.k.ManickavachagomPillay, S.viswanathan PVT .,LTD(2004).					


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	UNIT I : Chapter 3(full) UNIT II : Chapter 8(sec 1.1-1.5) UNIT III :Chapter 8(sec 1.6,1.7 & 4,5) UNIT IV : Chapter 10(sec2.1-2.5) UNIT V :Chapter 10 (sec1.1-1.4)
Reference Books	1. M.J. Strauss, G.L. Bradley and K. J. Smith, Calculus, 3rd Ed., Dorling Kindersley (India) P. Ltd. (Pearson Education), Delhi, 2007. (For Unit I, II & III) 2. N.P. Bali, Golden Differential Calculus, Laxmi Publications (P) Ltd. 2010. (For Unit IV &V) 3. H. Anton, I. Birens and S. Davis, Calculus, John Wiley and Sons, Inc., 2002. 4. G.B. Thomas and R.L. Finney, Calculus, Pearson Education, 2010.
Web resources	https://nptel.ac.in/

Course Outcomes:

Students will be able to

CO1: Find the nth derivative, form equations involving derivatives and apply Leibnitz formula

CO2: Find the partial derivative and total derivative coefficient

CO3: Determine maxima and minima of functions of two variables and to use the Lagrange's method of undetermined multipliers

CO4: Find the envelope of a given family of curves

CO5: Find the evolutes and involutes and to find the radius of curvature using polar co-ordinates

Mapping of Cos with POs and PSOs:

PO	Pos						PSOs		
	1	2	3	4	5	6	1	2	3
CO1	3	1	3	-	-	-	3	2	1
CO2	2	1	3	-	-	-	3	2	1
CO3	3	2	3	2	-	-	3	2	1
CO4	3	2	3	2	1	-	3	2	1
CO5	3	2	3	2	1	-	3	2	1

Question Paper Pattern

Maximum Marks: 75

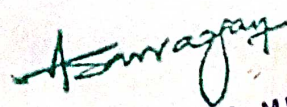
Examination Duration:3Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/or type—One question from each unit)

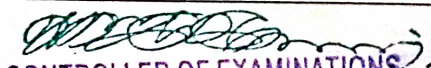
Part C: $3 \times 10 = 30$ (Three out of Five —One question from each unit)

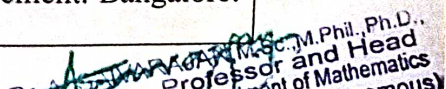

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Title of the Course		STRESS MANAGEMENT THROUGH YOGA					
Paper Number		SEC 1					
Category	SEC	Year	I	Credits	2	Course Code	T1MASE1
		Semester	I				
Instructional Hours per week	Lecture		Tutorial		Lab Practice		Total
	2		-		-		2
Objectives of the Course		This study investigated the effects of 8-16 week Yoga on Stress and Physiological health					
Course outline		UNIT – I: Meaning and Definition of Stress, Types- Eustress- Distress- Anticipatory Anxiety- Intense Anxiety and Depression- Meaning of Management – Stress Management					
		UNIT – II: Concept of Stress according to Yoga: Patanjali aphorism (PYS II – 3) AvidyaAsmita- Bhagavad-Gita (Gita II 62-63)- Dhayato Visayam Punsah ... Yoga Vasistha and Upanishad.					
		Unit–III: Physiology of Stress on: Autonomic Nervous System(ANS)- Endocrine System- Hypothalamus- Cerebral Cortex- Neurohumours					
		Unit –IV : Mechanism of Stress related diseases: Pshychic-physchomatic- Somatic phase - Organic phase- Role of Meditation & Pranayama on Stress- physiological aspect of Meditation- Constant stress&strain- anxiety- conflicts resulting in a fatigue among Executive- Contribution of Yoga to solve the stress related problems of Executive.					
		Unit –V : Meaning and definition of Health- various dimensions of health(Physical, Mental, Social and Spiritual)- Yoga and health- Yoga as therapy- Physical fitness- Stress control exercise- Sitting meditation- Walking meditation- Progressive muscular relaxation- Gentle stretches and Massage.					
Skills acquired from the course		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill					
Reference Books		<ol style="list-style-type: none"> 1. Andrews, Linda Wasmer.,(2005). Stress control for peace of Mind. London: Greenwich Editions 2. Lalvani,Vimla.,(1998). Yoga for stress. London: Hamlyn 3. Nagendra, H.R., and Nagarathana, R., (2004). Yoga perspective in stress management 4. Nagendra, H.R., and Nagarathana, R., (2004). Yoga practices for anxiety & depression. Bangalore: Swami Sukhabodananda 5. Sukhabodananda ,Swami., (2002). Stress Management. Bangalore: Prasanna trust. 					


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Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

- CLO1: Yoga appears to be effective for stress amelioration and promotion of psychological health
- CLO2: Demonstrate basic skills associated with stress and Yoga activities including strength and flexibility, balance and coordination.
- CLO3: Demonstrate the ability to perform Yoga movement in various combination and forms.
- CLO4: Understand and apply the knowledge of basic sequencing and effective group management.
- CLO5: Yoga might also help you to manage your symptoms of depression and anxiety that are due to different situations

Mapping of Cos with POs and PSOs:

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

Question Paper Pattern

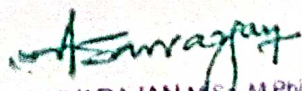
Maximum Marks: 75

Examination Duration: 3Hours

Part – A 5X6 =30 Marks Either or type – (Two questions from each unit)


Part – B 3X15 = 45 Marks (Three out of Five and One question from each Unit)

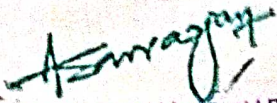

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Title of the Course		BASIC MATHEMATICS					
Paper Number		FC					
Category	FC	Year	I	Credits	2	Course Code	FCMA
		Semester	I				
Instructional Hours per week	Lecture		Tutorial		Lab Practice		Total
	2		-		--		2
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		<p>To bridge the gap and facilitate transition from higher secondary to tertiary education;</p> <p>To instill confidence among stakeholders and inculcate interest for Mathematics;</p>					
Course Outline		<p>UNIT-I: Algebra: Binomial theorem, General term, middle term, problems based on these concepts</p> <p>Unit II: Sequences and series (Progressions). Fundamental principle of counting. Factorial <u>$n!$</u></p> <p>Unit III: Permutations and combinations, Derivation of formulae and their connections, simple applications, combinations with repetitions, arrangements within groups, formation of groups.</p> <p>Unit IV: 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</p> <p>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.</p>					
Recommended Text		<p>1. NCERT class XI and XII text books.</p> <p>2. Any State Board Mathematics text books of class XI and XII</p>					
Website and e-Learning Source		https://nptel.ac.in					


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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 submultiple 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 Cos with POs and 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

Question paper pattern

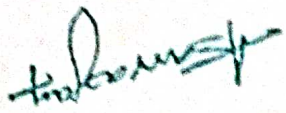
Maximum Marks: 75

Examination Duration: 3Hours

Part – A 5X6 =30 Marks Either or type – (Two questions from each unit)


Part – B 3X15 = 45 Marks (Three out of Five and One question from each Unit)

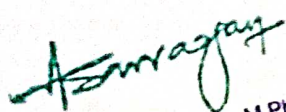

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(For students admitted from 2023- 2024)

Title of the Course		ANALYTICAL GEOMETRY (Two & Three Dimensions)					
Paper Number		CORE 3					
Category	Core	Year	I	Credits	4	Course Code	T2MA3
		Semester	II				
Instructional Hours/per week		Lecture	Tutorial	Lab Practice	Total		
		4	-	-	4		
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		<ul style="list-style-type: none"> 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. 					
Course Outline		UNIT-I: System of planes –Length of the perpendicular –Equation of the planes bisecting the angle between the plane.					
		UNIT-II: Polar coordinates: General polar equation of straight line – Equation of a circle– Equation chord of circle.					
		UNIT-III: Representation of line–angle between a line and a plane – co – planar lines–shortest distance between two skew lines –length of the perpendicular					
		UNIT-IV: Equation of a sphere-general equation-section of a sphere by a plane-equation of the circle- tangent plane-Orthogonal spheres.					
		UNIT-V: - Equation of a cone –Right circular cone –Intersection of a straight line and Quadric cone –Equation of cylinder-Enveloping cylinder					
Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)		<p>Questions related to the above topics, from various competitive examinations UPSC / TNPSC / others to be solved</p> <p>(To be discussed during the Tutorial hour)</p>					
Skills acquired from this course		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill					


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Recommended Text	<ol style="list-style-type: none"> 1. P Duralpandian, LaxmiDuralpandian and D Muhilan, Analytical Geometry 2D, Emerald Publishers, 1997. 2. T K Manleavacoghompillay and T Natarajan, Analytical geometry part-II 3D, S Viswanathan(Printers) PVT.LTD., 2013 3. A. Singaravelu and R. Ramaa, Analytical Geometry of 3Dimensions & Integral calculus (Paper II) A.R. Publications, June 2003. <p>Unit -1: Chapter 1&2 (section- 2.18-2.38) Text book-3</p> <p>Unit -2: Chapter 9 (section-9.1,9.2,9.3-9.5) Text book-1</p> <p>Unit -3: Chapter 1&2 (section- 2.39-2.75) Text book-3</p> <p>Unit -4: Chapter 1&2 (section-2.75-2.110) Text book-3</p> <p>Unit -5: Chapter-5 (section – 2 , 3 & 8) Text book-2</p>
Reference Book	<ol style="list-style-type: none"> 1. S. L. Loney, Co-ordinate Geometry. 2. Robert J. T. Bell, Co-ordinate Geometry of Three Dimensions. 3. William F. Osgood and William C. Graustein, Plane and Solid Analytic Geometry, Macmillan Company, New York, 2016.
Website and e-Learning Source	https://nptel.ac.in

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

CLO/CO

Mapping of Cqs with POs and PSOs:

	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

Question Paper Pattern

Maximum Marks: 75

Examination Duration: 3Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/or type - One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five - One question from each unit)


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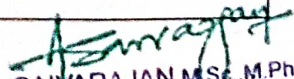
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Title of the Course		INTEGRAL CALCULUS					
Paper Number		CORE 4					
Category	Core	Year	I	Credits	4	Course Code	T2MA4
		Semester	II				
Instructional Hours/per week		Lecture	Tutorial	Lab Practice	Total		
		4	--	--	4		
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		<ul style="list-style-type: none"> • 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. 					
Course Outline		UNIT-I: Reduction formulae -Types, integration of product of powers of algebraic and trigonometric functions.					
		UNIT-II: integration of product of powers of algebraic and logarithmic functions - Bernoulli's formula..					
		UNIT-III: Multiple Integrals - definition of double integrals - evaluation of double integrals – double integrals in polar coordinates - Change of order of integration					
		UNIT-IV: Triple integrals –applications of multiple integrals - volumes of solids of revolution					
		UNIT-V: 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					
Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)		<p>Questions related to the above topics, from various competitive examinations UPSC / TNPSC / others to be solved</p> <p>(To be discussed during the Tutorial hour)</p>					
Skills acquired from this course		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill					


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Recommended Text	1. Calculus(volume-II),S.Narayanan and T.k.Manickavachagom Pillay, S.viswanathan PVT .,LTD(2017). UNIT I : Chapter 1 (sec 11,13-13.9) UNIT II : Chapter 1 (sec 13.10-15.1) UNIT III : Chapter 5(sec 1 -3 ,3.1,3.2) UNIT IV : Chapter 5(sec4-6, 6.1,6.2,6.3) UNIT V :Chapter 7(sec1.1, 2.1-2.6)
Reference Books	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. D. Chatterjee, Integral Calculus and Differential Equations, Tata-McGraw Hill Publishing Company Ltd. 4. P. Dyke, An Introduction to Laplace Transforms and Fourier Series, Springer Undergraduate Mathematics Series, 2001 (second edition).
Website and e-Learning Source	https://nptel.ac.in

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO 1: Determine the integrals of algebraic, trigonometric and logarithmic functions and to find the reduction formulae

CLO 2: Evaluate double and triple integrals and problems using change of order of integration

CLO 3: Solve multiple integrals and to find the areas of curved surfaces and volumes of solids of revolution

CLO 4: Explain beta and gamma functions and to use them in solving problems of integration

CLO 5: Explain Geometric and Physical applications of integral calculus

Mapping of Cos with POs and PSOs:

	-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

Question Paper Pattern

Maximum Marks: 75

Examination Duration:3Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/or type–One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five –One question from each unit)

RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
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(For students admitted from 2023- 2024)

Title of the Course		HERBS AND DRUG ACTION					
Paper Number		SEC 2					
Category	SEC	Year	I	Credits	2	Course Code	TIMASE2
		Semester	II				
Instructional Hours/per week		Lecture	Tutorial	Lab Practice	Total		
		2	-	-	2		
Objectives of the Course		The course introduces to the students to know the importance, concepts and knowledge in herbal medicine and remedy. To improve and maintain the health conditions in regular life.					
Course Outline		<p>UNIT I: Terminologies - Definitions -Classification of medical plants based on their effects with special with special reference to India.</p> <p>Unit II: Allergens - Types - Sources -Active principles -chemical nature -Cell modifiers - Lectins - mutagens, teratogens - Allergic reactions with known examples.</p> <p>Unit III: Drugs acting on brain and nervous system - Rheumatic arthritis - Psychoactive drugs - Depressants, stimulants. Haucinogens -sources, effects, basic mechanism of action.</p> <p>Unit IV: Cardiovascular diseases - blood pressure - cardiac drugs of plant origins - alkaloids, anticoagulants - basic mechanism of action, pulmonary/ respiratory disorders - asthma - bronchitis - common cold - allergy - remedy from plants.</p> <p>Unit V: Drugs for urinogenital disorders - roots of With aniasomnifera - Memory stimulants - centellaasiatics - Drugs for dissolving kidney stones - Musa paradisiac (pseudostem) - Antiinflammatory drugs - Cardiosprimum - Anti cancer drugs - Catharanthusroseus.</p>					
Skills acquired from this course		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill					
Reference Books		<ol style="list-style-type: none"> 1. Alex Ramani V, Food chemistry, MJP Publishers, Triplicane, Chennai 2009. 2. Thangamma Jacob, Food adulteration, Macmillancompany of India limited, New Delhi 1976. 3. Jeyaraman J, laboratory manual in Biochemistry, Wiley Eastern limited, New Delhi 1981. 					

(For students admitted from 2023- 2024)

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CO1: Explain method for identification and authentication of herbal drugs.

CO2: Explain basic principles of traditional medicinal system with method of

CO3: preparation and standardization of ayurvedic formulations.

CO4: Study the basic knowledge about the native medicine and how it works in our body.

