

**D.K.M COLLEGE FOR WOMEN (AUTONOMOUS)  
VELLORE-1**



**DEPARTMENT OF MATHEMATICS  
(COMPOSITE BOARD)**

**TEMPLATE AND SYLLABUS  
FOR BACHELOR DEGREE COURSE IN  
MATHEMATICS**

**WITH EFFECT FROM 2024 - 2025**

**D.K.M. COLLEGE FOR WOMEN (AUTONOMOUS), VELLORE-1**  
**DEPARTMENT OF MATHEMATICS**  
**B.SC. MATHEMATICS (With effect from 2024 – 2025)**  
**CBCS PATTERN WITH OUTCOME BASED EDUCATION**  
**THE COURSE OF STUDY AND THE SCHEME OF EXAMINATION**

**Curriculum Design**

**First Year  
Semester-I**

<b>Part</b>	<b>List of Courses</b>	<b>Credit</b>	<b>Hours per week (L/T/P)</b>
Part-I	Language –Tamil – I/ Hindi - I	3	6
Part-II	English - I	3	6
Part-III	Core – I. Algebra & Trigonometry	4	4
	Core – II. Differential Calculus	4	4
	Elective – I(Choose any one) Theory 1) Allied Physics – I Practical (or) 2) Numerical Methods -I Practical	3 + 0	3+3/4+2
Part-IV	Skill Enhancement Course – I (Non Major Elective) Mathematics for Competitive Examinations-I	2	2
	Foundation Course FC- Bridge Mathematics	2	2
		<b>21</b>	<b>30</b>

**First Year  
Semester-II**

<b>Part</b>	<b>List of Courses</b>	<b>Credit</b>	<b>Hours per week (L/T/P)</b>
Part-I	Language –Tamil- II/Hindi – II	3	6
Part-II	English – I	3	6
Part-III	Core – III. Analytical Geometry	4	4
	Core – IV. Integral Calculus	4	4
	Elective – II (Choose any one) 1) Allied Physics – II Practical (or) 2) Numerical Methods -II Practical	3 + 2	3 + 3
Part-IV	Skill Enhancement Course –II Mathematics for Competitive Examinations – II	2	2
	Skill Enhancement Course –III Office Automation	2	2
		<b>23</b>	<b>30</b>

**Second Year  
Semester-III**

<b>Part</b>	<b>List of Courses</b>	<b>Credit</b>	<b>Hours per week (L/T/P)</b>
Part-I	Language –Tamil III/Hindi – III	3	6
Part-II	English – III	3	6
Part-III	Core – V, Vector Calculus	5	5
	Core – VI, Differential Equations	5	5
	Elective – III, Mathematical Statistics I	3	4
Part-IV	Skill Enhancement Course (Entrepreneurial Based) (Any One) Latex Mathematics for Manager	1	1
	Skill Enhancement Course -SEC-5 (Discipline Specific/ Generic) Statistics with R Programming	2	2
	Environmental Studies	-	1
		<b>22</b>	<b>30</b>

**Semester-IV**

<b>Part</b>	<b>List of Courses</b>	<b>Credit</b>	<b>Hours per week (L/T/P)</b>
Part-I	Language –Tamil IV/Hindi – IV	3	6
Part-II	English – IV	3	6
Part-III	Core – VII, Industry Module – Optimization Techniques	5	5
	Core – VIII, Elements of Mathematical Analysis	5	5
	Elective – IV, Mathematical Statistics II	3	3
Part-IV	Skill Enhancement Course – Introduction to Data Science	2	2
	Skill Enhancement Course – Computational Mathematics	2	2
	Environmental Studies	2	1
		<b>25</b>	<b>30</b>

**Third Year  
Semester-V**

<b>Part</b>	<b>List of Courses</b>	<b>Credit</b>	<b>Hours per week (L/T/P)</b>
Part-III	Core – IX, Abstract Algebra	4	5
	Core – X, Real Analysis	4	5
	Core – XI, Mathematical Modelling	4	5
	Core - XII, Project with Viva voce	4	4
	Elective – V, (Any One) Transform Techniques Special Functions Programming in C Language with practical	3	5
	Elective – VI, (Any One) Graph Theory and Applications Number Theory	3	4
Part-IV	Value Education	2	2
	Internship / Industrial Training (Summer vacation at the end of IV semester activity)	2	-
		<b>26</b>	<b>30</b>

**Semester-VI**

<b>Part</b>	<b>List of Courses</b>	<b>Credit</b>	<b>Hours per week (L/T/P)</b>
Part-III	Core – XIII, Linear Algebra	5	6
	Core – XIV, Complex Analysis	5	6
	Core – XV, Mechanics	4	6
	Elective – VII, (Any One) Programming Language with C++ with Practical Programming Language with Python with Practical	3	5
	Elective – VIII, (Any One) Discrete Mathematics Financial Analytics	3	5
Part-IV	Professional Competency Skill	2	2
	Extension Activity	1	
		<b>23</b>	<b>30</b>

**Total Credits : 140**

### 5. Consolidated Semester wise and Component wise Credit distribution

Parts	Sem I	Sem II	Sem III	Sem IV	Sem V	Sem VI	Total Credits
<b>Part I</b>	3	3	3	3	-	-	12
<b>Part II</b>	3	3	3	3	-	-	12
<b>Part III</b>	11	13	13	13	22	20	92
<b>Part IV</b>	4	4	3	6	4	2	23
<b>Part V</b>	-	-	-	-	-	1	1
<b>Total</b>	21	23	22	25	26	23	<b>140</b>

