B.SC.,
MATHEMATICS

ManonmaniamSundaranarUniversity Tirunelveli

SYLLABUSFROM THE ACADEMICYEAR 2024-2025

TAMILNADUSTATECOUNCILFORHIGHER EDUCATION,CHENNAI – 600 005

NEWINITIATIVEINMODERNISING

UNDER-GRADUATEPROGRAMMEINMATHEMATICS

RevampedCurriculumDesignandSyllabus

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1. Introduction

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

Mathematics is the study of quantity, structure, space and change, focusing on problem solving, with wider scope of application in science, engineering, technology, social sciences etc. The key core areas of study in Mathematics include Algebra, Analysis (Real & Complex), Differential Equations, Geometry, and Mechanics. The Bachelor's Degree B.Sc. Mathematics is awarded to the students on the basis of knowledge, understanding, skills, attitudes, values and academicachievementsexpectedtobeacquiredbylearnersattheendoftheProgramme.Learning outcomesofMathematicsareaimedatfacilitatingthelearnerstoacquiretheseattributes,keeping in view of their preferences and aspirations for gaining knowledge of Mathematics.

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

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

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

UnderGraduateProgramme

ProgrammeOutcomes:

PO1: Disciplinary Knowledge: Capable of demonstrating comprehensive knowledge and understandingofoneor morediscipliнesthatformapartofanundergraduateprogramme of study.

PO2: Critical Thinking: Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevantassumptionsorimplications;formulatecoherentarguments;critically evaluatepractices, policies and theories byfollowing scientific approach to knowledge development.

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

PO4:AnalyticalReasoning: Abilitytoevaluatethereliabilityandrelevanceofevidence;identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples and addressing opposing viewpoints.

PO5:Scientific Reasoning: Abilitytoanalyse,interpretanddrawconclusions from quantitative/ qualitative data; and critically evaluate ideas, evidence, and experiences from an open minded and reasoned perspective.

PO6: Self-directed & Lifelong Learning: Ability to work independently, identify and manage aproject.Abilitytoacquireknowledgeandskills,including"learninghowtolearn", throughself- placed and self-directed learning aimed at personal development, meeting economic, social and cultural objectives.

B.Sc.Mathematics

Programme Specific Outcomes:

PSO1: Acquire good knowledge and understanding, to solve specific theoretical and applied problems in different area of mathematics & statistics.

PSO2: Understand, formulate, develop mathematical arguments, logically and use quantitative models to address issues arising in social sciences, business and other context /fields.

PSO3: To prepare the students who will demonstrate respectful engagement with other's ideas, behaviors, beliefs and apply diverse frames of references to decisions and actions. To create effectiveentrepreneursbyenhancingtheircriticalthinking,problemsolving, decisionmakingand leadership skill that will facilitate startups and high potential organizations.

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

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

HighlightsoftheRevampedCurriculum:

- Student-centric, meeting the demands of industry & society, incorporating industrial components, hands-on training, skill enhancement modules, industrial project, project with viva-voce, exposure to entrepreneurial skills,trainingforcompetitiveexaminations, sustaining the quality of the core components and incorporating application oriented content wherever required.
- The Core subjects include latest developments in the education and scientific front, advanced programming packages allied with the discipline topics, practical training, devisingmathematicalmodelsandalgorithmsforprovidingsolutionstoindustry/reallife situations. The curriculum also facilitates peer learning with advanced mathematical topics in the final semester, catering to the needs of stakeholders with research aptitude.
- The General Studies and Mathematics based problem solving skills are included as mandatorycomponentsinthe„TrainingforCompetitiveExaminations"courseatthefinal semester, a first of its kind.
- The curriculum is designed so as to strengthen the Industry-Academia interface and provide more job opportunities for the students.
- The Industrial Statistics course is newly introduced in the fourth semester, to expose the students to real life problems and train the students on designing a mathematical modelto provide solutions to the industrial problems.
- The Internship duringthesecond yearvacation will help the students gain valuablework experience, that connects classroom knowledge to real world experience and to narrow down and focus on the career path.
- Project with viva-voce component in the fifthsemester enables the student, application ofconceptualknowledgetopracticalsituations.Thestateofarttechnologiesinconducting a Explain in a scientific and systematic way and arriving at a precise solutionis ensured. Such innovative provisions of the industrial training, project and internships will give students an edge over the counterparts in the job market.
- State-ofArttechniquesfromthestreamsofmulti-disciplinary,crossdisciplinaryandinter disciplinary nature are incorporated as Elective courses, covering conventional topics to the latest - Artificial Intelligence.

2. ValueadditionsintheRevampedCurriculum:

Semester	Newly introduced Components	Outcome/Benefits
I	**FoundationCourse** To ease the transition of learning from higher secondary to higher education, providing an overview of thepedagogy of learning abstract Mathematics and simulating mathematical conceptstorealworld.	• Instilconfidenceamong students • Createinterestforthesubject
I,II,III, IV	**Skill Enhancement papers** (Discipline centric / Generic / Entrepreneurial)	• Industryreadygraduates • Skilledhumanresource • Students are equipped with essential skills to make them employable
		• Training on Computing / Computational skills enable the students gainknowledge and exposure on latest computational aspects
		• Dataanalytical skillswillenable studentsgain internships,apprenticeships,fieldworkinvolving data collection, compilation, analysis etc.
		• Entrepreneurial skill training will provide an opportunity for independent livelihood • Generatesself– employment • Createsmallscaleentrepreneurs • Trainingto girlsleadstowomenempowerment
		• DisciplinecentricskillwillimprovetheTechnical knowhow of solving real life problems usingICT tools
III,IV,V &VI	Electivepapers- An open choice of topics categorized under Generic and Discipline Centric	• Strengtheningthedomainknowledge • Introducing the stakeholders to the State-of Art techniques from the streams of multi-disciplinary, cross disciplinary and inter disciplinary nature • Students are exposed to Latest topics on Computer Science / IT, that require strong mathematical background • Emergingtopicsinhighereducation/industry/

		communication network / health sector etc. are introduced with hands-on-training, facilitates designingofmathematicalmodelsintherespective sectors
IV	IndustrialStatistics	• Exposuretoindustrymouldsstudentsintosolution providers • GeneratesIndustryreadygraduates • Employmentopportunitiesenhanced
II year Vacation activity	Internship /Industrial Training	• Practical training at the Industry/ Banking Sector / Private/ Public sector organizations / Educational institutions, enable the students gain professional experienceandalsobecomeresponsiblecitizens.
V Semester	ProjectwithViva-voce	• Self-learningisenhanced • Applicationoftheconcepttorealsituationis conceived resulting intangible outcome
VI Semester	Introduction of ProfessionalCompetency component	• Curriculum design accommodates all category of learners; "Mathematics for Advanced Explain" component will comprise of advanced topics in Mathematics and allied fields, for those in the peer group / aspiring researchers; • „Training for Competitive Examinations" –caters to theneedsoftheaspirantstowardsmostsought-after services of the nation viz, UPSC, CDS, NDA, Banking Services, CAT, TNPSC group services, etc.
ExtraCredits: ForAdvancedLearners/Honoursdegree		• Tocatertotheneedsofpeerlearners/research aspirants

Skills acquired from theCourses	Knowledge,ProblemSolving,Analyticalability,Professional Competency,ProfessionalCommunicationandTransferrableSkill

3. TemplateforCurriculumDesign forUGProgrammein Mathematics

CreditDistributionforUGProgrammeinMathematics B.Sc.
Mathematics
First Year
Semester-I

Part	ListofCourses	Credit	Hoursper week(L/T/P)
Part-I	Language	3	6
Part-II	English	3	6
Part-III	CoreCourses2(CC1, CC2)	8	8
	ElectiveCourse1(Generic/ DisciplineSpecific)EC1	5	6
Part-IV	SkillEnhancementCourseSEC1	2	2
	FoundationCourseFC	2	2
		23	**30**

Semester-II

Part	ListofCourses	Credit	Hoursper week(L/T/P)
Part-I	Language	3	6
Part-II	English	3	4
Part-III	CoreCourses2(CC3, CC4)	8	8
	ElectiveCourse1(Generic/DisciplineSpecific)EC2	5	6
Part-IV	SkillEnhancementCourse-SEC2	1	2
	SkillEnhancementCourse-SEC3(DisciplineSpecific/Generic)	1	2
	Naan Mudhalvan	2	2
		23	**30**

Second Year
Semester-III

Part	ListofCourses	Credit	Hoursper week(L/T/P)
Part-I	Language	3	6
Part-II	English	3	6
Part-III	CoreCourses2(CC5, CC6)	8	8
	ElectiveCourse1(Generic/ DisciplineSpecific) EC3	4	4
Part-IV	SkillEnhancementCourse-SEC4(DisciplineSpecific/Generic)	2	2
	EVS	2	2
	Naan Mudhalvan	2	2
		24	**30**

Semester-IV

Part	ListofCourses	Credit	Hoursper week(L/T/P)
Part-I	Language	3	6
Part-II	English	3	6
Part-III	CoreCourses2(CC7, CC8)	8	8
	ElectiveCourse1(Generic/DisciplineSpecific)EC4	4	4
Part-IV	SkillEnhancementCourse-SEC5(DisciplineSpecific/Generic)	2	2
	Value Education	2	2
	Naan Mudhalvan	2	2
		24	**30**

Third Year
Semester-V

Part	ListofCourses	Credit	Hoursper week(L/T/P)
Part-III	CoreCourses 3 (CC9, CC10, CC11)	12	15
	Core / Project with viva-voce (CC12)	4	5
	ElectiveCourses2(Generic/ DisciplineSpecific) EC5, EC6	6	8
Part-IV	Naan Mudhalvan	2	2
	Internship / Industrial Training / Field Visit / Knowledge Updating	1	-
		25	**30**

Semester-VI

Part	ListofCourses	Credit	Hoursper week(L/T/P)
Part-III	CoreCourses3 (CC13, CC14, CC15)	12	18
	ElectiveCourses2(Generic/ DisciplineSpecific) EC7, EC8	6	10
Part-IV	Naan Mudhalvan	2	2
Part V	Extension Activity	1	-
		21	**30**

4. CreditDistributionforUGProgrammeinMathematics

SemI	Credit	SemII	Credit	Sem III	Credit	Sem IV	Credit	Sem V	Credit	Sem VI	Credit
1.1.Language	3	2.1.Language	3	3.1.Language	3	4.1.Language	3	5.1.Core Course CC9	4	6.1.Core Course CC13	4
1.2.English	3	2.2.English	3	3.2.English	3	4.2.English	3	5.2.Core Course CC10	4	6.2.CoreCourse CC14	4
1.3.CoreCourse CC1	4	2.3.CoreCourse CC3	4	3.3.CoreCourse CC5	4	4.3.CoreCourse CC7	4	5.3.CoreCourse CC11	4	6.3.CoreCourse CC15	4
1.4.CoreCourse CC2	4	2.4.CoreCourse CC4	4	3.4.CoreCourse CC6	4	4.4.CoreCourse CC8	4	5.4.Core/Project CC12	4	6.4.Elective EC7	3
1.5. Elective EC1	5	2.5. Elective EC2	5	3.5. Elective EC3	4	4.5. Elective EC4	4	5.5. Elective EC5	3	6.5. Elective EC8	3
1.6. Skill Enhancement CourseSEC1	2	2.6. Skill Enhancement CourseSEC2	1	3.6.Skill Enhancement CourseSEC4	2	4.6.Skill Enhancement CourseSEC5	2	5.6.Elective EC6	3	6.6. Naan Mudhalvan	2
1.7. Skill Enhancement (Foundation Course)	2	2.7. Skill Enhancement CourseSEC3	1	3.7.EVS	2	4.7.Value Education	2	5.7. Naan Mudhalvan	2	6.7. Extension Activity	1
-	-	2.8. Naan Mudhalvan 1	2	3.8. Naan Mudhalvan 2	2	4.8. Naan Mudhalvan 3	2	5.8. Internship	1		
-	-	-	-								
	23		**23**		**24**		**24**		**25**		**21**

5. ConsolidatedSemesterwiseandComponentwiseCreditdistribution

Parts	SemI	SemII	SemIII	SemIV	Sem V	Sem VI	Total Credits
PartI	3	3	3	3	-	-	12
Part II	3	3	3	3	-	-	12
Part III	13	13	12	12	22	18	90
Part IV	4	4	6	6	3	2	25
PartV	-	-	-	-	-	1	1
Total	23	23	24	24	25	21	140

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

6. ExaminationSystem

There are two components in the evaluation and assessment of a student, namely ContinuousInternalAssessment(CIA)andSemesterExamination(SE).TheCIAwilltakeplace during the course of the semester and the semester Examination shall be conducted at the end of each semester.Each UG course consists of six semesters.

SemesterExaminationQuestionPaperPatternForTheTheoryPapers

- TheMaximumMarks forSemesterExamination is75for UG.
- ThequestionpapershallhavethreePartswiththemaximumof75marksforthreehourswiththe following break-up.

Part-A

Part-A shall contain **ten**Multiple Choice Questions drawn from all the units on the basis oftwo questions from each unit.Eachquestionshall carryonemark (10×1=10Marks).Answer allthe questions.

Part-B

Part-Bshallcontain **five**either or type questionsdrawnfrom all the5 units. One either or type question from each unit.Eachquestionshall carry5marks (5×5 = 25Marks).Answer allthe questions.

Part-C

Part-Cshallcontain **five**either or type questionsdrawn from all the5 units. One either or type question from each unit.Eachquestionshall carry8marks (5×8 = 40Marks).Answer allthe questions.

ContinuousInternalAssessment (CIA)

Thebreak-upoftheinternal markscomponents isas follows:

- CIATests –20Marks
- Assignment–5Marks

MarksForPracticals

- TheMaximumMarksforPracticalExaminationis100forUG.
- ExternalMarkComponents60Marks -PracticalExamination45MarksandRecord15Marks.
- Internal Mark 40 Marks.

Passing Minimum

The candidate shall be declared to have passed the examination if the candidates secure not less than 30 marks out of 75 marks in the semester examination in each theory course and in total (CIA mark + Theory Exam mark) not less than 40 marks.

The candidates shall be declared to have passed the examination if he/she secures not less than40 marks intotal(CIAmark +Practical Exam mark)with minimumof18marks out of45 marks in the Practical Exam conducted by the University.There is no passing minimum for the record notebook. However, submission of the record notebook is necessary.

Candidate who does not obtain the required minimum marks for a pass in a Course/Practical shall be declared Re-Appear (RA) and the candidate has to appear and pass the same at a subsequent appearance.

7. Illustrative B.Sc.MathematicsCurriculumDesign

FirstYear Semester-I

Part	ListofCourses	Credit	Hoursper week(L/T/P)
Part-I	1.1.Language–Tamil	3	6
Part-II	1.2.Language–English	3	6
Part-III	1.3. CoreCourse CC1: Algebra&Trigonometry	4	4
	1.4.CoreCourseCC2: DifferentialCalculus	4	4
	1.5.ElectiveCourse EC1:Chooseanyonefrom thefollowing: 1.ProgrammingLanguageCwithPractical* 2.AlliedPhysicsI with Practical 3. Allied Chemistry I with Practical	T-3 P -2	6
Part-IV	1.6.SkillEnhancementCourseSEC1 Mathematicsfor Competitive Examination 1	2	2
	1.7.FoundationCourseFC–BridgeMathematics	2	2
		23	**30**

***ShouldbetakenbyMathematicsdepartment staffonly. T – Theory and P - Practical**

Semester-II

Part	ListofCourses	Credit	Hoursper week(L/T/P)
Part-I	2.1. Language–Tamil	3	6
Part-II	2.2.Language–English	3	4
Part-III	2.3.CoreCourseCC3:Analytical Geometry(Two&Three Dimensions)	4	4
	2.4.CoreCourseCC4: IntegralCalculus	4	4
	2.5. Elective Course EC2: Choose any one from the following: 1. ProgrammingLanguageC++withPractical* 2. AlliedPhysics II withPractical 3. Allied Chemistry II with Practical	T-3 P -2	6
Part-IV	2.6.SkillEnhancementCourseSEC2 Mathematicsfor Competitive Examination 2	1	2
	2.7.SkillEnhancement CourseSEC3:LaTeX	1	2
	2.8. Naan Mudhalvan # (Substitute Course: Mathematics for Competitive Examination III)	2	2
		23	**30**

***ShouldbetakenbyMathematicsdepartmentstaffonly**
T– Theoryand P–Practical

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

SecondYear Semester-III

Part	ListofCourses	Credit	Hoursper week(L/T/P)
Part-I	3.1.Language–Tamil	3	6
Part-II	3.2.Language–English	3	6
Part-III	3.3. CoreCourseCC5: Vector Calculus and Applications	4	4
	3.4.CoreCourseCC6: DifferentialEquationsand Applications	4	4
	3.5.ElectiveCourse EC3: (Statistics I/ Difference Equations)	4	4
Part-IV	3.6.SkillEnhancementCourseSEC4: Computational Mathematics	2	2
	3.7. Environmental Studies – EVS	2	2
	3.8. Naan Mudhalvan # (Substitute Course: Mathematics for Competitive Examination IV)	2	2
		24	**30**

Semester-IV

Part	ListofCourses	Credit	Hours per week(L/T/P)
Part-I	4.1. Language–Tamil	3	6
Part-II	4.2.Language–English	3	6
Part-III	4.3.CoreCourseCC7: Sequence and Series	4	4
	4.4.CoreCourseCC8: Fourier Seriesand Integral Transforms	4	4
	4.5. Elective Course EC4: (Statistics II/ Numerical Methods)	4	4
Part-IV	4.6. SkillEnhancementCourseSEC5: GeoGebra	2	2
	4.7.Value Education	2	2
	4.8. Naan Mudhalvan # (Substitute course: Office Automation)	2	2
		24	**30**

Third Year Semester-V

Part	ListofCourses	Credit	Hoursper week(L/T/P)
Part-III	5.1. CoreCourseCC9: Abstract Algebra	4	5
	5.2.CoreCourse CC10: Real Analysis	4	5
	5.3. Core Course CC11: Mathematical Modeling	4	5
	5.4. Core Course CC12: Number Theory/ Project with Viva-voce	4	5
	5.4. Elective Course EC5 (One course from Group A)	3	4
	5.5. Elective Course EC6 (One course from Group A other than EC5)	3	4
Part-IV	5.7. Naan Mudhalvan # (Substitute course: Statistics with Excel Programming)	2	2
	5.8. Internship / Industrial training / Field Visit / Knowledge Updating Activity **	1	-
		25	**30**

Semester-VI

Part	ListofCourses	Credit	Hoursper week(L/T/P)
Part-III	6.1. CoreCourseCC13: Linear Algebra	4	6
	6.2.CoreCourse CC14: Complex Analysis	4	6
	6.3. Core Course CC15: Mechanics	4	6
	6.4. Elective Course EC7: (One course from Group B)	3	5
	6.5. Elective Course EC8: (One course from Group B other than EC7)	3	5
Part-IV	6.6. Naan Mudhalvan: Data Analytics using powerBI (Edunet) (Substitute course: MATLAB)	2	2
Part-V	6.7. Extension Activity ***	1	-
		21	**30**

Total Credits: 140

**** Internship / Industrial training / Field visit / Knowledge updating activity:**

- **Internal: 50 marks and External: 50 marks (Total: 100 marks)**
- **A report should be submitted at the end of 5th semester and evaluated by external examiners.**
- **Internship students should submit certificate of attendance from the industry along with report.**

***** Extension Activity:**

- **NSS/NCC/ YRC/RRC/Sports and Games/Youth Welfare Activity/Outreach Programmes/Migration Awareness in the Tamil Nadu Education system**
- **Internal: 50 marks and External: 50 marks (Total: 100 marks)**
- **External examination will be conducted at the end of 6th semester instead of 4th semester as per the existing pattern for extension activity.**

8 8.1SuggestiveTopics inCoreComponent

- ClassicalAlgebra
- Trigonometry
- DifferentialCalculus
- IntegralCalculus
- AnalyticalGeometry(2D/ 3D)
- VectorAnalysis
- DifferentialEquations
- AbstractAlgebra
- LinearAlgebra
- Sequences&Series
- FourierSeries
- RealAnalysis
- TransformTechniques(Laplace,Fourier)
- ComplexAnalysis
- Mechanics(Statics/ Dynamics)
- MathematicalModeling
- IndustrialMathematicsandmore