CO5: Study the basic knowledge about the Drugs for urinogenital disorders

Mapping of Cos with POs and PSOs:

	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


Question paper pattern


Maximum Marks: 75

Examination Duration: 3Hours

Part – A 5X6 =30 Marks Either or type – (Two questions from each unit)


Part – B 3X15 = 45 Marks (Three out of Five and One question from each Unit)

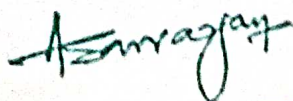

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(For students admitted from 2023- 2024)

Title of the Course		FOOD AND NUTRITION					
Paper Number		SEC3					
Category	SEC	Year	I	Credits	2	Course Code	T2MASE3
	Semester	II					
Instructional Hours/per week		Lecture		Tutorial		Lab Practice	
		2		-		--	
Objectives of the Course		The course introduces to the students to know the importance of nutritional food, knowledge of nutrition and of basic terminology and healthy food. To equip students with knowledge and understanding of modern aspects of nutritional science and novel food usage.					
Course Outline		<p>UNIT I: Food, Nutrition and Health: The meaning of food, nutrition, nutritional care, and health -- nutritional problems in India.</p> <p>Unit II: Biological Importance of Food: Nutritional classification of food – nutrients as body constituents – digestion and absorption of food. Types of food, caloric content, and dieting.</p> <p>Unit III: Basic Chemical Constituents of Food: Biological functions of carbohydrates, proteins, fats, vitamins, minerals, and water.</p> <p>Unit IV: Food Adulteration Testing: Common adulteration in food – testing methods of all food adulteration (Ghee, Chill powder, oil, Milk, Turmeric powder).</p> <p>Unit V: Health Problems of Food Adulteration: Principal adulteration and its effect on health.</p>					
Skills acquired from this course		Knowledge and understanding of healthy food for healthy body and also for healthy life.					
Reference Books		<ol style="list-style-type: none"> 1. Alex Ramani V, Food chemistry, MJP Publishers, Triplicane, Chennai 2009. 2. Thangamma Jacob, Food adulteration, Macmillan company of India limited, New Delhi 1976. 3. Jeyaraman J, laboratory manual in Biochemistry, Wiley Eastern limited, New Delhi 1981. 					


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Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO 1: Knowledge: Summarize and critically discuss / understand both fundamental and applied aspects of food science.

CLO 2: They will be able to explain functions of specific nutrients in maintaining health, identifying nutrient specific foods and apply principles from the various facts of food science and related disciplines

CLO 3: To solve practical as well as real – world problems.

CLO 4: Skills: Use current information technologies to locate and apply evidence – based guidance and protocols

CLO 5: Getting imparted with critical thinking to take leadership roles in fields of health, dietetics, special nutritional needs, and nutritional counseling.

Mapping of Cos with POs and PSOs:

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

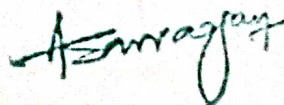
Question paper pattern


Maximum Marks: 75

Examination Duration: 3Hours

Part – A 5X6 =30 Marks Either or type – (Two questions from each unit)

Part – B 3X15 = 45 Marks (Three out of Five and One question from each Unit)




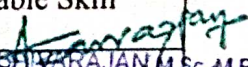

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Title of the Course		VECTOR CALCULUS AND APPLICATIONS					
Paper Number		CORE 5					
Category	Core	Year	II	Credits	4	Course Code	T3MA5
		Semester	III				
Instructional Hours per week		Lecture		Tutorial		Lab Practice	Total
		4		-		--	4
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		<ul style="list-style-type: none"> • Knowledge about differentiation of vectors and on differential operators. Knowledge about derivatives of vector functions. • Skills in evaluating line, surface and volume integrals. • The ability to analyze the physical applications of derivatives of vectors. 					
Course Outline		UNIT-I: Vector point function - Scalar point function - Derivative of a vector and derivative of a sum of vectors - Derivative of a product of a scalar and a vector point function - Derivative of a scalar product and vector product.					
		UNIT-II: The vector operator 'del', The gradient of a scalar point function - Divergence of a vector - Curl of a vector - solenoidal and irrotational vectors – simple applications.					
		UNIT-III: Laplacian operator, Vector identities - Line integral - simple problems.					
		UNIT-IV: Surface integral - Volume integral – Applications.					
		UNIT-V: Gauss divergence Theorem, Stoke's Theorem, Green's Theorem in two dimensions – Applications to real life situations.					
Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)		<p>Questions related to the above topics, from various competitive examinations UPSC / TNPSC / others to be solved</p> <p>(To be discussed during the Tutorial hour)</p>					
Skills acquired from this course		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill					


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(For students admitted from 2023- 2024)

Recommended Text	1. Duraipandian, P and Laxmiduraipandian - Vector Analysis (Revised Edition-Reprint 2005) Emerald Publishers. UNIT I : Chapter1: Sections 1.1 to 1.5 UNIT II : Chapter2: Sections 2.1 to 2.7 UNIT III : Chapter2: Sections 2.8 and Chapter3: Sections 3.1, 3.2, 3.3, 3.4) UNIT IV : Chapter3: Sections 3.5, 3.6 UNIT V : Chapter4: 4.1 to 4.5.
Reference Books	1. J.C. Susan ,Vector Calculus, , (4th Edn.) Pearson Education, Boston, 2012. 2. A. Gorguis, Vector Calculus for College Students, Xilbius Corporation, 2014. 3. J.E. Marsden and A. Tromba ,Vector Calculus, , (5thedn.) W.H. Freeman, New York, 1988.
Website and e-Learning Source	https://nptel.ac.in

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CO 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

CO 2: Applications of the operator 'del' and to Explain soleonidal and ir-rotational vectors

CO 3: Solve simple line integrals

CO 4: Solve surface integrals and volume integrals

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

Mapping of Cos with POs and PSOs:

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CO1	3	2	3	1	-	-	3	2	1
CO2	3	2	3	1	2	-	3	2	1
CO3	3	3	3	3	-	-	3	3	1
CO4	3	3	3	3	-	-	3	3	1
CO5	3	3	3	3	2	-	3	3	1

Question Paper Pattern

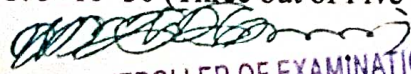
Maximum Marks: 75


Examination Duration:3 Hours

Part A:10 ×2=20 (Two questions from each unit)

Part B: 5×5=25 (Either / Or type–One questions from each unit)


Part C: 3×10=30 (Three out of Five –One questions from each unit)

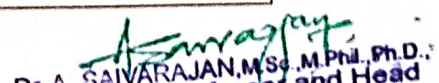

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(For students admitted from 2023- 2024)

Title of the Course		DIFFERENTIAL EQUATIONS AND APPLICATIONS					
Paper Number		CORE 6					
Category	Core	Year	II	Credits	4	Course Code	T3MA6
		Semester	III				
Instructional Hours per week		Lecture	Tutorial	Lab Practice	Total		
		4	-	--	4		
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		<ul style="list-style-type: none"> • Knowledge about the methods of solving Ordinary and Partial Differential Equations. • The understanding of how Differential Equations can be used as a powerful tool in solving problems in science. 					
Course Outline		UNIT-I: Ordinary Differential Equations: Variable separable - Homogeneous Equation-Non-Homogeneous Equations of first degree in two variables -Linear Equation - Bernoulli's Equation-Exact differential equations.					
		UNIT-II: Equation of first order but not of higher degree: Equation solvable for dy/dx - Equation solvable for y -Equation solvable for x - Clairauts' form - Linear Equations with constant coefficients-Particular integrals of algebraic, exponential, trigonometric functions and their products.					
		UNIT-III: Simultaneous linear differential equations- Linear Equations of the Second Order -Complete solution in terms of a known integrals-Reduction to the Normal form-Change of the Independent Variable-Method of Variation of Parameters.					
		UNIT-IV: Partial differential equation: Formation of PDE by Eliminating arbitrary constants and arbitrary functions – complete integral – singular integral-General integral-Lagrange's Linear Equations –Simple Applications.					
		UNIT-V: Special methods – Standard forms-Charpit's Methods – Simple Applications					
Extended Professional Component (is a part of internal component only)		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					


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Recommended Text	1. Narayanan S and Manicavachagom Pillay T.K. Differential equations and its application, 2006, S. Viswanathan Printers Pvt. Ltd. UNIT I : Chapter 2: Sections 1 to 6 UNIT II : Chapter 4: Sections 1, 2, 3 and Chapter 5: 1 to 4 UNIT III : Chapter 6: Sections 1 to 4 and Chapter 8: Sections 1 to 4 UNIT IV : Chapter 12: Sections 1, 2, 3, and 4 UNIT V : Chapter 12: 5, and 6.
Reference Books	1. Shepley L. Ross, Differential Equations, 3rd Ed., John Wiley and Sons, 1984. 2. L.Sneddon, Elements of Partial Differential Equations, McGrawHill, International Edition, 1967. 3. G.F. Simmons, Differential equations with applications and historical notes, 2nd Ed, Tata McGraw Hill Publications, 1991. 4. D.A. Murray, Introductory course in Differential Equations, Orient and Longman
Website and e-Learning Source	https://nptel.ac.in

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to


CLO 1: Determine solutions of homogeneous equations, non-homogeneous equations of degree one in two variables, solve Bernoulli's equations and exact differential equations

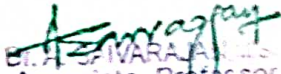
CLO 2: Find the solutions of equations of first order but not of higher degree and to Determine particular integrals of algebraic, exponential, trigonometric functions and their products

CLO 3: Find solutions of simultaneous linear differential equations, linear equations of second order and to find solutions using the method of variations of parameters

CLO 4: Form a PDE by eliminating arbitrary constants and arbitrary functions, find complete, singular and general integrals, to solve Lagrange's equations

CLO 5: Explain standard forms and Solve Differential equations using Charpit's method


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Mapping of Cos with POs and PSOs:

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

Question Paper Pattern

Maximum Marks: 75


Examination Duration:3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either / Or type—One questions from each unit)


Part C: $3 \times 10 = 30$ (Three out of Five —One questions from each unit)

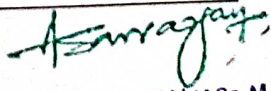

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(For students admitted from 2023- 2024)

Title of the Course		TEST OF VERBAL AND NON-VERBAL REASONING					
Paper Number		SEC 5					
Category	SEC	Year	II	Credits	2	Course Code	T3MASE5
		Semester	III				
Instructional Hours per week	Lecture	Tutorial		Lab Practice		Total	
	2	-		--		2	
Objectives of the Course		<ul style="list-style-type: none"> • Knowledge about solve the problems using language-based reasoning framework • Ability to understand and analyses visual information. • Accrued Self confident to face any competitive examinations . 					
Course Outline		UNIT-I: Coding decoding – Alphabet text UNIT-II: Word formation – Letter series – Logical order of words UNIT-III: Logical Venn-Diagrams – Eligibility test UNIT-IV: Mirror image – Water image UNIT-V: Figure completion – Figure matrix					
Extended Professional Component (is a part of internal component only)		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					
Recommended Text		1. Jaikishan and Premkishan, Teat of Reasoning, Arihant Publishers. UNIT I : Chapter 1, 4 (Verbal) UNIT II : Chapter 5, 11, 17 (Verbal) UNIT III : Chapter 19, 20 (Verbal) UNIT IV : Chapter 1, 2 (Non-Verbal) UNIT V :Chapter 11, 12 (Non-Verbal)					
Reference Books		1. R.S. Aggarwal, Quantitative Aptitude for Competitive Examinations, S.Chand co Ltd., 152. Anna Salai, Chennai,2010. 2. R.S. Aggarwal, A Morden approach to Verbal and Non-Verbal Reasoning, S.Chand co Ltd., New Delhi, 2007.					
Website and e-Learning Source		https://mathforum.org , http://ocw.mit.edu/ocwwweb/Mathematics , http://www.opensource.org , http://www.mathpages.com https://www.mathsisfun.com/					


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Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO 1: convert the text to another particular form.

CLO 2: find the solutions to arrange word in the perfect order.

CLO 3: find solutions using logical thinking.

CLO 4: Classify and solve the image problems

CLO 5: Explain standard forms and Solve the non-verbal problem.

Mapping of Cos with POs and PSOs:


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

Question paper pattern

Part – A 5X6 =30 Marks Either or type – (Two questions from each unit)


Part – B 3X15 = 45 Marks (Three out of Five and One question from each Unit)



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(For students admitted from 2023- 2024)

Title of the Course		TRANSFORM TECHNIQUES					
Paper Number		CORE 7					
Category	Core	Year	II	Credits	4	Course Code	T4MA7
		Semester	IV				
Instructional Hours per week		Lecture		Tutorial	Lab Practice	Total	
		4		-	--	4	
Objectives of the Course		To bridge the gap between industry academia interface – to apply the theory learnt to industrial applications					
Course Outline		Core Industry Module / Industrial Statistics can be designed as per HEI's need.					
Course Outline		UNIT-I: The Laplace Transforms-Definitions-Sufficient conditions for the existence of the Laplace transform(without proof)-Laplace transform of periodic functions-some general theorems-evaluation of integrals using Laplace transform-Problems.					
		UNIT-II: The inverse Laplace Transforms- Applications of Laplace Transforms to ordinary differential equations with constant co-efficients and variable co-efficients, simultaneous equations and equations involving integrals-Problems.					
		UNIT-III: Fourier series- Expansion of periodic functions of period 2π -Expansion of even and odd functions, Half range Fourier series-Change of intervals –Problems.					
		UNIT-IV: Fourier Transform- Infinite Fourier Transform(Complex form) – Properties of Fourier Transform – Fourier cosine and Fourier sine Transform – Properties – Parseval's identity – Convolution theorem - Problems.					
		UNIT-V: Z Transforms: Definition of Z-Transform and its properties - Z-Transforms of some basic functions- Examples and simple problems					
Extended Professional Component		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		<ul style="list-style-type: none"> • About Laplace Transforms and its inverse. • To apply Laplace transform in solving Ordinary Differential Equations with constant coefficients, simultaneous Ordinary Differential Equations. • To solve problems in Fourier series and Fourier transforms. 					


