

**SRI SARADA COLLEGE FOR WOMEN (AUTONOMOUS)**

**SALEM – 16**

Reaccredited with 'B++' Grade by NAAC

Affiliated to Periyar University



**PG & RESEARCH DEPARTMENT OF MATHEMATICS**

**(DST-FIST & DBT-STAR SPONSORED)**

**Outcome Based Syllabus**

**B.Sc. MATHEMATICS**

**(For the students admitted in 2023-24 onwards)**

## **B.Sc. MATHEMATICS**

### **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.

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**B.Sc. MATHEMATICS**  
**PROGRAMME STRUCTURE UNDER CBCS**  
*(For the students admitted in 2023-24 onwards)*  
**Total Credits: 140 + Extra Credits (Maximum 28)**

**I SEMESTER**

<b>Part</b>	<b>Course</b>	<b>Course Title</b>	<b>Code</b>	<b>No. of Hours</b>	<b>Credits</b>
I	Language	Tamil-I / Hindi-I / Sanskrit-I	23ULTC1/ 23ULHC1/ 23ULSC1	6	3
II	English	General English - I	23ULEC1	6	3
III	Core Course -I	Algebra & Trigonometry	23UMACC1	4	4
	Core Course -II	Differential Calculus	23UMACC2	5	4
	Generic Elective - I	Physics - I	23UMAGEC1	3	3
		Physics Practical - I	23UMAGECQ1	2	2
IV	Skill Enhancement Course (NME-I)	Mathematics for Competitive Examinations	23UMASEC1	2	2
	Skill Enhancement (Foundation Course)	Bridge Mathematics	23UMASEFC	2	2
	<b>Total</b>			<b>30</b>	<b>23</b>
V	<ul style="list-style-type: none"> <li>• Articulation and Idea Fixation Skills</li> <li>• Physical Fitness Practice - 35 Hours per Semester</li> </ul>				
	<ul style="list-style-type: none"> <li>• Advanced Diploma in Vedic Mathematics Level -1: Certificate Course 100 Hours per Year</li> </ul>				

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**Total Credits: 140 + Extra Credits (Maximum 28)**

**SEMESTER-II**

Part	Course	Course Title	Code	No. of Hours	Credits
I	Language	Tamil-I / Hindi-I / Sanskrit-II	23ULTC2/ 23ULHC2/ 23ULSC2	6	3
II	English	General English – I	23ULEC2	6	3
III	Core Course -III	Analytical Geometry (Two & Three Dimensions)	23UMACC3	5	4
	Core Course -IV	Integral Calculus	23UMACC4	4	4
	Elective-II (Generic)	Physics – II	23UMAGEC2	3	3
Physics Practical - II		23UMAGECQ2	2	2	
IV	Skill Enhancement Course -II(NME)	Quantitative Aptitude for Competitive Examinations	23UMASEC2	2	2
	Skill Enhancement Course- III (Indian Knowledge System)	History and Development of Indian Mathematics (From Vedic Period to Modern Era)	23UMASEC3	2	2
<b>Total</b>				<b>30</b>	<b>23</b>
V	<ul style="list-style-type: none"> <li>• Articulation and Idea Fixation Skills-1 Extra Credit</li> <li>• Physical Fitness Practice - 35 Hours per Semester-1 Extra Credit</li> </ul>				
	<ul style="list-style-type: none"> <li>• Advanced Diploma in Vedic Mathematics</li> <li>• Level -1: Certificate Course 100 Hours per Year-2 Extra Credits</li> </ul> Extra credits are given for extra skills and courses qualified in MOOC/NPTEL				

<b>Title of the Course</b>		<b>ALGEBRA &amp; TRIGONOMETRY</b>					
<b>Paper Number</b>		<b>CORE I</b>					
<b>Category</b>	<b>CORE</b>	<b>Year</b>	<b>I</b>	<b>Credits</b>	<b>4</b>	<b>Course Code</b>	<b>23UMACC1</b>
		<b>Semester</b>	<b>I</b>				
<b>Instructional Hours per week</b>		<b>Lecture</b>	<b>Tutorial</b>	<b>Lab Practice</b>		<b>Total</b>	
		<b>3</b>	<b>1</b>	<b>-</b>		<b>4</b>	
<b>Pre-requisite</b>		12 <sup>th</sup> Standard Mathematics					
<b>Objectives of the Course</b>		<p>1.Basic ideas on the Theory of Equations, Matrices and Number Theory.</p> <p>2.Knowledge to find expansions of trigonometry functions, solve theoretical and applied problems.</p>					
<b>Course Outcomes:</b>		<p>Students will be able to</p> <p><b>CO1:</b> Classify and solve reciprocal equations</p> <p><b>CO2:</b> Find the sum of binomial, exponential and logarithmic series</p> <p><b>CO3:</b> Find Eigen values, eigen vectors, verify Cayley - Hamilton theorem and diagonalize a given matrix</p> <p><b>CO4:</b> Expand the powers and multiples of trigonometric functions in terms of sine and cosine</p> <p><b>CO5:</b> Determine relationship between circular and hyperbolic functions and the summation of trigonometric series</p>					
<b>Course Outline</b>		<b>Unit – I (Hours: 12)</b>					
		<p>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.</p> <p><b>Chapter 4 (Sections 32-34), Chapter 5 (Section 45) &amp; Chapter 11 (Section 108)</b></p>					
		<b>Unit –II (Hours: 12)</b>					
		<p>Summation of Series: Binomial - Exponential - Logarithmic series (Theorems without proof) – Approximations - related problems.</p> <p><b>Chapter 1 (Page 84 - 88, 90 – 103) &amp; Chapter 13 (Page 253)</b></p>					
		<b>Unit–III (Hours: 12)</b>					
		<p>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.</p> <p><b>Chapter 5(Sections5.1 -5.3) &amp; Page 371</b></p>					