Part	Subject	Papers	Credit	Total credits	Marks	Total Marks
I	Language	4	3	12	100	400
II	English	4	3	12	100	400
III	Allied Theory – Physics I and II	2	3	8	100	200
	Practical (or) Numerical Methods I and II	1	2		100 (or) 100	100 (or) 100
	Practical				100	200
	Allied – Allied Statistics I and II	2	3	6	100 100	200
III	Elective EC	4	3	3 x 4 = 12	100	400
III	Core theory	14	8x4=32 6x5=30	62	100	1400
	Core Practical					
III	Project	1	4	4	100	100
IV	EVS	1	2	2	100	100
IV	VE	1	2	2	100	100
IV	Skill Enhancement Course	7	6x2=12 1x1=1	13	100	700
IV	Foundation Course	1	2	2	100	100
IV	Professional Competency Skill	1	2	2	100	100
IV	Internship	1	2	2	100	100
V	Extension activity	1	1	1	100	100
<b>Total</b>				<b>140</b>		<b>4500</b>

## **Introduction**

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

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

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

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

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

**LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK GUIDELINES  
BASED  
REGULATIONS FOR UNDER GRADUATE PROGRAMME**

<b>Programme:</b>	<b>B.Sc., MATHEMATICS</b>
<b>Programme Code:</b>	
<b>Duration:</b>	<b>3 years [UG]</b>
<b>Programme Outcomes:</b>	<p><b>PO1: Disciplinary knowledge:</b> Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate Programme of study</p> <p><b>PO2: Communication Skills:</b> Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share one’s views and express herself/himself; demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.</p> <p><b>PO3: Critical thinking:</b> Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development.</p> <p><b>PO4: Problem solving: Capacity</b> to extrapolate from what one has learned and apply their competencies to solve different kinds of non- familiar problems, rather than replicate curriculum content knowledge; and apply one’s learning to real life situations.</p> <p><b>PO5: Analytical reasoning:</b> Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples, and addressing opposing viewpoints.</p> <p><b>PO6: Research-related skills:</b> A sense of inquiry and capability for asking relevant/appropriate questions, problem arising, synthesizing and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyse, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation</p> <p><b>PO7: Cooperation/Team work:</b> Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team</p> <p><b>PO8: Scientific reasoning:</b> Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.</p> <p><b>PO9: Reflective thinking:</b> Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.</p> <p><b>PO10 Information/digital literacy:</b> Capability to use ICT in a variety of</p>

learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources; and use appropriate software for analysis of data.

**PO 11 Self-directed learning:** Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.

**PO 12 Multicultural competence:** Possess knowledge of the values and beliefs of multiple cultures and a global perspective; and capability to effectively engage in a multicultural society and interact respectfully with diverse groups.

**PO 13: Moral and ethical awareness/reasoning:** Ability to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. Capable of demonstrating the ability to identify ethical issues related to one's work, avoid unethical behaviour such as fabrication, falsification or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights; appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.

**PO 14: Leadership readiness/qualities:** Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating and inspiring team members to engage with that vision, and using management skills to guide people to the right destination, in a smooth and efficient way.

**PO 15: Lifelong learning:** Ability to acquire knowledge and skills, including „learning how to learn“, that are necessary for participating in learning activities throughout life, through self-paced and self-directed learning aimed at personal development, meeting economic, social and cultural objectives, and adapting to changing trades and demands of work place through knowledge/skill development/reskilling.



## Under Graduate Programme

### Programme Outcomes:

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

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

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

**PO4: Analytical Reasoning:** Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples and addressing opposing viewpoints.

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

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

## **B.Sc Mathematics**

### **Programme Specific Outcomes:**

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

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

**PSO3:** To prepare the students who will demonstrate respectful engagement with other's ideas, behaviors, beliefs and apply diverse frames of references to decisions and actions. To create effective entrepreneurs by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate startups and high potential organizations.

<b>Title of the Course</b>		<b>ALGEBRA &amp; TRIGONOMETRY</b>					
<b>Paper Number</b>		<b>CORE 1</b>					
<b>Category</b>	Core	<b>Year</b>	I	<b>Credits</b>	4	<b>Course Code</b>	
		<b>Semester</b>	I				
<b>Instructional Hours per week</b>		<b>Lecture</b>		<b>Tutorial</b>		<b>Lab Practice</b>	<b>Total</b>
		4				--	4
<b>Pre-requisite</b>		12 <sup>th</sup> Standard Mathematics					
<b>Objectives of the Course</b>		<ul style="list-style-type: none"> <li>• Basic ideas on the Theory of Equations, Matrices and Number Theory.</li> <li>• Knowledge to find expansions of trigonometry functions, solve theoretical and applied problems.</li> </ul>					
<b>Course Outline</b>		<b>Unit I:</b> Reciprocal Equations-Standard form-Increasing or decreasing the roots of a given equation- Removal of terms, Approximate solutions of roots of polynomials by Horner's method – related problems.					
		<b>Unit II:</b> Summation of Series: Binomial– Exponential – Logarithmic series (Theorems without proof) – Approximations - related problems.					
		<b>Unit III:</b> Characteristic equation – Eigen values and Eigen Vectors-Similar matrices - Cayley – Hamilton Theorem (Statement only) - Finding powers of square matrix, Inverse of a square matrix up to order 3, Diagonalization of square matrices - related problems.					
		<b>Unit IV:</b> 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 $\tan(\theta_1+\theta_2+\dots+\theta_n)$ -Expansions of $\sin\theta$ , $\cos\theta$ and $\tan\theta$ in terms of $\theta$ - related problems.					
		<b>Unit V:</b> Hyperbolic functions – Relation between circular and hyperbolic functions Inverse hyperbolic functions, Logarithm of complex quantities, Summation of trigonometric series - related problems.					