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(For students admitted from 2023- 2024)

Recommended Text	1.S.NarayananandT.K.ManleavachagamPillal,"Calculus-Volume III" – (Ananda Book Depot) 2. T.Veerarajan"Engineering Mathematics for Semester III- Third Edition – (Tata McGraw-Hill Publishing Company Ltd, New Delhi) UNIT I : Chapter 5: Section-1 to 5, (from 1) UNIT II : Chapter 5: Section-6 to 12.(from 1) UNIT III : Chapter 6: Section-1 to 6,(from 1) UNIT IV : Chapter 6: Section-8 to 15.(from 1) UNIT V : Chapter 7: Sections -7.1 to 7.3.(from 2)
Reference Books	1. P.Kandasamy and K. Thilagavathy and K. Gunavathy, <i>Engineering Mathematics Volume III</i> – (S.Chand and Co.) 2. Stanley Grossman and William R.Devit. <i>Advanced Engineering Mathematics</i> 3. A.Singaravelu, <i>Engineering Mathematics III- Meenakshi Agency, Chenani, 2008</i>
Website and e-Learning Source	https://nptel.ac.in http://www.sosmath.com http://mathworld.wolfram.com

Question Paper Pattern


Maximum Marks: 75


Examination Duration:3 Hours

Part A:10 ×2=20 (Two questions from each unit)

Part B: 5×5=25 (Either / Or type–One questions from each unit)


Part C: 3×10=30 (Three out of Five –One questions from each unit)

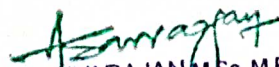

CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
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(For students admitted from 2023- 2024)

Title of the Course		NUMERICAL METHODS ^{WITH} APPLICATIONS					
Paper Number		CORE 8					
Category	Core	Year	II	Credits	3	Course Code	T4MA8
		Semester	IV				
Instructional Hours per week		Lecture	Tutorial	Lab Practice	Total		
		3	--	--	3		
Objectives of the Course		<ul style="list-style-type: none"> To develop the mathematical skills of the students in the areas of numerical methods. To provide the student with numerical methods of solving the Interpolation, differentiation and integration. This course is an introduction to broad range of numerical methods for solving mathematical problems that arise in science and engineering. 					
Course Outline		<p>UNIT-I: Algebraic and Transcendental equations – Finding the solution of the given equation using bisection method, Method of false position, Newton-Raphson method, Iteration method.</p> <p>UNIT-II: Finite differences – Forward, Backward and central differences – Newton's Forward and backward difference interpolation formulae – Interpolation with unevenly spaced points – Lagrange's interpolation formula.</p> <p>UNIT-III: Numerical Integration - Using Trapezoidal rule and Simpson's 1/3 and 3/8 - rules.</p> <p>UNIT-IV: Solution to Linear systems – Gauss Elimination method – Jacobi and Gauss Siedal iterative methods.</p> <p>UNIT-V: Numerical solution of ODE – Solution by Taylor's series method, Picard's method, Euler's method, Runge-kutta second and fourth order methods.</p>					
Extended Professional Component		<p>Questions related to the above topics, from various competitive examinations UPSC / TNPSC / others to be solved</p> <p>(To be discussed during the Tutorial hour)</p>					
Skills acquired from this course		<p>Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill</p>					


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(For students admitted from 2023- 2024)

Recommended Text	[1] S.S Sastry, Introductory methods of Numerical Analysis, Prentices Hall of India Pvt.Limited,2001,Third Edition. UNIT I : Chapter 2 (sections 2.2, 2.3, 2.4, 2.5) UNIT II : Chapter 3 (sections 3.3.1, 3.3.2, 3.3.3, 3.6, 3.9, 3.9.1) UNIT III : Chapter 5 (sections 5.4, 5.4.1, 5.4.2, 5.4.3) UNIT IV : Chapter 6 (sections 6.3, 6.3.2) and Chapter 8 (sections 8.3.1 , 8.3.2) UNIT V : Chapter 7 (sections 7.1, 7.2, 7.3, 7.4,7.5).
Reference Books	[1] S.Narayanan and others, Numerical Analysis, S.Viswanathan Publishers, 1994, [2] A.Singaravelu, Numerical methods, Meenachi Agency, June 2000. [3] E. Kendall, Atkinson, An Introduction to Numerical Analysis, II Edition, John wiley& Sons, 1989.

Course Learning Outcome (for Mapping with POs and PSOs)

The students will be able to

- CO1: Learn the numerical methods to find our solution of algebraic equations using different methods.
- CO2: Understand the various interpolation methods and finite difference concepts.
- CO3: Apply numerical methods to obtain approximate solutions to mathematical problems.
- CO4: Work numerically on the ordinary differential equations using different methods through the theory of finite differences.
- CO5: Apply Taylor series and Rungekutta methods to find the solution of the equations.

Mapping of Cos with POs and PSOs:

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CO1	3	1	3	1	-	-	3	2	1
CO2	2	1	3	1	2	-	3	2	1
CO3	3	1	3	3	-	-	3	3	1
CO4	3	1	3	3	-	-	3	3	1
CO5	3	1	3	3	2	-	3	3	1

Question Paper Pattern

Maximum Marks: 75


Examination Duration:3 Hours

Part A:10 ×2=20 (Two questions from each unit)

Part B: 5×5=25 (Either / Or type–One questions from each unit)

Part C: 3×10=30 (Three out of Five –One questions from each unit)


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(For students admitted from 2023- 2024)

Title of the Course		MATHEMATICS FOR COMPETITIVE EXAMINATION-I					
Paper Number		SEC 6					
Category	SEC	Year	II	Credits	2	Course Code	T4MASE6
		Semester	IV				
Instructional Hours per week		Lecture	Tutorial	Lab Practice	Total		
		2	--	--	2		
Objectives of the Course		<ul style="list-style-type: none"> To learn the simple techniques for solving aptitude problems. To enable the students prepare themselves for various competitive examinations 					
Course Outline		UNIT-I: Simple Interest – Compound Interest.					
		UNIT-II: Logarithms - Area.					
		UNIT-III: Volume & Surface Areas – Races & Games of Skill.					
		UNIT-IV: Calendar - Clocks.					
		UNIT-V: Stocks & Shares.					
Skills acquired from this course		Knowledge, Analytical ability, Reasoning Skill, Prepare problem Solving for Competitive Examination					
Recommended Text		1. R.S. Aggarwal, Quantitative Aptitude for Competitive Examinations, S.Chand co Ltd., 152. Anna Salai, Chennai, 2010. Unit I: (Chap – 21 & 22) Unit II: (Chap – 23 & 24) Unit III: (Chap – 25 & 26) Unit IV: (Chap – 27 & 28) Unit V: (Chap – 29)					
Website and e-Learning Source		https://mathforum.org , http://ocw.mit.edu/ocwweb/Mathematics , http://www.opensource.org , http://www.mathpages.com , https://www.mathsisfun.com/					

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO 1 : Explain in detail about Simple Interest and Compound Interest.


CLO 2 : Explain Logarithms and Area.

CLO 3 : Explain Volume & Surface Areas and Races & Games of Skill.

CLO 4 : Explain Calendar and Clocks.

CLO 5 : Explain Stocks & Shares.

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(For students admitted from 2023- 2024)

Mapping of Cos with POs and PSOs:


	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CO1	3	1	3	-	-	-	3	2	1
CO2	2	1	3	1	-	-	3	2	1
CO3	3	1	3	1	-	-	3	2	1
CO4	3	1	3	-	-	-	3	2	1
CO5	3	1	3	-	-	-	3	2	1

Question Paper Pattern

Part – A 5X6 =30 Marks Either or type – (Two questions from each unit)

Part – B 3X15 = 45 Marks (Three out of Five and One question from each Unit)


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(For students admitted from 2023- 2024)


Title of the Course		HISTROY OF MATHEMATICS							
Paper Number		SEC 7							
Category	SEC	Year	II	Credits	2	Course Code	T4MASE7		
	Semester	IV							
Instructional Hours per week		Lecture	2	Tutorial	--	Lab Practice	--	Total	2
Objectives of the Course		<ul style="list-style-type: none"> To learn the origin and development of mathematics. To enable the knowledge of famous mathematicians. 							
Course Outline		<p>UNIT-I: Early number systems and symbols.</p> <p>UNIT-II: Mathematics in early civilization.</p> <p>UNIT-III: The beginnings of Greek mathematics.</p> <p>UNIT-IV: The Alexandrian school: Euclid.</p> <p>UNIT-V: The twilight of Greek Mathematics: Diaphantus.</p>							
Skills acquired from this course		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill							
Recommended Text		1. M. David, The History of Mathematics, Seventh Edition							
Reference Books		1. Aczel, Amer, The Artist and the Mathematician: the Story of Nicolas Bourbaki, the Genius Mathematician who never Existed, New York: Thunder's Month Prss,2006.							
Website and e-Learning Source		https://mathforum.org , http://ocw.mit.edu/ocwweb/Mathematics , http://www.opensource.org , http://www.mathpages.com .							

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

- CO 1 :understand early number systems.
- CO 2 :explain early civilization of mathematics.
- CO 3 :have knowledge about origin of Greek mathematics.
- CO 4 :explain the Alexandrian school.
- CO 5 :explain Diaphantus.


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Mapping of Cos with POs and PSOs:


	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CO1	3	1	3	-	1	-	3	2	1
CO2	2	2	3	2	-	2	3	2	1
CO3	3	2	3	2	-	2	3	2	1
CO4	3	2	3	1	2	1	3	2	1
CO5	3	1	3	-	1	1	3	2	1

Question Paper Pattern

Part – A 5X6 =30 Marks Either or type – (Two questions from each unit)


Part – B 3X15 = 45 Marks (Three out of Five and One question from each Unit)

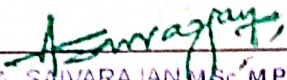

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(For students admitted from 2023- 2024)

Title of the Course		ABSTRACT ALGEBRA					
Paper Number		CORE 9					
Category	Core	Year	III	Credits	4	Course Code	T5MA9
		Semester	V				
Instructional Hours per week	Lecture	Tutorial		Lab Practice		Total	
	4	1		-		5	
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		<ol style="list-style-type: none"> 1. To prepare students to understand the concept and properties of algebra and their application 2. To provide the principles and practices of Algebra. 3. To construct a legitimate proof involves different skill and expertise. 					
Course outline		Unit –I Group Theory: Subgroup – A Counting Principle – Normal subgroups and Quotient groups.					
		Unit –II Group Theory: Homomorphism's – Automorphisms.					
		Unit–III Group Theory: Cayley's Theorem – Permutation groups – Another counting principles					
		Unit –IV Ring Theory: Definition and Examples of Rings – Some Special Classes of Rings – Homomorphism's – Ideal and Quotient Rings – More Ideal and Quotient Rings – The Field of Quotients of an Integral Domain.					
		Unit –V Vector Spaces: Elementary Basic Concepts – Linear Independence and Bases – Dual Spaces – Inner Product Spaces.					
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/TRB/NET/UGC – CSIR/ GATE/ TNPSC/ others to be solved (To be discussed during the Tutorial hour)					
Skills acquired from the course		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill					
Recommended Text		Topics in Algebra, I. N . Herstein, John Wiley & Sons, Edition. UNIT I: Chapter 2 (Sec 2.4 – 2.6)					


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	UNIT II: Chapter 2 (Sec 2.7 – 2.8) UNIT III: Chapter 2 (Sec 2.9 – 2.10) UNIT IV: Chapter 3 (Sec 3.1 – 3.6) UNIT V: Chapter 4 (Sec 4.1 – 4.4)
Reference Book	1. Algebra, S.Lang, 3rd Edition, Springer (India), 2004.
Web resources	https://nptel.ac.in/

Course Outcomes:

Students will be able to

- CLO1:** Explain groups, subgroups, normal subgroup and quotient groups
- CLO2:** Explain homomorphism and automorphism and verify the functions for homomorphism and automorphism and verify the functions for homomorphism and automorphism properties
- CLO3:** Explain permutation groups and apply Caley's theorem to problems
- CLO4:** Explain rings, ideals and quotient rings and examine the structure
- CLO5 :** Discuss about vector spaces and to explain in detail about dual spaces, inner product spaces

Mapping of Cos with POs and PSOs:

PO	POs						PSOs		
CO	1	2	3	4	5	6	...	1	2
CO1	3	3	2	3	1	---	...	3	3
CO2	3	3	2	3	1	---	...	3	3
CO3	3	3	2	3	2	---	...	3	3
CO4	3	3	2	3	1	---	...	3	3
CO5	3	3	2	3	2	---	...	3	3

Question Paper Pattern


Maximum Marks: 75


Examination Duration:3Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/or type—One question from each unit)


Part C: $3 \times 10 = 30$ (Three out of Five—One question from each unit)


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(For students admitted from 2023- 2024)

Title of the Course		REAL ANALYSIS					
Paper Number		CORE 10					
Category	Core	Year	III	Credits	4	Course Code	T5MA10
		Semester	V				
Instructional Hours per week		Lecture	4	Tutorial	1	Lab Practice	-
		Total			5		
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		1.Real Numbers and properties of Real-valued functions. 2.Connectedness, Compactness, Completeness of Metric spaces 3.Taylor's theorem, Binomial theorem and L'Hospital's rules examples					
Course outline		Unit –I Continuous Functions on Metric Spaces: Open sets– closed sets– Discontinuous function on R^1 . Connectedness, Completeness and Compactness: More about open sets-Connected sets.					
		Unit –II Bounded sets and totally bounded sets: Complete metric spaces- compact metric spaces, continuous functions on a compact metric space, continuity of inverse functions, uniform continuity.					
		Unit–III Calculus: Sets of measure zero, definition of the Riemann integral, existence of the Riemann integral-properties of Riemann integral.					
		Unit –IV Derivatives-Rolle's theorem, Law of mean, Fundamental theorems of calculus.					
		Unit –V Taylor's theorem-The Binomial theorem-L'Hospital's rule.					
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/TRB/NET/UGC – CSIR/ GATE/ TNPSC/ others to be solved (To be discussed during the Tutorial hour)					
Skills acquired from the course		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill					
Recommended Text		1. Methods of Real Analysis-Richard R.Goldberg (John Wiley & sons, 2 nd edition) (Indian edition –Oxford and IBH Publishing Co, New Delhi, 1 st January 2020)					


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	UNIT-I : Chapter 5&6(sections 5.3 to 5.6&6.1 to 6.2) UNIT-II : Chapter 6(sections 6.3 to 6.8) UNIT-III : Chapter 7(sections 7.1 to 7.4) UNIT-IV : Chapter 7(sections 7.5 to 7.8) UNIT-V : Chapter 8(sections 8.5 to 8.7)
Reference Books	1. Principles of Mathematical Analysis by Walter Rudin, Tata McGraw Hill Education, Third edition (1 July 2017). 2. Mathematical Analysis Tom M A postal, Narosa Publishing House, 2 nd edition (1974), Addison-Wesley publishing company, New Delhi.
Web resources	https://nptel.ac.in/

Course Outcomes:

Students will be able to

CLO 1: Explain the concepts of Continuous and Discontinuous functions, open and close sets, Connectedness, Completeness and Compactness

CLO 2: Explain the concepts of bounded and totally bounded sets, continuity of inverse functions and Uniform continuity

CLO 3: Define the sets of measure zero, to Explain about the existence and properties of Riemann integral

CLO 4: Explain the concept of differentiability and to Explain Rolle's theorem, Law of mean, and Fundamental theorem of calculus

CLO 5: Explain the binomial theorem, L'Hospital rule and to derive the Taylor's theorem

Mapping of Cos with POs and PSOs:

PO	POs						PSOs		
CO	1	2	3	4	5	6	...	1	2
CO1	3	3	1	3	1	-	3	1	1
CO2	3	3	1	3	1	-	3	1	1
CO3	3	3	1	3	1	-	3	1	1
CO4	3	3	1	3	1	-	3	1	1
CO5	3	3	1	3	1	-	3	1	1

Question Paper Pattern


Maximum Marks: 75

Examination Duration:3Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/or type—One question from each unit)

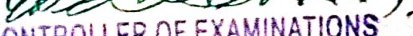
Part C: $3 \times 10 = 30$ (Three out of Five —One question from each unit)