	<p><b>Unit –IV (Hours: 12)</b>  Expansions of <math>\sin n\theta</math>, <math>\cos n\theta</math> in powers of <math>\sin\theta</math>, <math>\cos\theta</math> - Expansion of <math>\tan n\theta</math> in terms of <math>\tan\theta</math>, Expansions of <math>\cos^n\theta</math>, <math>\sin^n\theta</math>, <math>\cos^m\theta\sin^n\theta</math> –Expansions of <math>\tan(\theta_1+\theta_2+\dots+\theta_n)</math>-Expansions of <math>\sin\theta</math>, <math>\cos\theta</math> and <math>\tan\theta</math> in terms of <math>\theta</math> - related problems.  <b>Chapters 9 (Page 169 - 174) &amp; Chapter 5 (Page 79 - 84)</b></p> <p><b>Unit –V (Hours: 12)</b>  Hyperbolic functions – Relation between circular and hyperbolic functions Inverse hyperbolic functions, Logarithm of complex quantities, Summation of trigonometric series - related problems.  <b>Chapter 4 (Page 52-57), Chapter 6 (Page 104 – 107 &amp; 110),</b>  <b>Chapter 10 (Page 197-202),</b>  <b>Chapter 13 (Page 241 - 245 &amp; 256) &amp; Chapter 9 (Page 174 - 178)</b></p>
Extended Professional Component (is a part of Internal Component only, not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC/TRB/NET/UGC – CSIR/ GATE/ TNPSC/ others to be solved.  (To be discussed during the Tutorial hour)
Skills acquired from the course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
<b>Recommended Text</b>	<ol style="list-style-type: none"> <li>1. W.S. Burnstine and A.W. Panton, Theory of equations (for Unit I)</li> <li>2. David C. Lay, Linear Algebra and its Applications, 3rd Ed., Pearson Education Asia, Indian Reprint, 2007 (for Unit III)</li> <li>3. C.V.Durell and A. Robson, Advanced Trigonometry, Courier Corporation, 2003, (for Unit II, IV &amp; V)</li> </ol>
<b>Reference Books</b>	<ol style="list-style-type: none"> <li>1. G.B. Thomas and R.L. Finney, Calculus, 9th Ed., Pearson Education, Delhi, 2005</li> <li>2. J.Stewart, L. Redlin, and S. Watson, Algebra and Trigonometry, Cengage Learning, 2012.</li> <li>3. Calculus and Analytical Geometry, G.B. Thomas and R. L. Finny, Pearson Publication, 9<sup>th</sup> Edition, 2010.</li> <li>4. Dr.P.R.Vittal &amp; V.Malini, Algebra, Analytical Geometry &amp; Trigonometry, Margham Publications, Chennai-17.</li> <li>5. T.K.Manickavasagam Pillai &amp; others, Algebra Volume-I, S.V. Publications, 1985.</li> </ol>
<b>Web resources</b>	<a href="https://nptel.ac.in/">https://nptel.ac.in/</a> <a href="https://yutsumura.com/linear-algebra/the-cayley-hamilton-theorem/">https://yutsumura.com/linear-algebra/the-cayley-hamilton-theorem/</a> <a href="https://www.youtube.com/watch?v=V1AKAkGJIN8">https://www.youtube.com/watch?v=V1AKAkGJIN8</a>

**Mapping of COs with POs and PSOs:**

	Pos						PSOs		
	1	2	3	4	5	6	1	2	3
<b>CO1</b>	3	1	3	-	-	-	3	2	1
<b>CO2</b>	2	1	3	1	-	-	3	2	1
<b>CO3</b>	3	1	3	1	-	-	3	2	1
<b>CO4</b>	3	1	3	-	-	-	3	2	1
<b>CO5</b>	3	1	3	-	-	-	3	2	1

**Strong-3; Medium-2; Low-1**



<b>Title of the Course</b>		<b>DIFFERENTIAL CALCULUS</b>					
<b>Paper Number</b>		<b>CORE II</b>					
<b>Category</b>	<b>CORE</b>	<b>Year</b>	<b>I</b>	<b>Credits</b>	<b>4</b>	<b>Course Code</b>	<b>23UMACC2</b>
		<b>Semester</b>	<b>I</b>				
<b>Instructional Hours per week</b>		<b>Lecture</b>	<b>Tutorial</b>	<b>Lab Practice</b>		<b>Total</b>	
		<b>4</b>	<b>1</b>	<b>-</b>		<b>5</b>	
<b>Pre-requisite</b>		12 <sup>th</sup> Standard Mathematics					
<b>Objectives of the Course</b>		<p>1.The basic skills of differentiation, successive differentiation, and their applications.</p> <p>2.Basic knowledge on the notions of curvature, evolutes, involutes and polar co-ordinates and in solving related problems.</p>					
<b>Course Outcomes:</b>							
Students will be able to							
<b>CO1:</b> Find the nth derivative, form equations involving derivatives and apply Leibnitz formula							
<b>CO2:</b> Find the partial derivative and total derivative coefficient							
<b>CO3:</b> Determine maxima and minima of functions of two variables and to use the Lagrange's method of undetermined multipliers							
<b>CO4:</b> Find the envelope of a given family of curves							
<b>CO5:</b> Find the evolutes and involutes and to find the radius of curvature using polar co-ordinates							
<b>Course Outline</b>		<b>Unit–I (Hours: 15)</b> <b>Successive Differentiation</b> Introduction (Review of basic concepts) – The $n^{th}$ derivative – Standard results – Fractional expressions – Trigonometrical transformation – Formation of equations involving derivatives – Leibnitz formula for the $n^{th}$ derivative of a product – Feynman's method of differentiation. <b>Chapter 3 (Sections 3.1, 3.2 &amp;3.3)</b>					
		<b>Unit–II (Hours: 15)</b> <b>Partial Differentiation</b> Partial derivatives – Successive partial derivatives – Function of a function rule – Total differential coefficient – A special case – Implicit Functions. <b>Chapter 11 (Sections 11.3-11.5)</b>					
		<b>Unit–III (Hours: 15)</b> <b>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>Chapter 11 (Sections 11.3, 11.7, 11.8)</b>					
		<b>Unit –IV(Hours: 15)</b>					

	<p><b>Curvature</b>  Definition of Curvature – Circle, Radius and Centre of Curvature – Evolutes and Involutives – Radius of Curvature in Polar Coordinates.  <b>Chapter 13 (Sections 13.1, 13.2, 13.4, 13.7, 13.10)</b></p> <p><b>Unit –V (Hours: 15)</b>  <b>Envelope</b>  Method of finding the envelope – Another definition of envelope – Envelope of family of curves which are quadratic in the parameter.  <b>Chapter 14 (Sections 14.1 to 14.4)</b></p>
Extended Professional Component (is a part of Internal Component only, not to be included in the External Examination question paper)	<p>Questions related to the above topics, from various competitive examinations UPSC/TRB/NET/UGC – CSIR/ GATE/ TNPSC/ others to be solved.</p> <p>(To be discussed during the Tutorial hour)</p>
Skills acquired from the course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
<b>Recommended Text</b>	<ol style="list-style-type: none"> <li>1. M.J. Strauss, G.L. Bradley and K. J. Smith, Calculus, 3rd Ed., Dorling Kindersley (India) P. Ltd. (Pearson Education), Delhi, 2007. (For Unit I, II &amp; III)</li> <li>2. N.P. Bali, Golden Differential Calculus, Laxmi Publications (P) Ltd. 2010. (For Unit IV &amp; V)</li> </ol>
<b>Reference Books</b>	<ol style="list-style-type: none"> <li>1. H. Anton, I. Birens and S. Davis, Calculus, John Wiley and Sons, Inc., 2002.</li> <li>2. G.B. Thomas and R.L. Finney, Calculus, Pearson Education, 2010.</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>
<b>Web resources</b>	<p><a href="https://nptel.ac.in/">https://nptel.ac.in/</a>  <a href="https://arcsecond.wordpress.com/2009/05/10/feynmans-differentiation-trick/">https://arcsecond.wordpress.com/2009/05/10/feynmans-differentiation-trick/</a></p>

