




## K.S. Rangasamy College of Arts and Science (Autonomous)

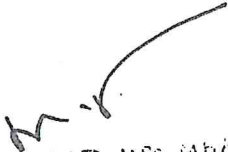
NAAC Re-accredited and an ISO 9001 : 2008 Certified Institution  
(Affiliated to Periyar University, Salem. Included under 2(f) & 12(B) of UGC Act, 1956)

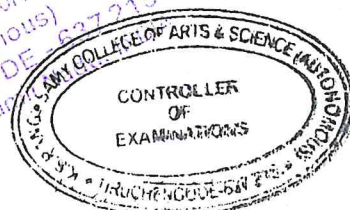
Tiruchengode - 637 215

### *New Course Added*

- Core VI: Statics And Dynamics
- SBC I: Quantitative Aptitude
- Core VIII: Sequences & Series
- Core XVI: Numerical Methods
- SBC IV: Mathematics for Competitive Exams-II
- Data Analysis Using R-Software
- Numerical Computations Using MatLab
- Advanced Learners Course: Index Numbers & Time Series Analysis
- Advanced Learners Course: Theory of Numbers & Inequalities
- Advanced Learners Course: Astronomy
- Advanced Learners Course: Mathematical Modeling

  
HEAD  
Department of Mathematics  
K.S. Rangasamy College of Arts and Science (Autonomous)  
Tiruchengode - 637 215, Namakkal (Dt.)

  
Mr. M. PRASAD, M.Sc., M.Phil., M.A.  
Controller of Examinations  
K.S. Rangasamy College of Arts & Science (Autonomous)  
Tiruchengode - 637 215, Tamilnadu, India.



## SCHEME OF EXAMINATION

Subject Code	Subject	Hours of Instruction	Exam Duration	Max. Marks			Credit Points
				CA	CE	Total	
<b>First Semester</b>							
<b>Part I</b>							
18UTALA101/ 18UHILA101/ 18UFRLA101	Tamil I/ Hindi I/ French I	5	3	25	75	100	3
<b>Part II</b>							
18UENLA101	Foundation English - I	5	3	25	75	100	3
<b>Part III</b>							
18UMAM101	Core I : Classical Algebra	6	3	25	75	100	4
18UMAM102	Core II : Differential Calculus	5	3	25	75	100	4
18UPHMAA101	Allied I : Physics I	4	3	25	75	100	2
18UPHMAAP101	Allied Practical I : Physics I	3	3	40	60	100	2
<b>Part IV</b>							
18UVE101	Value Education I : Yoga	2	3	25	75	100	2
<b>Total</b>		<b>30</b>				<b>700</b>	<b>20</b>
<b>Second Semester</b>							
<b>Part I</b>							
18UTALA201/ 18UHILA201/ 18UFRLA201	Tamil II/ Hindi II/ French II	5	3	25	75	100	3
<b>Part II</b>							
18UENLA201	Foundation English - II	5	3	25	75	100	3
<b>Part III</b>							
18UMAM201	Core III: Integral Calculus	6	3	25	75	100	4
18UMAM202	Core IV: Differential Equations and Laplace Transforms	5	3	25	75	100	4
18UPHMAA201	Allied II: Physics II	4	3	25	75	100	2
18UPHMAAP201	Allied Practical II: Physics II	3	3	40	60	100	2
<b>Part IV</b>							
18UVE201	Value Education II : Environmental Studies	2	3	25	75	100	2
<b>Total</b>		<b>30</b>				<b>700</b>	<b>20</b>