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(For students admitted from 2023- 2024)

Title of the Course		MATHEMATICAL MODELLING					
Paper Number		CORE 11					
Category	Core	Year	III	Credits	4	Course Code	T5MA11
		Semester	V				
Instructional Hours per week	Lecture	Tutorial	Lab Practice	Total			
	4	1	-	5			
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		1. Construction and Analysis of Mathematical models found in real life problems. 2. Modeling through differential and difference equations					
Course outline		Unit –I Mathematical Modeling: Simple situations requiring mathematical modeling, characteristics of mathematical models.					
		Unit –II Mathematical Modeling through differential equations: Linear Growth and Decay Models. Non-Linear growth and decay models, Compartment models.					
		Unit–III Mathematical Modeling, through system of Ordinary differential equations of first order: Prey-predator models, Competition models, Model with removal and model with immigrations. Epidemics: simple epidemic model, Susceptible-infected- susceptible (SIS) model, SIS model with constant number of carriers. Medicine: Model for Diabetes Mellitus.					
		Unit –IV Introduction to difference equations.					
		Unit –V Mathematical Modeling through difference equations: Harrod Model, cob web model application to Actuarial Science.					
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/TRB/NET/UGC – CSIR/ GATE/ TNPSC/ others to be solved (To be discussed during the Tutorial hour)					
Skills acquired from the course		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill					


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(For students admitted from 2023- 2024)

Recommended Text	1. J N Kapur, Mathematical Modeling, New Age International publishers (2009).
Reference Books	<ol style="list-style-type: none"> 1. Mathematical Modeling by Bimalk. Mishra and Dipak K.Satpathi. Ane Books Pvt. Ltd(1 January 2009) 2. Mathematical Modeling Models, Analysis and Applications, by Sandip Banerjee, CRC Press, Taylor & Francis group, 2014 3. Mathematical Modeling applications with Geogebra by Jonas Hall & Thomas Ligeffjard, John Wiley & Sons, 2017 4. Mark M. Meerschaert: Mathematical Modeling, Elsevier Publ., 2007.
Web resources	https://nptel.ac.in/

Course Outcomes:

Students will be able to

CLO 1: Explain simple situations requiring Mathematical Modeling and to Determine the characteristics of such models

CLO 2: Model using differential equations in-terms of linear growth and Decay models

CLO 3: Model using systems of ordinary differential equations of first order, to discuss about various models under the categories 'Epidemics' and 'Medicine'

CLO 4: Explain in detail about difference equations

CLO 5: Model using difference equations

Mapping of Cos with POs and PSOs:

PO	POs						PSOs		
CO	1	2	3	4	5	6	1	2	3
CO1	2	3	3	3	2	2	2	3	2
CO2	2	3	3	3	2	2	2	3	2
CO3	2	3	3	3	2	2	2	3	2
CO4	3	2	2	2	-	1	2	3	2
CO5	2	3	3	3	2	2	2	3	2

Question Paper Pattern


Maximum Marks: 75


Examination Duration:3Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/or type—One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five —One question from each unit)



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(For students admitted from 2023- 2024)

Title of the Course		OPTIMIZATION TECHNIQUES					
Paper Number		CORE 12					
Category	Core	Year	III	Credits	4	Course Code	T5MA12
		Semester	V				
Instructional Hours per week		Lecture	Tutorial	Lab Practice		Total	
		4	1	-		5	
Objectives of the Course		1. To introduce the field of operations research which has many applications in management techniques. 2. To help students to find optimum solutions in business and management problems. 3. To develop scientific ability.					
Course outline		Unit –I Linear Programming Problem: Introduction – Mathematical Formulation of the problem – Graphical Solution Method – Simplex method – Big (M) Method.					
		Unit –II Transportation Problem: Introduction – North west corner rule – Least cost method – Vogel’s approximation Method – MODI Method – Assignment problems.					
		Unit–III Sequencing Problems: Introduction – Problem of sequencing – Basic term used in sequencing – Processing n Jobs through 2 machines – Processing n Jobs through k machines – Processing 2 Jobs through k machines.					
		Unit –IV Replacement Problems: Introduction – Replacement of Equipment / asset that Deteriorates Gradually – Replacement of Equipment that fails suddenly.					
		Unit –V Network scheduling by PERT/CPM: Introduction – Network and basic components – Rules of network construction – Critical path analysis – Probability consideration in PERT – Distinction between PERT and CPM.					
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/TRB/NET/UGC – CSIR/ GATE/ TNPSC/ others to be solved (To be discussed during the Tutorial hour)					
Skills acquired from the course		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill					
Recommended Text		1. Operations Research – Kanti Swarub, P.K.Gupta, Man Mohan. Sultan Chan & Sons Educational Publishers New Delhi, Sixteenth thoroughly Revised Edition Reprint – 2014.					


 CONTROLLER OF EXAMINATIONS
 RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
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 Thanjavur-613005

(For students admitted from 2023- 2024)

	UNIT I : Chapter 2 (sections 2.1, 2.3) Chapter 3 (sections 3.1, 3.2) Chapter 4 (sections 4.1, 4.4) UNIT II : Chapter 10 (sections 10.1, 10.2, 10.8,10.9, 10.13) Chapter 11 (sections 11.1, 11.2, 11.3, 11.4) UNIT III : Chapter 12 (sections 12.1 to 12.6) UNIT IV: Chapter 18 (sections 18.1 to 18.3) UNIT V : Chapter 25 (sections 25.1, 25.2 , 25.4, 25.6, 25.7, 25.8).
Reference Books	1. Hamdy A. Taha, Operations Reseach (7 th Edn.), Prentice Hall of India, 2002. 2. Richard Bronson, Theory and Problems of Operations Research, Tata McGraw Hill Publishing Company Ltd., New Delhi, 1982. 3. Kanti Swarup, P.K. Gupta and Man Mohan, Operations Research (Sultan chand and sons).

Course Outcomes:

Students will be able to

- CO1:** Learn mathematical techniques that will help them to understand and analyze managerial problems in industry so that resources (Capitals, Materials, staffing and machines) may be utilized more effectively.
- CO2:** Use mathematical software to solve the Transportation Problems.
- CO3:** Identity and develop operational research models from the verbal description of the real system.
- CO4:** Solve the replacement problem.
- CO5:** Understand the Network scheduling of PERT/CPM method.

Mapping of Cos with POs and PSOs:

PO	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CO	1	2	3	4	5	6	1	2	3
CO1	3	2	3	2	1	1	3	3	2
CO2	3	2	3	2	1	1	3	3	2
CO3	3	2	3	2	1	1	3	3	2
CO4	3	2	3	2	1	1	3	3	2
CO5	3	2	3	2	1	1	3	3	2

Question Paper Pattern


Maximum Marks: 75


Examination Duration:3Hours

Part A: 10 ×2=20 (Two questions from each unit)

Part B: 5×5=25 (Either/or type–One question from each unit)


Part C: 3×10=30 (Three out of Five –One question from each unit)


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(For students admitted from 2023- 2024)

Title of the Course		LINEAR ALGEBRA					
Paper Number		CORE 13					
Category	Core	Year	III	Credits	5	Course Code	T6MA13
		Semester	VI				
Instructional Hours, per week		Lecture		Tutorial	Lab Practice	Total	
		5		1	--	6	
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		<ul style="list-style-type: none"> • Vector Spaces, linear dependence and independence of vectors .Dual spaces, Inner product and norm – orthogonalization process. • Linear transformations. Various operators on vector spaces 					
Course Outline		UNIT-I: Vector spaces – Subspaces – Linear Combinations and linear span - Systems of Linear equations – Homogenous Equations – Non-homogenous Equations – Elementary Matrices – Row reduced - Echelon form. Chapter 1: 1.1 – 1.4					
		UNIT-II: Linear Dependence and Linear independence – Bases – Dimensions Chapter 1: 1.5 – 1.6					
		UNIT-III: Linear transformations, null spaces and ranges – Matrix representation of a linear transformation –invertibility and isomorphisms. – dual spaces. Chapter 2: 2.1 – 2.4, 2.6					
		UNIT – IV: Eigen values, eigen vectors, diagonalizability – invariant subspaces – Cayley– Hamilton theorem. Chapter 5: 5.1 – 5.2					
		UNIT-V: Inner products and norms – Gram Schmidt Orthogonalization Process - Orthogonal complements. Chapter 6: 6.1 – 6.2					
Extended Professional Component		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					


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(For students admitted from 2023- 2024)

Recommended Text	Linear Algebra - Stephen H Friedberg, Arnold J Insel and Lawrence E Spence, 5 th edition (2018) Pearson
Reference Books	<ol style="list-style-type: none"> 1. I.N.Herstein, Topics in Algebra, Wiley EasternLtd. Second Edition, 2006. 2. N.S.Gopalakrishnan, University Algebra, New Age International Publications, Wiley Eastern Ltd. 3. John B.Fraleigh, First course in Algebra, Addison Wesley. 4. Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence, Linear Algebra, 4th Ed., Prentice Hall of India Pvt. Ltd., New Delhi, 2004.

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO 1: Acquire a detailed knowledge about vector spaces and subspaces

CLO 2: Explain the concepts of Linear Dependence, Linear Independence, Bases and Dimension of basis

CLO 3: Explain the concept of Linear Transformations, their Matrix representation and the notion of dual spaces

CLO 4: Find the Eigen values and Eigen vectors, to apply the concepts for diagonalisation

CLO5: Explain about Inner product and norms and to apply Gram Schmidt Orthogonalization Process to problems on inner product spaces

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

Question Paper Pattern


Maximum Marks: 75


Examination Duration:3Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/or type–One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five –One question from each unit)

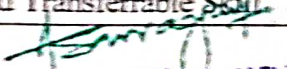

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(For students admitted from 2023- 2024)

Title of the Course		COMPLEX ANALYSIS						
Paper Number		CORE 14						
Category	Core	Year	III	Credits	5	Course Code	T6MA14	
		Semester	VI					
Instructional Hours per week	Lecture	5	Tutorial	1	Lab Practice	-	Total	6
	Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		<ol style="list-style-type: none"> 1. Apply concept and consequences of analyticity and C-R equations. 2. Understand the concept of mappings and transformations. 3. Compute complex contour integrals and applying Cauchy's integral in various versions. 4. Understand zeros and singularities of an analytic function, apply their properties in the evaluation of definite integral. 						
Course outline		<p>Unit -I Analytic functions: Functions of a Complex variable –Limits – Theorem on limits –Continuity – Derivatives – Differentiation formulas – Cauchy Riemann equation – conditions for differentiability – Polar coordinates– Analytic functions– Harmonic functions.</p> <p>Unit -II Conformal mapping: Mappings – Mapping by exponential function – Linear transformation – The transformation $w = \frac{z-i}{z+i}$ – Mappings by $\frac{1}{z}$ – Linear fractional transformations (bilinear).</p> <p>Unit-III Complex Integration: Contour integrals– Some examples – Simply and Multiply connected domains– Cauchy integral formula – Formula for derivatives– Liouville's theorem –Fundamental theorem of Algebra– Maximum modulus principle.</p> <p>Unit -IV Sequences and Series: Convergence of sequences – Convergence of series– Taylor's series – Laurent series– Absolute and uniform convergence of power Series – Continuity of sums of power series–Integration & differentiation of power series.</p> <p>Unit -V Residues and Poles: Isolated singular points – Residues – Cauchy Residue theorem –Residue at infinity– The three types of isolated singular points –Residues at poles – Zeros of analytical functions – Zeros and poles – Evaluation of real improper integrals (excluding poles on the real axis).</p>						
Extended Professional Component		Questions related to the above topics, from various competitive examinations UPSC/TRB/NET/UGC – CSIR/ GATE/ TNPSC/ others to be solved (To be discussed during the Tutorial hour)						
Skills acquired from the course		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill						


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Recommended Text	Complex variables and application, Seventh Edition by James Ward Brown and Ruel V. Churchill, Mc-Graw Hill Book Co., International Edition, 2009.
Reference Books	1. Theodore W. Gamelan, Complex Analysis, Springer Verlag, 2008 Joseph Bak and Donald J. Newman, Complex analysis, 2nd Ed., Undergraduate Texts in Mathematics, Springer-Verlag New York, Inc., New York, 1997.
Web resources	https://nptel.ac.in/

Course Outcomes:

Students will be able to

CO 1: Explain about analytic functions, their differentiation and continuity and to verify the Harmonic functions using analyticity conditions

CO 2: Explain the concept of Conformal mappings and mappings by linear transformations and linear fractional transformations

CO 3: Explain about the integrations of functions over simply and multiply connected domains and to derive the Cauchy integral formula, Liouville's theorem, Fundamental theorem of Algebra and Maximum Module Principle

CO 4: Find the convergence the sequences and series, to derive Taylor's and Laurent's series

CO 5: Find the nature of singularities, to find the residue of a given function at a given singular point, to Explain about zeros and poles and to evaluate real improper integrals (Excluding poles on the real axis)

Mapping of Cos with POs and PSOs:

PO	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CO1	3	3	3	2	1	-	3	3	2
CO2	3	3	3	2	1	-	3	3	2
CO3	3	3	3	2	1	-	3	3	2
CO4	3	3	3	2	1	-	3	3	2
CO5	3	3	3	2	1	-	3	3	2

Question Paper Pattern

Maximum Marks: 75

Examination Duration: 3Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/or type—One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five—One question from each unit)

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(For students admitted from 2023- 2024)

Title of the Course		MECHANICS					
Paper Number		CORE 15					
Category	Core	Year	III	Credits	4	Course Code	T6MA15
		Semester	VI				
Instructional Hours per week		Lecture	5	Tutorial	1	Lab Practice	-
		Total					6
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		<ol style="list-style-type: none"> To provide a basic knowledge of the behavior of various types of forces To give enough working knowledge to handle practical forces 					
Course outline		<p>Unit –I Force – Resultant of two forces- Three forces related to a triangle – Resultant of Several forces – Equilibrium of a particle under three or more forces.</p> <p>Unit –II Forces on a Rigid Body: Moment of a Force – Equivalent systems of forces- Parallel Forces – Varignon’s Theorem - Forces along a Triangle – Couples – Resultant of Several coplanar forces- Equation of the line of action of the Resultant - Reduction of coplanar forces into a force and couple .</p> <p>Unit–III Types of forces – Friction – Laws of Friction- Coefficient of Friction. Angle and Coe of Friction – Limiting equilibrium of a particle on a rough inclined plane – Tilting of a body – Simple Problems.</p> <p>Unit –IV Virtual Work – Principle of Virtual work _ Applied to a body or a system of bodies in equilibrium – Equation of Virtual work – Simple problems.</p> <p>Unit –V Hanging Strings- Equilibrium of a uniform homogeneous string- Suspension bridge.</p>					
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/TRB/NET/UGC – CSIR/ GATE/ TNPSC/ others to be solved (To be discussed during the Tutorial hour)					
Skills acquired from the course		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill					
Recommended Text		Mechanics – P.Duraipandian, Laxmi Duraipandian S. Chand and Co June 1997 UNIT I : Chapter 2 and Chapter 3 (section3.1) Unit II : Chapter 4 (sections 4.1, 4.3 to 4.8) and chapter5(section 5.1)					

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(For students admitted from 2023- 2024)

	Unit III : Chapter 2 (section 2.1.2) and Chapter 3(section 3.2) and Chapter 5(section 5.2) Unit IV : Chapter 8 Unit V : Chapter 9
Reference Books	<ol style="list-style-type: none"> 1. S.L. Loney, The Elements of Statics and Dynamics, Cambridge University Press, 1904. 2. J.L. Meriam and L. G. Kraige, Engineering Mechanics: Statics, Seventh Edition, Wiley and sons Pvt Ltd., New York, 2012. A. Ruina and R. Pratap, Introduction to Statics and Dynamics, , Oxford University Press, 2014. 3. J.L. Meriam, L. G. Kraige, and J.N. Bolton, Engineering Mechanics: Dynamics, 8th edn, Wiley and sons Pvt Ltd., New York, 2015.
Web resources	https://nptel.ac.in/

Course Outcomes:

Students will be able to

CO 1: Define Resultant, Component of a Force, Coplanar forces, like and unlike parallel forces, Equilibrium of a Particle, Limiting equilibrium of a particle on an inclined plane.

