THIRUVALLUVAR UNIVERSITY

SERKKADU, VELLORE–632115

B.Sc. MATHEMATICS

SEMESTER - II
SYLLABUS

FROM THE ACADEMIC YEAR

2023 – 2024

S.No.	Part	Study Components Course Title		Ins. Hrs /week	Credit	Title of the Paper	Maximum Marks		
							CIA	Uni. Exam	Total
SEMESTER II									
1.	I	Language	Paper-2	6	3	Tamil/Other Languages	25	75	100
2.	II	English	Paper-2	4	3	English	25	75	100
3.	II	NMSDC: Language Proficiency for Employability	Paper-1	2	2	Overview of English Communication	25	75	100
4.	III	Core Course –CC III	Paper-2	5	5	Analytical Geometry	25	75	100
5.	III	Core Course –CC IV	Paper -3	5	5	Integral Calculus	25	75	100
6.	III	Elective II Generic/ Discipline Specific	Elective II	6	3	Physics –II (OR) Numerical Methods-II	25	75	100
7.	IV	Skill Enhancement Course SEC-2	Paper2	2	2	Mathematics for Competitive Examinations - II	25	75	100
8.	IV	Skill Enhancement Course SEC-3 (Discipline Specific)	Paper 1	2	2	Office Automation	25	75	100
		Sem. Total		**32**	**25**		**200**	**600**	**800**

Title of the Course	**ANALYTICAL GEOMETRY**						
Paper Number	**CORE 3**						
Category	Core	**Year**	I	**Credits**	5	**Course**	
		Semester	II			**Code**	
Instructional Hours per week		**Lecture**		**Tutorial**	**Lab Practice**	**Total**	
		5			--	5	
Pre-requisite	12th Standard Mathematics						
Objectives of the Course	- To understand and apply the concept of homogeneous equations of second degree to represent straight lines in different forms. - To derive polar equations for straight lines, circles, and conic sections, and analyze their geometric properties. - To formulate general equations of planes, calculate angles between two planes, and determine perpendicular distances. - To calculate the angle between a line and a plane, determine the length of perpendiculars, and analyze coplanar and skew lines. - To originate equations of spheres, determine lengths of tangents, and analyze sections of spheres.						
Course Outline	**Unit - I: Pair of Straight lines** Introduction – Homogeneous equation of second degree – Angle between the lines – Equation for the bisector of the angle between the lines – Condition for a second degree equation to represent a pair of straight lines. (Chapter 3: Sections 3.1 - 3.5 Pages: 89 - 129).						
	Unit - II: Polar Coordinates Introduction –Definition of polar coordinates – Relation between Cartesian coordinates and Polar coordinates – polar equation of a straight line – circle – Polar equation of a conic. (Chapter 9: Sections: 9.1 – 9.7.1 Pages: 480 - 500).						
	Unit - III: Plane Introduction – General equations of plane – Angle between two planes – Perpendicular distance – Plane passing through: Three given points, Intersection of two given planes – Condition for a second degree equation to represent a pair of planes. (Chapter 12: Sections: 12.1 – 12.12 Pages 585 - 629).						

	Unit - IV: Straight Lines Introduction – Equations of straight Lines – Angle between a line and plane – Length of the perpendicular – Coplanar lines – Skew lines – Intersection of three planes. (Chapter 13: Sections: 13.1 – 13.12 Pages: 630 – 647, 648 - 686).
	Unit - V: Sphere Equations of sphere – Length of the tangent – Section of a sphere – Equation of circle – Intersection of two spheres – Condition for the orthogonality – Radical planes. (Chapter 14: Sections: 14.1 – 14.11 Pages: 687 – 695, 699 - 727).
Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC / TNPSC / others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	P.R.Vittal, Analytical Geometry 2D and 3D, Pearson Publications, Chennai.
Reference Books	1. P.Duraipandian and LaxmiDuraipandian, Analytical Geometry Twodimensions, Emerald Publication. 2. Shanti Narayan and P.K.Mittal, Analytical Solid Geometry of 3D, S. Chand Publications. 3. ManicavasagamPillay&Natarajan, Analytical Geometry of Twodimensions, S. Viswanathan (printers & publication) Pvt Ltd. 4. ManicavasagamPillay&Natarajan, Analytical Geometry of Threedimensions, S. Viswanathan (printers & publication) Pvt Ltd.
Website and e-Learning Source	**https://mathworld.wolfram.com/ , http://www.univie.ac.at/future.media/moe/galarie.html/**

Course Learning Outcome (for Mapping with POs and PSOs)

CO Number	CO Statement	Knowledge Level

CO1	Understand and apply the concept of homogeneous equations of second degree to represent straight lines in different forms.	K1,K2
CO2	Derive polar equations for straight lines, circles, and conic sections, and analyze their geometric properties.	K4, K5
CO3	Formulate general equations of planes, calculate angles between two planes, and determine perpendicular distances.	K5,K6
CO4	Calculate the angle between a line and a plane, determine the length of perpendiculars, and analyze coplanar and skew lines.	K5,K6
CO5	Formulate equations of spheres, determine lengths of tangents, and analyze sections of spheres.	K4,K5,K6

Mapping of CO with PO and PSO

CO	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
1	3	3	3	3	2	3	3	3	3	2	2.8
2	3	3	3	3	2	3	3	3	3	2	2.8
3	3	3	3	3	2	3	3	3	3	1	2.7
4	3	3	3	3	1	3	3	3	3	1	2.6
5	3	3	3	3	1	3	3	2	3	1	2.5

Title of the Course	**INTEGRAL CALCULUS**					
Paper Number	**CORE 4**					
Category	Core	**Year**	I	**Credits**	5	**Course Code**	
		Semester	II				
Instructional Hours per week		Lecture		Tutorial	Lab Practice	Total
		5			--	5
Pre-requisite	12th Standard Mathematics					