**Mapping of COs with POs and PSOs:**

	Pos						PSOs		
	1	2	3	4	5	6	1	2	3
<b>CO1</b>	3	1	3	-	-	-	3	2	1
<b>CO2</b>	2	1	3	-	-	-	3	2	1
<b>CO3</b>	3	2	3	2	-	-	3	2	1
<b>CO4</b>	3	2	3	2	1	-	3	2	1
<b>CO5</b>	3	2	3	2	1	-	3	2	1

**Strong-3; Medium-2; Low-1**

Subject Code	Subject Name	Category	L	T	P	Credits	Inst. Hours	Marks
23UMAEC1	PHYSICS - I	Allied				3	3	75

<b>COURSE</b>	<b>GENERIC ELECTIVE - I</b>
<b>COURSE TITLE</b>	<b>PHYSICS - I</b>
<b>CODE</b>	<b>23UMAGEC1</b>
<b>CREDITS</b>	<b>3</b>
<b>HOURS</b>	<b>3</b>
<b>COURSE OBJECTIVES</b>	To impart basic principles of Physics that which would be helpful for students who have taken programmes other than Physics.

UNITS	COURSE DETAILS
<b>UNIT-I</b>	<b>WAVES, OSCILLATIONS AND ULTRASONICS:</b> simple harmonic motion (SHM) – composition of two SHMs at right angles (periods in the ratio 1:1) – Lissajous figures – uses – laws of transverse vibrations of strings – determination of AC frequency using sonometer (steel and brass wires) – ultrasound – production – piezoelectric method – application of ultrasonics: medical field – lithotripsy, ultrasonography – ultrasono imaging- ultrasonics in dentistry – physiotherapy, ophthalmology – advantages of noninvasive surgery – ultrasonics in green chemistry.
<b>UNIT-II</b>	<b>PROPERTIES OF MATTER:</b> <i>Elasticity:</i> elastic constants – bending of beam – theory of non- uniform bending – determination of Young’s modulus by non-uniform bending – energy stored in a stretched wire – torsion of a wire – determination of rigidity modulus by torsional pendulum <i>Viscosity:</i> streamline and turbulent motion – critical velocity – coefficient of viscosity – Poiseuille’s formula – comparison of viscosities – burette method, <i>Surface tension:</i> definition – molecular theory – droplets formation–shape, size and lifetime – COVID transmission through droplets, saliva – drop weight method – interfacial surface tension.
<b>UNIT-III</b>	<b>HEAT AND THERMODYNAMICS:</b> Joule-Kelvin effect – Joule-Thomson porous plug experiment – theory – temperature of inversion – liquefaction of Oxygen– Linde’s process of liquefaction of air– liquid Oxygen for medical purpose– importance of cryocoolers – thermodynamic system – thermodynamic equilibrium – laws of thermodynamics – heat engine – Carnot’s cycle – efficiency – entropy – change of entropy in reversible and irreversible process.
<b>UNIT-IV</b>	<b>ELECTRICITY AND MAGNETISM:</b> potentiometer – principle – measurement of theorem of using potentiometer –magnetic field due to a current carrying conductor – Biot-Savart’s law – field along the axis of the coil carrying current – peak, average and RMS values of ac current and voltage – power factor

	and current values in an AC circuit – types of switches in household and factories– Smart wifi switches- fuses and circuit breakers in houses
<b>UNIT-V</b>	<b>DIGITAL ELECTRONICS AND DIGITAL INDIA:</b> logic gates, OR, AND, NOT, NAND, NOR , EXOR logic gates – universal building blocks – Boolean algebra – De Morgan’s theorem – verification – overview of Government initiatives: software technological parks under MeitY, NIELIT- semiconductor laboratories under Dept. of Space – an introduction to Digital India
<b>TEXT BOOKS</b>	<ol style="list-style-type: none"> <li>1. R.Murugesan (2001), Allied Physics, S. Chand &amp; Co, New Delhi.</li> <li>2. Brijlal and N.Subramanyam (1994), Waves and Oscillations, Vikas Publishing House, New Delhi.</li> <li>3. Brijlal and N.Subramaniam (1994), Properties of Matter, S.Chand &amp; Co., New Delhi.</li> <li>4. J.B.Rajam and C.L.Arora (1976). Heat and Thermodynamics (8<sup>th</sup> edition), S.Chand &amp; Co., New Delhi.</li> <li>5. R.Murugesan (2005), Optics and Spectroscopy, S.Chand &amp; Co, New Delhi.</li> <li>6. A.Subramaniyam, Applied Electronics 2<sup>nd</sup> Edn., National Publishing Co., Chennai.</li> </ol>
<b>REFERENCE BOOKS</b>	<ol style="list-style-type: none"> <li>1. Resnick Halliday and Walker (2018). Fundamentals of Physics (11<sup>th</sup>edition),</li> <li>2. John Wiley and Sons, Asia Pvt. Ltd., Singapore.</li> <li>3. V.R.Khanna and R.S.Bedi (1998), Text book of Sound 1<sup>st</sup> Edn. Kedharnaath Publish &amp; Co, Meerut.</li> <li>4. N.S.Khare and S.S.Srivastava (1983), Electricity and Magnetism 10<sup>th</sup>Edn., Atma Ram &amp; Sons, New Delhi.</li> <li>5. D.R.Khannaand H.R. Gulati (1979). Optics, S. Chand &amp; Co.Ltd., New Delhi.</li> <li>6. V.K.Metha (2004). Principles of electronics 6<sup>th</sup> Edn. S.Chand and company.</li> </ol>
<b>WEB LINKS</b>	<ol style="list-style-type: none"> <li>1. <a href="https://youtu.be/M_5KYncYNyc">https://youtu.be/M_5KYncYNyc</a></li> <li>2. <a href="https://youtu.be/ljJLJgIvaHY">https://youtu.be/ljJLJgIvaHY</a></li> <li>3. <a href="https://youtu.be/7mGqd9HQ_AU">https://youtu.be/7mGqd9HQ_AU</a></li> <li>4. <a href="https://youtu.be/h5jOAw57OXM">https://youtu.be/h5jOAw57OXM</a></li> <li>5. <a href="https://learningtechnologyofficial.com/category/fluid-mechanics-lab/">https://learningtechnologyofficial.com/category/fluid-mechanics-lab/</a></li> <li>6. <a href="http://hyperphysics.phy-astr.gsu.edu/hbase/permot2.html">http://hyperphysics.phy-astr.gsu.edu/hbase/permot2.html</a><a href="https://www.youtube.com/watch?v=gT8Nth9NWPM">https://www.youtube.com/watch?v=gT8Nth9NWPM</a><a href="https://www.youtube.com/watch?v=9mXOMzUruMQ&amp;t=1s">https://www.youtube.com/watch?v=9mXOMzUruMQ&amp;t=1s</a><a href="https://www.youtube.com/watch?v=m4u-SuaSu1s&amp;t=3s">https://www.youtube.com/watch?v=m4u-SuaSu1s&amp;t=3s</a><a href="https://www.biolinscientific.com/blog/what-are-surfactants-and-how-do-they-work">https://www.biolinscientific.com/blog/what-are-surfactants-and-how-do-they-work</a></li> </ol>
<b>Board of Studies Date : 02.05.2023</b>	