SuggestiveTopicsinElectiveCourses(Generic/Discipline-centric) Group I:

- AlliedPhysics
- AlliedChemistry
- StatisticalMethods
- BioMathematics
- Bio Statistics
- ProgrammingLanguagewithpractical(C,Python,Java,R,etc.)
- ObjectOrientedProgrammingwithC++
- PrinciplesofEconometrics
- IntroductiontoActuarial Science
- PrinciplesofAccountingpractices
- Logistics &Supplychainmanagement
- ForecastingTechniques
- Simulation
- IntroductiontoDataScience
- Cloud Computing
- IntroductiontoMachineLearning
- DataStructures
- IntroductiontoArtificial Intelligence
- Neuralnetworkmodels
- FinancialMathematics and more

GroupII–SuggestiveElectiveCourses(Discipline-centric)

- NumericalMethodswithApplications
- MathematicalStatistics
- OptimizationTechniques
- GraphTheory&Applications
- SpecialfunctionswithApplications
- DiscreteMathematics
- CombinatorialMathematics
- NumberTheory&Cryptography
- Differenceequationswith application
- Formal Languages&AutomataTheory
- Astronomy/Elementsof SpaceScience
- StochasticProcesses
- FuzzySets&itsapplications
- IntroductiontoResearch Methodology
- IntegralTransforms&ZTransforms
- Algorithms
- Computational Geometryand more

SuggestiveTopicsinSkillEnhancementCourses(SEC)

Group III - Skill Enhancement Courses (SEC)

- StatisticswithR/Excel/SPSS
- LaTeX
- E-Commerce&Tally
- Computingskills(Office Automation)
- AndroidAppdevelopment
- WebDesigning
- MathematicsforCompetitive examinations
- ComputationalMathematics
- DataAnalysisusinglatestpackage (R/Matlab/Maxima/Torus/GeoGebra/GIMP)andmore

B.Sc. Mathematics
CoreComponentSyllabus

9.SyllabusfordifferentCoursesof B.Sc.Mathematics

<table>
<tr><td colspan="2">TitleoftheCourse</td><td colspan="8">ALGEBRA&TRIGONOMETRY</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="8">CORE M1</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>I</td><td rowspan="2">Credits</td><td rowspan="2">4</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>I</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hoursperweek</td><td>Lecture</td><td colspan="2">Tutorial</td><td colspan="2">LabPractice</td><td colspan="2">Total</td></tr>
<tr><td>4</td><td colspan="2">--</td><td colspan="2">--</td><td colspan="2">4</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="8">12th StandardMathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="8">• Basicideasonthetheoryofequations and to find numerical solution of an equation
• Knowledgeto findexpansions oftrigonometryfunctions, solve theoretical and applied problems.</td></tr>
<tr><td colspan="2" rowspan="5">CourseOutline</td><td colspan="8">UNIT I: Reciprocal Equations – Standard form–Increasing or decreasing the roots of a given equation– Removalof terms– Relatedproblems.
(Book 1- Chapter 6: Sections - 16 to 19)</td></tr>
<tr><td colspan="8">UNIT II: Symmetric function of roots – Sum of powers of the roots of an equation – Newton’s theorem –Approximate solutions of roots of polynomials– Horner’s method – General solutions of the cubic equation – Cardon’s method – Trigonometrical method – Related problems.
(Book 1: Chapter 6: Sections - 12 to 14, 30, 34)</td></tr>
<tr><td colspan="8">UNITIII:Summationof Series:Binomial–Exponential–Logarithmic series (Theorems without proof) – Approximations – Related problems.
(Book 1- Chapter 3: Sections -10, 14: Chapter 4: Sections -3, 5, 7, 9, 11)</td></tr>
<tr><td colspan="8">UNIT IV: Expansions of $\sin n\theta$, $\cos n\theta$ in powers of $\sin\theta$, $\cos\theta$ - Expansion of $\tan n\theta$ in terms of $\tan\theta$, Expansions of $\cos^n\theta$, $\sin^n\theta$, $\cos^m\theta\sin^n\theta$–Expansions of $\tan(\theta_1+\theta_2+\cdots+\theta_n)$– Expansionsof$\sin\theta$, $\cos\theta$and $\tan\theta$ in terms of θ -relatedproblems.
(Book 2 - Chapter 3)</td></tr>
<tr><td colspan="8">UNIT V: Hyperbolic functions – Relation between circular and hyperbolic functions Inverse hyperbolic functions, Logarithm of complexquantities–Relatedproblems.
(Book 2 - Chapter 4, Chapter 5: Section - 5)</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved (TobediscussedduringtheTutorial hour)
Skills acquired from this course	Knowledge, problem solving, analytical ability, professional competency,professionalcommunicationandtransferableskill.
Recommended Text	1. T.K.ManicavachagomPillay,T.NatarajanandKS.Ganapathy, Algebra Vol I, S. Viswanathan (Printers & Publishers) Pvt. Ltd., 2017. 2. S. Narayanan and T.K.ManicavachagomPillay, Trigonometry, S. Viswanathan (Printers & Publishers) Pvt. Ltd., 2009.
ReferenceBooks	1.W.S.BurnstineandA.W.Panton,Theoryofequations. 2. David C. Lay, Linear Algebra and its Applications, 3rd Ed., Pearson Education Asia, Indian Reprint, 2007. 3. G.B.ThomasandR.L.Finney,Calculus,9thEd.,PearsonEducation, Delhi, 2005. 4. C. V. Durell and A. Robson, Advanced Trigonometry, Courier Corporation, 2003. 5. J.Stewart,L.Redlin,andS.Watson,AlgebraandTrigonometry, Cengage Learning, 2012. 6. CalculusandAnalyticalGeometry,G.B.ThomasandR.L.Finny, PearsonPublication, 9th Edition, 2010.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMappingwithPOsandPSOs)

Studentswillbeableto

CLO1: Classifyandsolvereciprocalequations

CLO2: Find the sum of powers of the roots of an equation

CLO 3: Findthesumofbinomial,exponentialandlogarithmicseries

CLO4: Expandthepowersandmultiplesoftrigonometricfunctionsintermsofsineandcosine

CLO5: Determinerelationshipbetweencirculararandhyperbolicfunctions.

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

<table>
<tr><td colspan="2">TitleoftheCourse</td><td colspan="6">DIFFERENTIALCALCULUS</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="6">CORE M2</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>I</td><td rowspan="2">Credits</td><td rowspan="2">4</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>I</td></tr>
<tr><td colspan="2">Instructional Hours perweek</td><td colspan="2">Lecture
4</td><td colspan="2">Tutorial
--</td><td>LabPractice
--</td><td>Total
4</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">12th StandardMathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">• Thebasicskillsofdifferentiation,successivedifferentiation,and their applications.
• Basicknowledgeonthenotionsofcurvature,evolutes,involutes and polar co-ordinates and in solving related problems.</td></tr>
<tr><td colspan="2">CourseOutline</td><td colspan="6">UNITI: Successive Differentiation: Introduction (Review of basic concepts) – The n^{th} derivative – Standard results – Trigonometrical transformation – Formation of equations involving derivatives – Leibnitzformulaforthen^{th} derivativeofa product.
(Chapter 3: Sections - 1.1 to 1.6, 2.1)</td></tr>
<tr><td colspan="2"></td><td colspan="6">UNITII: Partial Differentiation: Partial derivatives – Successive partial derivatives – Function of a function rule – Total differential coefficient – A special case – Implicit functions.
(Chapter 8: Sections - 1.1 to 1.5)</td></tr>
<tr><td colspan="2"></td><td colspan="6">UNITIII: Partial Differentiation (Continued): Homogeneous functions – Partial derivatives of a function of two variables – Maxima and Minima of two variables.
(Chapter 8: Sections - 1.6, 1.7, 4 and 5)</td></tr>
<tr><td colspan="2"></td><td colspan="6">UNITIV:Envelope:Methodoffindingtheenvelope–Another definition of envelope – Envelope of familyof curves which are quadratic in the parameter.
(Chapter 10: Sections - 1.1 to1.4)</td></tr>
<tr><td colspan="2"></td><td colspan="6">UNITV: Curvature: Definition of Curvature – Circle, Radius and Centre of Curvature – Evolutes and Involutes – Radius of Curvature in Polar co-ordinates.
(Chapter 10: Sections - 2.1 to 2.6)</td></tr>
</table>

Extended Professional Component(isa part ofinternal componentonly, Not tobeincludedintheExternal Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / / TNPSC / others to be solved (TobediscussedduringtheTutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	1. S.NarayananandTK.ManicavachagomPillay,Calculus,Vol1, S.Viswanathan(Printers &Publication)PVT. LID.2015.
ReferenceBooks	1. R.CourantandF.John, IntroductiontoCalculusandAnalysis (Volumes I & II), Springer- Verlag, New York, Inc., 1989. 2. T.Apostol,Calculus,Volumes IandII. 3. S.Goldberg,Calculusandmathematicalanalysis. 4. H. Anton, I. Birens and S. Davis, Calculus, John Wiley and Sons, Inc., 2002. 5. G.B.ThomasandR.L.Finney,Calculus,PearsonEducation,2010. 6. M.J. Strauss, G.L. Bradleyand K.J. Smith,Calculus, 3rdEd., Dorling Kindersley(India) P. Ltd. (Pearson Education),Delhi, 2007.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearningOutcome(forMappingwithPLOsandPSOs)

Studentswillbeableto

CLO 1: Find thenth derivative, form equations involvingderivatives and applyLeibnitz formula

CLO2: Findthepartialderivativeandtotalderivativecoefficient

CLO 3: Determine themaxima and minima of functions of two variables

CLO 4: Find the envelope of a given familyof curves

CLO5: Findtheevolutesandinvolutesandtofindtheradiusofcurvatureusingpolarco-ordinates

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

<table>
<tr><td colspan="2">TitleoftheCourse</td><td colspan="6">PROGRAMMINGLANGUAGECWITH PRACTICAL</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="6">ELECTIVEEC1</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Elective</td><td>Year</td><td>I</td><td rowspan="2">Credits</td><td rowspan="2">5</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>II</td></tr>
<tr><td colspan="2">Instructional Hours perweek</td><td colspan="2">Lecture
4</td><td colspan="2">Tutorial
--</td><td>LabPractice
2</td><td>Total
6</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">12th StandardMathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">TostudythebasicconceptsandstructureofCprogramandtotrainthe students to write simple C programs.
.</td></tr>
<tr><td colspan="2">CourseOutline</td><td colspan="6">UNITI:Introduction – Characterset – C Tokens –Keywordsand Identifiers – Constants – Variables – Datatypes.
(Chapter 2: Sections - 2.1 to 2.7)</td></tr>
<tr><td colspan="2"></td><td colspan="6">UNITII: Operators: Arithmetic – Relational –Logical – Assignment– Increment and Decrement – Conditional – Bitwise – Special – PrecedenceofArithmetic operators – Managinginputandoutputoperation: Reading and writing a character – Formatted input and output.
(Chapters 3 and 4: Sections - 3.1 to 3.9, 3.12, 4.2 to 4.5)</td></tr>
<tr><td colspan="2"></td><td colspan="6">UNITIII: Decision making and branching: Statements: IF, IF … ELSE, Nesting of IF … ELSE, ELSE IF Ladder and Switch statements – The ?:operator – The GOTO statement – Decision makingand looping: The WHILE, DO and FOR statements –Jumpsin loops.
(Chapters 5 & 6: Sections - 5.3 to 5.9, 6.2 to 6.5)</td></tr>
<tr><td colspan="2"></td><td colspan="6">UNITIV: Array: One dimensional and twodimensional arrays– Declaration, Initialization of arrays – Multidimensional arrays- Character arrays and strings:Declaringandinitializingstringvariables – Readingandwritingofstrings – Stringhandlingfunctions.
(Chapters 7 & 8: Sections 7.1 to 7.7, 8.1 to 8.8)</td></tr>
<tr><td colspan="2"></td><td colspan="6">UNITV:Userdefinedfunctions: Definitionoffunction -Returnvaluesand their types – Function calls – Function declaration – Category of functions – Nesting of functions – Recursion.
(Chapter 9: Sections 9.5 to 9.9, 9.15, 9.16)</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved (TobediscussedduringtheTutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	E.Balaguruswamy-ProgramminginANSIC–TataMcGraw Hill Publishing company limited –III Edition, 2017.
ReferenceBooks	1. C.ReemaThareja,ProgramminginC-OxfordUniversity Press, 2018. 2. Ramasamyet.al.-ProgramminginC-ScetechPublication(INDIA) Pvt.Ltd. II Edition, 2015. 3. AshokN.Kamathane-ProgrammingwithAnsiandTurboC– Dorling Kindersley (India) Pvt.Ltd., 2009.
Websiteand e-LearningSource	https://nptel.ac.in

ListofPracticals:

1. Programtoprinttheevennumbersfrom1to100.
2. Programtoreadthreevaluesusingscanstatementandprintthefollowingresults: a)Sumofthevaluesb)Averageofthethreevaluesc) Largestofthe three
3. Programtoreadand displaythe followingtableofdata:

Name	Code	Price
Fan	67831	1234.50
Motor	450	5786.70

Thenameandcodemustbeleftjustifiedand pricemustberight justified.

4. Programtocomputetherealrootsofaquadratic equation.
5. Programtoevaluatetheinvestmentequation $V = P(1 + r)^n$ and printthetableswhich would give the value of V for various combination of the following values of P, r and n.

P : 1000, 2000, . . . ,10000

r : 0.10,0.11, . . . ,0.20

n : 1, 2, . . . ,10

6. Programtoprintallintegersthatarenotdivisible byeither2or3andliebetween1 and100and also should account the number of sets integers and print the result.
7. Programtomergetwo givenonedimensionalarrays AandB(whicharesortedinascendingorder) into a single sorted array C which is in ascending order.
8. Programtoreadastringfromthekeyboardanddeterminewhetherthestringisapalindromeor not.
9. Develop a modular interactive program using functions that reads the value of three sides of a triangleanddisplayseitheritsareaoritsperimeteraspertherequestoftheuser.Giventhethree sides a, b and c, perimeter is$a + b + c$ and areais$\sqrt{s(s-a)(s-b)(s-c)}$where $s = (a + b + c)/2$.
10. Developyourownfunctionsforperformingfollowingoperationsinstrings.
    a) Copyingonestringto another
    b) Comparingtwostings
    c) Addingastringtotheendofanotherstring

    Write a program to test your functions.

CourseLearningOutcome(forMappingwithPLOsandPSOs)

Studentswillbeableto

CLO 1: Identify the keywords, constants and variables

CLO2: Know different operators and their uses

CLO 3: Use suitable statements and looping

CLO 4: Know one, two and multidimensional arrays and the use of stringvariables

CLO5: Know user defined functions and how to apply these functions in programme.

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

<table>
<tr><td colspan="2">TitleoftheCourse</td><td colspan="8">MATHEMATICSFORCOMPETETIVEEXAMINATIONI</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="8">SEC1</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Skill Enhance-mentCourse</td><td>Year</td><td>I</td><td rowspan="2">Credits</td><td rowspan="2">2</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>I</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hoursperweek</td><td colspan="2">Lecture</td><td colspan="2">Tutorial</td><td colspan="2">LabPractice</td><td>Total</td></tr>
<tr><td colspan="2">2</td><td colspan="2">--</td><td colspan="2">--</td><td>2</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="8">12th StandardMathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="8">• Tolearnthetechniquesforsolvingaptitudeproblemsandtoenable the students to prepare themselves for various competitive examinations.</td></tr>
<tr><td colspan="2" rowspan="5">CourseOutline</td><td colspan="8">UNITI:Simplification – Averages.</td></tr>
<tr><td colspan="8">UNITII:Problems on Numbers.</td></tr>
<tr><td colspan="8">UNIT III:Profit andLoss.</td></tr>
<tr><td colspan="8">UNIT IV:Ratioandproportion.</td></tr>
<tr><td colspan="8">UNIT V:Partnership – Percentages.</td></tr>
<tr><td colspan="2">Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)</td><td colspan="8">Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved
(TobediscussedduringtheTutorial hour)</td></tr>
<tr><td colspan="2">Skills acquired from this course</td><td colspan="8">Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill</td></tr>
<tr><td colspan="2">Reference Books</td><td colspan="8">R.S.Agarwal-Objectivearithmetic,PublishedbyS.Chand&Co Ltd.,2018.</td></tr>
</table>

Recommended Text	1. R.S.Agarwal-Arithmeticsubjectiveand Objective, PublishedbyS.Chand&CoLtd.,RevisedEdition, 2017. 2. Rajesh Verma,Fast track Objective arithmetic,Arihant PublicationsIndiaLimitedFourthEdition,2018.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO1: Simplify an expression and to find average for given data

CLO 2: Find solution of problems on numbers

CLO 3: Find Profit andLoss

CLO4: Find Ratioandproportion

CLO5: Find Percentages.

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

<table>
<tr><td colspan="2">TitleoftheCourse</td><td colspan="8">Foundationcourse-BridgeMathematics</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="8">FOUNDATION</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>I</td><td rowspan="2">Credits</td><td rowspan="2">2</td><td rowspan="2">Course Code</td><td rowspan="2">FC</td></tr>
<tr><td>Semester</td><td>I</td></tr>
<tr><td colspan="2" rowspan="2">InstructionalHours perweek</td><td>Lecture</td><td colspan="2">Tutorial</td><td colspan="2">LabPractice</td><td colspan="2">Total</td></tr>
<tr><td>2</td><td colspan="2">-</td><td colspan="2">--</td><td colspan="2">2</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="8">12th StandardMathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="8">Tobridgethegapandfacilitatetransitionfromhighersecondaryto tertiaryeducation;
Toinstilconfidenceamongstakeholdersandinculcateinterestfor Mathematics;</td></tr>
<tr><td colspan="2" rowspan="5">CourseOutline</td><td colspan="8">UNITI:Algebra:Binomialtheorem,Generalterm,middleterm, problems based on these concepts</td></tr>
<tr><td colspan="8">UNIT II: Sequences and series (Progressions). Fundamental principle of counting. Factorial n.</td></tr>
<tr><td colspan="8">UNITIII:Permutationsandcombinations,Derivationofformulae andtheirconnections,simpleapplications,combinationswithrepetitions, arrangementswithingroups,formation ofgroups.</td></tr>
<tr><td colspan="8">UNIT IV: Trigonometry: Introduction to trigonometric ratios, proof of sin(A+B), cos(A+B), tan(A+B) formulae, multiple and sub multipleangles,sin(2A),cos(2A),tan(2A)etc.,transformationssum into product and product into sum formulae, inverse trigonometric functions,sineruleandcosinerule.</td></tr>
<tr><td colspan="8">UNIT V: Calculus: Limits, standard formulae and problems, differentiation,firstprinciple,uvrule,u/vrule,methodsof differentiation,applicationofderivatives,integration-product ruleandsubstitution method.</td></tr>
<tr><td colspan="2">RecommendedText</td><td colspan="8">1. NCERTclassXIandXIItext books.
2. AnyStateBoardMathematicstextbooksofclassXIandXII</td></tr>
</table>

Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome

Aftercompletionofthiscoursesuccessfully,thestudentswillbeableto

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

CLO2: Findthevarioussequencesandseriesandsolvetheproblemsrelatedtothem.Explainthe principle of counting.

CLO3: Find the number of permutations and combinations in different cases. Apply the principleof 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.

CLO5: Findthelimitandderivativeofafunctionatapoint,thedefiniteandindefiniteintegralof a function. Find the points of min/max of a function.