<b>Extended Professional Component (is apart of internal component only, Not to be included in the External Examination question paper)</b>	Questions related to the above topics, from various competitive examinations UPSC / TNPSC / others to be solved (To be discussed during the Tutorial hour)
<b>Skills acquired from this course</b>	Knowledge, problem solving, analytical ability, professional competency, professional communication and transferable skill.
<b>Recommended Text</b>	<ol style="list-style-type: none"> <li>1. T.K.Manickavachagom Pillay, T.N.Natarajan and K.S.Ganapathy Algebra, Volume I &amp;II, S.Viswanathan Printers &amp; Publishes Pvt. Ltd, 2004</li> <li>2. S.Narayanan and T. K. Mancikavachagom Pillay, Trigonometry, S.Viswanathan printers &amp; Publishers Pvt. Ltd. Chennai, 2004</li> <li>3. A.Singaravelu, Algebra and Trigonometry, Meenakshi Agency, 2003</li> <li>4. Duraipandian and Laxmi Duraipandian, Trigonometry, Emerald Publishers, Chennai, 1984</li> <li>5. W.S. Burnstine and A.W. Panton, Theory of equations</li> <li>6. David C. Lay, Linear Algebra and its Applications, 3rd Ed., Pearson Education Asia, Indian Reprint, 2007</li> <li>7. J. Stewart, L. Redlin, and S. Watson, Algebra and Trigonometry, Cengage Learning, 2012.</li> </ol>
<b>Reference Books</b>	<ol style="list-style-type: none"> <li>1. P. Kandasamy. K.Thilagavathy, Mathematics for B.Sc. Vol-I,II,III &amp; IV, S.Chand &amp; Company Ltd. New Delhi-55, 2004</li> <li>2. Algebra, Analytical Geometry and Trigonometry, P.R.Vittal and V. Malini, 2001</li> </ol>
<b>Website and e-Learning Source</b>	<a href="https://nptel.ac.in">https://nptel.ac.in</a>

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

**CLO 1:** Classify and Solve reciprocal equations

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

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

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

**CLO 5:** Determine relationship between circular and hyperbolic functions and the summation oftrigonometric series

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

<b>Title of the Course</b>		<b>DIFFERENTIAL CALCULUS</b>					
<b>Paper Number</b>		<b>CORE 2</b>					
<b>Category</b>	Core	<b>Year</b>	I	<b>Credits</b>	4	<b>Course Code</b>	
		<b>Semester</b>	I				
<b>Instructional Hours per week</b>		<b>Lecture</b>		<b>Tutorial</b>		<b>Lab Practice</b>	<b>Total</b>
		4				--	4
<b>Pre-requisite</b>		12 <sup>th</sup> Standard Mathematics					
<b>Objectives of the Course</b>		<ul style="list-style-type: none"> <li>• The basic skills of differentiation, successive differentiation, and their applications.</li> <li>• Basic knowledge on the notions of curvature, evolutes, involutes and polar co-ordinates and in solving related problems.</li> </ul>					
<b>Course Outline</b>		<b>UNIT-I: Successive Differentiation:</b> Introduction (Review of basic concepts) – The $n^{\text{th}}$ derivative – Standard results – Fractional expressions – Trigonometrical transformation – Formation of equations involving derivatives – Leibnitz formula for the $n^{\text{th}}$ derivative of a Product.					
		<b>UNIT-II: Partial Differentiation:</b> Partial derivatives – Successive partial derivatives – Function of a function rule – Total differential coefficient – A special case – Implicit Functions.					
		<b>UNIT-III: Partial Differentiation (Continued):</b> Homogeneous functions – Partial derivatives of a function of two variables – Maxima and Minima of functions of two variables - Lagrange's method of undetermined multipliers.					
		<b>UNIT-IV: Envelope:</b> Method of finding the envelope – Another definition of envelope – Envelope of family of curves which are quadratic in the parameter.					
		<b>UNIT-V: Curvature:</b> Definition of Curvature – Circle, Radius and Centre of Curvature – Evolutes and Involute – Radius of Curvature in Polar Co-ordinates.					

<p>Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)</p>	<p>Questions related to the above topics, from various competitive examinations UPSC // TNPSC / others to be solved (To be discussed during the Tutorial hour)</p>
<p>Skills acquired from this course</p>	<p>Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill</p>
<p><b>Recommended Text</b></p>	<ol style="list-style-type: none"> <li>1. S.Narayanan and T.K.Manickavachagom pillay, Calculus Volume I(2015), Volume II(2010), S.Viswanathan printers and publishers pvt. ltd –Chennai,</li> <li>2. H. Anton, I. Birens and S. Davis, Calculus, John Wiley and Sons, Inc., 2002.</li> <li>3. G.B. Thomas and R.L. Finney, Calculus, Pearson Education, 2010.</li> <li>4. M.J. Strauss, G.L. Bradley and K. J. Smith, Calculus, 3rd Ed., Dorling Kindersley (India) P. Ltd. (Pearson Education), Delhi, 2007.</li> </ol>
<p><b>Reference Books</b></p>	<ol style="list-style-type: none"> <li>1. P. Kandasamy. K.Thilagavathy, Mathematics for B.Sc. Vol- I,II,III &amp; IV, S.Chand &amp; Company Ltd. New Delhi-55, 2004</li> <li>2. Calculus, P.R.Vittal and V. Malini, 2012</li> <li>3. R. Courant and F. John, Introduction to Calculus and Analysis (Volumes I &amp; II), Springer- Verlag, New York, Inc., 1989.</li> <li>4. T. Apostol, Calculus, Volumes I and II.</li> <li>5. S. Goldberg, Calculus and mathematical analysis.</li> </ol>
<p><b>Website and e-Learning Source</b></p>	<p><a href="https://nptel.ac.in">https://nptel.ac.in</a></p>

Course Learning Outcome (for Mapping with PLOs and PSOs)