CO 2: Define Moment of a force and Couple with examples. Define Parallel Forces and Forces acting along a Triangle, Solve problems on frictional forces

CO 3: Define Friction, law of friction, coefficient of Friction, Angle and cone of friction, Tilting of a body.

CO 4: Define Virtual work, Principle of Virtual work, Applied to a body or a system of bodies in equilibrium and Equation of Virtual work

CO 5: Define String, Equilibrium of Strings under gravity, Common Catenery and Suspension bridge.

Mapping of Cos with POs and PSOs:

PO	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CO1	3	2	3	2	1	1	3	3	2
CO2	3	2	3	2	1	1	3	3	2
CO3	3	2	3	2	1	1	3	3	2
CO4	3	2	3	2	1	1	3	3	2
CO5	3	2	3	2	1	1	3	3	2

Question Paper Pattern

Maximum Marks: 75

Examination Duration: 3 Hours

Part A: 10 × 2 = 20 (Two questions from each unit)

Part B: 5 × 5 = 25 (Either/or type – One question from each unit)


Part C: 3 × 10 = 30 (Three out of Five – One question from each unit)

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(For students admitted from 2023- 2024)

Title of the Course		MATHEMATICS FOR COMPETITIVE EXAMINATION – II					
Paper Number		PCS					
Category	PCS	Year	III	Credits	2	Course Code	T6MAPC
		Semester	VI				
Instructional Hours per week	Lecture	Tutorial	Lab Practice		Total		
	2	-	-		2		
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		1. To learn the simple techniques for solving aptitude problems. 2. To enable the students prepare themselves for various competitive examinations.					
Course outline		Unit –I Profit & Loss – Ratio & Proportion.					
		Unit –II Partnership – Chain Rule.					
		Unit–III Time & Work – Pipes & Cistern.					
		Unit –IV Time & Distance – Problems on Trains.					
		Unit –V Boats & Streams – Alligation or Mixture.					
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/TRB/NET/UGC – CSIR/ GATE/ TNPSC/ others to be solved (To be discussed during the Tutorial hour)					
Skills acquired from the course		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill					
Recommended Text		1. R.S. Aggarwal, Quantitative Aptitude for Competitive Examinations, S.Chand co Ltd., 152. Anna Salai, Chennai,2010 . UNIT I : Chapter – 11 & 12 UNIT II : Chapter – 13 & 14 UNIT III : Chapter – 15 & 16 UNIT IV : Chapter – 17 & 18 UNIT V : Chapter – 19 & 20					
Reference Books		1. Quantitative Aptitude “by Abhijit Guha, Tata McGraw Hill Publishing Company Limited, New Delhi (2005)					


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(For students admitted from 2023- 2024)

Course Outcomes:

Students will be able to

CO 1 : Explain in detail about Profit & Loss and Ratio & Proportion.

CO 2 : Explain Partnership and Chain Rule.

CO 3 : Explain Time & Work and Pipes & Cistern.

CO 4 : Explain Time & Distance and Problems on Trains.

CO 5 : Explain Boats & Streams and Alligation or Mixture.

Mapping of Cos with POs and PSOs:

PO	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CO1	3	1	3	-	-	-	3	2	1
CO2	2	1	3	1	-	-	3	2	1
CO3	3	1	3	1	-	-	3	2	1
CO4	3	1	3	-	-	-	3	2	1
CO5	3	1	3	-	-	-	3	2	1

Question Paper Pattern


Maximum Marks: 75


Examination Duration:3Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/or type—One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five —One question from each unit)


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SYLLABUS

FOR

LIST OF ELECTIVE COURSES PART-B (DISCIPLINE)

(for the candidates admitted from the academic year 2023-2024 onwards)


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(For students admitted from 2023- 2024)

Title of the Course		GRAPH THEORY AND ITS APPLICATIONS					
Paper Number		EC 7					
Category	EC	Year	III	Credits	3	Course Code	TMAECB
		Semester	V				
Instructional Hours per week	Lecture	Tutorial		Lab Practice		Total	
	3	1		-		4	
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		<ol style="list-style-type: none"> 1. Be familiar with the most fundamental graph theory topics and results. 2. Be exposed to the techniques of proofs and analysis. 					
Course outline		<p>Unit –I Definition of a graph, application of a graph – Finite and infinite graphs – Incidence and degree – Isolated, pendant vertices and Null graph – Isomorphism – Sub graphs – walks, Paths and circuits – connected and disconnected graphs and components – Euler graphs – Operations on Graphs – More on Euler graphs – Hamiltonian paths and Circuits.</p> <p>Unit –II Trees – Properties of trees – Pendant vertices in a Tree – Distance and centres in a Tree – Rooted and Binary Trees – Spanning Trees – Fundamental Circuits.</p> <p>Unit–III Cut - sets – Properties of a Cut-set – All cut - sets in a graph Fundamental circuits and Cut sets – Connectivity and separability.</p> <p>Unit –IV Planar Graph: Planar Graphs - Kuratowsk's Two Graphs-Different Representation of Planar Graph. Vector Spaces of a Graph : Vectors and Vectors Spaces – Vector Space Associated with a Graph – Basis vectors of a graph – circuit and cut-set subspaces – Orthogonal vectors and Spaces.</p> <p>Unit –V Matrix representation of graphs – Incidence matrix – Circuit Matrix – Fundamental Circuit Matrix and rank of B – Cut-set matrix - Chromatic Number – Chromatic partitioning – Chromatic polynomial.</p>					
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/TRB/NET/UGC – CSIR/ GATE/ TNPSC/ others to be solved (To be discussed during the Tutorial hour)					
Skills acquired from the course		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill					
Recommended Text		1.Narsingh Deo, Graph Theory with applications to Engineering and Computer Science, Prentice Hall of India Pvt Ltd., New Delhi, Reprint 2004.					

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	<p>UNIT I : Chapter 1 (sections 1.1 to 1.5) and Chapter 2 (sections 2.1, 2.2, 2.4 to 2.9)</p> <p>UNIT II : Chapter 3 (sections 3.1 to 3.5, 3.7, 3.8)</p> <p>UNIT III : Chapter 4 (sections 4.1 to 4.5)</p> <p>UNIT IV : Chapter 5 & 6 (sections 5.2-5.4 & 6.4 to 6.8)</p> <p>UNIT V : Chapter 7 (sections 7.1, 7.3, 7.4, 7.6) and Chapter 8 (sections 8.1 to 8.3).</p>
Reference Books	<p>1. Dr. S.Arumugam and Dr.S.Ramachandran, Invitation to Graph Theory, Scitech Publications India Pvt Limited, Chennai 2001.</p> <p>2. K.R Parthasarathy, Basic Graph Theory, Tata Mcgraw Hill Publishing Company, New Delhi, 1994.</p> <p>3. G.T John Clark, Derek Allan Holten, A First Look at Graph Theory, World Scientific Publishing company, 1995.</p> <p>4. G.Chartrand, Linda Lesniak and Ping zhang, Graphs and Digraphs, Fifth Edition, CRC press, 2011.</p>

Course Outcomes:

Students will be able to

- CO1: Define basic notions in graph theory and account for the theory of paths and the degree of connectedness of a graph.
- CO2: Account the basic properties of trees and fundamental circuits.
- CO3: After learning the course the students should be able to solve problems involving vertex connectivity, edge connectivity.
- CO4: Define the vector spaces of a graph and Galois fields.
- CO5: Understand the matrix representation of graphs.

Mapping of Cos with POs and PSOs:

PO	POs						PSOs		
CO	1	2	3	4	5	6	1	2	3
CO1	3	1	3	-	-	-	3	2	1
CO2	2	1	3	1	-	-	3	2	1
CO3	3	1	3	1	-	-	3	2	1
CO4	3	1	3	-	-	-	3	2	1
CO5	3	1	3	-	-	-	3	2	1

Question Paper Pattern

Maximum Marks: 75

Examination Duration: 3 Hours

Part A: 10 × 2 = 20 (Two questions from each unit)

Part B: 5 × 5 = 25 (Either/or type – One question from each unit)

Part C: 3 × 10 = 30 (Three out of Five – One question from each unit)

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(For students admitted from 2023- 2024)

Title of the Course		DISCRETE MATHEMATICS						
Paper Number		EC 8						
Category	EC	Year	III	Credits	3	Course Code	TMAECD	
		Semester	V					
Instructional Hours per week	Lecture	3	Tutorial	1	Lab Practice	-	Total	4
	Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		<p>1. To study various finite(discrete) structures of Mathematics.</p> <p>2. To study recurrence relations and generating functions, analyses recurrence relations and provides methods for solving recurrence relations.</p> <p>3. To introduce group codes, procedure for generating group codes and Inference theory of predicate calculus.</p>						
Course outline		Unit –I Recurrence relations: Solution of finite order homogeneous Linear relations – Solution of Non-Homogeneous relations – Generating functions- Some common recurrence relations – Primitive recursive functions – Recursive and Partial Recursive Functions.						
		Unit –II Coding Theory: Introduction – Hamming Distance – Encoding a message – Group codes – Procedure for Generating Group codes – Decoding and Error correction – An example of single Error correcting code.						
		Unit–III Connectives –Atomic and Compound statements – Well formed formulae – Truth table of a Formula – Tautology - Tautological Implications and Equivalence of Formulae.						
		Unit –IV Replacement Process – Normal Forms – Principal Normal Forms.						
		Unit –V Theory of inference - Open Statements - Quantifiers – Inference theory of Predicate Calculus - statements involving more than one quantifier.						
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/TRB/NET/UGC – CSIR/ GATE/ TNPSC/ others to be solved (To be discussed during the Tutorial hour)						

CONTROLLER OF EXAMINATIONS
 RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
 THANJAVUR - 613 005.

Aswrajay
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 Associate Professor and Head
 P.G. and Research Department of Mathematics
 Rajah Serfoji Govt. College (Autonomous)
 Thanjavur-613005

(For students admitted from 2023- 2024)

Skills acquired from the course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	1. Dr.M.K. Venkataraman, Dr.N. Sridharan and N. Chandrasekharan, Discrete Mathematics, National Publishing Company, Chennai, 2001. UNIT I : Chapter 5 (Page No. 5.9 to 5.36) UNIT II : Chapter 8 (Page No. 8.1 to 8.16) UNIT III : Chapter 9 (Page No. 9.4 to 9.16 & 9.21 to 9.33) UNIT IV: Chapter 9 (Page No. 9.34 to 9.39 & 9.42 to 9.55) UNIT V : Chapter 9 (Page No. 9.56 to 9.80 & 9.86 to 9.98)
Reference Books	1. J.P. Trembly and R.Manohar; Discrete Mathematical Structures with Applications to Computer Science ,TMH Edition 1997. 2. A.R. Vasistha, A.K. Vasistha, M.A Krishna prakasam media (P) Ltd., 2008. 3. Kenneth H. Rosen, Discrete mathematics and its applications, 7 th edition, Tata MC Grow Hill Publication.co,Ltd., New Delhi, Special Indian edition 2011.

Course Outcomes:

Students will be able to

- CO1: Solve recurrence relation, linear equations and generating functions.
- CO2: Understand the techniques of coding and decoding systems.
- CO3: Able to get logical ideas to solve Tautology and Equivalence formulae.
- CO4: Gain the knowledge of logic and normal forms.
- CO5: Have exposure to the inference theory and predicate calculus.

Mapping of Cos with POs and PSOs:

PO	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CO	1	2	3	4	5	6	1	2	3
CO1	3	2	3	2	1	1	3	3	2
CO2	3	2	3	2	1	1	3	3	2
CO3	3	2	3	2	1	1	3	3	2
CO4	3	2	3	2	1	1	3	3	2
CO5	3	2	3	2	1	1	3	3	2

Question Paper Pattern

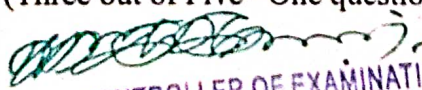
Maximum Marks: 75


Examination Duration:3Hours

Part A: 10 ×2=20 (Two questions from each unit)

Part B: 5×5=25 (Either/or type–One question from each unit)

Part C: 3×10=30 (Three out of Five –One question from each unit)


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(For students admitted from 2023- 2024 onwards)

Title of the Course		FUZZY SETS AND FUZZY LOGIC					
Paper Number		EC					
Category	EC	Year	III	Credits	3	Course Code	TMAECJ
		Semester	V				
Instructional Hours per week	Lecture		Tutorial	Lab Practice	Total		
	4		--	--	4		
Pre-requisite		Basic mathematical concepts and logics.					
Objectives of the Course		<ol style="list-style-type: none"> 1. To enable the students understand the need of fuzzy sets 2. To make the learners attain comprehensive acquisition of fuzzy operations and relations 3. To assist the stake holders in acquisition of the applications of fuzzy logic in real life situations 					
Course Outline		<p>UNIT-I Crisp set – operations on crisp sets – Fuzzy sets – representation of a fuzzy set – representation of membership function – types of fuzzy sets –cut of a fuzzy set - α-cut decomposition – some more definitions. Chapter 1 (Sections 1 to 5)</p> <p>UNIT-II Operations on fuzzy sets– properties of operation on fuzzy sets – first and second decomposition theorems - product on fuzzy sets. Chapter 1 (Sections 6 to 8)</p> <p>UNIT-III Fuzzy numbers – linguistic variables – fuzzy arithmetic – properties on interval valued arithmetic operations –operations on fuzzy numbers – fuzzy equations – lattice of fuzzy numbers. Chapter 2</p> <p>UNIT-IV Classical logic –logical connectives – truth values and truth tables – fuzzy logic – fuzzy logic truth tables – fuzzy connectives. Chapter 3 (Sections 1 to 4 & 7 to 9)</p> <p>UNIT-V Relation on fuzzy sets–representation – composition of fuzzy relations – max-min composition properties – fuzzy equivalence relation. Chapter 4 (Sections 1 to 4)</p>					
Extended Professional Component (is a part of internal only)		<p>Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC –</p> <p>CSIR / GATE / TNPSC / others to be solved (To be discussed during the Tutorial hour)</p>					

[Signature]
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Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	D S Hooda and Vivek Raich, Fuzzy Set Theory and Fuzzy Control, Narosa Publishing House, New Delhi, 2015.
Reference Books	1. George J.Klir and Bo Yuan, Fuzzy Sets and Fuzzy Logic Theory and Applications, PHI Learning Private Limited, New Delhi, 2009. 2. Zimmermann, Fuzzy set theory and its applications, Affiliated East West Press Pvt Ltd, 2nd Edition, 1996. 3. M. Murugalingam and Others, Introduction to Fuzzy Algebra, Sivam Publications, Vikramasingapuram, 2006.
Website and e-Learning Source	https://nptel.ac.in https://onlinecourses.swayam2.ac.in/cec22_cs20/preview

Course Learning Outcome (for Mapping with POs and PSOs):

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

CLO1: understand the membership function and fuzzy set

CLO2: work on the operations on fuzzy set

CLO3: skilled in fuzzy properties and fuzzy equations

CLO4: gain knowledge of fuzzy logic and fuzzy connectives

CLO5: realize fuzzy relations.