MappingofCourseLearningOutcomes(CLOs)withProgrammeLearningOutcomes(PLOs)and Programme Specific Outcomes (PSOs)

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

TitleoftheCourse		**ALGEBRAANDDIFFERENTIAL EQUATIONS**						
PaperNumber		**ALLIEDMATHEMATICS I**						
Category	Allied	**Year**	I	**Credits**	3	**Course Code**		
		Semester	I					
Instructional Hours perweek		**Lecture**		**Tutorial**		**LabPractice**		**Total**
		5		1		--		6
Pre-requisite		12th StandardMathematics						
Objectives of the Course		Toexplainthesimpleconceptsofthetheoryofequationsandtofind the roots of the equations by using techniques in various methods.						
CourseOutline		**UNITI:** Theoryof Equations – Formation of Equations – Relationbetweenrootsandcoefficients–Reciprocalequations.						
		UNITII: Transformationof Equations–Approximatesolutionsto equations –Newton's method and Horner's method.						
		UNITIII: Matrices–Characteristicequationofamatrix –Eigen values and Eigen vectors – Cayley Hamilton theorem and simple Problems.						
		UNITIV: Differential equation of first order but of higher degree – Equationssolvableforp, x, y–Partialdifferentialequations–formations– solutions –Standard form $Pp + Qq = R$.						
		UNITV: Laplacetransformation–InverseLaplacetransform.						

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved (TobediscussedduringtheTutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	Dr.S.Arumugam and A. ThangapandiIsaac– AlliedMathematicsPaper-I,New Gamma Publishing House, 2012.
ReferenceBooks	1. S. Narayanan.SandT.K.ManikavachagomPillay -Differential Equations and its applications, S.Viswanathan Printers Pvt.Ltd,2006. 2. T.Veerarajan-AlgebraandTrigonometry-YesDeePublishing Pvt.Ltd.,2009.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMappingwithPOsandPSOs)

Studentswillbeableto

CLO1: Form the equation, relation between the roots and classifyandsolvereciprocalequations

CLO2: Find approximate solution to equations by Horner's method

CLO 3: Findeigen values and eigen vectors for given square matrix and find inverse by using Cayley-Hamilton theorem

CLO4: Find solution of differential equations and partial differential equations

CLO5: Find Laplace transformation and inverse Laplace transformation for a given function.

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

<table>
<tr><td colspan="2">TitleoftheCourse</td><td colspan="6">ANALYTICALGEOMETRY(Two&ThreeDimensions)</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="6">CORE M3</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>I</td><td rowspan="2">Credits</td><td rowspan="2">4</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>II</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours perweek</td><td colspan="2">Lecture</td><td colspan="2">Tutorial</td><td>LabPractice</td><td>Total</td></tr>
<tr><td colspan="2">4</td><td colspan="2">--</td><td>--</td><td>4</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">12th StandardMathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">• Necessary skillstoanalyzecharacteristicsandpropertiesoftwo- and three-dimensional geometric shapes.
• Topresentmathematicalargumentsaboutgeometricrelationships.
• Tosolverealworldproblemsongeometryanditsapplications.</td></tr>
<tr><td colspan="2" rowspan="5">CourseOutline</td><td colspan="6">UNITI:Pole,Polar- conjugate pointsand conjugatelines – diameters – conjugate diameters of an ellipse –Semi diameters – Conjugatediameters of hyperbola – Related problems only.
(Book 1: Chapters: 9 and 10)</td></tr>
<tr><td colspan="6">UNITII: Polar coordinates: General polar equation of straight line – Polar equation of a circle given a diameter, Equation of a straight line, circle,conic–Equationofchord,tangent,normal.
(Book 2: Chapter 9: Sections - 1 to 3, 5 to 10, 12)</td></tr>
<tr><td colspan="6">UNITIII: System of Planes – Lengthof the perpendicular–Orthogonal projection.
(Book 3: Chapter 2: Sections - 1 to 11)</td></tr>
<tr><td colspan="6">UNITIV: Representation of line– Angle between a lineand a plane – coplanar lines– Shortest distance between two skew lines– Length of theperpendicular.
(Book 3: Chapter 3: Sections - 1 to 8)</td></tr>
<tr><td colspan="6">UNITV: Equation of a sphere- General equation – Sectionof a sphereby a plane – Equationof the circle –Tangentplane –Angleof intersection of two spheres –Condition for the orthogonality.
(Book 3: Chapter 4: Sections - 1 to 8)</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved (TobediscussedduringtheTutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	1. P. R. Mittal and V. Malini, Analytical Geometry & Trigonometry, Margam Publications, 2018. 2. T.K. Manicavachagom Pillay and T. Natarajan, Analytical Geometry (PartI -Twodimensions),S.ViswanathanPrintersand Publishers Pvt. Ltd., 2012. 3. T.K. Manicavachagom Pillay and T. Natarajan, Analytical Geometry (PartII-Threedimensions),S.Viswanathan(PrintersandPublishers) Pvt. Ltd., 2012.

Reference Books	1. S.L.Loney,Co-ordinateGeometry. 2. RobertJ.T.Bell, Co-ordinateGeometryofThreeDimensions. 3. William F. Osgood and William C. Graustein, Plane and Solid Analytic Geometry, Macmillan Company, New York, 2016. 4. CalculusandAnalyticalGeometry,G.B.ThomasandR.L.Finny, Pearson Publication, 9th Edition, 2010. 5. RobertC.Yates,AnalyticGeometrywithCalculus,PrenticeHall, Inc., New York, 1961. 6. EarlW.SwokowskiandJefferyA.Cole,AlgebraandTrigonometry with Analytic Geometry, Twelfth Edition, Brooks/Cole, Cengage Learning, CA, USA, 2010. 7. WilliamH.McCrea,AnalyticalGeometryofThreeDimensions, Dover Publications, Inc, New York, 2006. 8. JohnF.Randelph,CalculusandAnalyticGeometry,Wadsworth PublishingCompany, CA,USA,1969. 9. RalphPalmerAgnew,AnalyticGeometryandCalculuswith Vectors, McGraw-Hill Book Company, Inc. New York, 1962.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMappingwithPOsandPSOs)

Studentswillbeableto

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

CLO2: Findthepolarequationsofstraightlineandcircle,equationsofchord,tangentand normal

CLO3: Explainin detailthesystemofPlanes

CLO4: Explainindetailthesystemof Straight lines

CLO5: Explainindetailthesystemof Spheres

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

<table>
<tr><td colspan="2">TitleoftheCourse</td><td colspan="6">INTEGRALCALCULUS</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="6">CORE M4</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>I</td><td rowspan="2">Credits</td><td rowspan="2">3</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>II</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hoursperweek</td><td>Lecture</td><td>Tutorial</td><td>LabPractice</td><td colspan="3">Total</td></tr>
<tr><td>4</td><td>--</td><td>--</td><td colspan="3">4</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">12th StandardMathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">• Knowledge on integration and its geometrical applications, double, triple integrals and improper integrals.
• Knowledge about Beta and Gamma functions and their applications.
• SkillstoDetermineFourierseriesexpansions.</td></tr>
<tr><td colspan="2" rowspan="5">CourseOutline</td><td colspan="6">UNITI: Reduction formulae – Types, integration of product of powers of algebraic and trigonometric functions, integration of product of powersofalgebraicandlogarithmicfunctions–Bernoulli'sformula.
(Chapter 1: Sections -13 to 15)</td></tr>
<tr><td colspan="6">UNITII: Multiple Integrals–Definitionof double integrals–Evaluationof double integrals – Double integrals in polar coordinates – Changeof order of integration.
(Chapter 5: Sections - 1, 2.1, 2.2, 3.1, 3.2)</td></tr>
<tr><td colspan="6">UNITIII: Triple integrals –Applications of multipleintegrals – Areasofcurvedsurfaces–Changeofvariables–Jacobian.
(Chapter 5: Sections - 4, 5.1 to 5.4, 7; Chapter 6: Sections - 1, 2)</td></tr>
<tr><td colspan="6">UNITIV: Beta and Gamma functions – infinite integral –Definitions– Recurrence formula of Gamma functions – Properties of Beta and Gamma functions- Relation between Beta and Gamma functions - Applications. (Chapter 7: Sections - 2.1 to 2.3 and 3 to 6)</td></tr>
<tr><td colspan="6">UNIT-V:Geometrical ApplicationsofIntegralcalculus: Area – Volume – Length of a curve – Area of surface of revolution.
(Chapter 2:Sections -1.1 to 1.4, 3, 4, 5)</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved (TobediscussedduringtheTutorial hour)
Skills acquired fromthiscourse	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	S.Narayanan and T.K.ManicavachagomPillay,CalculusVolII, S.Viswanathan (Printers and Publishers) Pvt. Ltd., 2012.
Reference Books	1. H. Anton,I.Birens andS. Davis, Calculus, John Wiley and Sons, Inc., 2002. 2. G.B.ThomasandR.L. Finney,Calculus,PearsonEducation,2007. 3. D.Chatterjee,IntegralCalculusandDifferentialEquations,Tata-McGraw Hill Publishing Company Ltd. 4. P.Dyke, AnIntroductionto LaplaceTransforms and Fourier Series, SpringerUndergraduateMathematicsSeries,2nd Edition, 2001.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearningOutcome(forMappingwithPOsandPSOs)

Studentswillbeableto

CLO1: Determinetheintegralsofalgebraic,trigonometricandlogarithmicfunctionsandtofind 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

CLO4: Explainbetaandgammafunctionsand to usethem insolvingproblemsof integration

CLO5: ExplainGeometricapplications ofintegralcalculus.

	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

TitleoftheCourse		**PROGRAMMINGINC++WITHPRACTICAL**						
PaperNumber		**ELECTIVEEC2**						
Category	Elective	**Year**	I	**Credits**	5	**Course Code**		
		Semester	II					
Instructional Hoursperweek		**Lecture**		**Tutorial**		**LabPractice**	**Total**	
		4		--		2	6	
Pre-requisite		12th StandardMathematics						
Objectives of the Course		Tostudythebasicconceptsandstructureof Cprogramandtotrainthe students to write simple C programs.						
CourseOutline		**UNITI:** Introduction,Tokens,Keywords,Identifiersandconstants, Basicdatatypes,Userdefineddatatypes,storageclasses,Derived data types,Symbolic constants.						
		UNITII: Introduction,The main function, function prototyping, Call by reference, Return by references, Inline functions, Default arguments, constant Arguments, Recursion, Function overloading, Friend and virtual functions, Math library functions, C structures Revisited, Specifying a class, Definingmember functions, A C++ program with class, Makingan outside functions inline, Nesting member functions, Private member functions, Arrays within a class, Memory allocation for objects, Static memberfunctions,Arrayofobjects,objectsasfunctionarguments,Friend functions, Returning objects.						
		UNITIII: Introduction, Constructors, Parameterized constructors, Multiple constructors in a class, Constructors with default arguments, Dynamic initialization of objects, Copy constructor, Constructing Two-dimensional arrays, constant objects, Destructors.						
		UNITIV: Introduction,Definingoperator overloading, Overloading unary operator, Overloading Binary operator, Overloading Binary operators using Friends, Manipulation of strings using operators, Some other operator overloading examples, Rules for Overloading Operators						
		UNITV: Introduction, Defining Derived classes, Single inheritance, Making a private member inheritable, Multilevel inheritance, Multiple inheritance, Hierarchical inheritance, Hybrid inheritance.						

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved (TobediscussedduringtheTutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency,ProfessionalCommunicationandTransferrableSkill
Recommended Text	1.E.Balagurusamy,ObjectOrientedProgrammingwithC++,Tata Mc Graw Hill Education Private Limited, New Delhi(Fifth Print 2012).
ReferenceBooks	1.Reema Thareja,Object Oriented Programming with C++, Oxford University Press(January 2018)
Websiteand e-LearningSource	https://nptel.ac.in

ListofPractical:

1. Programto printthefollowingoutputusingfor loops

1
22
333
4444
55555
……

2. ProgramtocalculatethevarianceandstandarddeviationofNnumbers.

   Variance = $\frac{1}{N}\sum_1^N (x_i - \bar{x})^2$

   Standard Deviation = $\sqrt{\frac{1}{N}\sum_1^N (x_i - \bar{x})^2}$ where $\bar{x} = \frac{1}{N}\sum_1^N x_i$

3. Writeaprogramtoread amatrix ofsizemx nfromthekeyboardanddisplaythesameonthe screen using functions.
4. Write a function power power () to raise a number m to a power n. The function takes a double value for m and int value for n and returns the result Correctly: Use a default value of 2 for n to makethefunctiontoCalculateSquareswhenthisargumentisOmitted.Writeamainthatgets the values of m and n from the user totest the function.

5. Writeaclasstorepresentavector(aseriesoffloatvalues)Includememberfunction"toperformthe following tasks:

a)To createthevectorb)tomodifythevalueofagivenelement

c) Tomultiplybya Scalarvalue d) Todisplaythevectorintheform(10,20,30,...)

Write a progam to test your class.

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

7. Definea classStringthatCouldworkasauser-definedStringtype.Include ConstructersthatwillenableustocreateanuninitializedStringS1;//Stringwithlength0andalso to initialize an object with a String Constant at the time of constant at the time of creation like string S2 ("Welldone!");Include a function thataddstwostringsto makeathirdstring,Writeacompleteprogramto test yourclasstoseethat itdoes the following tasks:

a) Createuninitializedstringobjects
b) Createobjectwithstringconstants
c) Concatenestwostrings properly
d) DisplaysdesiredStringobject

8. CreateaclassFLOATHatcontainsonefloatdatamember.Overloadallthefourarithmetic operators So that they operate on the objects of FLOAT.
9. Definea classstring. Writeaprogramto comparetwostringsbyusingoverload==operator.

CourseLearningOutcome(forMappingwithPLOsandPSOs)

Studentswillbeableto

CLO 1: Identify the tokens, keywords, constants, variables and basicdatatypes

CLO2: Know functions and how to use them in programme

CLO 3: Know different constructors

CLO 4: Define the overloading operator of unary and binary

CLO5: Know various types of inheritance.

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

<table>
<tr><td colspan="2">TitleoftheCourse</td><td colspan="7">MATHEMATICSFORCOMPETETIVEEXAMINATIONII</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="7">SEC2</td></tr>
<tr><td>Category</td><td>Skill Enhance-mentCourse</td><td>Year</td><td>I</td><td>Credits</td><td>2</td><td>Course Code</td><td></td></tr>
<tr><td colspan="2"></td><td>Semester</td><td>II</td><td colspan="4"></td></tr>
<tr><td colspan="2">Instructional Hoursperweek</td><td colspan="2">Lecture</td><td colspan="2">Tutorial</td><td>LabPractice</td><td>Total</td></tr>
<tr><td colspan="2"></td><td colspan="2">2</td><td colspan="2">--</td><td>--</td><td>2</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="7">12th StandardMathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="7">Tolearnthetechniquesforsolvingaptitudeproblems.Alsotomotivate the students for attending various competitive examinations.
.</td></tr>
<tr><td colspan="2" rowspan="5">CourseOutline</td><td colspan="7">UNIT I:ChainRule.</td></tr>
<tr><td colspan="7">UNITII:Timeand work.</td></tr>
<tr><td colspan="7">UNIT V:Pipesand Cistern.</td></tr>
<tr><td colspan="7">UNIT III:TimeandDistance.</td></tr>
<tr><td colspan="7">UNIT V:SimpleinterestandCompound interest.</td></tr>
<tr><td colspan="2">Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)</td><td colspan="7">Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved
(TobediscussedduringtheTutorial hour)</td></tr>
<tr><td colspan="2">Skills acquired from this course</td><td colspan="7">Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill</td></tr>
<tr><td colspan="2">Recommended Text</td><td colspan="7">R.S.Agarwal-ObjectiveArithmetic,PublishedbyS.Chand&Co, Ltd.,Edition(2018).</td></tr>
<tr><td colspan="2">ReferenceBooks</td><td colspan="7">1. Rajesh Verma- Fasttrack Objective arithmetic, ArihantPublications(India)Limited.,Fourth Edition 1st January 2018.
2. R.S.Aggarwal,ArithmeticSubjectiveandobjective, Published by S.Chand andCo. Ltd. Revised Edition.1st April 2017.</td></tr>
<tr><td colspan="2">Websiteand e-LearningSource</td><td colspan="7">https://nptel.ac.in</td></tr>
</table>

CourseLearning Outcome(forMapping withPOs and PSOs)
Studentswill beable to

CLO1: Explain chain rule

CLO 2: Explain Timeand work

CLO 3: Explain Pipesand Cistern

CLO4: Find TimeandDistance

CLO5: Find SimpleinterestandCompound interest.

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

<table>
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<tr><td colspan="2">PaperNumber</td><td colspan="6">SEC III</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Skill Enhance-mentCourse</td><td>Year</td><td>I</td><td>Credits</td><td>2</td><td>Course Code</td><td></td></tr>
<tr><td>Semester</td><td>II</td><td colspan="4"></td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hoursperweek</td><td colspan="2">Lecture</td><td colspan="2">Tutorial</td><td colspan="2">LabPractice</td><td>Total</td></tr>
<tr><td colspan="2">2</td><td colspan="2">--</td><td colspan="2">--</td><td>2</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">12th StandardMathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">Tointroducecodinganddecodingconcepts.Alsotodevelopthe students in the field of coding theory</td></tr>
<tr><td colspan="2" rowspan="5">CourseOutline</td><td colspan="6">UNITI: LaTeX – Sample Files, Editing Cycle, Three productivity tools, Typing text, Typing Math, Anatomy of an article, Sectioning, Invoking proclamations, Inserting references, LaTeX error messages.
(Chapter 1: Sections - 1.2 to 1.4; Chapter 2: Sections - 2.1 to 2.4; Chapter 3: Sections - 3.1 to 3.4; Chapter 4: Sections - 4.1, 4.2.2 to 4.2.4, 4.3.1)</td></tr>
<tr><td colspan="6">UNITII: Typing Text: The keyboard, Word Sentences and paragraphs, Symbols not on the keyboard (Quotation marks, Dashes, Special Characters – only), Comments and footnotes.
(Chapter 5: Sections - 5.1, 5.2, 5.4.1, 5.4.2, 5.4.4, 5.5)</td></tr>
<tr><td colspan="6">UNITIII: Typing Text: Changing Font Characteristics, Lines paragraphs and pages.
(Chapter 5: Sections - 5.6, 5.7)</td></tr>
<tr><td colspan="6">UNITIV: Text Environments: Some general rules for displayed text environments, Lists environments, Style and size environments, Proclamations (theorem-like structures), Proof environments, Tabular environments.
(Chapter 6: Sections - 6.1 to 6.6)</td></tr>
<tr><td colspan="6">UNITV:Typing Math: Math environments, Spacing Rules, Equations, Basic Constructs, Delimiters, Operators.
(Chapter 7: Sections - 7.1 to 7.6)</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved (TobediscussedduringtheTutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	GeorgeGratzer,MoreMathintoLaTeX,4th Edition,Springer,2007.
ReferenceBooks	1. HelmutKopkaandPatricW.Daly,AguidetoLaTeX,Fourth edition, Addison-Wesley. 2. DavidR.Wilkins,GettingstartedwithLaTeX,SecondEdition.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO1: Explainto type text and anatomy of an article

CLO 2: Explain the different comments and footnotes

CLO 3: Explain the changing of font characteristic

CLO4: Explain different text environments

CLO5: Know the spacing rules and operators.

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

<table>
<tr><td colspan="2">TitleoftheCourse</td><td colspan="6">VECTORCALCULUSANDFOURIERSERIES</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="6">ALLIEDMATHEMATICSII</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Allied</td><td>Year</td><td>I</td><td rowspan="2">Credits</td><td rowspan="2">3</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>II</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hoursperweek</td><td colspan="2">Lecture</td><td colspan="2">Tutorial</td><td>LabPractice</td><td>Total</td></tr>
<tr><td colspan="2">5</td><td colspan="2">1</td><td>--</td><td>6</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">12th StandardMathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">Toknowtheconceptsofvectordifferentiationandvector integration.</td></tr>
<tr><td colspan="2" rowspan="5">CourseOutline</td><td colspan="6">UNITI:Vectordifferentiation–Gradient–Divergenceand curl.</td></tr>
<tr><td colspan="6">UNITII:Evaluationofdoubleandtripleintegrals</td></tr>
<tr><td colspan="6">UNITIII:Vectorintegration–Line,surfaceandvolumeintegrals.</td></tr>
<tr><td colspan="6">UNITIV:Green’s,Stoke’sandDivergencetheorems(withoutproof)– Simple problems.</td></tr>
<tr><td colspan="6">UNITV:Fourierseries–Evenandoddfunctions–HalfrangeFourier series.</td></tr>
<tr><td colspan="2">Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)</td><td colspan="6">Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved
(TobediscussedduringtheTutorial hour)</td></tr>
<tr><td colspan="2">Skills acquired from this course</td><td colspan="6">Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill</td></tr>
<tr><td colspan="2">Recommended Text</td><td colspan="6">1. S.Arumugamand A. Thangapandi Isaac,AlliedMathematicsPaper-II, New Gamma Publishing House, Palayamkottai, 2012.
2. T.K.ManicavachagomPillay, Calculus(VolII), S.Vishvanathan Printer and Publisher PVT.LTD, 2012.</td></tr>
</table>

ReferenceBooks	1. S.Arumugam and others, Analytical Geometry 3D &Vector Calculus,NewGammaPublishingHouse,Palayamkottai, 2017. 2. J. C. Susan, Vector Calculus(4th Edition),Pearson Education, Boston, 2012. 3. MurraySpiegel, Vectoranalysis, SchaumPublishingcompany, NewYork, 2009.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO 1: Findthederivativeofvectorand to find gradient, divergence and curl of a vector

CLO2: Evaluate double and triple integrals

CLO3: Find line, surface and volume integrals

CLO4: Verifythetheorems of Gauss,Stoke'sand Green's

CLO5: Find Fourier series of even and odd functions and half-range Fourier series.