<b>COURSE</b>	<b>GENERIC ELECTIVE - I</b>
<b>COURSE TITLE</b>	<b>PHYSICS PRACTICAL - I</b>
<b>CODE</b>	<b>23UMAGECQ1</b>
<b>CREDITS</b>	<b>2</b>
<b>HOURS</b>	<b>2</b>
<b>COURSE OBJECTIVES</b>	Apply various physics concepts to understand Properties of Matter and waves, set up experimentation to verify theories, quantify and analyse, able to do error analysis and correlate results
<b>ANY Seven only</b>	
<ol style="list-style-type: none"> <li>1. Young's modulus by non-uniform bending using pin and microscope</li> <li>2. Young's modulus by non-uniform bending using optic lever, scale and telescope</li> <li>3. Rigidity modulus by static torsion method.</li> <li>4. Rigidity modulus by torsional oscillations without mass</li> <li>2. Surface tension and interfacial Surface tension – drop weight method</li> <li>3. Comparison of viscosities of two liquids – burette method</li> <li>4. Specific heat capacity of a liquid – half time correction</li> <li>5. Verification of laws of transverse vibrations using sonometer</li> <li>6. Calibration of low range voltmeter using potentiometer</li> <li>7. Determination of thermosemf using potentiometer</li> <li>8. Verification of truth tables of basic logic gates using ICs</li> <li>9. Verification of De Morgan's theorems using logic gate ICs.</li> <li>10. Use of NAND as universal building block.</li> </ol> <p><i>Note</i> : Use of digital balance permitted</p>	
<b>Board of Studies Date : 02.05.2023</b>	

**METHOD OF EVALUATION:**

<b>Continuous Internal Assessment</b>	<b>End Semester Examination</b>	<b>Total</b>	<b>Grade</b>
25	75	100	

<b>Title of the Course</b>		<b>MATHEMATICS FOR COMPETITIVE EXAMINATIONS</b>					
<b>Paper Number</b>		<b>NME I</b>					
<b>Category</b>	<b>Skill Enhancement</b>	<b>Year</b>	<b>I</b>	<b>Credits</b>	<b>2</b>	<b>Course Code</b>	<b>23UMASEC1</b>
		<b>Semester</b>	<b>I</b>				
<b>Instructional Hours per week</b>		<b>Lecture</b>	<b>Tutorial</b>	<b>Lab Practice</b>		<b>Total</b>	
		<b>2</b>	<b>-</b>	<b>-</b>		<b>2</b>	
<b>Pre-requisite</b>		12 <sup>th</sup> Standard Mathematics					
<b>Objectives of the Course</b>		<ol style="list-style-type: none"> <li>1. To introduce the basic concepts of Mathematics.</li> <li>2. To make them to find simple and compound interest.</li> <li>3. To promote the problem solving ability to write the competitive examinations.</li> </ol>					
<b>Course Outcomes:</b>							
Students will be able to							
<b>CO1:</b> Recognize the notions on numbers and averages							
<b>CO2:</b> Understand the concepts of profit and loss, ratio and proportion, partnership, simple interest and compound interest problems							
<b>CO3:</b> Apply the concepts obtained in the course to solve real life problems							
<b>CO4:</b> Infer solutions about the partnership and rate of proportionality appropriately.							
<b>CO5:</b> Analyze the problems on profit and loss and inspect the odd man out series.							
<b>Course outline</b>		<b>Unit – I (Hours: 6)</b>					
		Averages, Problems on Numbers. <b>Section-I – Chapter 6 – Solved examples 1-15 only (Page No. 139-141), Chapter 7 - Solved examples 1-15 only (Page No.161-163).</b>					
		<b>Unit – II (Hours: 6)</b>					
		Profit and Loss <b>Section-I – Chapter 11 – Solved examples 1-29 only (Page No.251-256).</b>					
		<b>Unit – III (Hours: 6)</b>					
Ratio and Proportion, Partnership <b>Section-I – Chapter 12 – Solved examples 1-7 only (Page No.294-296), Chapter 13 (Page No.311-325).</b>							
<b>Unit – IV (Hours: 6)</b>							
Simple Interest, Compound Interest <b>Section-I – Chapter 21 – Solved examples 1-12 only (445-447), Chapter 22 – Solved examples 1-15 only (466-470).</b>							
<b>Unit – V (Hours: 6)</b>							
Odd Man Out and Series <b>Section-I – Chapter 35 (Page No.649-657).</b>							



Extended Professional Component (is a part of Internal Component only, not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC/TRB/NET/UGC – CSIR/ GATE/ TNPSC/ others to be solved.
Skills acquired from the course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
<b>Recommended Text</b>	Dr. R. S. Aggarwal- Quantitative Aptitude for Competitive Examinations (Fully Solved) (Seventh Revised Edition), S. Chand & Company Pvt. Ltd
<b>Reference Books</b>	Abhijit Guha - Quantitative Aptitude for All Competitive Examinations, McGraw Hill Education, Sixth edition.
<b>Web resources</b>	<ol style="list-style-type: none"> <li>1. <a href="https://ncert.nic.in/ncerts/l/gemh108.pdf">https://ncert.nic.in/ncerts/l/gemh108.pdf</a></li> <li>2. <a href="https://ncert.nic.in/textbook/pdf/femh112.pdf?html">https://ncert.nic.in/textbook/pdf/femh112.pdf?html</a></li> <li>3. <a href="https://ncert.nic.in/ncerts/l/hemh108.pdf">https://ncert.nic.in/ncerts/l/hemh108.pdf</a></li> </ol>