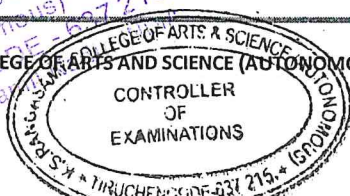
<b>Third Semester</b>							
<b>PartI</b>							
18UTALA301/ 18UHILA301/ 18UFRLA301	TamilIII/ Hindi III/ FrenchIII	5	3	25	75	100	3
<b>PartII</b>							
18UENLA301	Foundation English- III	5	3	25	75	100	3
<b>PartIII</b>							
18UMAM301	Core V: Analytical Geometry of 2D and 3D	5	3	25	75	100	4
18UMAM302	Core VI: Statics and Dynamics	5	3	25	75	100	4
18UMAA301	Allied III : Mathematical Statistics I	3	3	25	75	100	2
18UMAAP301	Allied Practical III: Statistical Package (Ms-Excel)	2	3	40	60	100	2
<b>PartIV</b>							
18UMASB301	SBC I: Quantitative Aptitude - 100% Internal Evaluation	2	3	100	-	100	2
18UMANM301	NMEC I	2	3	25	75	100	2
<b>Non Credit</b>							
18ULS301	Career Competency Skills I	1	-	-	-	-	-
	Add-on Course *	-	-	-	-	-	-
<b>Total</b>		<b>30</b>				<b>800</b>	<b>22</b>
<b>Fourth Semester</b>							
<b>PartI</b>							
18UTALA401/ 18UHILA401 / 18UFRLA401	TamilIV/ Hindi IV/ FrenchIV	5	3	25	75	100	3
<b>Part II</b>							
18UENLA401	Foundation English -IV	5	3	25	75	100	3
<b>PartIII</b>							
18UMAM401	Core VII: Applications of Integration and Vector Calculus	5	3	25	75	100	4
18UMAM402	Core VIII: Sequences and Series	5	3	25	75	100	4
18UMAA401	Allied IV: Mathematical Statistics II	3	3	25	75	100	2
18UMAAP401	Allied Practical IV: Statistical Software (SPSS )	2	3	40	60	100	2
<b>PartIV</b>							
18UMASB401	SBC II : Statistics for Competitive Exams - 100% Internal Evaluation	2	3	100	-	100	2
18UMANM401	NMEC II	2	3	25	75	100	2
<b>Non Credit</b>							
18ULS401	Career Competency Skills II	1	-	-	-	-	-
	Add-on Course *	-	-	-	-	-	-
<b>Total</b>		<b>30</b>				<b>800</b>	<b>22</b>



**B.Sc.,Mathematics(Studentsadmittedfrom2018-2019Onwards)**

Fifth Semester							
Part III							
18UMAM501	Core IX: Abstract Algebra	6	3	25	75	100	5
18UMAM502	Core X: Real Analysis I	6	3	25	75	100	5
18UMAM503	Core XI: Operations Research	6	3	25	75	100	5
18UMAM504	Core XII: Programming in C	3	3	25	75	100	3
	Elective I	4	3	25	75	100	4
18UMAMP501	Core Practical I: Programming in C	2	3	40	60	100	2
Part IV							
18UMASB501	SBC III: Mathematics for Competitive Exams- I (100% Internal Evaluation )	2	3	100	-	100	2
Part V							
18UMAE501	Extension Activity	-					2
Non Credit							
18ULS501	Career Competency Skills III	1	-	-	-	-	-
	<b>Total</b>	<b>30</b>				<b>700</b>	<b>28</b>
Sixth Semester							
Part III							
18UMAM601	Core XIII: Linear Algebra( Fifth Unit as Self-Study )	5	3	25	75	100	5
18UMAM602	Core XIV: Real Analysis II	6	3	25	75	100	5
18UMAM603	Core XV: Complex Analysis	5	3	25	75	100	5
18UMAM604	Core XVI: Numerical Methods	5	3	25	75	100	5
	Elective II	4	3	25	75	100	4
18UMAMP601	Core Practical II: Sci Lab	2	3	40	60	100	2
Part IV							
18UMASB601	SBC IV: Mathematics for Competitive Exams- II (100% Internal Evaluation )	2	3	-	100	100	2
Non Credit							
18ULS601	Career Competency Skills IV	1	-	-	-	-	-
	<b>Total</b>	<b>30</b>				<b>700</b>	<b>28</b>
	<b>Grand Total</b>					<b>4400</b>	<b>140</b>

*K.S. Rangasamy College of Arts & Science  
TIRUCHENGODE - 627 215  
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**ELECTIVE -I**

(Student shall select any one of the following subject as Elective in fifth semester)

S.No	Subject Code	Name of the Subject
1.	18UMAEL501	Discrete Mathematics
2.	18UMAEL502	Graph Theory

**ELECTIVE - II**

(Student shall select any one of the following subject as Elective in sixth semester)

S.No	Subject Code	Name of the Subject
1.	18UMAEL601	Number Theory
2.	18UMAEL602	Optimization Techniques

**NON MAJOR ELECTIVE COURSE**

The department offering the following Non Major Elective Course for other than Mathematics students.