Students will be able to

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

**CLO 2:** Find the partial derivative and total derivative coefficient

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

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

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

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



<b>Title of the Course</b>		<b>NUMERICAL METHODS - I</b>					
<b>Paper Number</b>		<b>ELECTIVE - I</b>					
<b>Category</b>	Core	<b>Year</b>	I	<b>Credits</b>	3	<b>Course Code</b>	
		<b>Semester</b>	I				
<b>Instructional Hours Per Week</b>		<b>Lecture</b>		<b>Tutorial</b>		<b>Lab Practice</b>	<b>Total</b>
		3		--		--	3
<b>Pre-requisite</b>		12 <sup>th</sup> Standard Mathematics					
<b>Objectives of the Course</b>		<ul style="list-style-type: none"> <li>➤ To know the methods of solving simultaneous linear equations.</li> <li>➤ To acquire knowledge about forward differences and Backward differences and their relationship.</li> <li>➤ Knowledge about central difference operators and problems based on various central differences formulae.</li> <li>➤ To study Newton's divided difference formula and problems based on Lagrange's interpolation formula.</li> </ul>					
<b>Course Outline</b>		<b>Unit I:</b> Solutions of Algebraic and Transcendental Equations: Bisection Method- Iteration Method- Regula-Falsi Method- Newton-Raphson Method. <b>Chapter 1 :</b> Section 1.1 to 1.4					
		<b>Unit II:</b> Solutions of Simultaneous Linear Equations: Gauss-Elimination Method, Gauss-Jordan Method, Crout's Method. <b>Chapter 2 :</b> Section 2.1 to 2.3					
		<b>Unit III:</b> Finite Differences: E Operators and Relation between them-Differences of Polynomial-Factorial Polynomials. <b>Chapter 3 :</b> Section 3.1 to 3.4					
		<b>Unit IV:</b> Interpolation with Equal Intervals: Newton's Forward and Backward Interpolation formulae. Central Differences Formulae: Gauss-Forward and Backward Formulae-Stirling's Formula and Bessel's Formula. <b>Chapter 4 :</b> Section 4.1 to 4.3 (omit 4.1a) <b>Chapter 5 :</b> Section 5.1 to 5.6					
		<b>Unit V:</b> Interpolation with Unequal Intervals: Divided Differences - Newton's Divided Differences Formula for Interpolation -Lagrange's Formula for Interpolation-Inverse Interpolation-Lagrange's method Reversion of Series method. <b>Chapter 6 :</b> Section 6.1, 6.2, 6.5 & 6.7					

<b>Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)</b>	Questions related to the above topics, from various competitive examinations UPSC / TNPSC / others to be solved (To be discussed during the Tutorial hour)
<b>Skills acquired from this course</b>	Knowledge, problem solving, analytical ability, professional competency, professional communication and transferable skill.
<b>Recommended Text</b>	P.Kandasamy, K.Thilagavathy (2003) Calculus of Finite differences & Numerical Analysis, S. Chand & Company Ltd., New Delhi-55.
<b>Reference Books</b>	1. B.D. Gupta. (2001) <i>Numerical Analysis</i> . Konark Pub. Ltd., Delhi 2. M.K. Venkataraman. (1992) <i>Numerical methods for Science and Engineering</i> National Publishing Company, Chennai. 3. S. Arumugam. (2003) <i>Numerical Methods</i> , New Gamma Publishing, Palayamkottai. 4. H.C. Saxena. (1991) <i>Finite differences and Numerical analysis</i> S.Chand & Co., Delhi
<b>Website and e-Learning Source</b>	<a href="https://ocw.mit.edu/courses/22-15-essential-numerical-methods-fall-2014/pages/syllabus/">https://ocw.mit.edu/courses/22-15-essential-numerical-methods-fall-2014/pages/syllabus/</a> <a href="https://ocw.mit.edu/courses/18-330-introduction-to-numerical-analysis-spring-2004/">https://ocw.mit.edu/courses/18-330-introduction-to-numerical-analysis-spring-2004/</a>

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

**CLO1:** After studied unit -1, the student will be able to solve Iteration method- Regula-falsi method- Newton-Raphson method.

**CLO2:** After studied unit -2, the student will be able to calculate interpolation values by applying Gauss-Elimination method, Gauss-Jordan method.

**CLO3:** After studied unit -3, the student will be able to calculate Differences of a polynomial-Factorial polynomials.

**CLO4:** After studied unit -4, the student will be able to estimate Central Differences Formulae.

**CLO5:** After studied unit -5, the student will be able to estimate the interpolation value for unequal intervals based on Lagrange's formula of inverse interpolation.

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

<b>Title of the Course</b>		<b>MATHEMATICS FOR COMPETITIVE EXAMINATIONS-I</b>					
<b>Paper Number</b>		<b>ELECTIVE (SEC)</b>					
<b>Category</b>	Core	<b>Year</b>	I	<b>Credits</b>	2	<b>Course Code</b>	
		<b>Semester</b>	I				
<b>Instructional Hours per week</b>		<b>Lecture</b>	<b>Tutorial</b>	<b>Lab Practice</b>	<b>Total</b>		
		2	--	--	2		
<b>Pre-requisite</b>		12 <sup>th</sup> Standard Mathematics					
<b>Objectives of the Course</b>		After taking the course, <ul style="list-style-type: none"> <li>• The student will able to answer the questions related to the number system.</li> <li>• The student will able to answer real life simple problems by using HCF and LCM.</li> <li>• The student will able to apply the correct sequence of operations to find out the value of a given mathematical expressions.</li> <li>• The student will able to solve the problem involving square roots, cube roots and average.</li> <li>• The student will able to carry out the problems related to age and simple product.</li> </ul>					
<b>Course Outline</b>		<b>Unit I:</b> Number System. <span style="float: right;">Hours: 6</span>					
		<b>Unit II:</b> H.C.F and L.C.M of numbers , Decimal Fractions. <span style="float: right;">Hours: 6</span>					
		<b>Unit III:</b> Simplification. <span style="float: right;">Hours: 6</span>					
		<b>Unit IV:</b> Square root and Cube Roots, Averages. <span style="float: right;">Hours: 6</span>					
		<b>Unit V:</b> Problems on numbers, Problems on Age, Surds and Indices. <span style="float: right;">Hours: 6</span>					
<b>Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)</b>		Questions related to the above topics, from various competitive examinations UPSC / TNPSC / others to be solved (To be discussed during the Tutorial hour)					