<b>Title of the Course</b>		<b>BRIDGE MATHEMATICS</b>					
<b>Paper Number</b>		<b>FOUNDATION COURSE</b>					
<b>Category</b>	<b>Skill Enhancement</b>	<b>Year</b>	<b>I</b>	<b>Credits</b>	<b>2</b>	<b>Course Code</b>	<b>23UMASEFC</b>
		<b>Semester</b>	<b>I</b>				
<b>Instructional Hours per week</b>		<b>Lecture</b>	<b>Tutorial</b>	<b>Lab Practice</b>		<b>Total</b>	
		<b>2</b>	<b>-</b>	<b>-</b>		<b>2</b>	
<b>Pre-requisite</b>		12 <sup>th</sup> Standard Mathematics					
<b>Objectives of the Course</b>		<p>1.To bridge the gap and facilitate the transition from higher secondary to tertiary education;</p> <p>2.To instil confidence among stakeholders and inculcate interest for Mathematics.</p>					
<p><b>Course Outcomes:</b></p> <p>Students will be able to</p> <p><b>CO1:</b> Prove the binomial theorem and apply it to find the expansions of any <math>(x + y)^n</math> and also, solve the related problems</p> <p><b>CO2:</b> Find the various sequences and series and solve the problems related to them. Explain the principle of counting.</p> <p><b>CO3:</b> Find the number of permutations and combinations in different cases. Apply the principle of counting to solve the problems on permutations and combinations</p> <p><b>CO4:</b> 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.</p> <p><b>CO5:</b> 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.</p>							
<b>Course Outline</b>		<b>UNIT-I: (Hours: 6)</b>					
		Algebra: Binomial theorem, General term, middle term, problems based on these concepts					
		<b>Unit II: (Hours: 6)</b>					
		Sequences and series (Progressions). Fundamental principle of counting. Factorial n.					
		<b>Unit III:(Hours: 6)</b>					
		Permutations and combinations, Derivation of formulae and their connections, simple applications, combinations with repetitions, arrangements within groups, formation of groups.					

	<p><b>Unit IV: (Hours: 6)</b></p> <p>Trigonometry: Introduction to trigonometric ratios, proof of <math>\sin(A+B)</math>, <math>\cos(A+B)</math>, <math>\tan(A+B)</math> formulae, multiple and sub multiple angles, <math>\sin(2A)</math>, <math>\cos(2A)</math>, <math>\tan(2A)</math> etc., transformations sum into product and product into sum formulae, inverse trigonometric functions, sine rule and cosine rule.</p>
	<p><b>Unit V: (Hours: 6)</b></p> <p>Calculus: Limits, standard formulae and problems, differentiation, first principle, uv rule, u/v rule, methods of differentiation, application of derivatives, integration - product rule and substitution method.</p>
<b>Recommended Text</b>	<p>1. NCERT class XI and XII text books.</p> <p>2. Any State Board Mathematics text books of class XI and XII</p>
<b>Web resources</b>	<a href="https://nptel.ac.in/">https://nptel.ac.in/</a>

**Mapping of COs with POs and PSOs:**

	Pos						PSOs	
	1	2	3	4	5	6	1	2
<b>CO1</b>	1	1	1	1	1	1	1	1
<b>CO2</b>	2	1	1	2	2	1	2	1
<b>CO3</b>	2	1	1	2	2	1	2	1
<b>CO4</b>	1	1	1	1	1	1	2	1
<b>CO5</b>	1	1	1	1	1	1	2	1

**Strong-3; Medium-2; Low-1**

<b>Title of the Course</b>		<b>ANALYTICAL GEOMETRY (TWO &amp; THREE DIMENSIONS)</b>					
<b>Paper Number</b>		<b>CORE III</b>					
<b>Category</b>	<b>CORE</b>	<b>Year</b>	<b>I</b>	<b>Credits</b>	<b>4</b>	<b>Course Code</b>	<b>23UMACC3</b>
		<b>Semester</b>	<b>II</b>				
<b>Instructional Hours per week</b>		<b>Lecture</b>	<b>Tutorial</b>		<b>Lab Practice</b>	<b>Total</b>	
		<b>4</b>	<b>1</b>		<b>-</b>	<b>5</b>	
<b>Pre-requisite</b>		12 <sup>th</sup> Standard Mathematics					
<b>Objectives of the Course</b>		<ol style="list-style-type: none"> <li>1. Necessary skills to analyze characteristics and properties of two- and three-dimensional geometric shapes.</li> <li>2. To present mathematical arguments about geometric relationships.</li> <li>3. To solve real world problems on geometry and its applications.</li> </ol>					
<b>Course Outcomes:</b>		<p>Students will be able to</p> <p><b>CO1:</b> assimilate the basic concepts of Polar Equations of Straight Line and Circle</p> <p><b>CO2:</b> understand the concepts of the Ellipse, the Hyperbola and Conic</p> <p><b>CO3:</b> learn about angle between two planes, Symmetrical form of Equations and solve related problems.</p> <p><b>CO4:</b> analyse the concepts of straight lines, coplanarity of straight lines and shortest distance between two given lines</p> <p><b>CO5:</b> explain in detail the system of Spheres.</p>					
<b>Course Outline</b>	<p><b>Unit – I (Hours: 15)</b></p> <p><b>Coordinates, Length of Straight Lines and Areas of Triangles:</b>  Polar coordinates  <b>The Straight Line:</b> Polar Equations and Oblique Coordinates  <b>The Circle:</b> Equation to a Tangent</p> <p><b>Chapter 2 (Sections 30-35)</b>  <b>Chapter 5 (Sections 88-96)</b>  <b>Chapter 8(Sections138-147)</b></p>						
	<p><b>Unit –II (Hours: 15)</b></p> <p><b>The Ellipse: Pole and Polar - Conjugate Diameters.</b>  <b>The Hyperbola: Asymptotes</b>  <b>Polar Equation to a Conic:</b> Polar Equation to a Tangent, Polar and Normal.</p> <p><b>Chapter 12 (Sections 274-292)</b>  <b>Chapter 13 (Sections 312 -327)</b>  <b>Chapter 14(Sections 335-347)</b></p>						
	<p><b>Unit–III (Hours: 15)</b></p> <p><b>The Plane, The Straight line, Volume of the Tetrahedron:</b> Forms of the Equation to a Plane - The General Equation to a Plane - The Distance of a Point from a Plane - The Planes Bisecting the angles between two</p>						