S.No	Subject Code	Name of the Subject
1	18UMANM301	Quantitative Aptitude.
2	18UMANM401	Basic Statistics.

**ADD-ON COURSE**

If Students want to get a Degree with additional skills, they can do Add-on Courses offered by the Department. The Add-on Courses offered by the Department are listed below.

S.No	Subject Code	Name of the Subject
1	18UMAAC301	Data Analysis Using R-Software.
2	18UMAAC401	Numerical Computations Using MatLab.

**ADVANCED LEARNERS COURSE (ALC)**

ALC to be introduced in the 4<sup>th</sup> and 5<sup>th</sup> semester.

If Students want to get a Degree with additional credits, they can do Advanced Learners Courses offered by the Department. The available advanced learners courses are listed below.

S.No	Subject Code	Name of the Subject
1	18UMAAL401	Index Numbers & Time Series Analysis.
2	18UMAAL402	Theory of Numbers & Inequalities.
3	18UMAAL501	Astronomy
4	18UMAAL502	Mathematical Modeling



**TOTAL CREDIT DISTRIBUTION**

Subjects	Total	Credits
Part -I Tamil	4 X 100 = 400	12
Part -II English	4 X 100 = 400	12
Part - III Core	16 X 100 = 1600	70
Part - III Elective	2X100 =200	08
Part - III Core Practical	2 X 100 = 200	04
Part - III Allied	4 X 100 = 400	08
Part - III Allied Practical	4 X 100 = 400	08
Part - IV NMEC	2X100 =200	04
Part - IV SBC	4X100 =400	08
Part - IV Other Courses ( YOGA, EVS)	1 X 100 = 100 1 X 100 = 100	02 02
Part -V Extension Activity		02
<b>Total</b>	<b>4400</b>	<b>140</b>



**B.Sc., Mathematics (Students admitted from 2018-2019 Onwards)**

18UMAM302	CORE VI: STATICS & DYNAMICS	SEMESTER III	
<b>COURSE OBJECTIVES</b>			
The course aims			
<ul style="list-style-type: none"> <li>To provide the knowledge about the nature of forces acting on a surface, friction and centre of gravity.</li> <li>To enable the students to realize the resultant forces acting at a point.</li> <li>To learn about virtual work.</li> </ul>			
<b>Credits:04</b>		<b>Total Hours:60</b>	
UNIT	CONTENTS	Hrs	CO
I	Definition – parallelogram law of forces – resultant of two forces – triangle law of forces – perpendicular triangle of forces – Lami’s theorem. (Example problems only). Chapter 1 (Sections 1 - 6), Chapter 2 (Sections 1 - 9)	12	CO1
II	Introduction – experimental results – statistical, dynamical and limiting friction – laws of friction – coefficient of friction – angle of friction – cone of friction – equilibrium of a particle on a rough inclined plane- equilibrium of a body on a rough inclined plane under the force parallel to plane, under any force – problem on friction. (Example problem only). Chapter 7 (Sections 1 - 4, 6 - 8, 10 - 13)	12	CO2
III	Definition – two fundamental principles – path of a projectile is a parabola – characteristic of the motion of a projectile – maximum horizontal range – range on the inclined plane – motion on the surface of smooth inclined plane. (Example problems only). Chapter 6 (Sections 6.1 - 6.5, 6.7, 6.12, 6.16)	12	CO3
IV	Definition – fundamental laws of impact – Newton’s experimental law – principle of conservation of momentum – impact of sphere on a fixed smooth plane – direct and oblique impact of two spheres – loss of kinetic energy. (Example problems only). Chapter 8 (Sections 8.1 - 8.8)	12	CO4
V	Simple harmonic motion in a straight line – general solution simple harmonic motion equation – composition of two simple harmonic motion – loss or gain in the number of oscillation. Velocity and acceleration in polar co-ordinates – differential equation of central orbits – perpendicular from the pole with tangent – pedal equation of central orbit. (Example problems only). Chapter 10 (Sections 10.1-10.3, 10.6-10.7, 10.16) Chapter 11 (Sections 11.2, 11.6 - 11.8)	12	CO5