	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	1	-	3	3	1
CLO4	3	3	3	3	1	1	3	3	1
CLO5	3	3	3	3	2	-	3	3	1

<table>
<tr><td colspan="2">Titleof theCourse</td><td colspan="6">VECTORCALCULUSANDITS APPLICATIONS</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="6">CORE M5</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>II</td><td rowspan="2">Credits</td><td rowspan="2">4</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>III</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours perweek</td><td colspan="2">Lecture</td><td colspan="2">Tutorial</td><td>Lab Practice</td><td>Total</td></tr>
<tr><td colspan="2">4</td><td colspan="2">--</td><td>--</td><td>4</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">12th Standard Mathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">• Knowledgeaboutdifferentiationofvectorsandondifferentialoperators. Knowledge about derivatives of vector functions.
• Skillsinevaluatingline,surfaceandvolumeintegrals.
• Theabilitytoanalyzethephysicalapplicationsofderivativesof vectors.</td></tr>
<tr><td colspan="2" rowspan="5">Course Outline</td><td colspan="6">UNITI: 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.
(Chapter 1:Sections -1.1to1.5)</td></tr>
<tr><td colspan="6">UNITII: 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.
(Chapter 2:Sections -2.1to2.7)</td></tr>
<tr><td colspan="6">UNITIII:Laplacianoperator,Vectoridentities-Lineintegral- simple problems.
(Chapter 2:Section -2.8and Chapter3:Sections - 3.1 to 3.4)</td></tr>
<tr><td colspan="6">UNITIV:Surfaceintegral-Volumeintegral – Applications.
(Chapter 3:Sections - 3.5,3.6)</td></tr>
<tr><td colspan="6">UNITV:GaussDivergenceTheorem,Stoke’sTheorem,Green’s Theorem in two dimensions – Applications to real life situations.
(Chapter 4:Sections - 4.1to4.5)</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination question paper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved (Tobediscussed duringtheTutorial hour)
Skills acquired fromthis course	Knowledge, Problem Solving, Analytical ability, Professional Competency,ProfessionalCommunicationandTransferrable Skill.
Recommended Text	1. P. Duraipandian andLaxmiDuraipandian, Vector Analysis, Emerald Publishers, 2005.
ReferenceBooks	1. J.C.Susan,VectorCalculus,(4thEdition)PearsonEducation, Boston, 2012. 2. A.Gorguis,VectorCalculusforCollegeStudents,XilbiusCorporation, 2014. 3. J.E.MarsdenandA.Tromba,VectorCalculus,(5thEdition),W.H.Freeman,NewYork,1988.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO1: Findthederivativeofvectorandsumofvectors,productofscalarandvector

point function and to Determine derivatives of scalar and vector products

CLO2: Applicationsoftheoperator‘del’andtoExplainsolenoidalandirrotationalvectors

CLO3: Evaluatesimple lineintegrals

CLO4: Evaluatesurfaceintegralsandvolumeintegrals

CLO5: Verifythetheorems of Gauss,Stoke’sand Green’s.

	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

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<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>II</td><td rowspan="2">Credits</td><td rowspan="2">4</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>III</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours perweek</td><td colspan="2">Lecture</td><td colspan="2">Tutorial</td><td>Lab Practice</td><td>Total</td></tr>
<tr><td colspan="2">4</td><td colspan="2">-</td><td>--</td><td>4</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">12th Standard Mathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">• KnowledgeaboutthemethodsofsolvingOrdinaryandPartialDifferential Equations.
• TheunderstandingofhowDifferentialEquationscanbeusedasa powerfultoolinsolvingproblemsin science.</td></tr>
<tr><td colspan="2">Course Outline</td><td colspan="6">UNIT I:OrdinaryDifferentialEquations:Variable separable – Homogeneous Equation–Non-Homogeneous Equations of first degree in two variables – LinearEquation – Bernoulli’s Equation– Exact differential equations. (Chapter 2:Sections - 1to6)</td></tr>
<tr><td colspan="2"></td><td colspan="6">UNIT II: Equation of first order butof higher degree: Equation solvable for dy/dx - Equation solvable for y–Equation solvable for x– Clairaut’sform– LinearEquationswithconstantcoefficients: Definition – The operator D – Complete solution – Particularintegrals of algebraic, exponential, trigonometric functions and their products.
(Chapter 4:Sections -1 to 3andChapter 5: Sections - 1to4)</td></tr>
<tr><td colspan="2"></td><td colspan="6">UNIT III: Linear equations of second order: Complete solution in terms of a known integral – Reduction to normal form – Change of independent variable - Applications of first order equations: Flow of water from an orifice – Falling bodies and other rate problems, Free fall under gravity – The Brachistochrone – Fermat and Bernoulli – Simple electric circuits. (Chapter 8: Sections - 1 to 3 and Chapter 3: Sections - 2 to 6)</td></tr>
<tr><td colspan="2"></td><td colspan="6">UNIT IV:Partialdifferentialequation:FormationofPDEby Eliminatingarbitraryconstantsandarbitraryfunctions–Complete integral – Singularintegral – General integral –Lagrange’s Linear Equations.(Chapter 12: Sections - 1 to 4)</td></tr>
<tr><td colspan="2"></td><td colspan="6">UNIT V:Specialmethods–Standardforms.
(Chapter 12: Sections-5.1 to 5.5)</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinationsUPSC /TNPSC /others tobesolved (Tobediscussed du. ringtheTutorial hour)
Skills acquired fromthis course	Knowledge, Problem Solving, Analytical ability, Professional Competency,ProfessionalCommunicationandTransferrable Skill
Recommended Text	1.S. NarayananandT.K. ManicavachagomPillay, Differential equations and its application,S. Viswananthan Printers Pvt. Ltd., 2012.
ReferenceBooks	1. Shepley L. Ross, Differential Equations, 3rd Edition, John Wiley andSons, 1984. 2. I.Sneddon,ElementsofPartialDifferentialEquations,McGraw- Hill, International Edition, 1967. 3. G.F.Simmons,Differentialequationswithapplicationsandhistorical notes, 2nd Ed, Tata McGraw Hill Publications, 1991. 4. H.T. H.Piaggio, Elementary Treaties on Differential Equations and their applications, C.B.S Publisher & Distributors, Delhi,1985. 5. HorstR.Beyer,Calculus andAnalysis,Wiley,2010. 6. M. Braun, Differential Equations and their Applications. (3rdEdition), Springer- Verlag, New York, 1983. 7. S. Arumugam, A. Thangapandi Isaac and A. Somasundarua, Differential Equations and Applications, Yes Dee Publishing, 2020. 8. V. Sundrapandian,OrdinaryandPartialDifferentialEquations, TataMcGrawHillEducationPvt.Ltd.NewDelhi,2013.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs andPSOs)

Studentswill beable 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 linear equations of second order and know some applications

CLO4: Form a PDE byeliminatingarbitraryconstants and arbitrary functions, findcomplete, singularand generalintegrals,tosolveLagrange'sequations

CLO5: Explainstandardformsof PDE and find solutions.

	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	2	3	3	1
CLO4	3	1	3	2	2	-	3	3	1
CLO5	3	1	3	2	2	1	3	3	1

<table>
<tr><td colspan="2">Titleof theCourse</td><td colspan="6">STATISTICS I</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="6">ELECTIVE COURSE EC3</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">EC (Centric-Discipline)</td><td>Year</td><td>II</td><td rowspan="2">Credits</td><td rowspan="2">4</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>III</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours perweek</td><td>Lecture</td><td>Tutorial</td><td>Lab Practice</td><td colspan="3">Total</td></tr>
<tr><td>4</td><td>--</td><td>--</td><td colspan="3">4</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">12th Standard Mathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">• ToAcquiretheknowledgeofStatistical terms like Dispersion, Moments, Skewness, Correlation, Regression, Attributes and Index Numbers</td></tr>
<tr><td colspan="2" rowspan="5">Course Outline</td><td colspan="6">UNIT I: Dispersion – Measures of Dispersion – Coefficients of Dispersion – Moments – Skewness – Kurtosis.
(Book 1 - Chapter 2: Sections - 2.12 to 2.17)</td></tr>
<tr><td colspan="6">UNIT II: Correlation – Scatter Diagram – Karl Pearson’s coefficient of correlation –Probable error of Correlation Coefficient – Rank Correlation.
(Book 1 - Chapter 10: Sections - 10.2 to 10.4, 10.6, 10.7)</td></tr>
<tr><td colspan="6">UNIT III: Curve Fitting and Regression: Linear Regression – Curve linear Regression – Regression Curve.
(Book 1 - Chapter 11: Sections - 11.2 to 11.4)</td></tr>
<tr><td colspan="6">UNIT IV: Theory ofAttributes: Notations and Terminology – Classes and Class Frequency – Consistency of Data – Independence of Attributes – Association of Attributes.
(Book 1 - Chapter 13: Sections - 13.2 to 13.6)</td></tr>
<tr><td colspan="6">UNIT V: Index Numbers – Consumer Price Index Numbers – Conversion of Chain Base Index Number into Fixed Base Index and conversely.
(Book 2 - Chapter 9: Sections - 9.1 to 9.3)</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinationsUPSC /TNPSC /others tobesolved (Tobediscussed duringtheTutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication, Transferrable Skill and designingmathematicalmodelstowardssolvingmathematical Applications
Recommended Text	1. S. G. Gupta and V. K. Kapoor, Fundamentals of Mathematical Statistics, 12th Edition, Sultan Chand& Sons, New Delhi, 2021. 2. S. Arumugam and A. Thangapandi Isaac, Statistics, New Gamma Publishing House, 2016.
Reference Books	1. P. R. Vittal, Mathematical Statistics, Margham Publications, 2004. 2. D.C. Sachetiand V. K. Kapoor, Statistics, Sultan Chand & Sons, New Delhi, 2017.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO1: Find coefficient of dispersion, moments, skewness and kurtosis

CLO2: Find Karl Pearson's correlation and rank correlation

CLO3: Fit a straight line and parabolic curve by the method of least squares and find the regression lines and regression coefficients

CLO4: Develop the statistical techniques used in the theory of attributes and to analyze consistency of data

CLO5: Find the Index number.

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

<table>
<tr><td colspan="2">TitleoftheCourse</td><td colspan="8">DIFFERENCEEQUATIONS</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="8">ELECTIVECOURSEEC3</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">EC(Discipline-centric)</td><td>Year</td><td>II</td><td rowspan="2">Credits</td><td rowspan="2">4</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>III</td></tr>
<tr><td colspan="2" rowspan="2">InstructionalHours perweek</td><td colspan="2">Lecture</td><td colspan="2">Tutorial</td><td colspan="2">Lab Practice</td><td>Total</td></tr>
<tr><td colspan="2">4</td><td colspan="2">--</td><td colspan="2">--</td><td>4</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="8">12thStandardMathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="8">• Itisthestudyofdifferenceoperatoranditsapplication.
• Solving firstorderdifferenceequations.
• SolvingDifferenceequationsusingmatrixform.</td></tr>
<tr><td colspan="2" rowspan="5">Course Outline</td><td colspan="8">UNITI:The Difference Calculus: The Difference operator –Summation– Generating functions and approximate summation.
(Chapter 2: Sections - 2.1 to 2.3)</td></tr>
<tr><td colspan="8">UNITII:Linear Difference Equations: First order equations – Generalresults for linearequations – Solvinglinear equations.
(Chapter 3: Sections - 3.1 to 3.3)</td></tr>
<tr><td colspan="8">UNITIII:Linear Difference Equations: Applications – Equationswith variable coefficients – Nonlinear equations that can be linearized.
(Chapter 3: Sections - 3.4 to 3.6)</td></tr>
<tr><td colspan="8">UNITIV:Stability Theory: Initial value problems for linear systems – Stabilityof linear systems.
(Chapter 4: Sections - 4.1, 4.2)</td></tr>
<tr><td colspan="8">UNITV:Stability Theory: PhaseplaneAnalysis forLinearSystems, Fundamental Matrices and Floquet Theory.
(Chapter 4: Sections - 4.3, 4.4)</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitiveexaminationsUPSC /TNPSC /others tobesolved (Tobediscussed duringtheTutorial hour)
Skills acquired from thiscourse	Knowledge,ProblemSolving.
RecommendedText	1.W.G.KelleyandA.C.Peterson,DifferenceEquations,2nd Edition,AcademicPress,NewYork,2012.
Reference Books	1. R.P.Agarwal,DifferenceEquationsandInequalities,2nd Edition,MarcelDekker,NewYork,2000. 2. S. N.Elaydi, AnIntroductiontoDifferenceEquations, 3rdEdition, Springer, India, 2008. 3. R.E.Mickens,DifferenceEquations,3rdEdition,CRCPress, 2015.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearningOutcome(forMappingwithPOsandPSOs)

Studentswillableto

CLO1: Know howtousedifferenceoperator

CLO2: Solvefirstorderdifferenceequationandlinear equations

CLO3: Solveequationwithvariablecoefficients

CLO4: Solvetheinitialvalueproblemforlinearsystems

CLO5: Solvethefundamentalmatrices.

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

<table>
<tr><td colspan="2">Titleof theCourse</td><td colspan="7">COMPUTATIONALMATHEMATICS</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="7">SKILLENHANCEMENTCOURSE SEC4</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">SEC</td><td>Year</td><td>II</td><td rowspan="2">Credits</td><td rowspan="2">2</td><td>Course Code</td><td></td></tr>
<tr><td>Semester</td><td>III</td><td colspan="2"></td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours perweek</td><td>Lecture</td><td colspan="2">Tutorial</td><td colspan="2">Lab Practice</td><td>Total</td></tr>
<tr><td>2</td><td colspan="2">--</td><td colspan="2">--</td><td>2</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="7">12th Standard Mathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="7">• UnderstandandapplydifferentNumerical Methods.</td></tr>
<tr><td colspan="2" rowspan="5">Course Outline</td><td colspan="7">UNITI: Algebraic and Transcendental Equations: Errors in Numerical Computation – Iteration method – Regula Falsie method.
(Chapter 3: Sections - 3.1, 3.2, 3.4)</td></tr>
<tr><td colspan="7">UNITII:Algebraic and Transcendental Equations: Bisection method – Newton-Raphson method – Horner’s method.
(Chapter 3: Sections - 3.3, 3.5, 3.6)</td></tr>
<tr><td colspan="7">UNITIII:Simultaneous Equations: Simultaneous equations – Back substitution – Gauss Elimination method – Gauss-Jordan Elimination method – Calculation of inverse of a matrix.
(Chapter 4: Sections - 4.1 to 4.5)</td></tr>
<tr><td colspan="7">UNITIV:Simultaneous equations: Iterative Methods – Gauss Jacobi iteration method – Gauss-Seidel Iteration method – Relaxation method – Newton-Raphson method for simultaneous equations.
(Chapter 4: Sections - 4.7 to 4.10)</td></tr>
<tr><td colspan="7">UNITV: Numerical Solutions of Partial Differential Equations: Classification of partial differential equations of second order – Finite Difference Approximations to Derivatives – Laplace equation – Poisson’s equation.
(Chapter 11: Sections - 11.0 to 11.4)</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved (Tobediscussed duringtheTutorial hour)
Skills acquired fromthis course	Knowledge, Problem Solving, Analytical ability, Professional Competency,ProfessionalCommunicationandTransferrable Skill
Recommended Text	S. Arumugam, A. Thangapandi Isaac and A. Somasundaram, Numerical Methods, Scitech, 2017.
ReferenceBooks	1. S. S. Sastry, Introductory Methods of Numerical Analysis, Fourth Edition, PHI Learning Private Limited, New Delhi-1, 2009. 2. PallabGhosh,NumericalMethodswithComputerProgramsin C++, Prentice Hall India Pvt. Ltd., New Delhi, 2009. 3. T. Veerarajan and T. Ramachandran, Numerical Methods with Programs in C, Second Edition, McGraw Hill Education Pvt. Ltd, New Delhi, 2006.
Websiteand e-LearningSource	https://nptel.ac.in

CourseOutcomes (COs)

Onsuccessfulcompletion ofthecourse, thestudentswill beable to

CLO1: Describetherootsofalgebraicequationsusingdifferentmethodslike iteration method and Regula Falsie method

CLO2: Find the real root of an equation by Bisection method, Newton-Raphson method and Horner's method.

CLO 3: Solvea given system of simultaneous equationby usingsubstitution and elimination methods

CLO 4: Solve a given system of simultaneous equationby usingiteration method

CLO5: Find numerical solutions of Partial Differential.

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

<table>
<tr><td colspan="2">Titleof theCourse</td><td colspan="6">SEQUCNCES AND SERIES</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="6">CORE M7</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>II</td><td rowspan="2">Credits</td><td rowspan="2">4</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>IV</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hoursperweek</td><td>Lecture</td><td>Tutorial</td><td>Lab Practice</td><td colspan="3">Total</td></tr>
<tr><td>4</td><td>--</td><td>--</td><td colspan="3">4</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">12th Standard Mathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">• IdentifyandcharacterizesetsandfunctionsandUnderstand,test and analyze the convergence and divergence of sequences, series.</td></tr>
<tr><td colspan="2" rowspan="5">Course Outline</td><td colspan="6">UNIT I: Sequences - Bounded sequences - Monotonic Sequences – Convergent Sequences –Divergent and Oscillating Sequences – The Algebra of limits.
(Chapter 3:Sections - 3.1to3.7)</td></tr>
<tr><td colspan="6">UNIT II: Behaviour of Monotonic Sequences – Some theorem on limits – Subsequences –Limit points – Cauchy sequences.
(Chapter 3:Sections - 3.8to3.12)</td></tr>
<tr><td colspan="6">UNIT III: Series of positive terms: Infinite series – Comparison test.
(Chapter 2:Sections -4.1, 4.2)</td></tr>
<tr><td colspan="6">UNIT IV: Kummer’s test – Root test – Integral Test.
(Chapter 4:Sections -4.3 to4.5)</td></tr>
<tr><td colspan="6">UNIT V: Series of Arbitrary terms: Alternative series – Absolute convergence – Tests for convergence of series of arbitrary terms.
(Chapter 5:Sections - 5.1to5.3)</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved (Tobediscussed duringtheTutorial hour)
Skills acquired fromthis course	Knowledge, Problem Solving, Analytical ability, Professional Competency,ProfessionalCommunicationandTransferrable Skill
Recommended Text	1. S. Arumugam, A. Thangapandi Isaac and A. Somasundaram, Sequence and Series, Yes Dee Publications, 2021.
ReferenceBooks	1. RichardR.Goldberg,MethodsofRealAnalysis:Oxfordand IBH Publishing,2020. 2. EthanD.Bloch,TheRealNumbersandRealAnalysis,Springer, 2011. 3. G. M. Fikhtengol'ts,TheFundamentals ofMathematicalAnalysis,Vol I.Pergamon Press, New York, 1965. 4. T.M.Apostol,Calculus(Vol.I),JohnWiley andSons(Asia)P. Ltd., 2002. 5. R. G. Bartle and D. R Sherbert, Introduction to Real Analysis, John Wiley and Sons (Asia) P. Ltd., 2000. 6. E.Fischer,IntermediateRealAnalysis,SpringerVerlag, 1983. 7. K. A. Ross, Elementary Analysis - The Theory of Calculus Series - Undergraduate Texts in Mathematics, Springer Verlag, 2003.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO 1: Explain Sequence and Subsequence of real numbers and to find the limit of sequence to test for convergent, divergent and bounded sequences

CLO 2: Knowthe behaviour of monotonic sequences and the Cauchy sequence

CLO3: Explain series and to verify convergent of series by using comparison test

CLO 4: Understand Kummer's test and Ratio test

CLO 5: Classify the series of real numbers and the alternating series and their convergence and divergence, the conditional convergence and absolute convergence and solve problems on convergence of the sequences.