	<p>given Planes - The Equation to a Straight Line - Symmetrical form of Equation.</p> <p><b>Chapter - 3 (Sections 33 - 35, 37 - 40)</b></p> <p><b>Unit –IV (Hours: 15)</b></p> <p><b>The Plane, The Straight line, Volume of the Tetrahedron:</b> The Line through two given Points - The Direction Ratios found from the Equations - Constants in the Equation to a Line - The Plane and the Straight Line - The intersection of Three Planes - The Condition that two given Lines should be Coplanar - The Shortest Distance between two given Lines.</p> <p><b>Chapter - 3 (Sections 41 - 45, 48 &amp; 49)</b></p> <p><b>Unit -V (Hours: 15)</b></p> <p><b>The Sphere:</b> The Equation to a sphere - Tangents and Tangent Plane to a Sphere - The Radical Plane of two Spheres.</p> <p><b>Chapter - 5 (Sections 56 -58)</b></p>
Extended Professional Component (is a part of Internal Component only, not to be included in the External Examination question paper)	<p>Questions related to the above topics, from various competitive examinations UPSC/TRB/NET/UGC – CSIR/ GATE/ TNPSC/ others to be solved.</p> <p>(To be discussed during the Tutorial hour)</p>
Skills acquired from the course	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. L. Loney, Co-ordinate Geometry (For Units I &amp; II).</li> <li>2. Robert J. T. Bell, Co-ordinate Geometry of Three Dimensions. (For Units III, IV &amp; V)</li> </ol>
<b>Reference Books</b>	<ol style="list-style-type: none"> <li>1. Thomas G.B and Finney R. L, Calculus and Analytical Geometry, Pearson Publication, 9<sup>th</sup> Edition, 2010.</li> <li>2. Manicavachagom Pillay T. K and Natarajan T, A Text book of Analytical Geometry Part I- Two Dimensions, Divya Subramanian for Ananda Book Depot, 1996</li> <li>3. Shanti Narayanan and Mittal P.K, Analytical Solid Geometry, S. Chand Publishing, 2021.</li> <li>4. Vittal P.R and Malini V, Algebra, Analytical Geometry &amp; Trigonometry, Margam Publications, India, 2018</li> <li>5. William F. Osgood and William C. Graustein, Plane and Solid Analytic Geometry, Macmillan Company, New York, 2016.</li> </ol>
<b>Web resources</b>	<a href="https://nptel.ac.in">https://nptel.ac.in</a>

**Mapping of COs with POs and PSOs:**

	Pos						PSOs		
	1	2	3	4	5	6	1	2	3
<b>CO1</b>	2	2	2	1	-	-	3	2	1
<b>CO2</b>	2	2	2	1	-	-	3	2	1
<b>CO3</b>	3	2	2	1	-	-	3	2	1
<b>CO4</b>	3	2	3	1	-	-	3	2	1
<b>CO5</b>	3	2	3	1	-	-	3	2	1

**Strong-3; Medium-2; Low-1**

<b>Title of the Course</b>		<b>INTEGRAL CALCULUS</b>					
<b>Paper Number</b>		<b>CORE IV</b>					
<b>Category</b>	<b>CORE</b>	<b>Year</b>	<b>I</b>	<b>Credits</b>	<b>4</b>	<b>Course Code</b>	<b>23UMACC4</b>
		<b>Semester</b>	<b>II</b>				
<b>Instructional Hours per week</b>		<b>Lecture</b>	<b>Tutorial</b>	<b>Lab Practice</b>		<b>Total</b>	
		<b>4</b>	<b>-</b>	<b>-</b>		<b>4</b>	
<b>Pre-requisite</b>		12 <sup>th</sup> Standard Mathematics					
<b>Objectives of the Course</b>		1. Knowledge on integration and its geometrical applications, double, triple integrals and improper integrals. 2. Knowledge about beta and gamma functions and the applications. 3. Skills to determine Fourier series expansions.					
<b>Course Outcomes:</b> Students will be able to <b>CO1:</b> determine the integrals of algebraic, trigonometric and logarithmic functions and to find the reduction formulae. <b>CO2:</b> evaluate double and triple integrals and problems using change of order of integration <b>CO3:</b> solve multiple integrals and to find the areas of curved surfaces and volumes of solids of revolution <b>CO4:</b> explain beta and gamma functions and to use them in solving problems of integration <b>CO5:</b> explain geometric and physical applications of integral calculus							
<b>Course Outline</b>		<b>Unit – I (Hours: 12)</b>  Reduction formulae - Types, integration of product of powers of algebraic and trigonometric functions, integration of product of powers of algebraic and logarithmic function - Bernoulli's formula, Feynman's technique of integration. <b>Chapter 6 &amp; 7 (Sections 6.6 &amp;6.7, 7.2-7.4)</b>					
		<b>Unit – II (Hours: 12)</b>  Multiple Integrals - definition of double integrals -evaluation of double integrals - double integrals in polar coordinates - Change of order of integration. <b>Chapter 14 (Sections 14.1&amp;14.3)</b>					
		<b>Unit–III (Hours: 12)</b>  Triple integrals - applications of multiple integrals - volumes of solids of revolution - areas of curved surfaces - change of variables - Jacobian. <b>Chapter 14 (Sections 14.5-14.7)</b>					

	<p><b>Unit –IV (Hours: 12)</b></p> <p>Beta and Gamma functions - infinite integrals - definitions - recurrence formula of Gamma functions - properties of Beta and Gamma functions - relation between Beta and Gamma functions - Applications.</p> <p><b>Chapter 3(Sections 3.1-3.3)</b></p>
	<p><b>Unit –V (Hours: 12)</b></p> <p>Geometric and Physical Applications of Integral calculus.</p> <p><b>Chapter 5(Sections 5.1 - 5.8)</b></p>
Extended Professional Component (is a part of Internal Component only, not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC/TRB/NET/UGC – CSIR/ GATE/ TNPSC/ others to be solved.
Skills acquired from the course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
<b>Recommended Text</b>	1.H. Anton, I. Birens and S. Davis, Calculus, John Wiley and Sons, Inc.,2002. (For Units I,II,III & V) 2.D. Chatterjee, Integral Calculus and Differential Equations, Tata-McGraw Hill Publishing Company Ltd. (For Unit IV)
<b>Reference Books</b>	1. G.B. Thomas and R.L. Finney, Calculus, Pearson Education, 2010. 2. P. Dyke, An Introduction to Laplace Transforms and Fourier Series, Springer Undergraduate Mathematics Series, 2001(second edition).
<b>Web resources</b>	<a href="https://nptel.ac.in/">https://nptel.ac.in/</a>



**Mapping of COs with POs and PSOs:**

	Pos						PSOs		
	1	2	3	4	5	6	1	2	3
<b>CO1</b>	3	1	3	-	-	-	3	2	1
<b>CO2</b>	3	1	3	-	-	-	3	2	1
<b>CO3</b>	3	1	3	-	-	-	3	2	1
<b>CO4</b>	3	1	3	-	-	-	3	2	1
<b>CO5</b>	3	1	3	-	2	1	3	2	1

**Strong-3; Medium-2; Low-1**

Subject Code	Subject Name	Category	L	T	P	Credits	Inst. Hours	Marks
23UMAGEC2	PHYSICS –II	Elective	2	1	-	3	3	70

<b>COURSE</b>	<b>ELECTIVE-II (GE)</b>
<b>COURSE TITLE</b>	<b>PHYSICS –II</b>
<b>CREDITS</b>	3
<b>COURSE OBJECTIVES</b>	To understand the basic concepts of optics, modern Physics, Relativity, quantum physics, semiconductor physics and electronics