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K.S. RANGASAMY COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS), TIRUCHENGODE

*A.S. Rangasamy College (Autonomous) Tiruchengode - 637 215*  
Principal  
TIRUCHENGODE - 637 215  
Tamil Nadu



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Controller of Examinations  
K.S. Rangasamy College of Arts & Science (Autonomous)  
Tiruchengode - 637 215, Tamil Nadu, India.



TEXT BOOKS	
1.	<i>Venkatraman, M.K. Statics. [Eleventh Edition]. Agasthiar Publication, Trichy.</i>
2.	<i>Venkatraman, M.K. Dynamics.[Fifteenth Edition].Agasthiar Publication, Trichy.</i>
REFERENCE BOOKS	
1.	<i>Narayanan, S. 1986.Static. Sultan Chand and Co., Chennai.</i>
2.	<i>Duraipandian, P. and Lakshmi Duraipandian. 1984. Mechanics. Emerald Publishers, Chennai.</i>

### COURSE OUTCOMES (CO)

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

CO1	Understand the concepts of forces and know the resultant of any number of forces acting on a particle.
CO2	Compute the experimental results of statistical, dynamical and limiting frictions.
CO3	Solve problems involving the concepts projectile.
CO4	Understand the concepts of fundamental laws of impact and kinetic energy.
CO5	Apply the concepts of simple harmonic motion, velocity and acceleration to solve problems in real life situation.

### MAPPING

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	M	H	H
CO2	H	M	M	H	H
CO3	H	H	H	M	M
CO4	H	M	M	M	M
CO5	H	H	M	L	M

H-High; M-Medium; L-Low

**B.Sc.,Mathematics(Studentsadmittedfrom2018-2019Onwards)**

<b>18UMASB301</b>	<b>SBC I : QUANTITATIVE APTITUDE ( 100% Internal Evaluation )</b>	<b>SEMESTER III</b>	
<b>COURSE OBJECTIVES:</b> The course aims <ul style="list-style-type: none"> <li>To develop and improve the problem solvingskill.</li> </ul>			
<b>Credits:02</b>		<b>Total Hours:25</b>	
<b>UNIT</b>	<b>CONTENTS</b>	<b>Hrs</b>	<b>CO</b>
<b>I</b>	Simplification and Average. Chapters 4 and 6	05	<b>CO1</b>
<b>II</b>	Square roots and cube roots, Surds and indices. Chapters 5 and 9	05	<b>CO2</b>
<b>III</b>	Ratio and proportion, Chain rule. Chapters 12 and 14	05	<b>CO3</b>
<b>IV</b>	Profit and loss, partnership. Chapters 11 and 13	05	<b>CO4</b>
<b>V</b>	Problem on ages and percentage. Chapters 8 and 10	05	<b>CO5</b>
<b>TEXT BOOK</b>			
1.	<i>Agarwal, R.S.</i> 2014. <b>Quantitative Aptitude.</b> S. Chand & Company Ltd, New Delhi.		

**COURSE OUTCOMES (CO)**

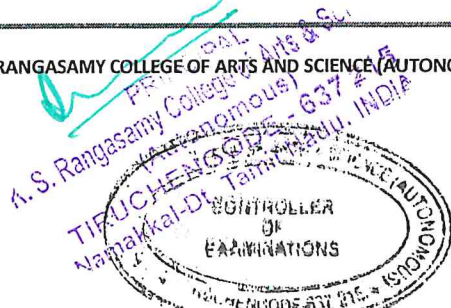
After completion of the course, the students will be able to

<b>CO1</b>	Solve problems involving the concepts of Simplification and Average.
<b>CO2</b>	Solve problems involving the concepts of Surds and indices.
<b>CO3</b>	Solve problems involving the concepts of Ratio and proportion.
<b>CO4</b>	Solve problems involving the concepts of Profit and loss, Partnership.
<b>CO5</b>	Solve problems involving the concepts of age and percentage.