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

<table>
<tr><td colspan="2">Titleof theCourse</td><td colspan="7">FOURIER SERIES AND INTEGRAL TRANSFORMS</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="7">CORE M8</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>II</td><td rowspan="2">Credits</td><td rowspan="2">4</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>IV</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours perweek</td><td colspan="2">Lecture</td><td colspan="2">Tutorial</td><td>Lab Practice</td><td>Total</td></tr>
<tr><td colspan="2">4</td><td colspan="2">--</td><td>--</td><td>4</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">12th Standard Mathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">• To study the concept of Fourier Series and to solve problems by making use of it
• To acquire knowledge about Laplace Transform and its inverse and understandingofhowDifferentialEquationscanbe solved by Laplace Transformation.</td></tr>
<tr><td colspan="2" rowspan="4">Course Outline</td><td colspan="6">UNIT I:Fourier Series–Definition – Fouriercoefficients and Fourier series for a given periodic function with period 2π and $2l$,odd and even functions – Convergence of Fourier series.
(Book 1 - Chapter 1: Sections - 1.4 to 1.8)</td></tr>
<tr><td colspan="6">UNIT II: Half range Fourier series – Parseval's theorem – Root-Mean square value of a function – Harmonic analysis – Complex form of Fourier series.
(Book 1 - Chapter 1: Sections - 1.9 to 1.12)</td></tr>
<tr><td colspan="6">UNIT III: Fourier Transforms – Fourier Integral theorem – Fourier sine and cosine transforms – Properties of Fourier transform – Convolution theorem – Parsavel's Identity.
(Book 1 -Chapter 2: Sections - 2.2 to 2.6))</td></tr>
<tr><td colspan="6">UNIT IV: Laplace Transforms – Definition – Results – Laplace transform of periodic functions – Some general Theorems – Evaluation of certain integrals.
(Book 2 - Chapter 9:Sections -1 to 5)</td></tr>
<tr><td colspan="2"></td><td colspan="6">UNIT V: The Inverse Transform – Results – Solving ordinary differential equations with constant coefficients, simultaneous linear differential equations and differential equations with variable coefficients by Laplace Transform.
(Book 2 - Chapter 9:Sections -6 to 10)</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinationsUPSC /TNPSC /others tobesolved (Tobediscussed duringtheTutorial hour)
Skills acquired fromthis course	Knowledge, Problem Solving, Analytical ability, Professional Competency,ProfessionalCommunicationandTransferrable Skill
Recommended Text	1. T. Veerarajan, Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2001. 2. S. Narayananand T.K. ManicavachagomPillay, Differential equations and its application,S. Viswananthan Printers Pvt. Ltd., 2012.
ReferenceBooks	1. M.K. Venkataraman and Manorama Sridhar, Vector Calculus and Fourier Series, The National Publishing Company, Chennai-1, 2002. 2. J. Ray Hanna, FourierSeries, TransformsandBoundaryvalueProblems, Dover Publications, NewYork,2008. 3. P. R. Mittal, Differential Equations, Fourier and Laplace Transforms, Probability, Margham Publications, Chennai, 2012. 4. S. Arumugam A. Thangapandi Issac, Trigonometry and Fourier Series.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs andPSOs)

Studentswill beable to

CLO 1: Determine the Fourier coefficients and Fourier series for a given periodic function

CLO 2: Determine the Half range Fourier series and the complex form of Fourier series.

CLO3: Find the Fourier transform of a given function and to know the properties of FT

CLO 4: Find the Laplace transform of periodic functions and evaluation of certain integrals

CLO 5: Find the inverse Laplace transform and to solve differential equations using Laplace transform

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

<table>
<tr><td colspan="2">Title of the Course</td><td colspan="8">STATISTICS II</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="8">ELECTIVE COURSEEC4</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">EC(Centric-Discipline)</td><td>Year</td><td>III</td><td rowspan="2">Credits</td><td rowspan="2">4</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>IV</td></tr>
<tr><td colspan="2" rowspan="2">InstructionalHours perweek</td><td>Lecture</td><td colspan="2">Tutorial</td><td colspan="2">Lab Practice</td><td colspan="2">Total</td></tr>
<tr><td>4</td><td colspan="2">-</td><td colspan="2">--</td><td colspan="2">4</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="8">12th Standard Mathematics</td></tr>
<tr><td colspan="2">Objectivesofthe Course</td><td colspan="8">• TointroducetheconceptsofRandomVariablesand Distribution of Random Variables.
• TogiveagoodgriponconceptsofMathematical Expectation and Variance.
• ToprovideasoundknowledgeaboutsomeStandard Distributions.</td></tr>
<tr><td colspan="2">Course Outline</td><td colspan="8">UNIT I: Randomvariables and Distribution functions:Introduction – Distributionfunctions–Discreterandomvariable(One dimensional) – Probability massfunctionandDistributionfunction– Continuous random variable (one dimensional) – Probability density function – Various measure of central tendency – Continuous distribution function – Problems.
(Chapter 5: Sections - 5.1 to 5.4)</td></tr>
<tr><td colspan="2"></td><td colspan="8">UNIT II: MathematicalExpectation: Introduction– MathematicalExpectation– Expectedvalueoffunctionof Random variable – Properties – Variance – Properties – Covariance – Problems.
(Chapter 6: Sections - 6.1 to 6.6)</td></tr>
<tr><td colspan="2"></td><td colspan="8">UNITIII: GeneratingfunctionsandLawoflargenumbers:Moment Generating functions – Cumulants – Characteristic function – Properties – Problems.
(Chapter 7: Sections - 7.1 to 7.4)</td></tr>
<tr><td colspan="2"></td><td colspan="8">UNIT IV: SpecialDiscreteProbability Distributions: Binomial Distribution – Poisson Distribution – Properties and Problems.
(Chapter 8: Sections - 8.4, 8.5)</td></tr>
<tr><td colspan="2"></td><td colspan="8">UNITV: SomeContinuousProbability Distributions:Normaldistribution – Uniformdistribution– Properties andProblems.
(Chapter 9: Sections - 9.3, 9.8)</td></tr>
</table>

ExtendedProfessional Component(isapart ofinternalcomponentonly, Not to be includedinthe ExternalExamination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved
Skillsacquiredfrom this course	Knowledge,problemsolving,analyticalability,andprofessional competency.
RecommendedText	1. S. C. GuptaS.C.andV. K. KapoorV.K, FundamentalsofMathematicalStatistics, 12th Edition, Sultan Chand &Sons, New Delhi, 2021.
ReferenceBooks	1. S. C. GuptaandV. K. Kapoor,ElementsofMathematicalStatistics, 3rd Edition, Sultan Chand &Sons, New Delhi, 2001. 2. P. R. Vittal,MathematicalStatistics, MarghamPublications, Chennai, 2020. 3. S. Arumugam and A. Thangapandi Isaac, Statistics, New Gamma Publication, 2016.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO1: DefineRandom variables,Probabilitymassfunction,Probabilitydensityfunction,and Distribution functions

CLO2: ComputeExpectation,VarianceandCovariance

CLO 3: Know about Moment Generating functions and Characteristic functions**CLO 4:** Solve problems involving the concepts of theoretical discrete distributions

CLO5: Solveproblemsinvolvingtheconceptsoftheoreticalcontinuous distributions.

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO1	3	2	3	2	3	1	3	3	2
CLO2	3	2	3	2	3	1	3	3	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

<table>
<tr><td colspan="2">Titleof theCourse</td><td colspan="7">NUMERICAL METHODS</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="7">ELECTIVE COURSE EC4</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">EC(Discipline - centric)</td><td>Year</td><td>II</td><td rowspan="2">Credits</td><td rowspan="2">4</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>IV</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours perweek</td><td>Lecture</td><td colspan="2">Tutorial</td><td colspan="2">Lab Practice</td><td>Total</td></tr>
<tr><td>4</td><td colspan="2">--</td><td colspan="2">--</td><td>4</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="7">12th Standard Mathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="7">• Understandand apply differentnumericalmethods in differentiation and integration</td></tr>
<tr><td colspan="2" rowspan="5">Course Outline</td><td colspan="7">UNIT I: Finite Differences: Difference Operators – OtherDifference Operators – Errorpropagation in a difference table.
(Chapter 6: Sections - 6.1 to 6.3)</td></tr>
<tr><td colspan="7">UNIT II:Interpolation: Newton’s Interpolation Formulae – Central Difference Interpolation Formulae: Gauss Forward and Backward and Sterling’s (only) –Lagrange’s Interpolation Formula– DividedDifferences – Newton’s Divided Differences formula.
(Chapter 7: Sections - 7.1 to 7.5)
[Except Bessel’s and Laplace Everett’s formulae in 7.2]</td></tr>
<tr><td colspan="7">UNIT III:Numerical Differentiation and Integration: Derivatives using Newton’s forward difference formula –Derivativesusing Newton’s backward difference formula –Derivatives using central difference formula – Maximaand Minima of the Interpolating polynomial – Numerical Integration.
(Chapter 8: Sections - 8.1 to 8.5)</td></tr>
<tr><td colspan="7">UNIT IV:Numerical Solutions of Ordinary Differential Equations: Taylor’s Series Method – Picard’s method – Euler’s method – Runge-Kutta method.
(Chapter 10: 10.1 to 10.4)</td></tr>
<tr><td colspan="7">UNIT V: Numerical Solutions of Ordinary Differential Equations: Predictor Corrector method – Milne’s Method – Adams-Bashforth method.
(Chapter 10: Sections – 10.5 to 10.7)</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved (Tobediscussed duringtheTutorial hour)
Skills acquired fromthis course	Knowledge, Problem Solving, Analytical ability, Professional Competency,ProfessionalCommunicationandTransferrable Skill
Recommended Text	1. S. Arumugam, A. Thangapandi Isaac and A. Somasundaram, Numerical Methods, Scitech, 2017.
ReferenceBooks	1. R.M. Somasundaram and R.M. Chandrasekaran, Numerical MethodswithC++Programming,PrenticeHallIndiaPvt.Ltd., New Delhi, 2005. 2. S. S. Sastry, Introductory Methods of Numerical Analysis, Fourth Edition, PHI Learning Private Limited, New Delhi-1, 2009. 3. PallabGhosh,NumericalMethodswithComputerProgramsin C++, Prentice Hall India Pvt. Ltd., New Delhi, 2009. 4. T. Veerarajan and T. Ramachandran, Numerical Methods with Programs in C, Second Edition, McGraw Hill Education Pvt. Ltd, New Delhi, 2006.
Websiteand e-LearningSource	https://nptel.ac.in

CourseOutcomes (COs)

Onsuccessfulcompletion ofthecourse, thestudentswill beable to

CLO1: Describetherootsofalgebraicequationsusingdifferentmethodslike, Bisection Method, False Method, Newton- Raphson method, Ramanujan's Method etc.

CLO2: Find the real root of an equation and to find a quadratic factor of a polynomial.

CLO 3: Find the missing term a given series.

CLO 4: Solve a given algebraicequationusingdirectand iterativemethods.

CLO5: Find a polynomial for given data.

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

<table>
<tr><td colspan="2">Titleof theCourse</td><td colspan="6">GEOGEBRA</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="6">SKILLENHANCEMENTCOURSE SEC5</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">SEC</td><td>Year</td><td>II</td><td rowspan="2">Credits</td><td rowspan="2">2</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>IV</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours perweek</td><td>Lecture</td><td colspan="2">Tutorial</td><td>Lab Practice</td><td colspan="2">Total</td></tr>
<tr><td>2</td><td colspan="2">--</td><td>--</td><td colspan="2">2</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">Basic Computer Knowledge</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">• ToAcquiretheknowledgeofdrawing figures using GeoGebra package</td></tr>
<tr><td colspan="2" rowspan="5">Course Outline</td><td colspan="6">UNIT I: Installation and Introduction of GeoGebra - Drawing versus Geometric Construction.
(Chapters: 1 and 2)</td></tr>
<tr><td colspan="6">UNIT II: Practice Block I – Basic Algebraic Input, Commands and Functions.
(Chapters: 3 and 4)</td></tr>
<tr><td colspan="6">UNIT III: Export of Pictures to the Clipboard – Practice Block II – Inserting Pictures into the Graphics View.
(Chapters:5, 6 and 7)</td></tr>
<tr><td colspan="6">UNIT IV:Inserting Text into the Graphics View – Practice Block III.
(Chapters: 8 and 9)</td></tr>
<tr><td colspan="6">UNIT V: Combining Spreadsheet View & Graphics View - Creating Static Instructional Materials – Creating Dynamic Worksheets.
(Chapters: 10, 11 and 12)</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved (Tobediscussed duringtheTutorial hour)
Skills acquired fromthis course	Knowledge, Problem Solving, Analytical ability, Professional Competency,ProfessionalCommunicationandTransferrable Skill
Recommended Text	1.Judith and Markus Hohenwarter, Introduction to GeoGebra, 2011.
Reference Books	1. Steve Phelps, An Introduction to GeoGebra, 2011.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO1: Install the GeoGebra App and draw geometrical figures

CLO2: Know the commands and functions used in GeoGebra

CLO3: Export of Pictures to the Clipboard and Insert Pictures into the Graphics View

CLO4: Insert Text into the Graphics View

CLO5: Combine Spreadsheet View & Graphics View.

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

<table>
<tr><td colspan="2">Titleof theCourse</td><td colspan="6">ABSTRACTALGEBRA</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="6">CORE M9</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>III</td><td rowspan="2">Credits</td><td rowspan="2">4</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>V</td></tr>
<tr><td colspan="2" rowspan="2">InstructionalHours perweek</td><td>Lecture</td><td>Tutorial</td><td>Lab Practice</td><td colspan="2">Total</td></tr>
<tr><td>5</td><td>--</td><td>--</td><td colspan="2">5</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">12th Standard Mathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">• ConceptsofSets,Groups and Rings.
• Construction,characteristicsandapplicationsoftheabstract algebraic structures</td></tr>
<tr><td colspan="2" rowspan="5">Course Outline</td><td colspan="6">UNIT I:Groups: Definition and Examples – Properties – Permutation Groups – Subgroups – Cyclic Groups.
(Chapter 3: Sections-3.1, 3.2, 3.4 to 3.6)</td></tr>
<tr><td colspan="6">UNITII:Order of an element – Cosetsand Lagrange’s Theorem – Normalsubgroups and Quotient groups.
(Chapter3:Sections-3.7to3.9)</td></tr>
<tr><td colspan="6">UNITIII:Isomorphism -Cayley’sTheorem–Homomorphisms - Fundamental Theorem.
(Chapter3:Sections-3.10 and 3.11)</td></tr>
<tr><td colspan="6">UNITIV: Rings:Definition and examples –Properties – Types of rings – Characteristic of a ring – Subrings – Ideals. Some specialclassesof rings-homomorphismofrings-Idealsandquotientrings-Moreidealsandquotientrings.
(Chapter4:Section-4.1, 4.2, 4.4to 4.7)</td></tr>
<tr><td colspan="6">UNITV:Quotient Rings – Maximal and Prime Ideals – Homomorphism and Isomorphism of Ring - ThefieldofquotientsofanIntegralDomain.
(Chapter4: Section-4.3, 4.8 to 4.11)</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitiveexaminations UPSC / TNPSC / others to be solved (Tobediscussed duringtheTutorial hour)
Skills acquired fromthis course	Knowledge, Problem Solving, Analytical ability, Professional Competency,ProfessionalCommunicationandTransferrable Skill
Recommended Text	S. Arumugam and A. Thangapandi Isaac, Modern Algebra, Scitech Publications, 2014.
ReferenceBooks	1. I. N. Herstein,TopicsinAlgebra, WileyEasternLtd.SecondEdition, 2006. 2. JohnB.Fraleigh,AFirstCourseinAbstractAlgebra,7thEd., Pearson, 2002. 3. M.Artin,AbstractAlgebra, 2ndEd.,Pearson, 2011. 4. Joseph A Gallian, Contemporary Abstract Algebra, 4th Edition, Narosa, 1999.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO1: Explaingroups,subgroups andcyclic groups

CLO2: Explain about cosets, normalsubgroup and quotientgroups and to apply Lagrange's theorem for a given finite group has a subgroup

CLO3: ApplyCayley'stheoremtoproblems and to know and verify the functions for homomorphism and automorphism properties

CLO4: Explainrings,properties, different types of rings, idealsandexaminetheir structure

CLO 5: Know the quotient ring and to discuss about the field of quotient of an integral domain.

	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

<table>
<tr><td>Title of the Course</td><td colspan="6">REAL ANALYSIS</td></tr>
<tr><td>Paper Number</td><td colspan="6">CORE M10</td></tr>
<tr><td rowspan="2">Category Core</td><td>Year</td><td>III</td><td rowspan="2">Credits</td><td rowspan="2">4</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>V</td></tr>
<tr><td rowspan="2">InstructionalHours perweek</td><td colspan="2">Lecture</td><td>Tutorial</td><td>Lab Practice</td><td colspan="2">Total</td></tr>
<tr><td colspan="2">5</td><td>--</td><td>--</td><td colspan="2">5</td></tr>
<tr><td>Pre-requisite</td><td colspan="6">12th Standard Mathematics</td></tr>
<tr><td>Objectives of the Course</td><td colspan="6">• RealNumbers andproperties ofReal–valuedfunctions.
• Connectedness,Compactness,CompletenessofMetricspaces.
• Convergenceofsequencesoffunctions,Examplesandcounter examples</td></tr>
<tr><td rowspan="5">Course Outline</td><td colspan="6">UNIT 1: Metricspaces: Definition and Examples – Boundedsets – Openball– Opensets – Subspaces– Interiorofaset.
(Chapter 2:Section - 2.1to 2.6)</td></tr>
<tr><td colspan="6">UNIT2:Closedsets– Closure– Limitpoint– Denseset– Completemetricspace: Completeness –Cantor'sintersectiontheorem– Baire'sCategorytheorem.
(Chapter 2:Sections - 2.7to 2.10 and Chapter 3: Sections – 3.1 and 3.2)</td></tr>
<tr><td colspan="6">UNIT3: Continuity: Continuity –Homeomorphism–UniformContinuity – Discontinuous functions on R.
(Chapter 4: Sections- 4.1 to 4.4)</td></tr>
<tr><td colspan="6">UNIT4: Connectedness: Definition and Examples –ConnectedsubsetsofR– Connectedness and continuity–Contractionmappingtheorem.
(Chapter 5: Sections-5.1 to 5.3 and Chapter 8: Section - 8.1)</td></tr>
<tr><td colspan="6">UNIT5: Compactness: CompactmetricspacesCompactsubsetsofR– Equivalentcharacterizations forcompactness–Compactnessand Continuity.
(Chapter 6:Sections- 6.1 to 6.4)</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitiveexaminations UPSC / TNPSC / others to be solved (Tobediscussed duringtheTutorial hour)
Skills acquired fromthis course	Knowledge, Problem Solving, Analytical ability, Professional Competency,ProfessionalCommunicationandTransferrable Skill
Recommended Text	S. Arumugam and A. Thangapandi Issac, Modern Analysis, New Gamma Publishing House, Palayamkottai, 2015
ReferenceBooks	1. RichardR.Goldberg, MethodsofRealAnalysis, (JohnWiley&sons,2nd Edition) (Indian edition –Oxford and IBH Publishing Co, New Delhi, 1st January 2020) 2. WalterRudin, Principles ofMathematical Analysis, Tata McGraw Hill Education, Third Edition (1 July 2017). 3. TomMApostal,MathematicalAnalysis, NarosaPublishingHouse, 2nd edition(1974),Addison-Wesleypublishingcompany,NewDelhi.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO 1: Explain the concepts of bounded, open and close sets and to find interior and closure of a given set

CLO2: Explaintheconceptsof limit point and dense set and define complete metric space

CLO3: Define and verify continuous, uniform continuous and discontinuous function on *R*

CLO 4: Explain the concept of connected and theorems on connected and continuity

CLO 5: Explain the concept of compact, compact subset of *R*and equivalent characterization of compactness.