Mapping of CLOs with POs and PSOs:

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

Question Paper Pattern


Maximum Marks: 75


Examination Duration: 3 Hours

Part A: 10 × 2 = 20 (Two questions from each unit)

Part B: 5 × 5 = 25 (Either / Or type – One questions from each unit)

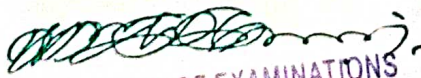
Part C: 3 × 10 = 30 (Three out of Five – One questions from each unit)

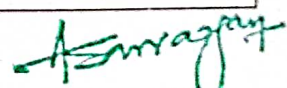

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(For students admitted from 2023- 2024 onwards)

Title of the Course		ASTRONOMY					
Paper Number		EC					
Category	EC	Year	III	Credits	3	Course Code	TMAECF
		Semester	V				
Instructional Hours per week		Lecture	Tutorial	Lab Practice		Total	
		4	--	--		4	
Pre-requisite		Basic mathematical concepts and trigonometric					
Objectives of the Course		To enable the students to understand the Astronomical aspects and about the laws governing the planet movements.					
Course Outline		UNIT-I Solar system: General description of the Solar system. Comets and meteorites – Spherical trigonometry.					
		UNIT-II Celestial sphere: Celestial sphere – Celestial co – ordinates – Diurnal motion – Variation in length of the day.					
		UNIT-III Geocentric parallax: Dip – Twilight – Geocentric parallax.					
		UNIT-IV Refraction: Refraction – Tangent formula – Cassini's formula.					
		UNIT-V Kepler's law: Kepler's laws – Relation between true eccentric and mean anomalies.					
Extended Professional Component (is a part of internal only)		Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC – CSIR / GATE / 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					
Recommended Text		Astronomy-S.Kumaravelu and Susheela Kumaravelu (TextPublisher: Sivakasi: Janki7th Edition 1986).					
Website and e-Learning Source		https://nptel.ac.in https://onlinecourses.swayam2.ac.in/cec22_cs20/preview					


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Course Learning Outcomes (for Mapping with POs and PSOs):

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

CLO1: define properties of physical systems that comprise the known universe

CLO2: understand the Solar system, Celestial sphere, Dip-Twilight & Kepler's laws.

CLO3: apply their physics and mathematical skills to problems in the areas of planetary science.

CLO4: demonstrates the skill to infer valid scientific conclusions and communicate those conclusions in a clear and articulate manner.

CLO5: analyze the astronomical concepts.

Mapping of CLOs with POs and PSOs:

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

Question Paper Pattern


Maximum Marks: 75


Examination Duration: 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either / Or type - One questions from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five - One questions from each unit)



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(For students admitted from 2023- 2024)

Title of the Course		PROGRAMMING IN C						
Paper Number		EC 9						
Category	EC	Year	III	Credits	3	Course Code	TMAECH	
		Semester	VI					
Instructional Hours per week	Lecture	5	Tutorial	1	Lab Practice	-	Total	6
	Objectives of the Course	The major objective is to provide students with understanding of code organization and functional hierarchical decomposition with using complex data types.						
Course outline	Unit –I UNIT I : Introduction – Basic structure of C programming – Executing a C program – Character – C tokens – Key words and of variables – Assigning value to variables – Symbolic constants – All operators. (Related simple programs)							
	Unit –II Arithmetic expression – Evaluation of expression – Precedence of arithmetic operators – some computational problems – Type conversion in expression – Mathematical function – Reading a character – Writing a character – Formatted input – Formatted output – Declaring and initializing string variable – Reading string from terminal – writing string to screen – comparison of two strings – string handling functions.(Related simple programs)							
	Unit–III Decision making with IF statement – simple IF statement – IF...ELSE LADDER – Switch statement – The? : Operator – GOTO statement – While statement – Do statement – FOR Statement.							
	Unit –IV Arrays: One dimensional arrays – Two dimensional arrays – Initializing two dimensional arrays – Multi dimensional arrays– User defined function: Need for user defined functions –A multi function program – The form of C function – Return values and their types calling functions – first three category of functions –Recursion.							
	Unit –V Structure: Structure definition – Giving value to members structure initialization – comparison of structure variables – Arrays of structures – Arrays within structure – Structure within structure – Pointers – Initialization of pointer variables – pointer expressions – pointer arrays – function arguments – pointers to functions – pointers and structures.							
Extended Professional Component	Questions related to the above topics, from various competitive examinations UPSC/TRB/NET/UGC – CSIR/ GATE/ TNPSC/ others to be solved (To be discussed during the Tutorial hour)							
Skills acquired from the course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill							
Recommended Text	1. Programming in ANSI C, E. Balagurusamy, Tata McGraw – Hill publishing company Ltd, New Delhi, Second Edition. UNIT I : Chapter I (Sec 1.2, 1.4-1.6),Chapter II (Sec 2.2 - 2.10) Chapter III (Sec 3.2 - 3.6) UNIT II: Chapter III (Sec 3.10-3.16), Chapter IV (Sec 4.2- 4.5) &							


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Chapter V (Sec 8.2, 8.4, 8.7, 8.8) UNIT III: Chapter V (Sec 5.2 - 5.9) & Chapter VI (Sec 6.2 - 6.4) UNIT IV : Chapter VII (Sec 7.2 - 7.5) & Chapter IX (Sec 9.2 - 9.10, 9.13) UNIT V: Chapter X (Sec 10.2 - 10.8) & Chapter XI (Sec 11.1 - 11.16)

Course Outcomes:

Students will be able to

CO1: Recall the basic concepts of C Language, C tokens , constants and variables.

CO2: Defining the various types of operators, Formatted Input and output and Evaluating the arithmetic expressions .

CO3: Explaining the various types of If statements, switch statement, Goto statement and For statement.

CO4: Evaluating the various programs using array concepts.

CO5: Demonstrating Structure and its types , Unions , Pointers and its applications.

Mapping of Cos with POs and PSOs:

PO	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CO1	3	3	1	3	1	-	3	1	1
CO2	3	3	1	3	1	-	3	1	1
CO3	3	3	1	3	1	-	3	1	1
CO4	3	3	1	3	1	-	3	1	1
CO5	3	3	1	3	1	-	3	1	1

Question Paper Pattern


Maximum Marks: 75


Examination Duration: 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/or type - One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five - One question from each unit)



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(For students admitted from 2023- 2024)


Title of the Course		PROGRAMMING IN C - PRACTICAL					
Paper Number		EC 10					
Category	EC	Year	III	Credits	3	Course Code	TMAECI
		Semester	VI				
Instructional Hours per week		Lecture	Tutorial		Lab Practice		Total
		4	-		-		4
Objectives of the Course		C is a general – purpose language, ideal for building mostly state of the art system applications like OS kernels, data bases and embedded system are used by billions around the world.					
Course outline		1. Write a program to convert temperature form degree centigrade to Fahrenheit and Simple interest.					
		2. Write a program to find whether given number is Even or Odd.					
		3. Write a program to check the Palindrome.					
		4. Write a program to solve quadratic equation using if...else statement.					
		5. Write a program to find greatest of three numbers.					
		6. Write a program to find the multiplication of two matrices.					
		7. Write a program to display first Ten natural numbers and their sum.					
		8. Write a function to generate the Fibonacci series .					
		9. Write a program to find factorial of a number using Recursion.					
		10. Write a program to create a file containing student details.					
Recommended Text		1. Programming in ANSI C, E. Balagurusamy, Tata McGraw – Hill publishing company Ltd, New Delhi, Second Edition.					



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(For students admitted from 2023- 2024 onwards)

Title of the Course		INTRODUCTION TO PYTHON					
Paper Number		EC					
Category	EC	Year	III	Credits	3	Course Code	TMAECC
		Semester	VI				
Instructional Hours per week	Lecture		Tutorial		Lab Practice		Total
	4		--		--		4
Pre-requisite		Basic Knowledge of Programming concept					
Objectives of the Course		<ol style="list-style-type: none"> 1. Describe the core syntax and semantics of Python programming language. 2. Discover the need for working with the strings and functions. 3. Illustrate the process of structuring the data using lists, dictionaries, tuples and sets. 4. Understand the usage of packages and Dictionaries 					
Course Outline		<p>UNIT-I Introduction -Python Overview - Getting Started with Python - Comments -Python Identifiers - Reserved Keywords - Variables - Standard Data Types - Operators - Statement and Expression - String Operations - Boolean Expressions (Sections 3.1 to 3.12)</p> <p>UNIT-II Control Statements -Iteration – while Statement - Input from Keyboard (Sections 3.13 to 3.15)</p> <p>UNIT-III Introduction - Built-in Functions - Composition of Functions - Parameters and Arguments - Function Calls - The return Statement - Python Recursive Function - The Anonymous Functions (Sections 4.1 to 4.9)</p> <p>UNIT-IV Text Files-Directories (Sections 7.1 & 7.2)</p> <p>UNIT-V Overview of OOP-Class Definition-Creating Objects-Objects as Arguments-Objects as Return Values-Built-in Class Attributes-Inheritance-Method Overriding-Data Encapsulation-Data Hiding (Sections 8.1 to 8.10)</p>					


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Extended Professional Component (is a part of internal only)	Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC – CSIR / GATE / 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
Recommended Text	E Balagurusamy, "Introduction to Computing and Problem Solving Using Python", 1st Edition, McGraw Hill India; 2016
Reference Books	1. Charles Dierbach, "Introduction to Computer Science using Python - A computational Problem solving Focus", Wiley India Edition, 2015. 2. Wesley J. Chun, "Core Python Applications Programming", 3rd Edition, Pearson Education, 2016 3. Mark Lutz, "Learning Python Powerful Object Oriented Programming", O'reilly Media 2018, 5th Edition. 4. Timothy A. Budd, "Exploring Python", Tata MCGraw Hill Education Private Limited 2011, 1st Edition. 5. John Zelle, "Python Programming: An Introduction to Computer Science", Second edition, Course Technology Cengage Learning Publications, 2013, ISBN 978- 1590282410 6. Michel Dawson, "Python Programming for Absolute Beginners", Third Edition, Course Technology Cengage Learning Publications, 2013, ISBN 978-1435455009
Website and e-Learning Source	https://nptel.ac.in https://onlinecourses.swayam2.ac.in/cec22_cs20/preview

Course Learning Outcome (for Mapping with POs and PSOs):

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


CLO1: develop and execute simple Python programs.


CLO2: write simple Python programs using conditionals and looping for solving problems.

CLO3: decompose a Python program into functions.

CLO4: read and write data from/to files in Python programs.

CLO5: use of Classes and Objects in python.


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Mapping of CLOs with POs and PSOs:

	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

Question Paper Pattern


Maximum Marks: 75


Examination Duration: 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either / Or type - One questions from each unit)


Part C: $3 \times 10 = 30$ (Three out of Five - One questions from each unit)



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(For students admitted from 2023- 2024 onwards)

Title of the Course		FORMAL LANGUAGES AND AUTOMATA THEORY					
Paper Number		EC					
Category	EC	Year	III	Credits	3	Course Code	TMAECE
		Semester	VI				
Instructional Hours per week	Lecture		Tutorial		Lab Practice		Total
	4		--		--		4
Pre-requisite		Basic Knowledge in Mathematics					
Objectives of the Course		<p>1. To impart knowledge in Finite automata, regular languages, regular grammars, context free grammars, languages, and pushdown automata which play a crucial role</p> <p>2. To Identify different formal language classes and their relationship.</p>					
Course Outline		<p>UNIT-I Phrase Structure Languages: Introduction – phrase structure languages.</p> <p>UNIT-II Closure Operations: Closure operations.</p> <p>UNIT-III Context Free Languages: Context free languages.</p> <p>UNIT-IV Finite State Automata: Finite state automata.</p> <p>UNIT-V Push Down Automata: Push down automata.</p>					
Extended Professional Component (is a part of internal only)		<p>Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC –</p> <p>CSIR / GATE / TNPSC / others to be solved (To be discussed during the Tutorial hour)</p>					
Skills acquired from this course		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill					
Recommended Text		Formal Languages and Automata- Rani Siromoney. (Revised edition 1984) (Published by the Christian Literary Society, Madras-3					
Reference Books		<p>1 Formal languages and their relation automata-J.E. Hopcroft and D.Ullman (Addison Wesley1969)</p> <p>2 Automata theory: Machines and Languages-Richard .Y.Kain (McGraw Hill1972)</p>					


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Website and e-Learning Source	https://nptel.ac.in/courses/106/103/106103070/2 https://www.digimat.in/nptel/courses/video/111103016/L02.html
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Course Learning Outcome (for Mapping with POs and PSOs):

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

CLO1: acquires a fundamental understanding of the core concepts in automata theory and formal languages.

CLO2: design grammars and automata for different language classes.

CLO3: describe the types of grammar and derivation tree.

CLO4: apply context-free languages, push-down automata.

CLO5: design automata, regular expressions and context-free grammars accepting or generating a certain language.