**MAPPING**

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	M	H	H
CO2	H	M	M	H	H
CO3	H	H	H	M	M
CO4	H	M	M	M	M
CO5	H	H	M	L	M

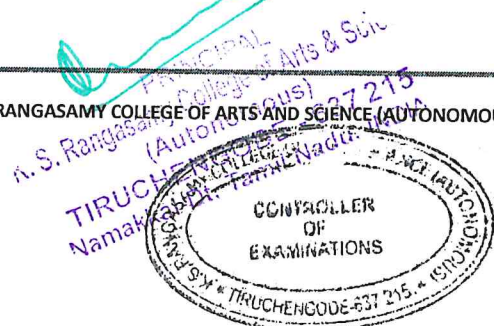
H-High; M-Medium; L-Low





**B.Sc.,Mathematics(Studentsadmittedfrom2018-2019Onwards)**

<b>18UMAM402</b>	<b>CORE VIII: SEQUENCES AND SERIES</b>	<b>SEMESTER IV</b>
<b>COURSE OBJECTIVES</b>		
The course aims		
<ul style="list-style-type: none"> <li>To understand the functions of Bounded variations.</li> <li>To know the application of Power series (Problem only).</li> </ul>		
<b>Credits:04</b>		<b>TotalHours:60</b>
<b>UNIT</b>	<b>CONTENTS</b>	<b>Hrs CO</b>
<b>I</b>	Sequences:Introduction - Convergence sequences - Oscillatory sequences - Bounded sequences -- Divergent sequences- Some important limit theorems - Cauchy sequences. <b>Chapter 5 (Sections 5.1 , 5.2, 5.4 , 5.6, 5.7 - 5.9)</b>	12 <b>CO1</b>
<b>II</b>	Cluster points of a sequence -Monotonic sequences - Subsequences - Limit superior and limit inferior of a sequence. <b>Chapter 5 (Sections 5.3, 5.11 - 5.13)</b>	12 <b>CO2</b>
<b>III</b>	Infinite series : Introduction - Sequences of partial sums of a series -A necessary condition for the convergence - Convergent series - Cauchy's general principle of convergence for series-Series of positive term. <b>Chapter 6 (Sections 6.1 - 6.4)</b>	12 <b>CO3</b>
<b>IV</b>	Comparison tests - An important comparison series - Cauchy's $n^{\text{th}}$ root test - D'Alembert's ratio test - Raabe's test - Cauchy's condensation test. <b>Chapter 6 (Sections 6.6 - 6.9,6.11-6.13,6.20)</b>	12 <b>CO4</b>
<b>V</b>	Logarithmic test - Bertrand and de Morgan's test -Kummer's test- Gauss's test - Absolute convergence - conditional convergence - Alternative series. <b>Chapter6(Sections6.14-6.15,6.17-6.18)Chapter7(Sections7.2-7.3)</b>	12 <b>CO5</b>
<b>NOTE: Definition, Theorem Statement ( Excluding Proof ) &amp; Problems Only.</b>		
<b>TEXT BOOK</b>		
1.	<i>Shanti Narayan and Raisinghania, M.D. 2007. Elements of Real Analysis. S. Chand and Company Ltd., New Delhi.</i>	
<b>REFERENCE BOOK</b>		
1.	<i>Singal, M.K. and Asha Rani Singal. 2003. A First Course in Real Analysis. R. Chand and Company Ltd., New Delhi. (For units I, III, IV &amp; V)</i>	



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**COURSE OUTCOMES (CO)**

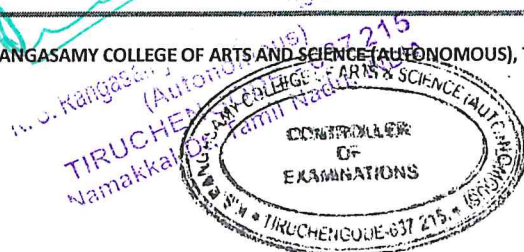
After completion of the course, the students will be able to