<b>Skills acquired from this course</b>	Knowledge, problem solving, analytical ability, professional competency, professional communication and transferable skill.
<b>Recommended Text</b>	1. R.S. Aggarwal [2017], Quantitative Aptitude for Competitive Examinations, S.Chand and Company , New Delhi. Chapters 11-13, 18, 19, 22, 23
<b>Reference Books</b>	1. Praveen R.V, Quantitative Aptitude and reasoning ,PHI Learning Pvt, New Delhi.

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

**CLO1:** Solve Mathematical Problems using Mathematical formulae.

**CLO2:** Understand the knowledge of application of Mathematics

**CLO3:** Understand the concepts of simplification.

**CLO4:** Calculate the square root and cube root.

**CLO5:** Solve the problems on age.

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

<b>Title of the Course</b>		Foundation course - <b>Bridge Mathematics</b>					
<b>Paper Number</b>		<b>FOUNDATION 1</b>					
<b>Category</b>	Core	<b>Year</b>	I	<b>Credits</b>	2	<b>Course Code</b>	<b>FC</b>
		<b>Semester</b>	I				
<b>Instructional Hours per week</b>		<b>Lecture</b>	<b>Tutorial</b>	<b>Lab Practice</b>	<b>Total</b>		
		2	-	--	2		
<b>Pre-requisite</b>		12 <sup>th</sup> Standard Mathematics					
<b>Objectives of the Course</b>		To bridge the gap and facilitate transition from higher secondary to tertiary education; To instill confidence among stakeholders and inculcate interest for Mathematics. Hours: 6					
<b>Course Outline</b>		<b>UNIT-I:</b> Algebra: Binomial theorem, General term, middle term, problems based on these concepts. Hours: 6					
		<b>Unit II:</b> Sequences and series (Progressions). Fundamental principle of counting. Factorial n. Hours: 6					
		<b>Unit III:</b> Permutations and combinations, Derivation of formulae and their connections, simple applications, combinations with repetitions, arrangements within groups, formation of groups. Hours: 6					
		<b>Unit IV:</b> Trigonometry: Introduction to trigonometric ratios, proof of $\sin(A+B)$ , $\cos(A+B)$ , $\tan(A+B)$ formulae, multiple and sub multiple angles, $\sin(2A)$ , $\cos(2A)$ , $\tan(2A)$ etc., transformations sum into product and product into sum formulae, inverse trigonometric functions, sine rule and cosine rule. Hours: 6					
		<b>Unit V:</b> Calculus: Limits, standard formulae and problems, differentiation, first principle, uv rule, u/v rule, methods of differentiation, application of derivatives, integration - product rule and substitution method. Hours: 6					
<b>Recommended Text</b>		1. NCERT class XI and XII text books. 2. Any State Board Mathematics text books of class XI and XII					
<b>Website and e-Learning Source</b>		<a href="https://nptel.ac.in">https://nptel.ac.in</a>					

Course Learning Outcome

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

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

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

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

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

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

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

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

<b>Title of the Course</b>		<b>ANALYTICAL GEOMETRY</b>					
<b>Paper Number</b>		<b>CORE 3</b>					
<b>Category</b>	Core	<b>Year</b>	I	<b>Credits</b>	4	<b>Course Code</b>	
		<b>Semester</b>	II				
<b>Instructional Hours per week</b>		<b>Lecture</b>		<b>Tutorial</b>		<b>Lab Practice</b>	<b>Total</b>
		4				--	4
<b>Pre-requisite</b>		12 <sup>th</sup> Standard Mathematics					
<b>Objectives of the Course</b>		<ul style="list-style-type: none"> <li>• To understand and apply the concept of homogeneous equations of second degree to represent straight lines in different forms.</li> <li>• To derive polar equations for straight lines, circles, and conic sections, and analyze their geometric properties.</li> <li>• To formulate general equations of planes, calculate angles between two planes, and determine perpendicular distances.</li> <li>• To calculate the angle between a line and a plane, determine the length of perpendiculars, and analyze coplanar and skew lines.</li> <li>• To originate equations of spheres, determine lengths of tangents, and analyze sections of spheres.</li> </ul>					
<b>Course Outline</b>		<b>Unit - I: Pair of Straight lines</b>					
		Introduction – Homogeneous equation of second degree – Angle between the lines – Equation for the bisector of the angle between the lines – Condition for a second degree equation to represent a pair of straight lines. (Chapter 3: Sections 3.1 - 3.5)					
		<b>Unit - II: Polar Coordinates</b>					
		Introduction – Definition of polar coordinates – Relation between Cartesian coordinates and Polar coordinates – polar equation of a straight line – circle – Polar equation of a conic. (Chapter 9: Sections: 9.1 – 9.7.1)					
		<b>Unit - III: Plane</b>					
		Introduction – General equations of plane – Angle between two planes – Perpendicular distance – Plane passing through: Three given points, Intersection of two given planes – Condition for a second degree equation to represent a pair of planes. (Chapter 12: Sections: 12.1 – 12.12)					
		<b>Unit - IV: Straight Lines</b>					
		Introduction – Equations of straight Lines – Angle between a line and plane – Length of the perpendicular – Coplanar lines – Skew lines – Intersection of three planes. (Chapter 13: Sections: 13.1 – 13.12)					