UNITS	COURSE DETAILS
<b>UNIT-I</b>	<b>OPTICS:</b> Interference – interference in thin films – colors of thin films – air wedge – determination of diameter of a thin wire by air wedge – diffraction – diffraction of light– normal incidence – experimental determination of wavelength using diffraction grating (no theory) – polarization – polarization by double reflection – Brewster’s law – optical activity – application in sugar industries
<b>UNIT-II</b>	<b>ATOMIC PHYSICS:</b> Atom models – Bohr atom model – mass number – atomic number – nucleons – vector atom model – various quantum numbers – Pauli’s exclusion principle – electronic configuration – periodic classification of elements – Bohr magneton – Stark effect – Zeeman effect (elementary ideas only).
<b>UNIT-III</b>	<b>NUCLEAR PHYSICS:</b> Nuclear models – magic numbers – shell model – nuclear energy – mass defect – binding energy – radioactivity – uses – half life - radio isotopes and uses – nuclear fission – energy released in fission – chain reaction - atom bomb - nuclear fusion – thermonuclear reactions – differences between fission and fusion (elementary ideas only).
<b>UNIT-IV</b>	<b>INTRODUCTION TO RELATIVITY AND GRAVITATIONAL WAVES:</b> Frame of reference – postulates of special theory of relativity – Galilean transformation equations – Lorentz transformation equations – derivation – length contraction – time dilation – twin paradox – mass-energy equivalence.
<b>UNIT-V</b>	<b>SEMICONDUCTOR PHYSICS:</b> p-n junction diode – forward and reverse biasing – characteristic of diode – zener diode – characteristic of zener diode – voltage regulator – full wave bridge rectifier.

<b>TEXT BOOKS</b>	<ol style="list-style-type: none"> <li>1. R.Murugesan (2005), Allied Physics, S.Chand &amp; Co, New Delhi.</li> <li>2. K.Thangaraj and D.Jayaraman (2004), Allied Physics, Popular Book Depot, Chennai.</li> <li>3. Brijlal and N.Subramanyam (2002), Text book of Optics, S.Chand &amp; Co, New Delhi.</li> <li>4. R.Murugesan (2005), Modern Physics, S.Chand &amp; Co, New Delhi.</li> <li>5. A.Subramaniyam Applied Electronics, 2<sup>nd</sup> Edn., National Publishing Co., Chennai.</li> </ol>
<b>REFERENCE BOOKS</b>	<ol style="list-style-type: none"> <li>1. Resnick Halliday and Walker (2018), Fundamentals of Physics, 11<sup>th</sup> Edn., John Willey and Sons, Asia Pvt. Ltd., Singapore.</li> <li>2. D.R.Khanna and H.R. Gulati (1979). Optics, S.Chand &amp; Co.Ltd., New Delhi.</li> <li>3. A.Beiser (1997), Concepts of Modern Physics, Tata Mc Graw Hill Publication, New Delhi.</li> <li>4. Thomas L. Floyd (2017), Digital Fundamentals, 11<sup>th</sup> Edn., Universal Book Stall, New Delhi.</li> <li>5. V.K.Metha (2004), Principles of electronics, 6<sup>th</sup> Edn. , S.Chand and Company, New Delhi.</li> </ol>
<b>WEBLINKS</b>	<ol style="list-style-type: none"> <li>1. <a href="https://www.berkshire.com/learning-center/delta-p-facemask/https://www.youtube.com/watch?v=QrhxU47gtj4https://www.youtube.com/watch?time_continue=318&amp;v=D38BjgUdL5U&amp;feature=emb_logo">https://www.berkshire.com/learning-center/delta-p-facemask/https://www.youtube.com/watch?v=QrhxU47gtj4https://www.youtube.com/watch?time_continue=318&amp;v=D38BjgUdL5U&amp;feature=emb_logo</a></li> <li>2. <a href="https://www.youtube.com/watch?v=JrRrp5F-Qu4">https://www.youtube.com/watch?v=JrRrp5F-Qu4</a></li> <li>3. <a href="https://www.validyne.com/blog/leak-test-using-pressure-transducers/">https://www.validyne.com/blog/leak-test-using-pressure-transducers/</a></li> <li>4. <a href="https://www.atoptics.co.uk/atoptics/blsky.htm">https://www.atoptics.co.uk/atoptics/blsky.htm</a> -</li> <li>5. <a href="https://www.metoffice.gov.uk/weather/learn-about/weather/optical-effects">https://www.metoffice.gov.uk/weather/learn-about/weather/optical-effects</a></li> </ol>
<b>Board of Studies Date : 02.11.2023</b>	

**METHOD OF EVALUATION:**

Continuous Internal Assessment	End Semester Examination	Total	Grade
30	70	100	



Subject Code	Subject Name	Category	L	T	P	Credits	Inst. Hours	Marks
23UMAGECQ2	PHYSICS PRACTICALS - II	Elective	-	-	2	2	2	60

COURSE	Elective Course (GE)
COURSE TITLE	PHYSICS PRACTICAL – II
CREDITS	2
COURSE OBJECTIVES	1. Apply the concepts of Light, electricity and magnetism and waves, 2. Set up experiments to verify theories, quantify and analyse the observations. 3. To do error analysis and correlate results
<b>Any Eight</b>	
<ol style="list-style-type: none"> <li>1. Radius of curvature of lens by forming Newton's rings</li> <li>2. Thickness of a wire using air wedge</li> <li>3. Wavelength of mercury lines using spectrometer and grating</li> <li>4. Refractive index of material of the lens by minimum deviation</li> <li>5. Refractive index of liquid using liquid prism</li> <li>6. Determination of AC frequency using sonometer</li> <li>7. Specific resistance of a wire using PO box</li> <li>8. Thermal conductivity of poor conductor using Lee's disc</li> <li>9. Determination of figure of merit table galvanometer</li> <li>10. Determination of Earth's magnetic field using field along the axis of a coil</li> <li>11. Characterisation of Zener diode</li> <li>12. Construction of Zener/IC regulated power supply</li> <li>13. Construction of AND, OR, NOT gates using diodes and transistor</li> <li>14. NOR gate as a universal building block</li> </ol>	
<b>Board of Studies Date : 02.11.2023</b>	