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

<table>
<tr><td colspan="2">TitleoftheCourse</td><td colspan="6">MATHEMATICAL MODELLING</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="6">CORE M11</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>III</td><td rowspan="2">Credits</td><td rowspan="2">4</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>V</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours perweek</td><td colspan="2">Lecture</td><td colspan="2">Tutorial</td><td>Lab Practice</td><td>Total</td></tr>
<tr><td colspan="2">5</td><td colspan="2">--</td><td>--</td><td>5</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">12th Standard Mathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">• ConstructionandAnalysisofMathematicalmodelsfoundinreal life problems.
• Modellingthroughdifferentialanddifference equations</td></tr>
<tr><td colspan="2" rowspan="5">Course Outline</td><td colspan="6">UNITI: Mathematical Modelling: Simple situations requiring mathematical modelling, characteristics of mathematical models.
(Chapter1:Sections -1.1 and 1.4)</td></tr>
<tr><td colspan="6">UNITII: Mathematical Modelling through differential equations: Linear Growth and Decay Models. Non-Linear growth and decay models, Compartment models.
(Chapter2:Sections -2.1to2.4)</td></tr>
<tr><td colspan="6">UNITIII: Mathematical Modelling, through system of Ordinary differential equations of first order: Prey-predator models, Competition models,Modelwithremovalandmodelwithimmigrations.Epidemics: simple epidemic model, Susceptible-infected- susceptible (SIS) model, SIS model with constant number of carriers. Medicine: Model for Diabetes Mellitus.
(Chapter3:Sections -3.1.1,3.1.2, 3.2.1to 3.2.4,3.2.6, 3.5.1)</td></tr>
<tr><td colspan="6">UNITIV:Introduction todifferenceequations.
(Chapter5:Sections -5.1, 5.2.1 to 5.2.3)</td></tr>
<tr><td colspan="6">UNITV:MathematicalModellingthroughdifferenceequations: Harrod Model, cob web model application to Actuarial Science
(Chapter5:Sections - 5.3.1,5.3.2, 5.3.4)</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved (Tobediscussed duringtheTutorial hour)
Skills acquired fromthis course	Knowledge, Problem Solving, Analytical ability, Professional Competency,ProfessionalCommunicationandTransferrable Skill
Recommended Text	1. JNKapur,MathematicalModeling,NewAgeInternational Publishers, 2009.
ReferenceBooks	1. Bimal K.MishraandDipak K. Satpathi, MathematicalModeling, Ane Books India, 2007. 2. Sandip Banerjee, Mathematical Modeling Models, Analysis and Applications, CRC Press, Taylor & Francis group, 2014. 3. MathematicalModelingapplicationswithGeogebrabyJonas Hall & Thomas Ligefjard, John Wiley & Sons, 2017 4. Mark M. Meerschaert: Mathematical Modeling, Elsevier Publ., 2007. 5. Edward A. Bender: An introduction to mathematical Modeling, CRC Press,2002 6. WalterJ.Meyer,ConceptsofMathematicalModeling,Dover Publ., 2000
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO1: ExplainsimplesituationsrequiringMathematicalModellingandtoDeterminethe characteristics of such models

CLO2: Modelusingdifferentialequationsin-termsoflineargrowthand Decaymodels

CLO3: Model using systemsof ordinary differentialequationsof firstorder, todiscussabout various models under the categoriesEpidemics' and Medicine'

CLO4: Explainin detailaboutdifferenceequations

CLO5: Model usingdifferenceequations

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

<table>
<tr><td colspan="2">Titleof theCourse</td><td colspan="7">NUMBER THEORY</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="7">CORE M12</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">CORE</td><td>Year</td><td>III</td><td rowspan="2">Credits</td><td rowspan="2">4</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>V</td></tr>
<tr><td colspan="2" rowspan="2">InstructionalHours per week</td><td colspan="2">Lecture</td><td colspan="2">Tutorial</td><td colspan="2">Lab Practice</td><td>Total</td></tr>
<tr><td colspan="2">5</td><td colspan="2">-</td><td colspan="2">--</td><td>5</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="7">12th Standard Mathematics</td></tr>
<tr><td colspan="2">Objectivesof the Course</td><td colspan="7">• To highlight the beauties in the world of numbers and to prepare the students for coding through congruence.</td></tr>
<tr><td colspan="2" rowspan="4">Course Outline</td><td colspan="7">UNIT I:Preliminaries: Mathematicalinduction–TheBinomialTheorem–EarlyNumber Theory.
(Chapter 1:Sections - 1.1, 1.2 and Chapter 2: Section – 2.1)</td></tr>
<tr><td colspan="7">UNIT II: DivisionAlgorithm–GCD–EuclideanAlgorithm–TheDiophantineEquation$ax + by = c$.
(Chapter 2:Sections -2.3 to2.5)</td></tr>
<tr><td colspan="7">UNIT III: ThefundamentalTheoremofArithmetic – TheSieve ofEratosthenes– TheGoldbachconjecture.
(Chapter 3:Sections - 3.1 to 3.3)</td></tr>
<tr><td colspan="7">UNIT IV: Basic propertiesofcongruences– Binary and Decimal representation of integers – Linearcongruenceand TheChineseRemainderTheorem.
(Chapter 4:Sections – 4.2 to 4.4)</td></tr>
<tr><td colspan="2"></td><td colspan="7">Unit V: Fermat’sTheorem–Wilson’sTheorem–TheFermat-KraitchikFactorizationMethod.
(Chapter 5:Sections - 5.1 to 5.4)</td></tr>
<tr><td colspan="2">Extended Professional Component (is a part of internal component only, Not to be included in the External Examinationquestion paper)</td><td colspan="7">Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved</td></tr>
</table>

Skills acquiredfrom this course	Knowledge,problemsolving,analyticalability,andprofessional competency.
RecommendedText	1. David M. Burton, Elementary Number Theory, McGraw Hill Education (India) Pvt. Ltd., New Delhi, 2014.
ReferenceBooks	1. NevilleRobinns,BeginningNumberTheory,2nd Ed.,Narosa PublishingHousePvt.Limited,Delhi, 2006. 2. RichardE.Klima,NeilSigmon,ErnestStitzinger,Applicationsof AbstractAlgebrawith Maple, CRCPress,BocaRaton, 2000. 3. S. Kumaravelu and Susheela Kumaravelu, Elements of Number Theory, Raja Sankar Offset Printers, 2002.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO1: Explain mathematical induction and to make use of binomial theorem

CLO2: Illustrate Division Algorithm and to determine the GCD of given two numbers and solution of Diophantine equation $ax + by = c$

CLO3: Interpret the fundamental theorem of arithmetic and to explain The Sieve of Eratosthenes and to use Goldbach Conjecture

CLO4: Summarize the basic properties of congruences and to apply Chinese Remainder Theorem

CLO5: Elaborate Fermat's Theorem, Wilson's Theorem and to apply Kraitchik Factorization Method.

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

Titleof theCourse	PROJECT WITH VIVA-VOCE

PaperNumber		PROJECT					
Category	CORE	Year	III	Credits	4	Course Code	
		Semester	V				
InstructionalHours per week		Lecture	Tutorial		Lab Practice	Total	
		5	-		--	5	
Objectivesofthe Course		• Motivate the students to get thorough idea on a specific topic and an idea for doing research.					

***Project viva-voce examination:**

- Internal: 50 marks and External: 50 marks (Total: 100 marks)
- Group (maximum five students) project report should be submitted
- External 50 marks will be evaluated by external examiners.

<table>
<tr><td colspan="2">Titleof theCourse</td><td colspan="6">LINEAR ALGEBRA</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="6">CORE M13</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>III</td><td rowspan="2">Credits</td><td rowspan="2">4</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>VI</td></tr>
<tr><td colspan="2">Instructional Hours perweek</td><td colspan="2">Lecture
5</td><td colspan="2">Tutorial
1</td><td>Lab Practice
--</td><td>Total
6</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">12th Standard Mathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">• VectorSpaces, lineardependenceandindependenceofvectors.Dual spaces, Inner product andnorm–orthogonalization process.
• Lineartransformations. Variousoperatorson vectorspaces.</td></tr>
<tr><td colspan="2" rowspan="5">Course Outline</td><td colspan="6">UNITI: Vector Spaces:Definitionandexamples– Subspaces– Linear Transformations–Fundamentaltheoremofhomomorphism.
(Chapter 5: Sections - 5.1 to 5.3)</td></tr>
<tr><td colspan="6">UNITII:Spanofaset– Linear Dependenceand Independence– Basisand Dimension.
(Chapter 5: Sections - 5.4 to 5.6)</td></tr>
<tr><td colspan="6">UNITIII:Rank and Nullity of a transformation – Matrix of a linear transformation – Inner product space: Definitionandexamples– Orthogonality – Orthogonalcomplement.
(Chapter 5: Sections - 5.7, 5.8 and Chapter 6: Sections - 6.1 to 6.3)</td></tr>
<tr><td colspan="6">UNITIV:Matrices – Elementary transformation – Rank of a matrix – Simultaneous linear equations – Characteristic equation and Cayley-Hamilton Theorem.
(Chapter 7: Sections - 7.4 to 7.7)</td></tr>
<tr><td colspan="6">UNITV:Eigen values and Eigen vectors – Properties and problems – Bilinear forms – Quadratic forms – Reductionofquadraticformtodiagonalform.
(Chapter 7: Sections - 7.8 and Chapter 8: Sections - 8.1, 8.2)</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved (Tobediscussed duringtheTutorial hour)
Skills acquired fromthis course	Knowledge, Problem Solving, Analytical ability, Professional Competency,ProfessionalCommunicationandTransferrable Skill
Recommended Text	S. Arumugam and A. Thangapandi Isaac, Modern Algebra, Scitech, 2014.
ReferenceBooks	1. I.N.Herstein, Topicsin Algebra,WileyEasternLtd.SecondEdition, 2006. 2. N.S.Gopalakrishnan,UniversityAlgebra,NewAgeInternational Publications, Wiley Eastern Ltd. 3. JohnB.Fraleigh,FirstcourseinAlgebra,AddisonWesley. 4. Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence, Linear Algebra,5thEdition,PrenticeHallof IndiaPvt. Ltd., 2018. 5. DavidC.Lay,LinearAlgebraanditsApplications,3rdEd., Pearson Education Asia, Indian Reprint, 2007. 6. S.Lang,IntroductiontoLinearAlgebra,2ndEd.,Springer, 2005. 7. GilbertStrang,LinearAlgebraanditsApplications,Thomson,2007.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO1: Acquireadetailedknowledge aboutvectorspacesand subspaces

CLO2: ExplaintheconceptsofLinearDependence,LinearIndependence,Basesand Dimension of basis

CLO3: ExplaintheconceptofLinearTransformations and theirMatrixrepresentation,

Inner product and norms and to apply Gram Schmidt Orthogonalization

CLO 4: Know the concept ofElementarytransformations which is applied to find Rank of a matrix and solve Simultaneous linear equations

CLO5: Find the Eigen values and Eigen vectors and to know the quadratic forms.

	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

<table>
<tr><td colspan="2">Titleof theCourse</td><td colspan="6">COMPLEXANALYSIS</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="6">CORE M14</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>III</td><td rowspan="2">Credits</td><td rowspan="2">4</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>VI</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours perweek</td><td colspan="2">Lecture</td><td colspan="2">Tutorial</td><td>Lab Practice</td><td>Total</td></tr>
<tr><td colspan="2">5</td><td colspan="2">1</td><td>--</td><td>6</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">12th Standard Mathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">• Applyconcept andconsequencesofanalyticityandC-Requations.
• Understandthe conceptofmappings andtransformations.
• Computecomplexcontourintegralsandapplying Cauchy'sintegral in various versions.
• Understandzerosandsingularitiesofananalyticfunction,apply theirpropertiesin the evaluation ofdefinite integral.</td></tr>
<tr><td colspan="2" rowspan="4">Course Outline</td><td colspan="6">UNITI:FunctionsofaComplex variable –Limits –Theorem on limits – Continuity – Derivatives – Differentiation formulas – Cauchy Riemann equation – conditions for differentiability – Polar coordinates– Analytic functions– Harmonic functions.
(Chapter2:Sections - 2.1 to 2.8)</td></tr>
<tr><td colspan="6">UNITII:Conformal Mapping – Elementary Transformation – Bilinear Transformation – Cross Ratio – Fixed Points.
(Chapter2:Section - 2.9 and Chapter 3:Sections –3.1 to 3.4)</td></tr>
<tr><td colspan="6">UNITIII: Complex Integration: Definite Integral – Cauchy's Theorem– Cauchy integral formula – Higher Derivatives.
(Chapter 6: Sections - 6.1 to 6.4)</td></tr>
<tr><td colspan="6">UNITIV: Sequence and Series – Power Series – Taylor's series – Laurent series– Zeros of an Analytic function – Singularities.
(Chapter 4:Sections - 4.1, 4.3 and Chapter 7: Sections - 7.1 to 7.4)</td></tr>
<tr><td colspan="2"></td><td colspan="6">UNITV: Residues– Cauchy Residue theorem –Residue at infinity– Evaluation of Definite Integrals.
(Chapter 8:Sections -8.1 to 8.3)</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved (Tobediscussed duringtheTutorial hour)
Skills acquired fromthis course	Knowledge, Problem Solving, Analytical ability, Professional Competency,ProfessionalCommunicationandTransferrable Skill
Recommended Text	1. S. Arumugam, A. Thangapandi Isaac and A. Somasundaram, ComplexAnalysis, Scitech, 2014.
ReferenceBooks	1. JamesWardBrownandRuelV.Churchill, ComplexVariablesandApplication,SeventhEdition,Mc-GrawHillBookCo., InternationalEdition,2009. 2. TheodoreW.Gamelan,Complex Analysis,SpringerVerlag,2008 3. Joseph Bak and Donald J. Newman, Complex analysis, 2nd Ed., Undergraduate Texts in Mathematics, Springer-Verlag New York, Inc., New York, 1997. 4. Richard A. Silverman, Introductory Complex Analysis, Dover Publications, 1972. 5. S.PonnusamyandH.Silverman,ComplexVariableswith Applications,Birkhauser, 2006.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

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

CLO 2: Explain the concept of Conformal mappings and mappings by linear transformations and to find fixed points of transformations

CLO 3: Explain about theintegrations offunctions oversimplyand multiplyconnecteddomains and to derive the Cauchy integral formula, Liouville's theorem, Fundamental theorem of Algebra and Maximum Module Principle

CLO 4: Find the convergence of sequences and series and derive Taylor's and Laurent's series

CLO5: Findthezeros of analytic function, theresidueofa givenfunctionatagivensingular point and to evaluate definite integrals.

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

Titleof theCourse		**MECHANICS**					
PaperNumber		**COREM15**					
Category	Core	**Year**	III	**Credits**	4	**Course Code**	
		Semester	VI				

Instructional Hoursperweek	**Lecture**	**Tutorial**	**Lab Practice**	**Total**
	5	1	--	6

Pre-requisite	12th Standard Mathematics
Objectives of the Course	• Equilibriumofaparticleundertheactionofgiven forces • SimpleHarmonicMotion • Projectiles
Course Outline	**UNITI:**Force:Newton'slawsofmotion –Resultantoftwoforceson a particle - Equilibrium of a Particle: Equilibrium of a particle – Limiting equilibrium of a particle on an inclined plane. (Chapter2:Section-2.1,2.1 andChapter3:Section-3.1,3.2)
	UNITII: Forces on a Rigid Body: Moment of a Force – General motion of a body – Equivalent systems of forces- Parallel Forces – Forces acting along a Triangle - A specific reduction of Forces: Reduction of coplanar forces into a force and couple – Problems involving frictional forces. (Chapter4:Section-4.1to 4.5 andChapter5:Sections-5.1,5.2)
	UNITIII: Work, Energy and Power: Work – Conservative field of force – Power – Rectilinear Motion under Varying Force: Simple Harmonic Motion - along a horizontal line – along a vertical line. (Chapter11:Sections -11.1 to 11.3; Chapter12:Sections -12.1 to 12.3)
	UNITIV: Projectiles:Forcesonaprojectile–Projectileprojected onaninclinedplane. (Chapter13:Sections -13.1, 13.2)
	UNITV: CentralOrbits**:**Generalorbits–Centralorbit–Conicasa centeredorbit. (Chapter16:Sections -16.1to16.3)

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved (Tobediscussed duringtheTutorial hour)
Skills acquired fromthis course	Knowledge,ProblemSolving,Analyticalability,Professional Competency,ProfessionalCommunicationandTransferrable Skill
Recommended Text	1. P. Duraipandian, LaxmiDuraipandianandMuthamizhJayapragasm, Mechanics, S.Chand& Company Ltd, 2007.
ReferenceBooks	1. A.RuinaandR.Pratap,IntroductiontoStaticsandDynamics, Oxford University Press, 2014. 2. S.L. Loney, The Elements of Statics and Dynamics, Cambridge UniversityPress,1904. 3. J.L. Meriam, L. G. Kraige and J.N. Bolton, Engineering Mechanics, Dynamics,8th edn,WileyandsonsPvtltd.,NewYork, 2015. 4. A.K.Dhiman,P.DhinamandD.Kulshreshtha,Engineering Mechanics(StaticsandDynamics),McGrawHillEducation(India) Private Limited, New Delhi, 2015.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs and PSOs)

Students will ableto

CLO1: DefineResultant,ComponentofaForce,Coplanarforces,likeandunlikeparallel forces, Equilibrium of a Particle, Limiting equilibrium of a particle on an inclined plane

CLO2: DefineMomentofaforceandCouplewithexamples. DefineParallelForcesand Forces acting along a Triangle, Solve problems on frictional forces

CLO3: Define work, energy, power, rectilinearmotions under varying forces.Define Simple Harmonic Motion and find its Geometrical representation.

CLO4: DefineProjectile,impulse,impactandlawsofimpact.Provethatthepathofaprojectile is a parabola. Find the direct and oblique impact of smooth elastic spheres

CLO5: Definecentralorbits,explainconicascenteredorbitsandsolveproblemsrelatedto central orbits.

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

GROUP A (Select two Elective Courses for 5th Semester)

<table>
<tr><td colspan="2">Titleof theCourse</td><td colspan="7">OPERATIONS RESEARCH I</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="7">ELECTIVE COURSE EC</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">EC(Centric / Discipline)</td><td>Year</td><td>III</td><td>Credits</td><td>3</td><td>Course Code</td><td></td></tr>
<tr><td>Semester</td><td>V</td><td colspan="3"></td></tr>
<tr><td colspan="2" rowspan="2">InstructionalHours Per week</td><td>Lecture</td><td colspan="2">Tutorial</td><td colspan="2">Lab Practice</td><td>Total</td></tr>
<tr><td>4</td><td colspan="2">-</td><td colspan="2">-</td><td>4</td></tr>
<tr><td colspan="2">Pre- requisite</td><td colspan="7">12thStandard Mathematics</td></tr>
<tr><td colspan="2">Objectiveofthe Course</td><td colspan="7">• ToprovideknowledgeonFormulatingreallifeproblemsinto LPP
• To teachthe techniques for convertingtheindustrial problemsasmathematicalproblemsandsolvingthem.</td></tr>
<tr><td colspan="2" rowspan="3">Course Outline</td><td colspan="7">UNIT1: Linear Programming: Linear Programming Problem: Formulating a problem as linear programming model – Examples of LP model formulation – General LPP – Canonical and Standard forms of LPP – Terminology for the solution of LPP - Graphical solution.
(Chapter 2: Sections - 2.1, 2.5 to 2.9 and Chapter 3: Section - 3.1)</td></tr>
<tr><td colspan="7">UNIT II: Solving LPP: The computational procedure – Simplex Algorithm – Two-Phase method and Big-M method –Theory of simplex method: Revised simplex method)
(Chapter 3: Sections - 3.3 to 3.5and Chapter 4: Section - 4.7)</td></tr>
<tr><td colspan="7">UNITIII: Duality in LP: General Primal-Dual pair – Formulating a Dual problem – Properties of Dual problem – Duality and Simplex method – Dual Simplex method.
(Chapter 5: Sections - 5.2 to 5.5, 5.8)</td></tr>
<tr><td colspan="2"></td><td colspan="7">UNITIV: TransportationProblem (TP): General structure of a TP – Existence of solution in TP – Duality in TP – Degeneracy in TP – Solution of a TP – Method for finding IBFS – North-West Corner method, Least-Cost method, Vogel’s Approximation Method – Optimality test – Stepping stone method – MODI.
(Chapter 7: Sections - 7.1 to 7.10)</td></tr>
</table>

	UNITV: Assignment Problem(AP): Formulation of an AP – Assumptions in AP – Methods of solving an AP (Hungarian method) – Special case in AP (Unbalanced AP & Maximization case in AP) – Dual of the AP. (Chapter 8: Sections - 8.1 to 8.4 and 8.6)
Extended Professional Component(isa partofinternal componentonly, Nottobei ncluded intheExternal Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved (Tobediscussed duringtheTutorial hour)
Skills acquired fromthis course	Knowledge,ProblemSolving,Analyticalability, Professional Competency,ProfessionalCommunicationandTransferrable Skill.
Recommended Text	1. Kanti Swarup, P. K. Gupta and Man Mohan, Operations Research, [20th Revised Edition],SultanChand&Sons,New Delhi, 2022.
ReferenceBooks	1. P. K. Gupta,and D. S. Hira,OperationsResearch, Sultan Chand & Sons, New Delhi, 2020. 2. P. K. Gupta and Man Mohan. Problems in Operations Research [NinthEdition], SultanChandandSons,New Delhi, 2014. 3. S. Kalavathy, OperationsResearch [FourthEdition], Vikas Publishing House, Chennai, 2012.