CO1	Define sequence, convergent sequence, divergent sequence and bounded sequence.
CO2	Understand the concepts of Monotone sequence, limit superior and limit inferior.
CO3	Identify whether the given infinite series is either convergent or divergent.
CO4	Apply various test to find the convergence and divergence of the series.
CO5	Show that the given series is either convergent or divergent with the help various test and applying the concepts of absolute convergent and conditional convergent.

**MAPPING**

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	M	H	H
CO2	H	M	M	H	H
CO3	H	H	H	M	M
CO4	H	M	M	M	M
CO5	H	H	M	L	M

H-High; M-Medium; L-Low





B.Sc., Mathematics ( Students admitted from 2018 – 2019 Onwards )

18UMAM604	CORE XVI: NUMERICAL METHODS	SEMESTER VI	
<b>COURSE OBJECTIVES</b>			
The course aims			
<ul style="list-style-type: none"> <li>To learn the numerical methods to solve algebraic, transcendental, differential equations and the system of simultaneous linear algebraic equations.</li> <li>To introduce the concepts of interpolation using finite differences.</li> </ul>			
Credits:04		Total Hours:50	
UNIT	CONTENTS	Hrs	CO
I	The Solution of Numerical Algebraic and Transcendental Equations: Bisection method - Iteration Method - Regula Falsi Method - Newton Raphson method - Generalized Newton's method - Horner's Method. Chapter 3 (Sections 3.1 to 3.5)	10	CO1
II	Solution of Simultaneous Linear Algebraic Equations: Introduction - Gauss elimination method - Gauss Jordan Method - Inversion of a Matrix using Gauss Elimination Method - Iterative methods - Gauss-Jacobi method - Gauss-Seidal method of Iteration. Chapter 4 (Sections 4.1 to 4.3, 4.7 to 4.9)	10	CO2
III	Interpolation (for Equal intervals): Introduction - Newton's Forward Interpolation Formula - Newton's Backward Interpolation Formula - Equidistant terms with one or more missing values. Central difference interpolation formulae (For Equal Intervals): Central Differences and Central Difference Table - Central difference interpolation formulae - Gauss's forward interpolation formula - Gauss's Backward interpolation formula - Stirling's formula. Chapter 6 (Sections 6.1 to 6.3, 6.7) Chapter-7 (Sections 7.1 to 7.5)	10	CO3
IV	Numerical Differentiation: Introduction - Newton's Forward difference formula - Newton's Backward difference formula - Stirling's formula. Numerical Integration: Introduction - Quadrature formula - Trapezoidal rule - Geometrical interpretation - Truncation Error in Trapezoidal Rule - Romberg's Method - Simpson's 1/3 rule - Simpson's 3/8 rule. Chapter 9 (Sections 9.1 to 9.4, 9.7 to 9.14)	10	CO4

TEXT BOOK	
1.	<i>Kandasamy, P., Thilagavathy, K. and Gunavathi, K.</i> 2016. <b>Numerical Methods.</b> [Third Edition]. S.Chand and Company Ltd., New Delhi.
REFERENCE BOOK	
1.	<i>Singaravelu, A.</i> 2002. <b>Numerical Methods.</b> Meenakshi Publications, Arpakkam

**COURSE OUTCOMES (CO)**

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

CO1	Understanding solution of algebraic equations and Transcendental equations
CO2	Application of various methods in solving simultaneous linear algebraic equations.
CO3	Applying interpolation formulas
CO4	Application of various numerical difference formulas, trapezoidal rule and Simpson's rule
CO5	Utilizing solution of Taylor's series, Euler's method and Runge-kutta methods