	<b>Unit - V: Sphere</b> Equations of sphere – Length of the tangent – Section of a sphere – Equation of circle – Intersection of two spheres – Condition for the orthogonality – Radical planes. (Chapter 14: Sections: 14.1 – 14.11)
<b>Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)</b>	Questions related to the above topics, from various competitive examinations UPSC / TNPSC / others to be solved (To be discussed during the Tutorial hour)
<b>Skills acquired from this course</b>	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
<b>Recommended Text</b>	1. Analytical Geometry 2D and 3D P.R. Vittal , Pearson Publications First Edition Edition - 1 January 2013 ISBN-13: 978-8131773604 ISBN-10: 8131773604
<b>Reference Books</b>	<ol style="list-style-type: none"> <li>1. P.Duraipandian and Laxmi Duraipandian, Analytical  Geometry Two dimensions, Emerald Publication.</li> <li>2. Shanti Narayan and P.K.Mittal, Analytical Solid Geometry of  3D, S. Chand Publications.</li> <li>3. Manicavasagam Pillay &amp; Natarajan, Analytical Geometry of  Twodimensions,  S. Viswanathan (printers &amp; publication) Pvt Ltd.</li> <li>4. Manicavasagam Pillay &amp; Natarajan, Analytical Geometry  of Three dimensions, S. Viswanathan (printers &amp;  publication) Pvt Ltd.</li> </ol>
<b>Website and e-Learning Source</b>	<a href="https://mathworld.wolfram.com/">https://mathworld.wolfram.com/</a> , <a href="http://www.univie.ac.at/future.media/moe/galarie.html/">http://www.univie.ac.at/future.media/moe/galarie.html/</a>

Course Learning Outcome (for Mapping with POs and PSOs)

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

**Mapping of CO with PO and PSO**

CO	Programme Outcomes (PO)					Programme Specific Outcomes (PSO)					Mean Scores of COs
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
1	3	3	3	3	2	3	3	3	3	2	2.8
2	3	3	3	3	2	3	3	3	3	2	2.8
3	3	3	3	3	2	3	3	3	3	1	2.7
4	3	3	3	3	1	3	3	3	3	1	2.6
5	3	3	3	3	1	3	3	2	3	1	2.5

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

<b>Recommended Text</b>	<ol style="list-style-type: none"> <li>1. S.Narayanan and T.K.Manickavachagom pillay, Calculus Volume I(2007),Volume II(2010), S.Viswanathan printers and publishers pvt.ltd –Chennai</li> <li>2. H. Anton, I. Birens and S. Davis, Calculus, John Wiley and Sons,Inc., 2002.</li> <li>3. G.B. Thomas and R.L. Finney, Calculus, Pearson Education, 2007.</li> <li>4. D. Chatterjee, Integral Calculus and Differential Equations, Tata-McGraw Hill Publishing Company Ltd.</li> </ol>
<b>Reference Books</b>	<ol style="list-style-type: none"> <li>1. P. Kandasamy. K.Thilagavathy, Mathematics for B.Sc. Vol- I,II,II &amp; IV, S.Chand &amp; Company Ltd. New Delhi-55, 2004</li> <li>2. Calculus, P.R.Vittal and V. Malini, 2012</li> </ol>
<b>Website and e-Learning Source</b>	<a href="https://nptel.ac.in">https://nptel.ac.in</a>

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

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

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

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

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

**CLO 5:** Explain Geometric and Physical applications of integral calculus

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

<b>Title of the Course</b>		<b>NUMERICAL METHODS WITH APPLICATIONS - II</b>				
<b>Paper Number</b>		<b>ELECTIVE - II</b>				
<b>Category</b>	Core	<b>Year</b>	I	<b>Credits</b>	3	<b>Course Code</b>
		<b>Semester</b>	II			
<b>Instructional Hours per week</b>	<b>Lecture</b>		<b>Tutorial</b>		<b>Lab Practice</b>	<b>Total</b>
	3		--		--	3
<b>Pre-requisite</b>		12 <sup>th</sup> Standard Mathematics				
<b>Objectives of the Course</b>		<ul style="list-style-type: none"> <li>➤ To evaluate derivatives using Newton's forward and backward differences formulae.</li> <li>➤ To acquire the knowledge about evaluation of numerical integration.</li> <li>➤ To evaluate the solution of linear homogeneous difference equations with constant coefficients.</li> <li>➤ To obtain numerical solutions to the ordinary differential equations.</li> </ul>				
<b>Course Outline</b>		<p><b>Unit I:</b> Numerical Differentiation: Derivatives using Newton's Forward and Backward Difference Formulae Derivatives using Stirling's Formula- Derivatives using Divided Difference Formula- Maxima and Minima using the above Formulae. <b>Chapter 7</b> :Section 7.1 to 7.4 &amp; 7.6</p> <p><b>Unit II:</b> Numerical Integration: Trapezoidal Rule-Simpson's One-ThirdRule - Simpson's Three-Eighth Rule- Weddle's Rule. <b>Chapter 7</b> :Section 7.9 &amp; 7.13 to 7.15</p> <p><b>Unit III:</b> Difference Equations: Linear Homogenous and Non Homogenous Difference Equation with constant coefficients- particular integrals for <math>a^x, x^m, \sin kx, \cos kx, a^x F(x)</math>. <b>Chapter 8</b> :Section 8.1 to 8.4 &amp; 8.6</p> <p><b>Unit IV:</b> Numerical solution of Ordinary Differential Equations(I order only): Taylor's series method- Picard's method. <b>Chapter 9:</b> Section 9.5 ,9.6</p> <p><b>Unit V:</b> Numerical solution of Ordinary Differential Equations (I order only): Euler's Method- Modified Euler's Method-Runge-Kutta Method (Fourth Order only). <b>Chapter 9</b> : Section 9.7,9.9 to 9.11</p>				