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO1: Definelinearprogrammingproblemandtosolvetheproblemsusinggraphical method

CLO2: Solve LPP by Simplex, Two-Phase and Big-M methods

CLO3: Interpret the concept of duality, classify primal and dual problems and solve LPP using dual simplex method

CLO4: Determine the solution for Transportation problems

CLO5: Determine the solution for Assignment problems

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

<table>
<tr><td>Titleof theCourse</td><td colspan="7">DISCRETEMATHEMATICS</td></tr>
<tr><td>PaperNumber</td><td colspan="7">ELECTIVE COURSEEC</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">EC(Discipline- centric)</td><td>Year</td><td>III</td><td rowspan="2">Credits</td><td rowspan="2">3</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>V</td></tr>
<tr><td rowspan="2">InstructionalHours per week</td><td colspan="2">Lecture</td><td>Tutorial</td><td colspan="2">Lab Practice</td><td colspan="2">Total</td></tr>
<tr><td colspan="2">4</td><td>--</td><td colspan="2">--</td><td colspan="2">4</td></tr>
<tr><td>Pre-requisite</td><td colspan="7">12th Standard Mathematics</td></tr>
<tr><td>Objectivesofthe Course</td><td colspan="7">• Mathematical Logic
• TruthTable
• RelationsandOrdering</td></tr>
<tr><td rowspan="4">Course Outline</td><td colspan="7">UNITI:Mathematicallogic: Statements andNotations – Connectives– Negation –Conjunction –Disjunction –Statement formulas and truth table – Conditionaland Biconditional–Well- formedformulas– Tautologies.
(Chapter1: Sections- 1.1,1.2.1to1.2.4,1.2.6to1.2.8)</td></tr>
<tr><td colspan="7">UNITII: Normalforms–DisjunctiveNormalforms– ConjunctiveNormal forms – PrincipalDisjunctive Normal forms – Principalconjunctive Normal forms – Orderingand Uniqueness of Normal forms – Validityusing truth tables – Rulesof inference.
(Chapter1: Sections- 1.3.1to1.3.5,1.4.1,1.4.2)</td></tr>
<tr><td colspan="7">UNITIII:ThePredicatecalculus–Predicates –TheStatement function,Variablesandquantifiers –Predicateformulas–Freeand bound variables – TheUniverse of discourse –Inferencetheory of the predicate calculus – Validformulas and Equivalence – Somevalid formulas over finite Universes – Specialvalid formulas involving quantifiers – Theoryof inference for the Predicate calculus.
(Chapter1: Sections -1.5.1to1.5.5 and 1.6.1 to 1.6.4)</td></tr>
<tr><td colspan="7">UNITIV:RelationsandOrdering–Relations –Propertiesof Binary relations in a set– Partialordering– Partiallyorderedset: Representation and Associated terminology - Functions: DefinitionandIntroduction–Compositionoffunctions– Inversefunctions.
(Chapter2: Sections -2.3.1,2.3.2,2.3.8,2.3.9,2.4.1to2.4.3)</td></tr>
</table>

	UNITV: Latticesaspartiallyorderedsets:Definitionandexamples–SomepropertiesofLattices–Sublattices, Direct product and Homomorphism – Booleanalgebra: Definition and examples – SubAlgebra, Direct product and Homomorphism. (Chapter4: Sections -4.1.1,4.1.2,4.1.4,4.2.1,4.2.2)
Skillsacquiredfrom thiscourse	Knowledge,ProblemSolving.
RecommendedText	1. J.P.Tremblay,R.Manohar,DiscreteMathematicalstructureswithApplicationstoComputerScience,TataMcGrawhill,2001.
Reference Books	1. M.K. Sen and B.C. Charraborthy, Introduction to Discrete Mathematics, Arunabha Sen Books & Allied Pvt. Ltd, Kolkatta. 2. KennethH.Rosen,DiscreteMathematicsandIts Applications, FourthEdition.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearningOutcome(forMappingwithPOs andPSOs)

Studentswillableto

CLO1: Findmathematical logicstatement and notations

CLO 2: Findthedecisionproblemoffindingwhetheragivenstatementistautology or contradiction or satisfiable in a finite number of steps.

CLO3: Findthepredicatelogic and findthetheoryofinferenceforthePredicatecalculus

CLO4: DefineRelations, Ordering and typesoffunctions

CLO5: DefineLattice and study the propertiesofLattice.

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

<table>
<tr><td>Titleof theCourse</td><td colspan="7">COMBINATORIAL MATHEMATICS</td></tr>
<tr><td>PaperNumber</td><td colspan="7">ELECTIVE COURSEEC</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">EC(Discipline - centric)</td><td>Year</td><td>III</td><td rowspan="2">Credits</td><td rowspan="2">3</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>V</td></tr>
<tr><td rowspan="2">InstructionalHours per week</td><td colspan="2">Lecture</td><td colspan="2">Tutorial</td><td colspan="2">Lab Practice</td><td>Total</td></tr>
<tr><td colspan="2">4</td><td colspan="2">-</td><td colspan="2">--</td><td>4</td></tr>
<tr><td>Pre-requisite</td><td colspan="7">12th Standard Mathematics</td></tr>
<tr><td>Objectivesofthe Course</td><td colspan="7">• To know permutation and combination
• To know recurrence relations and to solve them
• To understand the principle of inclusion and exclusion
• Togainknowledgeabout block design and square block design</td></tr>
<tr><td rowspan="4">Course Outline</td><td colspan="7">UNIT I: Selections and Binomial coefficients–Permutations–Ordered selections–unordered selections–Miscellaneous Problems.
(Chapter1:Sections - 1.1to 1.4)</td></tr>
<tr><td colspan="7">UNIT II: Parings Problems: Pairings within a set–Pairing between sets.
(Chapter2:Sections -2.1 and 2.2)</td></tr>
<tr><td colspan="7">UNIT III: Recurrence–Fibonacci-type relations using generating functions–Miscellaneous methods.
(Chapter 3:Sections - 3.1 to 3.4)</td></tr>
<tr><td colspan="7">UNIT IV: The Inclusion-Exclusion Principles – Rook Polynomial.
(Chapter 4:Sections- 4.1to4 .3)</td></tr>
<tr><td></td><td colspan="7">UNIT V: Block designs– Square block designs.
(Chapter 5:Sections- 5.1, 5.2)</td></tr>
<tr><td>Extended Professional Component (is a part of internal component only, Not to be included in the External Examinationquestion paper)</td><td colspan="7">Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved</td></tr>
<tr><td>Skillsacquiredfrom this course</td><td colspan="7">Knowledge,problemsolving,analyticalability,andprofessional competency.</td></tr>
<tr><td>RecommendedText</td><td colspan="7">Ian C. Andersen, A First Course in Combinatorial Mathematics, Clarendon Press, Oxford, 1989.</td></tr>
</table>

ReferenceBooks	1. Ralph P. Grimaldi, Discrete and Combinatorial Mathematics-An Applied Introduction, V Edition, Pearson, 2004.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO1: Explain selections and to find binomial coefficients and classify ordered selections and unordered selections

CLO2: Solve pairing problems

CLO3: Explain recurrence and classify the types of relations using generating functions

CLO4: Illustrate the inclusion and exclusion principles

CLO5: Construct and solve block designs and square block designs

	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	3	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

<table>
<tr><td colspan="2">Titleof the Course</td><td colspan="8">FUZZY SETS AND APPLICATIONS</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="8">ELECTIVE COURSEEC</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">EC(Centric-Discipline)</td><td>Year</td><td>III</td><td>Credits</td><td>3</td><td>Course Code</td><td></td></tr>
<tr><td>Semester</td><td>V</td></tr>
<tr><td colspan="2" rowspan="2">InstructionalHours per week</td><td colspan="2">Lecture</td><td colspan="2">Tutorial</td><td colspan="2">Lab Practice</td><td>Total</td></tr>
<tr><td colspan="2">4</td><td colspan="2">--</td><td colspan="2">--</td><td>4</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="8">12th Standard Mathematics</td></tr>
<tr><td colspan="2">Objectives ofthe Course</td><td colspan="8">• To introduce Fuzzy concepts to students and to facilitate the students to study Fuzzy operations, Fuzzy numbers and Fuzzy Decision Making</td></tr>
<tr><td colspan="2" rowspan="4">Course Outline</td><td colspan="8">UNIT I: From Crisp sets to Fuzzy sets: Crisp Sets – Fuzzy Sets – Basic Types – Basic Concepts – Characteristics and Significance of Paradigm Shift.
(Chapter1: Sections - 1.1 to 1.5)</td></tr>
<tr><td colspan="8">UNIT II: Fuzzy sets verses Crisp sets: Additional properties of α-cuts – Representations of Fuzzy sets – Extension principle of Fuzzy sets.
(Chapter 2: Sections - 2.1 to 2.3)</td></tr>
<tr><td colspan="8">UNIT III: Operations on Fuzzy sets: Types of Operations – Fuzzy Complements – Fuzzy intersections: t-Norms –Fuzzy Unions: t-Conorms – Combinations of operations.
(Chapter 3: Sections - 3.1 to 3.5)</td></tr>
<tr><td colspan="8">UNIT IV: Fuzzy Arithmetic: Fuzzy Numbers – Linguistic Variables – Arithmetic Operations on Intervals – Arithmetic Operations on Fuzzy Numbers - Lattice of Fuzzy numbers - Fuzzy Equations.
(Chapter4: Sections - 4.1 to 4.6)</td></tr>
<tr><td colspan="2"></td><td colspan="8">UNIT V: Fuzzy Decision Making: – Individual Decision Making – Multi- Person Decision Making – Multicriteria Decision Making – Fuzzy Linear Programming.
(Chapter 15: Sections - 15.1 to 15.4 and 15.7)</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Not to be included in the External Examinationquestion paper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved
Skillsacquiredfromthiscourse	Knowledge,ProblemSolving.
RecommendedText	1. George J. Klir and Bo Yuan, Fuzzy sets and Fuzzy Logic Theory Applications, Prentice Hall of India, New Delhi, 2002.
Reference Books	1. GeorgeJ.KlirandTinaA.Folger, Fuzzy sets, Uncertainty and Information, Prentice Hall ofIndia, New Delhi, 2003. 2. S. Nanda and N. R. Das, Fuzzy Mathematical Concepts, Narosa Publishing House, 2012.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearningOutcome(forMappingwithPOs andPSOs)

Studentswillableto

CLO1: Explain Crisp sets and fuzzy sets and illustrate the characteristics and significance of Paradigm Shift

CLO 2: Elaborate the Additional properties of α-cuts and the extension principle for fuzzy sets

CLO3: Perform Fuzzy set operations and to determine Fuzzy complements, Fuzzy intersections and Fuzzy unions

CLO4: Determine Fuzzy numbers and Linguistic variables and to apply arithmetic operations on intervals and on Fuzzy numbers

CLO5: Analyze and classify Fuzzy decision making, Individual decision making, Multi-Person decision making problems.

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

GROUP B (Select two Elective Courses for 6th Semester)

<table>
<tr><td colspan="2">Titleof theCourse</td><td colspan="6">OPERATIONS RESEARCH II</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="6">ELECTIVE COURSE EC</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">EC</td><td>Year</td><td>III</td><td>Credits</td><td>3</td><td>Course Code</td><td></td></tr>
<tr><td>Semester</td><td>VI</td><td colspan="4"></td></tr>
<tr><td colspan="2" rowspan="2">InstructionalHours Per week</td><td>Lecture</td><td colspan="2">Tutorial</td><td colspan="2">Lab Practice</td><td>Total</td></tr>
<tr><td>5</td><td colspan="2">-</td><td colspan="2">-</td><td>5</td></tr>
<tr><td colspan="2">Pre- requisite</td><td colspan="6">12thStandard Mathematics</td></tr>
<tr><td colspan="2">Objectiveofthe Course</td><td colspan="6">• To teachthe techniques for convertingthereal life and industrial problemsasmathematicalproblemsandsolvingthem</td></tr>
<tr><td colspan="2" rowspan="4">Queuing models -</td><td colspan="6">UNIT I: Operations Scheduling: ProblemofSequencing –Basicin Sequencing – Gantt Chart –Single Processor Scheduling-SPT, DD and Moore procedure – Flow Shop Scheduling – Two-machine, Three-Machine and k-Machine – Processing of Two jobs through m machines. (Chapter 10: Sections - 10.1 to 10.8)</td></tr>
<tr><td colspan="6">UNIT II: Scheduling Techniques: Basic components of Network – Logical Sequencing – Rules of Network construction – NetworkScheduling– CPM – PERT.
(Chapter 13: Sections - 13.1 to 13.10)</td></tr>
<tr><td colspan="6">UNIT III: Decision Theory:Two-Person Zero-sum Game – Solution of Two-person Zero-sum Game – TheMaximin-Minimax Principle –Saddle point – A Games with Pure strategy, mixed strategy – 2×2 Games – GraphicalSolution for $2 \times n$ and $m \times 2$Games–DominanceProperty.
(Chapter 19: Sections - 19.10, 19.11)</td></tr>
<tr><td colspan="6">UNITIV: Queueing Theory: Queuing system – Deterministic, Characteristic and Probability Distributions in Queuing system – Classification Queuing models – Probabilistic Queuing models – Poisson-Exponential Models–$(M/M/1) : (N/FCFS)$ and $(M/M/1) : \infty/FCFS)$.
(Chapter 20: Sections -20.1 to 20.9)</td></tr>
</table>

	UNIT V: Inventory Management: Typesof Inventory–Inventory Decisions– Costs associated with Inventories – EOQ Models – EOQ and Quantity discount – EOQ and price breaks. (Chapter 22: Sections - 22.1, 22.3, 22.5, 22.8 to 22.11)
Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved (Tobediscussed duringtheTutorial hour)
Skills acquired fromthis course	Knowledge,ProblemSolving,Analyticalability, Professional Competency,ProfessionalCommunicationandTransferrable Skill.
Recommended Text	1. Kanti Swarup, P. K. Gupta and Man Mohan, Operations Research, [20th Revised Edition],SultanChand&Sons,New Delhi, 2022.
ReferenceBooks	1. P. K. Gupta,and D. S. Hira,OperationsResearch, Sultan Chand & Sons, New Delhi, 2020. 2. P. K. Gupta and Man Mohan. Problems in Operations Research [NinthEdition], SultanChandandSons,New Delhi, 2014. 3. S. Kalavathy, OperationsResearch [FourthEdition], Vikas Publishing House, Chennai, 2012.

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO1: Understand the problemof sequencing and to solve job machine problems

CLO2: Compose network scheduling using PERT/CPM and to explain the rules of network construction

CLO3: Interpret the games and strategies and to solve two persons zero-sum game by making use of mixed strategies and dominance property

CLO4: Explain the queueing models and classify the models $(M/M/1):(N/FCFS)$ and $(M/M/1):\infty/FCFS)$

CLO5: Analyse and solve inventory control problems.

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

Titleof theCourse	GRAPHTHEORY

PaperNumber		ELECTIVE COURSE EC						
Category	EC(Discipline-centric)	Year	III	Credits	3	Course Code		
		Semester	VI					
InstructionalHours per week		Lecture		Tutorial		Lab Practice		Total
		5		-		--		5
Pre-requisite		12th Standard Mathematics						
Objectives of the Course		• Tointroducetheconcepts of Graphs. • Toprovide asound knowledgeon Trees andSpanning Trees • TogainknowledgeaboutMatricesofGraphsandDigraphs.						
Course Outline		**UNIT I:** Introduction – Application of Graphs – Finite and Infinite graphs – Incidence and degree – Isolated vertex, Pendent vertex and Null graph – Isomorphism –Subgraphs – Walks, Pathsand Circuits – Connected Graphs – Disconnected Graphs and Components. (Chapter 1:Sections - 1.1to 1.5 and Chapter 2: Sections 2.1, 2.2, 2.4, 2.5)						
		UNITII: Eulergraphs –Operations onGraphs – More onEulergraphs – Hamiltonian Paths and Circuits – Trees – Some propertiesonTrees – Pendent verticesinaTree – Distance and Centersin a Tree – Spanning Trees. (Chapter 2:Sections - 2.6 to2.9 and Chapter 3:Sections -3.1 to3.4, 3.7)						
		UNIT III: Incidence Matrix – Circuit Matrix – Fundamental Circuit Matrix and Rank of B – Path Matrix – Adjacency Matrix. (Chapter 7:Sections - 7.1, 7.3, 7.4, 7.8, 7.9)						
		UNIT IV: Planar Graphs – Kuratowski's Two Graphs – Euler's formula – -ChromaticNumber – Chromatic Partitioning – Chromatic Polynomial. (Chapter 5:Sections - 5.2 to 5.4 and Chapter 8: Sections - 8.1to8.3)						
		UNIT V: Matchings – Coverings – Four Colour Problem – Definition – Some typesofDigraphs – Directed PathsandConnectedness – Euler Digraphs. (Chapter 8:Sections - 8.4 to 8.6; Chapter 9: Sections - 9.1, 9.2, 9.4, 9.5)						

Extended Professional Component (is a part of internal component only, Not to be included in the External Examinationquestion paper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved
Skills acquired from this course	Knowledge,problemsolving,analyticalability,andprofessional competency.
RecommendedText	NarsinghDeo, GraphTheorywithApplicationsto Engineering & Computer Science, Prentice Hall of India, New Delhi, 1974.
ReferenceBooks	1. FrankHarary, GraphTheory,NarosaPublishingHousePvt Ltd, New Delhi, 2001. 2. S. Arumugam and S. Ramachandran,InvitationtoGraphTheory, Scitech Publications, Chennai, 2001. 3. S. P. RajagopalanandR. Sattanathan, GraphTheory,Margham Publications, Chennai. 4. Neeraj Pant and Shahab Faruqi, Graph Theory, CBS Publisher, 2017.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO1: UnderstandtheconceptsofGraph,Subgraph,Walks, Paths, Cycles, Connected and Disconnected

CLO2: DiscussaboutEuleriangraphs,HamiltonianPathsandTrees

CLO3: GiveMatrixRepresentationsof Graphs

CLO4: Knowabout Planar Graphs, Chromaticnumber and Chromatic Polynomial of a Graph

CLO5: Know Matching and to describeaboutdigraph and Eulerdigraphs.