**METHOD OF EVALUATION:**

Continuous Internal Assessment	End Semester Examination	Total	Grade
30	70	100	

<b>Title of the Course</b>		<b>QUANTITATIVE APTITUDE FOR COMPETITIVE EXAMINATIONS (FOR I B.A / I B.Sc. / I B.Com)</b>					
<b>Paper Number</b>		<b>NME II</b>					
<b>Category</b>	<b>Skill Enhancement</b>	<b>Year</b>	<b>I</b>	<b>Credits</b>	<b>2</b>	<b>Course Code</b>	<b>23UMASEC2</b>
		<b>Semester</b>	<b>II</b>				
<b>Instructional Hours per week</b>		<b>Lecture</b>	<b>Tutorial</b>		<b>Lab Practice</b>	<b>Total</b>	
		<b>2</b>	<b>-</b>		<b>-</b>	<b>2</b>	
<b>Pre-requisite</b>		12 <sup>th</sup> Standard Mathematics					
<b>Objectives of the Course</b>		1. To introduce the basic concepts of Mathematics. 2.To make the students to acquire knowledge on Geometry and solid and plane figures. 3.To initiate the students to find the volume and surface area of solids.					
<b>Course Outcomes:</b>		Students will be able to <b>CO1:</b> recognize the notions of numbers, H.C.F and L.C.M percentage <b>CO2:</b> understand the concepts of area, volume and surface area. <b>CO3:</b> use the acquire knowledge to solve the problems in numbers, H.C.F and L.C.M and percentage. <b>CO4:</b> calculate the area, volume and surface area for geometrical shapes and solid shapes. <b>CO5:</b> apply the concepts acquired to write the competitive examinations.					
<b>Course outline</b>		<b>Unit - I (Hours: 6)</b>					
		Operations on Numbers.					
		<b>Section-I - Chapter 1 - Solved examples 1-32 only.(Page No. 1-9 only)</b>					
		<b>Unit – II (Hours: 6)</b>					
		H.C.F. and L.C.M of Numbers.					
		<b>Section-I - Chapter 2 (Page No. 30-45 only)</b>					
		<b>Unit - III (Hours: 6)</b>					
		Percentage					
		<b>Section-I - Chapter 10 - Solved examples 1-33 only. (Page No.208-214 only)</b>					
		<b>Unit - IV (Hours: 6)</b>					
		Area					
		<b>Section-I - Chapter 24 - Solved examples 1-32 only. (Page No. 499-505 only)</b>					

	<p><b>Unit - V (Hours: 6)</b></p> <p>Volume and Surface Area</p> <p><b>Section-I - Chapter 25 - Solved examples 1-34 only. (Page No. 549-555 only)</b></p>
Extended Professional Component (is a part of Internal Component only, not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC/TRB/NET/UGC – CSIR/ GATE/ TNPSC/ others to be solved.
Skills acquired from the course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
<b>Recommended Text</b>	Dr. R. S. Aggarwal- Quantitative Aptitude for Competitive Examinations (Fully Solved) (Seventh Revised Edition), S. Chand & Company Pvt. Ltd
<b>Reference Books</b>	Rajesh Verma, Fast Track Objective Arithmetic, Arihant Publications India Limited, New Delhi, Completely Revised Edition.
<b>Web resources</b>	<ol style="list-style-type: none"> <li>1. <a href="http://ncert.nic.in/ncerts/l/iemh113.pdf">http://ncert.nic.in/ncerts/l/iemh113.pdf</a></li> <li>2. <a href="https://yoursmahboob.files.wordpress.com/2016/12/quantramandee-pbook-1.pdf">https://yoursmahboob.files.wordpress.com/2016/12/quantramandee-pbook-1.pdf</a></li> </ol>

<b>Title of the Course</b>		<b>HISTORY AND DEVELOPMENT OF INDIAN MATHEMATICS (FROM VEDIC PERIOD TO MODERN ERA)</b>					
<b>Paper Number</b>		<b>SEC III</b>					
<b>Category</b>	<b>Skill Enhancement</b>	<b>Year</b>	<b>I</b>	<b>Credits</b>	<b>2</b>	<b>Course Code</b>	<b>23UMASEC3</b>
		<b>Semester</b>	<b>II</b>				
<b>Instructional Hours per week</b>		<b>Lecture</b>	<b>Tutorial</b>	<b>Lab Practice</b>		<b>Total</b>	
		<b>2</b>	<b>-</b>	<b>-</b>		<b>2</b>	
<b>Pre-requisite</b>		12 <sup>th</sup> Standard Mathematics					
<b>Objectives of the Course</b>		<ol style="list-style-type: none"> <li>1. Understand the Ancient Beginnings</li> <li>2. Grasp the Classical Period Contributions</li> <li>3. Realize the Colonial Period and Modern Developments</li> </ol>					
<b>Course Outcomes:</b>		<p>Students will be able to</p> <p>CO1: understand the foundational contributions of ancient India during the Vedic period, including the concept of zero, arithmetic operations, and basic geometry.</p> <p>CO2: explore the classical period advancements, such as the Brahmas phutasiddhanta, the Aryabhata, and their influence on algebra, trigonometry, and astronomy.</p> <p>CO3: analyze the medieval era's contributions, including the works of Mathematicians like Bhaskar Acharya and his pioneering concept in calculus and continuous functions.</p> <p>CO4: recognize the interactions between Indian and global mathematics during the colonial period, leading to integrated and expanded mathematical knowledge.</p> <p>CO5: realize the modern era's contributions, where Indian mathematics like Ramanujan made profound discoveries and India's ongoing role in the global mathematical community.</p>					
<b>Course Outline</b>		<b>Unit – I (Hours:6)</b>					
		Introduction of Mathematics -Evolution of Vedic Mathematics - Features of Vedic Mathematics - Importance of Vedic Mathematics - Sutras - Sub sutras.					
		<b>Unit –II(Hours:6)</b>					
		Baudhayana-Apastamba-yajnavalkya-panini-Aryabhata-varahamihira- Brahmagupta- Bhaskara- Mahavira- Sridharacharya-Bhaskara-II-Madhava of Sangamagrama-Nilakantha somayaji-Jyeshtadeva-Parameshvara-Ramanujan.					
		<b>Unit–III (Hours:6)</b>					
		Birth of Zero - Mathematics in Vedas- A Generalized					



	Approach for finding the Nth order roots of Numbers.
	<p><b>Unit-IV (Hours:6)</b></p> <p>A Greedy Algorithm Hidden in Sulbasutra- Sankaras Geometrical Approach to Citrabhanus Ekavimsati Prasnottara.</p>
	<p><b>Unit –V(Hours:6)</b></p> <p>Vedic Mathematics in Modern Era - Vedic Mathematics in Computer: A survey -Vedic Mathematics- The cosmic software for implementation of fast Algorithms - Analysis of digital signal processing Algorithms based on Vedic Mathematics - Role of Vedic Mathematics in driving optimal solutions for Real Life Problems.</p>
<b>Recommended Text</b>	Proceedings of the National Workshop on Ancient Indian Mathematics with special reference to Vedic Mathematics and Astronomy. Rashtriya Sanskrit Vidyapeetha 2011.
<b>Web resources</b>	<a href="https://nptel.ac.in/">https://nptel.ac.in/</a>