<b>Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)</b>	Questions related to the above topics, from various competitive examinations UPSC / TNPSC / others to be solved (To be discussed during the Tutorial hour)
<b>Skills acquired from this course</b>	Knowledge, problem solving, analytical ability, professional competency, professional communication and transferable skill.
<b>Recommended Text</b>	P.Kandasamy, K.Thilagavathy (2003) Calculus of Finite differences & Numerical Analysis, S. Chand & Company Ltd., New Delhi-55.
<b>Reference Books</b>	1. B.D. Gupta. (2001) <i>Numerical Analysis</i> . Konark Pub. Ltd., Delhi 2. M.K. Venkataraman. (1992) <i>Numerical methods for Science and Engineering</i> National Publishing Company, Chennai. 3. S. Arumugam. (2003) <i>Numerical Methods</i> , New Gamma Publishing, Palayamkottai. 4. H.C. Saxena. (1991) <i>Finite differences and Numerical analysis</i> S.Chand & Co., Delhi
<b>Website and e-Learning Source</b>	<a href="https://ocw.mit.edu/courses/22-15-essential-numerical-methods-fall-2014/pages/syllabus/">https://ocw.mit.edu/courses/22-15-essential-numerical-methods-fall-2014/pages/syllabus/</a> <a href="https://ocw.mit.edu/courses/18-330-introduction-to-numerical-analysis-spring-2004/">https://ocw.mit.edu/courses/18-330-introduction-to-numerical-analysis-spring-2004/</a>

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

**CLO1:** After studied unit -1, the student will be able to evaluate derivatives by applying Newton's forward and backward differences formulae.

**CLO2:** After studied unit -2, the student will be able to evaluate integrations by applying the trapezoidal rule, Simpson's rules, and Weddle's rule.

**CLO3:** After studied unit -3, the student will be able to find a complete solution to linear difference equations.

**CLO4:** After studied unit -4, the student will be able to estimate approximate numerical solutions of ordinary differential equations by Euler, Picard and Taylor.

**CLO5:** After studied unit -5, the student will be able to estimate approximate numerical solutions of ordinary differential equations by Runge-Kutta methods.

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

<b>Title of the Course</b>		<b>NUMERICAL METHODS</b>					
<b>Paper Number</b>		<b>ELECTIVE PRACTICAL</b>					
<b>Category</b>	Core	<b>Year</b>	I	<b>Credits</b>	2	<b>Course Code</b>	
		<b>Semester</b>	I & II				
<b>Instructional Hours per week</b>	<b>Lecture</b>		<b>Tutorial</b>		<b>Lab Practice</b>	<b>Total</b>	
	--		--		2	2	
<b>Pre-requisite</b>		12 <sup>th</sup> Standard Mathematics					
<b>Objectives of the Course</b>		<ul style="list-style-type: none"> <li>➤ To understand the basic methods for forming difference table and learn the essence of interpolation techniques</li> <li>➤ To solve algebraic equations, system of linear equations and to find numerical differentiation, numerical integration and numerical solution of ordinary differential equations.</li> </ul>					
<b>Course Outline</b>		<ol style="list-style-type: none"> <li>1. Bisection method and Iteration Method.</li> <li>2. Regular falsi and Newton – Raphson Method.</li> <li>3. Gauss-Elimination Method and Gauss-Jordan Method</li> <li>4. Finite Difference interpolation</li> <li>5. Newton's forward and backward interpolation.</li> <li>6. Central Difference</li> <li>7. Divided differences interpolation.</li> <li>8. Lagrange's Interpolation</li> <li>9. Numerical Differentiation</li> <li>10. Numerical Integration</li> <li>11. Linear Homogenous and Non-Homogenous Difference Equation with constant coefficients- particular integrals</li> <li>12. Taylor's series</li> <li>13. Picard's method</li> <li>14. Euler's method and Rung Runge-Kutta Method (Fourth Order only).</li> </ol>					
<b>Skills acquired from this course</b>		Knowledge, problem solving, analytical ability, professional competency, professional communication and transferable skill.					
<b>Recommended Text</b>		1. P.Kandasamy, K.Thilagavathy (2003) Calculus of Finite differences & Numerical Analysis, S. Chand & Company Ltd., New Delhi-55.					
<b>Reference Books</b>		<ol style="list-style-type: none"> <li>1. B.D. Gupta. (2001) <i>Numerical Analysis</i>. Konark Pub. Ltd., Delhi</li> <li>5. M.K. Venkataraman. (1992) <i>Numerical methods for Science and Engineering</i> National Publishing Company, Chennai.</li> <li>6. S. Arumugam. (2003) <i>Numerical Methods</i>, New Gamma Publishing, Palayamkottai.</li> <li>7. H.C. Saxena. (1991) <i>Finite differences and Numerical analysis</i></li> <li>2. S.Chand &amp; Co., Delhi</li> </ol>					