	POs						PSOs		
	3	2	3	2	2	1	3	3	2
CLO1	3	2	3	2	2	1	3	3	2
CLO2	3	2	3	2	2	1	3	3	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

<table>
<tr><td colspan="2">Titleof theCourse</td><td colspan="7">FINANCIAL MATHEMATICS</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="7">ELECTIVE COURSEEC</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">EC(Discipline - centric)</td><td>Year</td><td>III</td><td>Credits</td><td>3</td><td>Course Code</td><td></td></tr>
<tr><td>Semester</td><td>VI</td><td colspan="4"></td></tr>
<tr><td colspan="2" rowspan="2">InstructionalHours per week</td><td colspan="2">Lecture</td><td colspan="2">Tutorial</td><td>Lab Practice</td><td>Total</td></tr>
<tr><td colspan="2">5</td><td colspan="2">-</td><td>--</td><td>5</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">12th Standard Mathematics</td></tr>
<tr><td colspan="2">Objectivesof theCourse</td><td colspan="6">• Basic knowledge on stock, bond and mutual funds
• To know the importance of life insurance.</td></tr>
<tr><td colspan="2" rowspan="5"></td><td colspan="6">UNIT I: Mathematics of Investment: Stocks – Bonds – Mutual funds.
(Chapter 5: Sections - 1 to 3)</td></tr>
<tr><td colspan="6">UNIT II: Mathematics of Investment: Options –Cost of Capital and Ratio.
(Chapter 5: Sections - 4 and 5)</td></tr>
<tr><td colspan="6">Unit III: Mathematics of Return and Risk: Measuring Return and Risk – The Capital Asset Pricing Model.
(Chapter 6: Sections -1 and 2)</td></tr>
<tr><td colspan="6">Unit IV: Mathematics of Insurance:Life Annuities – LifeInsurance.
(Chapter 7:Sections - 1, 2.1 to 2.8)</td></tr>
<tr><td colspan="6">Unit V: Mathematics of Insurance:Life Insurance – Propertyand Casualty Insurance.
(Chapter 7: Sections - 2.9 to 2.14, 3)</td></tr>
<tr><td colspan="2">Extended Professional Component (is a part of internal component only, Not to be included in the External Examinationquestion paper)</td><td colspan="6">Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved</td></tr>
<tr><td colspan="2">Skills acquired from this course</td><td colspan="6">Knowledge,problemsolving,analyticalability,andprofessional competency.</td></tr>
<tr><td colspan="2">RecommendedText</td><td colspan="6">M. J. Alhabeeb, Mathematical Finance, A John Wiley & Sons, Inc., Publication, 2012.</td></tr>
</table>

ReferenceBooks	1. S. P. Gupta and S. K. Jain, Financial Mathematics, Sahitya Bhawan Publications, 2022. 2. Bimal Jaiswal and Leena S. Shimpi, Financial Mathematics, New Royal Book Company, 2020. 3. Marek Capinski and Tomasz Zastawniak, Mathematics for Finance: An Introduction to Financial Engineering, Springer, 2010.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO1: Know stocks, bonds and mutual funds

CLO2: Know the options, capital and ratio

CLO3: Measure return and risk of the investment

CLO4: Know the life annuities and life insurance

CLO5: Explain the propertyand casualty insurance.

.

	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	3	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

<table>
<tr><td colspan="2">Titleof theCourse</td><td colspan="8">ASTRONOMY</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="8">ELECTIVE COURSEEC</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">EC(Discipline - centric)</td><td>Year</td><td>III</td><td rowspan="2">Credits</td><td rowspan="2">3</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>VI</td></tr>
<tr><td colspan="2" rowspan="2">InstructionalHours per week</td><td colspan="2">Lecture</td><td colspan="2">Tutorial</td><td colspan="2">Lab Practice</td><td>Total</td></tr>
<tr><td colspan="2">5</td><td colspan="2">-</td><td colspan="2">--</td><td>5</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="8">12th Standard Mathematics</td></tr>
<tr><td colspan="2">Objectivesof theCourse</td><td colspan="8">• To introduce the exciting world of Astronomy to students and to understand the movements of the celestial sphere.</td></tr>
<tr><td colspan="2" rowspan="5"></td><td colspan="8">UNIT I: Spherical Trigonometry: Spherical triangle –The fundamental formula of Spherical trigonometry, the sine, cosine, four parts and Napier formula (without proof) and simple problems.
(Chapter 1: Pages - 1 to 40)</td></tr>
<tr><td colspan="8">UNIT II: The Celestial Sphere: Celestial co-ordinates – Diurnal motion –Rising and setting of a star sidereal time – circumpolar stars – Morning and Evening stars.
(Chapter 2: Pages - 41 to 97)</td></tr>
<tr><td colspan="8">Unit III: Earth – Length of a day – Refraction – Tangent formula – Cassini’s formula – Effects of refraction.
(Chapter 3: Pages - 98 to 143 and 154 to 174)</td></tr>
<tr><td colspan="8">Unit IV: Geocentric parallax – Effects – Heliocentric parallax – Effects.
(Chapter 5: Pages - 175 to 190 and Chapter 8: Pages - 263 to 293)</td></tr>
<tr><td colspan="8">Unit V: Kepler’s laws – Verification of Kepler’s laws – True anomaly, Mean anomaly, Eccentric anomaly – Relation between them.
(Chapter 6: Pages - 191 to 219 and Chapter 7: Pages - 220 to 237)</td></tr>
<tr><td colspan="2">Extended Professional Component (is a part of internal component only, Not to be included in the External Examinationquestion paper)</td><td colspan="8">Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved</td></tr>
<tr><td colspan="2">Skillsacquiredfrom this course</td><td colspan="8">Knowledge,problemsolving,analyticalability,andprofessional competency.</td></tr>
</table>

RecommendedText	S. Kumaravelu andSusheelaKumaravelu, Astronomy for degree classes, RainbowPrinters,Nagercoil, 2005.
ReferenceBooks	1. G. V. Ramachandran, Astronomy, Mission Press, Palayamkottai, 1965. 2. Andrew Fraknoi, David Morrison and Sidney C. Wolff, Introduction to Astronomy, OpenStax, 2012.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO1: Explain Spherical Trigonometry and to elaborate the fundamental of spherical trigonometry, the sine, the cosine, four parts and Napier's formula

CLO2: Imagine the celestial sphere, illustrate about the rising and setting of a star and to Identify and classify circumpolar stars and morning, evening stars.

CLO3: Imagine Earth and to explain refraction and to Deduce Tangent formula and Cassini's formula

CLO4: Illustrate Geocentric parallax and Heliocentric parallax

CLO5: Elaborate Kepler's laws and to classify true anomaly, mean anomaly and eccentric anomaly and to obtain the relationship between them.

	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	3	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

Substitute courses for Naan Mudhalvan

Semester II: Naan Mudhalvan 1

<table>
<tr><td colspan="2">TitleoftheCourse</td><td colspan="6">MATHEMATICSFORCOMPETETIVEEXAMINATIONIII</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="6">NAAN MUDHALVAN 1</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">SEC</td><td>Year</td><td>I</td><td rowspan="2">Credits</td><td rowspan="2">2</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>II</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">12th StandardMathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">Tolearnthetechniquesforsolvingaptitudeproblems.Alsotomotivate the students for attending various competitive examinations.
.</td></tr>
<tr><td colspan="2" rowspan="5">CourseOutline</td><td colspan="6">UNITI: Square root and cube root.</td></tr>
<tr><td colspan="6">UNITII: Trains.</td></tr>
<tr><td colspan="6">UNITIII: Problems on age.</td></tr>
<tr><td colspan="6">UNITIV: Area.</td></tr>
<tr><td colspan="6">UNITV: Volume & Surface area.</td></tr>
<tr><td colspan="2">Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)</td><td colspan="6">Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved
(TobediscussedduringtheTutorial hour)</td></tr>
<tr><td colspan="2">Skills acquired from this course</td><td colspan="6">Knowledge,ProblemSolving,Analyticalability,Professional Competency, Professional Communication and Transferrable Skill</td></tr>
<tr><td colspan="2">Recommended Text</td><td colspan="6">R.S. Agarwal -ObjectiveArithmetic, PublishedbyS. Chand& Co, Ltd., Edition, 2018.</td></tr>
<tr><td colspan="2">ReferenceBooks</td><td colspan="6">1. Rajesh Verma- Fast track Objective arithmetic, Arihant Publications (India) Limited., Fourth Edition 1st January 2018.
2. R.S. Aggarwal, ArithmeticSubjectiveandobjective, Published by S. Chand and Co. Ltd. Revised Edition.1st April 2017.</td></tr>
<tr><td colspan="2">Websiteand e-LearningSource</td><td colspan="6">https://nptel.ac.in</td></tr>
</table>

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO1: Find square root and cube root

CLO 2: Find relative speed of train and time taken to cover a distance by a trains

CLO 3: Slove problems related to age

CLO4: Find area for the given data

CLO5: Find volume and surface area of given solid.

	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

Semester III: Naan Mudhalvan 2

<table>
<tr><td colspan="2">TitleoftheCourse</td><td colspan="6">MATHEMATICSFORCOMPETETIVEEXAMINATIONIV</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="6">NAAN MUDHALVAN 2</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">SEC</td><td>Year</td><td>I</td><td rowspan="2">Credits</td><td rowspan="2">2</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>III</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">12th StandardMathematics</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">Tolearnthetechniquesforsolvingaptitudeproblems.Alsotomotivate the students for attending various competitive examinations.
.</td></tr>
<tr><td colspan="2" rowspan="5">CourseOutline</td><td colspan="6">UNITI: Races and Games of skill.</td></tr>
<tr><td colspan="6">UNITII: Calendar & clock.</td></tr>
<tr><td colspan="6">UNITIII: Stock and shares.</td></tr>
<tr><td colspan="6">UNITIV: Banker’s discount.</td></tr>
<tr><td colspan="6">UNITV: Odd man out and series.</td></tr>
<tr><td colspan="2">Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)</td><td colspan="6">Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved
(TobediscussedduringtheTutorial hour)</td></tr>
<tr><td colspan="2">Skills acquired from this course</td><td colspan="6">Knowledge,ProblemSolving,Analyticalability,Professional Competency, Professional Communication and Transferrable Skill</td></tr>
<tr><td colspan="2">Recommended Text</td><td colspan="6">R.S. Agarwal -ObjectiveArithmetic, PublishedbyS. Chand& Co, Ltd., Edition, 2018.</td></tr>
<tr><td colspan="2">ReferenceBooks</td><td colspan="6">1. Rajesh Verma- Fast track Objective arithmetic, Arihant Publications (India) Limited., Fourth Edition 1st January 2018.
2. R.S. Aggarwal, ArithmeticSubjectiveandobjective, Published by S. Chand and Co. Ltd. Revised Edition.1st April 2017.</td></tr>
<tr><td colspan="2">Websiteand e-LearningSource</td><td colspan="6">https://nptel.ac.in</td></tr>
</table>

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO1: Find solution related to races and games of skill

CLO 2: Explain calendar and clock

CLO 3: Solve stock and shares problem

CLO4: Explainbanker's discount

CLO5: Find the odd man out from the given data.

	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

Semester IV: Naan Mudhalvan 3

<table>
<tr><td colspan="2">Titleof theCourse</td><td colspan="7">OFFICE AUTOMATION</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="7">NAAN MUDHALVAN 3</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">SEC</td><td>Year</td><td>II</td><td rowspan="2">Credits</td><td rowspan="2">2</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>IV</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="7">Basic Computer Knowledge</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="7">To acquire basic ideas of MS-Office and explore and understand the concept of networking</td></tr>
<tr><td colspan="2" rowspan="5">Course Outline</td><td colspan="7">UNIT I: MS-WORD:View of Microsoft Word Window – Creating a New Document – Editing text – Moving and copying text and object – Using Clipboard – Formatting.
(Unit 5: Sections - 5.1 to 5.7)</td></tr>
<tr><td colspan="7">UNIT II:MS-WORD: Finding and Replacing Text – Working with Table, Chart and Excel Spreadsheet in MSWord – Inserting Charts– Correcting spelling and grammatical errors.
(UNIT 6: Sections -6.1 to 6.4)</td></tr>
<tr><td colspan="7">UNIT III: MS-WORD: Charts – Screenshots – Mail Merge. MS-EXCEL: Creating a new document – Saving a document – Work Sheet -
(UNITS 7 & 8: Sections - 7.3 to 7.5 and 8.1 to 8.3)</td></tr>
<tr><td colspan="7">UNIT IV:MS-EXCEL: Formatting – Formatting Rows and Columns – Functions in Formula – Formulas and Functions.
(UNIT 8: Sections - 8.4 to 8.7)</td></tr>
<tr><td colspan="7">UNIT V: MS-POWERPOINT:Normal View – PowerPoint Slide – Applying a Theme – Text – Saving a Presentation – PowerPoint view – Slide Show – Adding audio content to slides.
(UNITS 10 & 11: Sections - 10.2 to 10.6, 11.1, 11.5, 11.6)</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Nottobeincluded in the External Examination questionpaper)	Questionsrelatedtotheabovetopics,fromvariouscompetitive examinations UPSC / TNPSC / others to be solved (Tobediscussed duringtheTutorial hour)
Skills acquired fromthis course	Knowledge,Analyticalability,ProfessionalCompetency,ProfessionalCommunicationandTransferrable Skill
Recommended Text	1. Ajay Kumar Bansal, Office Automation Tools, LPU, Punjab.
ReferenceBooks	1. https://baou.edu.in/assets/pdf/BSCIT_103_slm.pdf 2. https://www.msuniv.ac.in/images/academic/departments//information_technology/econtent/6_Computer_Fundamentals_and_Office_Automation.pdf
Websiteand e-LearningSource	https://nptel.ac.in

CourseOutcomes (COs)

Onsuccessfulcompletion ofthecourse, thestudentswill beable to

CLO1: Create, edit and save a word document

CLO2: Find and replace a word, insert a table and spell and grammar checking in a word document

CLO 3: Insert charts in word, create and save a word excel sheet

CLO 4: Format cells, rows and columns, apply formulae and functions in excel

CLO5: Create and save PowerPoint slides and add audio content to slides.

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

Semester V: Naan Mudhalvan 4

Title of the Course		**STATISTICSWITHEXCELPROGRAMMING**					
Paper Number		**NAAN MUDHALVAN 4**					
Category	**SEC**	**Year**	**II**	**Credits**	**2**	**Course Code**	
		Semester	**IV**				
Pre-requisite		12th Standard Mathematics with computer knowledge					
Objectives of the Course		• ToAcquiretheknowledgeofsome Statistical terms and interpret them in Excel sheet					
Course Outline		**UNIT I:** Distribution of data- Characteristics of data - Frequency distribution - Procedure for Constructing a Frequency Distribution- Using Excel to Construct a FrequencyDistribution - Relative Frequency Distribution - Cumulative Frequency Distribution. (Chapter 2: Pages 58 to 70)					
		UNIT II: Histograms - Relative Frequency Histogram - Normal Distribution - Common Distribution Shapes – Skewness - Using XLSTAT forHistograms – Graphs - UsingExceltoConstructaScatter plot - CorrelationCoefficient. (Chapter 2:Pages70to81)					
		UNIT III: Time-Series Graph - Dotplots - Using XLSTAT forStemplots - Bar Graphs - Using Excel to Create Bar Graphs - Pareto Charts - Pie Charts - Using Excel to Create Pie Charts - Frequency Polygon - UsingExceltoCreateFrequencyPolygons. (Chapter 2:Pages 81 to 98)					
		UNIT IV: Descriptive statistics – Measuresof Center - Mean-Using Excel to Calculate the Mean - Median - Using Excel to Find the median. (Chapter 3: Pages 110 to 114)					
		UNIT V: Mode-UsingExceltoFindtheMode - Midrange-UsingExcel toCalculatetheMidrange - WeightedMean-UsingExcelforDescriptive Statistics. (Chapter-3: Pages 114 to 125)					
Skills acquired from this course		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication, Transferrable Skill and designingmathematicalmodelstowardssolvingmathematical Applications					

Recommended Text	1.Mario F. Triola, ElementaryStatisticsUsingExcel, Fifth Edition, PearsonNewInternationalEdition,2014.
Reference Books	1. E. Balagurusamy, Computer Oriented Statistical and NumericalMethods, MacmillanPublishersIndiaLimited,2000. 2. V.K.Rohatgi,A.M.E.Saleh,Anintroductiontoprobability andstatistics, JohnWiley&Sons,2015. 3. B.Held,B.Moriarty and T.Richardson, MicrosoftExcel Functionsand Formulas,StylusPublishing,LLC,2019. 4. N. J. Salkind, Excel statistics: A quick guide, Sage Publications, 2015. 5. J.Schmuller,StatisticalanalysiswithExcelfordummies, JohnWiley&Sons,2013.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO1: Handledistributionofdataandanalyses thecharacteristicsof data usingExcel

CLO2: FindNormaldistribution,Commondistributionshapes,CorrelationCoefficientand plot graphs using Excel

CLO3: CreateTime-SeriesGraphs,Dotplots, Stemplots,BarCharts,Pie ChartsusingExcel

CLO4: ComputeMean andMedian usingExcel

CLO5: ComputeMode, Midrange,WeightedMeanusing Excel.

Semester VI: Naan Mudhalvan 5

<table>
<tr><td colspan="2">Titleof theCourse</td><td colspan="7">MATLAB</td></tr>
<tr><td colspan="2">PaperNumber</td><td colspan="7">NAAN MUDHALVAN 5</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">SEC</td><td>Year</td><td>III</td><td rowspan="2">Credits</td><td rowspan="2">2</td><td rowspan="2">Course Code</td><td rowspan="2"></td></tr>
<tr><td>Semester</td><td>VI</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="7">12th Standard Mathematics</td></tr>
<tr><td colspan="2">Objectives of</td><td colspan="7">• Gain knowledge the software MATLAB
• Gain knowledge of array addressing by using MATLAB built
• Understand the knowledge of script files</td></tr>
<tr><td colspan="2" rowspan="4">Course Outline</td><td colspan="7">UNIT I: Starting MATLAB, MATLAB – Windowsworking in the command window – Arithmeticoperations with scalars – Displayformats – ElementaryMath Built-in functions – Defining scalar variables – Usefulcommands for managing variables – Related problems.
(Chapter1:Sections - 1.1to 1.7)</td></tr>
<tr><td colspan="7">UNIT II: Creating Arrays: Creating a one-dimensional array(Vector) - Creating atwo-dimensional array (Matrix) – The transpose operator – Array addressing – Usinga colon in addressing arrays – Adding elements to existing variables – Deleing elements – Built-in functions for handling arrays – Related problems.
(Chapter2:Sections -2.1 to 2.9)</td></tr>
<tr><td colspan="7">UNIT III: Mathematical Operations with Arrays: Addition and subtraction – Array multiplication – Array division – Element-by-Element Operations – Using arrays in MATLAB Built-in Math functions – Built-in functions for analyzing arrays – Related problems.
(Chapter 3:Sections - 3.1 to 3.6)</td></tr>
<tr><td colspan="7">UNIT IV: Creating and Saving a Script File – Running a Script File – Inputto Script File – Output commands – The save and load commands – Related problems.
(Chapter 1:Section- 1.8 and Chapter 4: Sections - 4.1to4 .4)</td></tr>
<tr><td colspan="2"></td><td colspan="7">UNIT V: The Plot command – Thefplotcommand-Plotting multiple graphs in the same plot – Plotswith Logarithmic Axes - Plots with Special Graphics – Histograms – Polarplots – Related problems.
(Chapter 5:Sections- 5.1 to 5.3, 5.5, 5.7 to 5.9)</td></tr>
</table>

Skillsacquired from this course	Knowledge,problemsolving,analyticalability,andprofessional competency.
RecommendedText	Amos Gilat, MATLAB-An Introduction with Applications**,** The Ohio State University, Wiley, 2012.
ReferenceBooks	1. N. S. Alam and S. S. Alam, Understanding MATLAB: A text book for beginners, TechSar Pvt. Ltd., 2013. 2. R. Pratap, Getting started with MATLAB: A quick introduction for Scientists & Engineers, Oxford, 2010.
Websiteand e-LearningSource	https://nptel.ac.in

CourseLearning Outcome(forMapping withPOs and PSOs)

Studentswill beable to

CLO1: Acquire knowledge of the software MATLAB

CLO2: Acquire knowledge of array addressing by using MATLAB built

CLO3: Acquire knowledge of functions and function files

CLO4: Acquire knowledge of script files

CLO5: Acquire knowledge of two-dimensional plots.

	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	3	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