Mapping of CLOs with POs and PSOs:

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

Question Paper Pattern


Maximum Marks: 75


Examination Duration: 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either / Or type - One questions from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five - One questions from each unit)


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RAJAH SERFOJI GOVERNMENT COLLEGE (AUTONOMOUS)
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Dr. A. SAIVARAJAN, M.Sc., M.Phil., Ph.D.,
Associate Professor and Head
P.G. and Research Department of Mathematics
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Thanjavur-613005

SYLLABUS

FOR

ALLIED MATHEMATICS PAPERS


(PHYSICS, CHEMISTRY, STATISTICS AND
COMPUTER SCIENCE MAJOR)

(for the candidates admitted from the academic year 2023-2024 onwards)

(For students admitted from 2023- 2024)

Title of the Course		ALLIED PAPER – I ALGEBRA AND DIFFERENTIAL CALCULUS (FOR PHYSICS AND CHEMISTRY MAJOR)					
Paper Number		EC1					
Category	EC	Year	I	Credits	3	Course Code	T1GMA1
		Semester	I				
Instructional Hours per week		Lecture	4	Tutorial	-	Lab Practice	-
		Total					4
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		<ul style="list-style-type: none"> To train a complete treatment of differential calculus and algebraic concepts (series and matrices) and techniques for a firm understanding of the proofs. To make ability to apply the results to the related problems. 					
Course outline		Unit-I Binomial and Exponential Series: Summation and Approximation of the series. Chapter3(Sec 10, 14) & Chapter 4 (Sec 2,3)[1]					
		Unit-II Matrices: Symmetric, Skew-Symmetric matrices-Hermitian and Skew – Hermitian matrices – Unitary Matrices-Orthogonal matrices- Problems. Chapter2(Sec 6.1 –6.3,9.1)[2]					
		Unit-III Matrices: Eigen values and Eigen vectors – Cayley – Hamilton theorem (Proof excluded)-Verification of Cayley-Hamilton theorem. Chapter2(Sec 16,16.3)[2]					
		Unit –IV Successive differentiation– Leibnitz’s theorem (Proof excluded) and its applications. Chapter 3 (Sec. 1.1 – 1.6, 2.1 -2.2)[3]					
		Unit –V Curvature–Radius of Curvature in Cartesian Co-ordinates– Centre of Curvature. Chapter10 (Sec. 2.1,2.3,2.4)[3]					
Recommended Text		1. Algebra (Volume I), T. K. Manickavachagom Pillay, T. Natarajan and K.S. Ganapathy, S.Viswanathan PVT.LTD, (2015). 2. Algebra (Volume II), T. K. Manickavachagom Pillay, T. Natarajan and K.S. Ganapathy, S.Viswanathan, PVT.LTD ,(2015). 3. Calculus (Volume I), S. Narayanan and T. K. Manickavachagom Pillay ,S. Viswanathan, PVT., LTD(2013).					


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(For students admitted from 2023- 2024)

Course Outcomes:

Students will be able to

CO1: understand the concepts of Binomial and Exponential series

CO2: recall Symmetric, Skew Symmetric Hermitian, Skew- Hermitian, Unitary and Orthogonal matrices.

CO3: describe the concepts of Eigen values, Eigen vectors and solve the Cayley-Hamilton theorem based problems

CO4: understand the derivatives of successive differentiation, Leibnitz theorem and their applications.

CO5: compute the equation for centre and radius of curvature by using Cartesian formula and polar coordinates

Mapping of Cos with POs and PSOs:

PO	Pos						PSOs		
	2	3	2	1	2	3	3	2	2
CO1	2	3	2	1	2	3	3	2	2
CO2	3	2	2	2	1	2	3	2	2
CO3	1	3	2	2	3	3	3	2	2
CO4	1	2	3	2	3	2	3	2	3
CO5	1	2	2	2	3	2	3	2	2

Question Paper Pattern


Maximum Marks: 75


Examination Duration:3Hours

Part A: $10 \times 2=20$ (Two questions from each unit)

Part B: $5 \times 5=25$ (Either/or type–One question from each unit)

Part C: $3 \times 10=30$ (Three out of Five –One question from each unit)


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(For students admitted from 2023- 2024)

Title of the Course		ALLIED PAPER – II VECTOR ANALYSIS AND ANALYTICAL GEOMETRY 3D (FOR PHYSICS AND CHEMISTRY MAJOR)					
Paper Number		EC2					
Category	EC	Year	I	Credits	3	Course Code	T2GMA2
		Semester	II				
Instructional Hours per week		Lecture	Tutorial	Lab Practice		Total	
		4	-	-		4	
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		<ul style="list-style-type: none"> To teach the concepts of Vector differentiation, Vector integration and its applications and Analytical geometry of three dimensions for a firm understanding of the subjects. To make ability to apply it in scientific concepts. 					
Course outline		<p>Unit-I Vector differentiation: Velocity and acceleration- Vector and scalar fields –Gradient of a vector – Directional derivative – divergence and curl of a vector –Solenoidal and Irrotational vectors. Chapter 4 (Sec 1,2,6 – 11)[1]</p> <p>Unit-II Gauss Divergence Theorem – Stoke’s Theorem- Simple problems - Verification of the above theorems (Proof excluded). Chapter 6 (Sec 6&9)[1]</p> <p>Unit-III Plane: Standard equation of the plane – Intercept form – Normal form – Plane passing through the given points -Angle between the planes – Plane through the line of intersection of two planes Chapter 2 (Sec. 1 –9)[2]</p> <p>Unit –IV Straight line: Equation of a straight line in symmetrical form – Equation of a straight line passing through two given points - Coplanar lines – Equation of the Coplanar lines–Shortest distance between two skew lines– Equation of shortest distance. Chapter 3 (Sec. 1 –4,7 & 8)[2]</p> <p>Unit –V Sphere: Standard equation – Length of the tangent from any point – Plane section of a sphere - Sphere passing through a given circle – Intersection of two spheres –Equation of the tangent plane to the sphere Chapter 4 (Sec. 1 –8)[2]</p>					
Recommended Text		1. Vector Algebra and Analysis, S.Narayanan and T.K.ManickavachagomPillay, S.Viswanathan, PVT. LTD.					

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(For students admitted from 2023- 2024)

	2. Analytical Geometry (Three Dimensions), T. K. Manickavachagom Pillay and T. Natarajan, S. Viswanathan PVT.LTD, (2015).
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Course Outcomes:

Students will be able to

CO1: identify the concepts of vector differentiation

CO2: apply Gauss Divergence theorem and Stokes theorem

CO3: understand the concepts of analytical geometry, the properties and applications of planes.

CO4: apply the properties of lines, co-planer lines, skew lines and their applications.

CO5: analyse the equations of sphere and passing through the circle, tangent plane.

Mapping of Cos with POs and PSOs:

PO	Pos						PSOs		
CO1	3	2	2	2	1	2	3	2	2
CO2	2	3	2	1	2	3	3	2	2
CO3	1	2	3	2	3	2	3	2	3
CO4	2	3	2	1	2	3	3	2	2
CO5	1	2	2	3	2	2	3	2	2

Question Paper Pattern

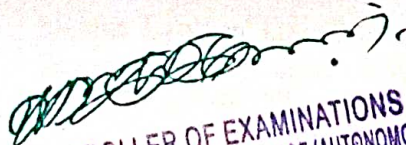
Maximum Marks: 75


Examination Duration: 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/or type – One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five – One question from each unit)


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(For students admitted from 2023- 2024)

Title of the Course		ALLIED PAPER – III INTEGRATION AND LAPLACE TRANSFORMS (FOR PHYSICS AND CHEMISTRY MAJOR)					
Paper Number		EC 3					
Category	EC	Year	I	Credits	3	Course Code	T2GMA3
		Semester	II				
Instructional Hours per week		Lecture	Tutorial	Lab Practice		Total	
		4	-	-		4	
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		<ul style="list-style-type: none"> To provide the mathematical foundation to understand and apply the principles of integration and Laplace transforms. To develop the necessary skills to solve problems and understand scientific concepts. 					
Course outline		<p>Unit-I Evaluation of integrals of types</p> <p>1) $\int \frac{dx}{ax^2 + bx + c}$ 2) $\int \frac{px + q}{ax^2 + bx + c} dx$ 3) $\int \frac{dx}{\sqrt{ax^2 + bx + c}}$</p> <p>4) $\int \frac{px + q}{\sqrt{ax^2 + bx + c}} dx$ 5) $\int \frac{dx}{a + b \cos x}$</p> <p>Chapter 1 (Sec 7.3(iii), 8(iii), 9)[1]</p> <hr/> <p>Unit-II Integration- Definite integrals : Properties of definite integrals –problems- Integration by parts problems.</p> <p>Chapter 1 (sec 11, 12)[1]</p> <hr/> <p>Unit-III Reduction formula for $I_n = \int x^n e^{ax} dx$, $I_n = \int x^n \sin ax dx$, $I_n = \int x^n \cos ax dx$ $I_n = \int \sin^n x dx$, $I_n = \int \cos^n x dx$ $I_n = \int \sin^m x \cos^n x dx$ (simple problems)</p> <p>Chapter 1 (13.1 – 13.5)[1]</p> <hr/> <p>Unit-IV Laplace Transform-Definition-$L(e^{at})$, $L(\cos(at))$, $L(\sin(at))$, $L(t^n)$, where n is a positive integer, Basic theorems in Laplace Transforms(formula only) – $L[e^{at} \cos bt]$, $L[e^{at} \sin bt]$, $L[e^{at} f(t)]$-$L[f(t)]$, $L[f'(t)]$, $L[f''(t)]$.</p> <p>Chapter 5(Sec. 1.2,4,5)[2]</p> <hr/> <p>Unit -V Inverse Laplace Transforms-Problems–Solution of Ordinary Differential Equations using Laplace Transforms</p> <p>Chapter 5 (Sec. 6,7,8)[2]</p>					

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(For students admitted from 2023- 2024)

Recommended Text	1. Calculus (Volume II), S. Narayanan and T. K. Manickavachagom Pillay, S. Viswanathan PVT. LTD, (2016). 2. Calculus (Volume III), S. Narayanan and T. K. Manickavachagom Pillay, S. Viswanathan, PVT. LTD, (2014).
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Course Outcomes:

Students will be able to

CO1: classify some types of integrals

CO2: analyse definite integrals

CO3: describe reduction formula

CO4: illustrate the concepts of Laplace Transformations.

CO5: determine the concepts of Inverse Laplace Transformations.

Mapping of Cos with POs and PSOs:

PO	Pos						PSOs		
CO1	3	2	2	2	1	2	3	2	2
CO2	2	3	2	1	2	3	3	2	2
CO3	1	2	3	2	3	2	3	2	3
CO4	2	3	2	1	2	3	3	2	2
CO5	1	2	2	3	2	2	3	2	2

Question Paper Pattern

Maximum Marks: 75

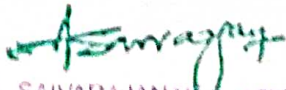
Examination Duration: 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/or type - One question from each unit)


Part C: $3 \times 10 = 30$ (Three out of Five - One question from each unit)

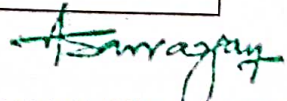

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Title of the Course		ALLIED PAPER – I DIFFERENTIAL CALCULUS AND MATRICES (FOR STATISTICS MAJOR)					
Paper Number		EC1					
Category	EC	Year	I	Credits	3	Course Code	T1GMST1
		Semester	I				
Instructional Hours per week		Lecture	Tutorial	Lab Practice		Total	
		4	-	-		4	
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		<ul style="list-style-type: none"> To provide the mathematical foundation to understand and apply the principles of differential calculus. To train a complete treatment of matrices concepts and techniques necessary for a firm understanding of the proofs. To make ability to apply the results to related problems. 					
Course outline		Unit-I Successive differentiation– Leibnitz’s theorem (Proof excluded) and its applications. Chapter 3 (Sec. 1.1 – 1.6, 2.1 -2.2)[1]					
		Unit-II Curvature–Radius of Curvature in Cartesian Co-ordinates– Centre of Curvature. Chapter10 (Sec. 2.1,2.3,2.4)[1]					
		Unit-III Matrices – Singular matrices – Inverse of matrix using adjoint matrix- Solution of simultaneous equations – Rank of matrix. Chapter 2 (Sec 1-5, 7,8,10,11)[2]					
		Unit -IV Matrices: Symmetric, skew-Symmetric matrices-Hermitian and skew-Hermitian matrices – Unitary Matrices-Orthogonal matrices– Problems. Chapter 2 (Sec. 6.1 –6.3, 9.1)[2]					
		Unit -V Matrices: Eigen values and Eigen vectors – Cayley –Hamilton theorem (Proof excluded) –Verification of Cayley-Hamilton theorem. Chapter 2 (Sec.16, 16.3)[2]					
Recommended Text		1. Calculus (Volume I), S. Narayanan and T. K. Manickavachagom Pillai , S. Viswanathan, PVT., LTD(2013). 2. Algebra (Volume II), T. K. Manickavachagom Pillay, T. Natarajan and K.S. Ganapathy, S. Viswanathan, PVT.LTD,(2015)					


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Course Outcomes:

Students will be able to

CO1: understand the derivatives of successive differentiation, Leibnitz theorem and their applications.

CO2: compute the equation for centre and radius of curvature by using Cartesian coordinates

CO3: recall the basic concepts of matrices.

CO4: understand the symmetric, skew symmetric Hermitian, Skew- Hermitian, Unitary and Orthogonal matrices.

CO5: determine the Eigen values, Eigen vectors and solve the Cayley-Hamilton theorem based problems.

Mapping of Cos with POs and PSOs:

PO	Pos						PSOs		
CO1	2	3	2	1	2	3	3	2	2
CO2	1	2	3	2	3	2	3	2	3
CO3	1	2	2	3	2	2	3	2	2
CO4	3	2	2	2	1	2	3	2	2
CO5	2	2	3	1	2	3	3	2	2

Question Paper Pattern

Maximum Marks: 75


Examination Duration: 3Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/or type—One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five—One question from each unit)


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(For students admitted from 2023- 2024)

Title of the Course		ALLIED PAPER – II INTEGRAL CALCULUS AND ANALYTICAL GEOMETRY 3D (FOR STATISTICS MAJOR)					
Paper Number		EC 2					
Category	EC	Year	I	Credits	3	Course Code	T2GMST2
		Semester	II				
Instructional Hours per week		Lecture	Tutorial	Lab Practice		Total	
		4	-	-		4	
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		<ul style="list-style-type: none"> To teach the concepts of Integral calculus and Analytical geometry of three dimensions for a firm understanding of the subjects. To make ability to apply it in scientific concepts 					
Course outline		<p>Unit-I Definite integrals: Properties – problems – Integration by parts – problems – Reduction formula for $I_n = \int x^n e^{ax} dx$, $I_n = \int x^n \sin ax dx$, $I_n = \int x^n \cos ax dx$, $I_n = \int \sin^n x dx$, $I_n = \int \cos^n x dx$ (simple problems) Chapter 1 (Sec. 11,12 & 13.1 – 13.4)[1]</p> <p>Unit-II Multiple integrals: Double integrals – Evaluation of double integrals – simple problems (Change the order of integration excluded) – Triple integrals – simple problems. Chapter 5 (Sec.1, 2.1,2.2,4)[1]</p> <p>Unit-III Plane: Standard equation of the plane – Intercept form – Normal form – Plane passing through the given points -Angle between the planes – Plane through the line of intersection of two planes Chapter 2 (Sec. 1 –9)[2]</p> <p>Unit –IV Straight line: Equation of a straight line in symmetrical form – Equation of a straight line passing through two given points -Coplanar lines – Equation of the Coplanar lines-Shortest distance between two skew lines– Equation of shortest distance Chapter 3 (Sec. 1 –4,7&8)[2]</p> <p>Unit –V Sphere: Standard equation – Length of the tangent from any point – Plane section of a sphere - Sphere passing through a given circle – Intersection of two spheres –Equation of the tangent plane to the sphere. Chapter 4 (Sec. 1 –8)[2]</p>					
Recommended Text		1. Calculus (Volume II), S. Narayanan and T. K. Manickavelu Pillay, S. Viswanathan PVT.LTD, (2017).					