<b>Website and e-Learning Source</b>	<a href="https://ocw.mit.edu/courses/22-15-essential-numerical-methods-fall-2014/pages/syllabus/">https://ocw.mit.edu/courses/22-15-essential-numerical-methods-fall-2014/pages/syllabus/</a> 3. <a href="https://ocw.mit.edu/courses/18-330-introduction-to-numerical-analysis-spring-2004/">https://ocw.mit.edu/courses/18-330-introduction-to-numerical- analysis-spring-2004/</a>
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<b>Title of the Course</b>		<b>MATHEMATICS FOR COMPETITIVE EXAMINATIONS-II</b>					
<b>Paper Number</b>		<b>ELECTIVE (SEC)</b>					
<b>Category</b>	Core	<b>Year</b>	I	<b>Credits</b>	2	<b>Course Code</b>	
		<b>Semester</b>	II				
<b>Instructional Hours per week</b>	<b>Lecture</b>		<b>Tutorial</b>		<b>Lab Practice</b>		<b>Total</b>
	2		--		--		2
<b>Pre-requisite</b>		12 <sup>th</sup> Standard Mathematics					
<b>Objectives of the Course</b>		After taking the course, To prepare the students for competitive examinations					
<b>Course Outline</b>		<p><b>Unit I:</b> Time and work – Time and distance – Problems on Trains.(Book 1:Chapters 15, 17, 18).</p> <p><b>Unit II:</b> Simple interest, compound Interest – Bar graphs – Pie Charts – LineGraphs.(Book 1: Chapters21, 22, 37, 38, 39).</p> <p><b>Unit III:</b> Logical Sequence of Words – Arithmetical Reasoning – Inserting theMissing Character.(Book 2, Section: 1, Chapters 13 – 15)</p> <p><b>Unit IV:</b> Data Sufficiency – Decision Making – Verification of Truth of the Statement.(Book 2, Section: 1, Chapters 16, 17, 20.)</p> <p><b>Unit V:</b> Non- Verbal Reasoning – Analytical Reasoning – Grouping of Identical Figures.(Book 2, Section: 3, Chapter 3, 4, 13)</p>					
<b>Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)</b>		Questions related to the above topics, from various competitive examinations UPSC / TNPSC / others to be solved.(To be discussed during the Tutorial hour)					
<b>Skills acquired from this course</b>		Knowledge, problem solving, analytical ability, professional competency, professional communication and transferable skill.					
<b>Recommended Text</b>		<p>4. R. S. Aggarwal, <i>Quantitative Aptitude for Competitive Examinations</i>, Revised Edition, S. Chandand Company Ltd., RamNagar, New Delhi, Reprint 2022.</p> <p>5. R. S. Agarwal, <i>A Modern Approach To Verbal And NonverbalReasoning</i>, S. Chand, 2018.</p>					

<b>Reference Books</b>	V.V. K. Subbiraj, <i>Test of Reasoning – Verbal/Non-Verbal &amp; General Intelligence for Competitive Examinations</i> , Sura Books, 2007
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Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

**CLO 1:** Make critique of quantitative information using proportional reasoning

**CLO 2:** Interpret and compare weighted averages, indices, ranking.

**CLO 3:** Identify uses and misuses of percentages related to a proper understanding of the bases.

**CLO 4:** Examining and estimating percentages as rates per 100

**CLO 5:** Solve for an unknown quantity in proportional situation

	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

**E-learning source:** [www.tcyonline.com/tests/mathematics-competitive-exam](http://www.tcyonline.com/tests/mathematics-competitive-exam)

<http://www.indiabix.com/online-test/non-verbal-reasoning-test/>

<http://books.tamilcube.com/career/aptitude-test/non-verbal-reasoning/non-verbal-reasoning-questions-001.aspx>

<https://www.kent.ac.uk/careers/tests/spatialtest.htm>

<http://www.careerbless.com/aptitude/qa/home.php>

<http://www.careerride.com/online-aptitude-test.aspx>

<b>Title of the Course</b>		<b>OFFICE AUTOMATION</b>					
<b>Paper Number</b>		<b>ELECTIVE (SEC)</b>					
<b>Category</b>	Core	<b>Year</b>	I	<b>Credits</b>	2	<b>Course Code</b>	
		<b>Semester</b>	II				
<b>Instructional Hours per week</b>		<b>Lecture</b>		<b>Tutorial</b>		<b>Lab Practice</b>	<b>Total</b>
		2		--		--	2
<b>Pre-requisite</b>		12 <sup>th</sup> Standard Mathematics					
<b>Objectives of the Course</b>		<ul style="list-style-type: none"> <li>➤ The major objective in introducing the Computer Skills course is to impart training for students in Microsoft Office which has different components like MS Word, MS Excel and Power point</li> <li>➤ The course is highly practice oriented rather than regular class room teaching.</li> <li>➤ .To acquire knowledge on editor, spread sheet and presentation software.</li> </ul>					
<b>Course Outline</b>		<p><b>Unit I:</b> Introductory concepts: Hardware and Software - Memory unit – CPU-Input Devices: Key board, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems - Introduction to Programming Languages.</p> <p><b>Unit II:</b> Word Processing: File menu operations - Editing text – tools, formatting, bullets and numbering - Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, printing – Preview, options, merge.</p> <p><b>Unit III:</b> Spreadsheets: Excel – opening, entering text and data, formatting,navigating; Formulas – entering, handling and copying</p> <p><b>Unit IV:</b> Charts – creating, formatting and printing, analysis tables, preparation of financial statements, introduction to data analytics.</p> <p><b>Unit V:</b> Power point: Introduction to Power point - Features – Understanding slide typecasting &amp; viewing slides – creating slide shows. Applying special object – including objects &amp; pictures – Slide transition – Animation effects, audio inclusion, timers.</p>					
<b>Skills acquired from this course</b>		Learning office automation develops skills in Microsoft Office, data management, digital communication, and basic IT, enhancing workplace productivity and efficiency.					
<b>Recommended Text</b>		Peter Norton, “Introduction to Computers” –Tata McGraw-Hill.					

<b>Reference Books</b>	Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, “Microsoft 2003”, Tata McGraw- Hill.
<b>Website and e-Learning Source</b>	Web content from NDL / SWAYAM or opensource web resources

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

**CLO 1:** Understand the basics of computer systems and its components.

**CLO 2:** Understand and apply the basic concepts of a word processing package

**CLO 3:** Understand and apply the basic concepts of electronic spreadsheet software.

**CLO 4:** Understand and apply the basic concepts of database management system.

**CLO 5:** Understand and create a presentation using PowerPoint tool.

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