Pre-requisite	12th Standard Mathematics
Objectives of the Course	• 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, integration of product of powers of algebraic and logarithmic functions - Bernoulli's formula, Feyman's technique of integration.
	UNIT-II: Multiple Integrals - definition of double integrals - evaluation of double integrals – double integrals in polar coordinates - Change of order of integration.
	UNIT-III: Triple integrals –applications of multiple integrals - volumes of solids of revolution - areas of curved surfaces–change of variables - Jacobian.
	UNIT-IV: Beta and Gamma functions – infinite integral - definitions– recurrence formula of Gamma functions – properties of Beta and Gamma functions- relation between Beta and Gamma functions - Applications.
	UNIT-V: Geometric and Physical Applications of Integral calculus.
Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC / TNPSC / others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill

Recommended Text	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

	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

Titleof theCourse	MATHEMATICSFORCOMPETIVEEXAMINATIONS-II					
PaperNumber	SEC 2					
Category	Core	Year	I	Credits	2	Course Code
		Semester	II			
InstructionalHours perweek	Lecture		Tutorial	LabPractice		Total
	2		--	--		2
Pre-requisite	12[th]StandardMathematics					
Objectives of theCo urse	Aftertakingthecourse, Topreparethestudentsforcompetitiveexaminations					
CourseOutline	**Unit I:** Time and work – Time and distance – Problems on Trains.(Book1:Chapters15,17,18).					
	UnitII: Simpleinterest,compoundInterest–Bargraphs–PieCharts– LineGraphs.(Book1:Chapters21,22,37,38,39).					
	UnitIII: LogicalSequenceofWords–ArithmeticalReasoning– InsertingtheMissingCharacter.(Book2,Section:1,Chapters13–15)					
	UnitIV: DataSufficiency–DecisionMaking– VerificationofTruthoftheStatement.(Book2,Section:1,Chapters16,17, 20.)					
	UnitV: Non-VerbalReasoning–AnalyticalReasoning– GroupingofIdenticalFigures.(Book2,Section:3,Chapter3,4,13)					

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examinationqu estionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinationsUPSC/TNPSC/otherstobesolved(Tob ediscussedduringtheTutorialhour)
Skills acquired fromthiscourse	Knowledge,problemsolving,analyticalability,professional competency,professionalcommunicationandtransferableskill.
Recommended Text	1.R.S.Aggarwal,*QuantitativeAptitudeforCompetitiveExaminations*,R evisedEdition,S.ChandandCompanyLtd.,RamNagar,NewDelhi,Repri nt2022. 2. R.S.Agarwal,*AModernApproachToVerbalAndNonverbalReasoning*,S .Chand,2018.

ReferenceBooks	V.V.K.Subbiraj,*TestofReasoning–Verbal/Non-Verbal&GeneralIntelligenceforCompetitiveExaminations*,SuraBooks,2007

CourseLearningOutcomes

Thiscoursewillenablethestudentsto:

CONumber	COStatement	Knowledge Level
CO1	makecritiqueofquantitativeinformationusing proportionalreasoning	K5
CO2	Interpretandcompareweightedaverages,indices, ranking.	K2
CO3	identifyusesandmisusesofpercentagesrelatedtoaproperu nderstanding ofthebases.	K1
CO4	examiningandestimatingpercentagesasratesper100	K3,K4
CO5	solveforanunknownquantityinproportional situation	K6

E-learningsource:www.tcyonline.com/tests/mathematics-competitive-examhttp://www.indiabix.com/online-test/non-verbal-reasoning-test/http://books.tamilcube.com/career/aptitude-test/non-verbal-reasoning/non-verbal-reasoning-questions-001.aspx

https://www.kent.ac.uk/careers/tests/spatialtest.htmhttp://www.careerbless.com/aptitude/qa/home.phphttp://www.careerride.com/online-aptitude-test.aspx

OFFICE AUTOMATION

Subject Code	L	T	P	S	Credits	Inst. Hours	Marks		
							CIA	External	Total
	2		2		3	4	25	75	100

Learning Objectives

LO1	The major objective in introducing the Computer Skills course is to impart training for students in Microsoft Office which has different components like MS Word, MS Excel and Power point.
LO2	The course is highly practice oriented rather than regular class room teaching.
LO3	To acquire knowledge on editor, spread sheet and presentation software.

Prerequisites: Should have studied Commerce in XII Std

Unit	Contents	No. of Hours
I	Introductory concepts: Hardware and Software - Memory unit – CPU-Input Devices: Key board, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems - Introduction to Programming Languages.	
II	Word Processing: File menu operations - Editing text – tools, formatting, bullets and numbering - Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, printing – Preview, options, merge.	
III	Spreadsheets: Excel – opening, entering text and data, formatting, navigating; Formulas – entering, handling and copying	
IV	Charts – creating, formatting and printing, analysis tables, preparation of financial statements, introduction to data analytics.	
V	Power point: Introduction to Power point - Features – Understanding slide typecasting & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition – Animation effects, audio inclusion, timers.	
	Total	

Course Outcomes

CO1	Understand the basics of computer systems and its components.
CO2	Understand and apply the basic concepts of a word processing package.
CO3	Understand and apply the basic concepts of electronic spreadsheet software.
CO4	Understand and apply the basic concepts of database management system.
CO5	Understand and create a presentation using PowerPoint tool.

Textbooks

1	Peter Norton, "Introduction to Computers" –Tata McGraw-Hill.

Reference Books

1	Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, "Microsoft 2003", Tata McGraw- Hill.

NOTE: Latest Edition of Textbooks May be Used	
Web Resources	
1	Web content from NDL / SWAYAM or opensource web resources