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S. Narayanan
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(For students admitted from 2023- 2024)

2. Analytical Geometry (Three Dimensions), T. K. Manickavachagan Pillay and T. Natarajan, S. Viswanathan PVT. LTD. (2015)

Course Outcomes:

Students will be able to

CO1: understand the concepts of Definite Integrals and its Properties

CO2: analyse the concepts of Double and Triple Integrals

CO3: understand the concepts of analytical geometry, the properties and applications of planes.

CO4: apply the properties of lines, co- planer lines, skew lines and their applications

CO5: analyse the equations of sphere and passing through the circle, tangent plane.

Mapping of Cos with POs and PSOs:

PO	Pos						PSOs		
CO1	3	2	2	2	1	2	3	2	2
CO2	2	3	2	1	2	3	3	2	2
CO3	1	2	3	2	3	2	3	2	3
CO4	2	3	2	1	2	3	3	2	2
CO5	1	2	2	3	2	2	3	2	2

Question Paper Pattern


Maximum Marks: 75


Examination Duration: 3 Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/or type—One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five —One question from each unit)


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Title of the Course		ALLIED PAPER – III VECTOR ANALYSIS AND LAPLACE TRANSFORMS (FOR STATISTICS MAJOR)					
Paper Number		EC 3					
Category	EC	Year	I	Credits	3	Course Code	T2GMST3
		Semester	II				
Instructional Hours per week	Lecture	Tutorial	Lab Practice	Total			
	4	-	-	4			
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		<ul style="list-style-type: none"> To provide a needful treatment of Vector differentiation and Vector integration and its applications. To train the concepts of Laplace transformations for a firm understanding of the concepts To make ability to apply the results in the related problems 					
Course outline		<p>Unit-I Scalars and Vectors – Derivative of a vector – Derivative of higher order integration of vectors – Velocity and acceleration. Chapter 2(P.No.2.1-2.15)[1]</p> <p>Unit-II Vector differentiation: - Vector and scalar fields –Gradient of a vector- Directional derivative–divergence and curl of a vector– Solenoidal and Irrotational vectors. Chapter 4 (Sec 1,2,6 – 11)[2]</p> <p>Unit-III Gauss Divergence Theorem – Stoke’s Theorem- Simple problems - Verification of the above theorems (Proof excluded). Chapter 6 (Sec 6,9)[2]</p> <p>Unit -IV Laplace Transform-Definition-$L(e^{at})$, $L(\cos(at))$, $L(\sin(at))$, $L(t^n)$, where n is a positive integer, Basic theorems in Laplace Transforms (formula only) – $L[e^{\pm st} \cos bt]$, $L[e^{\pm st} \sin bt]$, $L[e^{\pm st} f(t)]$-$L[f(t)]$, $L[f'(t)]$, $L[f''(t)]$ Chapter 5 (Sec. 1,2,4,5)[3]</p> <p>Unit -V Inverse Laplace Transforms-Problems–Solution of Ordinary Differential Equations using Laplace Transforms. Chapter 5 (Sec. 6,7,8)[3]</p>					

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Recommended Text	1. Allied Mathematics II, A. Singaravelu(2002) 2. Vector Algebra and Analysis, S.Narayananand T.K.ManickavachagomPillay, S.Viswanathan, PVT. LTD. 3. Calculus (Volume III), S. Narayanan and T. K. ManickavachagomPillay, S. Viswanathan, PVT.LTD,(2019).
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Course Outcomes:

Students will be able to

CO1: understand the problems based on derivative of vectors.

CO2: explain the problems based on vector differentiation.

CO3: determine the solutions of Gauss Divergence and Stoke's Theorem.

CO4: explain and solve the concepts of Laplace Transforms.

CO5: explain and solve the problems of Inverse Laplace Transforms

Mapping of Cos with POs and PSOs:

PO	Pos						PSOs		
	3	2	2	2	1	2	3	2	2
CO1	3	2	2	2	1	2	3	2	2
CO2	2	3	2	1	2	3	3	2	2
CO3	1	2	3	2	3	2	3	2	3
CO4	2	3	2	1	2	3	3	2	2
CO5	1	2	2	3	2	2	3	2	2

Question Paper Pattern

Maximum Marks: 75


Examination Duration: 3Hours

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(For students admitted from 2023- 2024)

Title of the Course		ALLIED PAPER – I NUMERICAL METHODS AND OPERATIONS RESEARCH (ALLIED PAPER FOR COMPUTER SCIENCE MAJOR)						
Paper Number		EC1						
Category	EC	Year	I	Credits	3	Course Code	TIGMCSI	
		Semester	I					
Instructional Hours per week	Lecture	4	Tutorial	-	Lab Practice	-	Total	4
	Pre-requisite	12 th Standard Mathematics						
Objectives of the Course	<ol style="list-style-type: none"> To obtain approximate solutions of Mathematical problems using numerical methods, Finite difference problems and the solution of linear systems. To generate ideas of operations research such as linear programming problems and transportation problems. 							
Course outline	Unit-I Solutions of algebraic and transcendental equation: Bisection Method – Iteration Method-Method of False position-Newton -Raphson Method. Chapter 2 (Sec. 2.2 -2.5)[1]							
	Unit-II Finite differences: Forward differences - Backward differences - Newton's Formulae for Interpolation (Problems Only) - Interpolation with Unevenly spaced points: Lagrange's interpolation Formula. Chapter 3(Sec. (3.3.1,3.3.2, 3.6,3.9.1)[1]							
	Unit-III Solution of linear systems: Gaussian elimination Method - Iterative methods: Gauss Seidal Methods. Numerical solutions of Ordinary differential equations: Taylor's series method–Euler's method (only). Chapter 7 (Sec. 7.5.1, 7.5.2, 7.6) & Chapter 8 (Sec. 8.2,8.4)[1]							
	Unit -IV Mathematical Formulation of linear programming problems-Graphical method- Assignment Problems: Introduction – Hungarian Algorithm – problems -Travelling salesman problem. Chapter 2 (Sec. 2.1-2.4) & Chapter 3 (Sec3.1 & 3.2) Chapter 11 (Sec. 11.1,11.2,11.3,11.7)[2]							
	Unit -V Transportation Problems: Introduction –Finding initial Basic feasible solution (North West Corner Rule, Least Cost Method, Vogel's Approximation Method). Chapter 10 (Sec10.1,10.2, 10.8,10.9)[2]							
Recommended Text	<ol style="list-style-type: none"> Introductory Methods of Numerical Analysis, S.S.Sastry, Prentice Hall of India Pvt. Ltd, New Delhi, (2022). Operations Research, Kantiswarup, P.K. Gupta, Man Mohan Sultan Chand & Sons Educational Publishers New Delhi(2007). 							


CONTROLLER OF EXAMINATIONS
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Associate Professor and Head
P.G. and Research Department of Mathematics
Rajah Serfoji Govt. College (Autonomous)
Thanjavur-613005

(For students admitted from 2023- 2024)

Course Outcomes:

Students will be able to

CO1: understand the solutions of algebraic and transcendental equations.

CO2: analyse the detailed solutions of Finite differences.

CO3: recall Gaussian elimination method and apply Iterative methods and Numerical Solutions of ordinary Differential equation.

CO4: analyse Mathematical Formulation of Linear Programming Problems and Assignment Problems

CO5: apply the concepts of Transportation Problems.

Mapping of Cos with POs and PSOs:

PO	Pos						PSOs		
CO1	2	3	2	1	2	3	3	2	2
CO2	1	2	2	3	2	2	3	2	2
CO3	2	2	3	2	2	2	3	2	3
CO4	1	2	2	3	2	2	3	2	2
CO5	1	2	3	2	3	2	3	2	3

Question Paper Pattern


Maximum Marks: 75

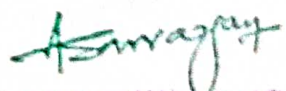
Examination Duration:3Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/or type–One question from each unit)


Part C: $3 \times 10 = 30$ (Three out of Five –One question from each unit)

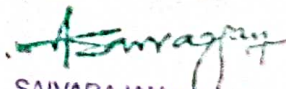

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(For students admitted from 2023- 2024)

Title of the Course		ALLIED PAPER – II PROBABILITY AND STATISTICS (FOR COMPUTER SCIENCE MAJOR)					
Paper Number		EC2					
Category	EC	Year	I	Credits	3	Course Code	T2GMCS2
		Semester	II				
Instructional Hours per week		Lecture	Tutorial	Lab Practice		Total	
		4		-		4	
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		<ul style="list-style-type: none"> To teach a thorough basic ideas of probability and statistics for a good understanding of subjects. To make ability to the direct application of the theorems and results. 					
Course outline		<p>Unit-I Probability - Definition- Sample space – Independent Events – Addition theorem – Conditional Probability – Multiplication theorem- Baye's theorem-Simple problems. Chapter 3(Sec. 3.8 – 3.13)</p> <p>Unit-II Random Variables-Distribution functions-Probability Mass Function- Probability density function- Two dimensional random variables-Simple problems. Chapter 5(Sec. 5.1-5.5)</p> <p>Unit-III Mathematical Expectation – Simple problems – Moment generating functions –Simple problems. Chapter 6 (Sec. 6.1-6.6) & Chapter 7 (Sec7.1)</p> <p>Unit -IV Binomial Distribution-Moments-Moment generating function-Poisson distribution – Moments – Moment generating function – Normal Distribution – Moment generating function. Chapter 8 (Sec. 8.4,8.4.1,8.4.6, 8.5,8.5.2, 8.5.5) & Chapter 9 (Sec. 9.2,9.2.5)</p> <p>Unit -V Correlation and Regression- Properties – Rank correlation – Regression Lines –Properties- Simple problems. Chapter 10 (Sec. 10.4 & 10.7) & Chapter 11 (Sec. 11.2, 11.2.1-11.2.3)</p>					
Recommended Text		Fundamentals of Mathematics Statistics, S.C. Gupta and V.K. Kapoor, Sultan Chand, Eleventh Edition (2019).					


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(For students admitted from 2023- 2024)

Course Outcomes:

Students will be able to

CO1:recall the Fundamental Properties of Probability Theory

CO2:explain discrete and continuous random variables

CO3: apply the properties and problems of mathematical expectations

CO4:illustrate different probability distributions

CO5: analyse the properties and problems of Correlation and Regression

Mapping of Cos with POs and PSOs:

	POs					PSOs				
CO-1	3	2	2	2	1	2	3	2	2	2
CO-2	2	3	2	1	2	3	3	2	2	3
CO-3	1	2	3	2	3	2	3	2	3	2
CO-4	2	3	2	1	2	3	3	2	2	3
CO-5	1	2	2	3	2	2	3	2	2	3

Question Paper Pattern

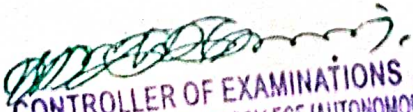
Maximum Marks: 75


Examination Duration:3Hours

Part A: $10 \times 2=20$ (Two questions from each unit)

Part B: $5 \times 5=25$ (Either/or type–One question from each unit)

Part C: $3 \times 10=30$ (Three out of Five –One question from each unit)


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(For students admitted from 2023- 2024)

Title of the Course		ALLIED PAPER – III VECTOR CALCULUS AND MATRICES (FOR COMPUTER SCIENCE MAJOR)					
Paper Number		EC3					
Category	EC	Year	I	Credits	3	Course Code	T2GMCS3
		Semester	II				
Instructional Hours per week		Lecture	Tutorial	Lab Practice	Total		
		4	-	-	4		
Pre-requisite		12 th Standard Mathematics					
Objectives of the Course		<ul style="list-style-type: none"> To provide a knowledge of vector, scalar point function and the concepts of derivative of vectors. To develop the knowledge of types of matrices. To create ability to direct application of these results to the related problems. 					
Course outline		<p>Unit-I Scalars and Vectors – Derivative of a vector – Derivative of higher order Velocity and acceleration – Integration of vectors. Chapter 2(P.No.2.1-2.15)[1]</p> <p>Unit-II Vector differentiation: - Vector and scalar fields –Gradient of a vector- Directional derivative–divergence and curl of a vector– Solenoidal and Irrotational vectors. Chapter 4 (Sec 1,2,6 – 11)[2]</p> <p>Unit-III Gauss Divergence Theorem – Stoke’s Theorem- Simple problems - Verification of the above theorems (Proof excluded). Chapter 6 (Sec 6&9)[2]</p> <p>Unit -IV Matrices: Symmetric, skew-Symmetric matrices-Hermitian and skew- Hermitian matrices – Unitary Matrices-Orthogonal matrices– Problems. Chapter 2 (Sec. 6.1 –6.3, 9.1)[3]</p> <p>Unit -V Matrices: Eigen values and Eigen vectors – Cayley –Hamilton theorem (Proof excluded) –Verification of Cayley-Hamilton theorem. Chapter 2 (Sec.16, 16.3)[3]</p>					
Recommended Text		<ol style="list-style-type: none"> Allied Mathematics II, A. Singaravelu(2002) Vector Algebra and Analysis, S.Narayananand T.K.ManickavachagomPillay, S.Viswanathan, PVT. LTD. Algebra (Volume II),T. K. ManickavachagomPillay, T. Natarajanand K.S. Ganapathy, S.Viswanathan, PVT.LTD,(2015) 					

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Course Outcomes:

Students will be able to

CO1: understand the problems based on derivative of vectors.

CO2: explain the problems based on vector differentiation.

CO3: determine the solutions of Gauss Divergence and Stoke's Theorem

CO4: recall Symmetric, Skew Symmetric Hermitian, Skew- Hermitian, Unitary and Orthogonal matrices.

CO5: describe the concepts of Eigen values, Eigen vectors and solve the Cayley-Hamilton theorem based problems

Mapping of Cos with POs and PSOs:

PO	Pos						PSOs		
	1	2	3	4	5	6	1	2	3
CO1	3	2	2	2	1	2	3	2	2
CO2	2	3	2	1	2	3	3	2	2
CO3	1	2	3	2	3	2	3	2	3
CO4	2	3	2	1	2	3	3	2	2
CO5	1	2	2	3	2	2	3	2	2

Question Paper Pattern

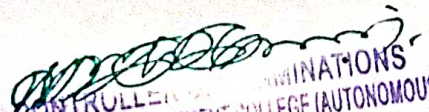
Maximum Marks: 75

Examination Duration:3Hours

Part A: $10 \times 2 = 20$ (Two questions from each unit)

Part B: $5 \times 5 = 25$ (Either/or type—One question from each unit)

Part C: $3 \times 10 = 30$ (Three out of Five —One question from each unit)


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