**MAPPING**

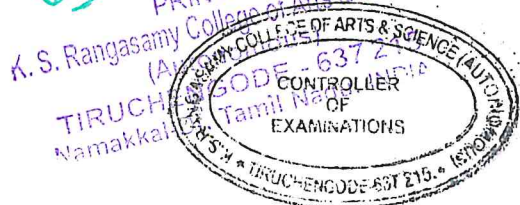
PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	M	H	H
CO2	H	M	M	H	H
CO3	H	H	H	M	M
CO4	H	M	M	M	M
CO5	H	H	M	L	M

H-High; M-Medium; L-Low



**B.Sc., Mathematics ( Students admitted from 2018 - 2019 Onwards )**

18UMASB601	SBC IV : MATHEMATICS FOR COMPETITIVE EXAMS-II(100 %InternalEvaluation)	SEMESTER VI	
<b>COURSE OBJECTIVES</b>			
The course aims			
<ul style="list-style-type: none"> <li>To strengthen our students skills to get success in Competitive exams.</li> <li>To provide Problem solvingskills.</li> </ul>			
Credits:02		TotalHours:25	
UNIT	CONTENTS	Hrs	CO
I	Algebra of complex number - Conjugate of complex numbers and properties - Graphical representation and properties of modulus - Polar form of complex numbers - Argument - Evaluation of principal argument and its properties - Euler's notation - Logarithm of a complex number - DeMoivre's theorem - nth roots of a complex number and properties cube roots of unity - nth roots of unity.	05	CO1
II	Quadratic equation and its roots - Quadratic equation with real coefficients - Nature of roots, real roots, non real roots, equal roots rational and irrational roots - Symmetric function of roots - Formation of equation with given roots - Sign of roots ,positive roots, negative roots, zero roots, infinite roots, reciprocal roots - Common roots.	05	CO2
III	Introduction - Binomial theorem for positive integral index and characteristics of expansion - Middle term ,greatest coefficient and numerically greatest term in the expansion - Binomial coefficients and properties . Binomial theorem any index and characteristics of expansion - Exponential series and properties of the series - Logarithms and Laws-Logarithmic series and its properties- Calculation of Napierian log and common log.	05	CO3
IV	Introduction of Differential equations, order and degree, linear and non-linear differential equations - Solution of differential equation, general and particular solution. Formation of differential equation - Solution of differential equations of first order and first degree, variable seperable form, homogeneous and linear differential equations - Differentialequations reducible to variableseperableform, homogeneous and linear forms - Bernoulli's equations.	05	CO4
V	Vectors, types of vectors- Addition of vectors, difference of vectors, multiplication of a vector by a scalar and properties, collinear vectors and points - Linear combination of vectors -	05	CO5

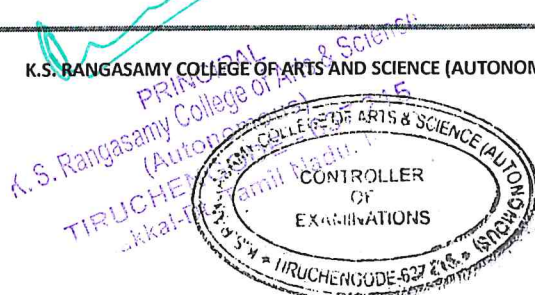


	Linearly independent and dependent system of vectors - Resolution or components of a vector in a plane and in space - Section formula - Centroid of a triangle - Collinearity of three point - Coplanarity of four points - Scalar product of two vectors, geometrical interpretation and properties - Vector triple product-Scalar product of four vectors, vector product of four vectors - Reciprocal system of vectors.		
<b>TEXT BOOK</b>			
1.	<i>Er. Anoop K. Srivastava .2014. Objective Mathematics for JEE MAIN 2014. [Eleventh Edition]. Disha Publication. New Delhi.</i>		
<b>REFERENCE BOOKS</b>			
1.	<i>Vittal, P.R. 2000. Algebra Calculus and Trigonometry. [Fifth Edition]. Margham Publications, Chennai.</i>		
2.	<i>Vittal, P.R. 2000. Calculus. Margham publications, Chennai.</i>		
3.	<i>Duraipandian, P. and Laxmi Duraipandian. 2001. Complex Analysis. Emerald Publishers, Chennai.</i>		

**COURSE OUTCOMES (CO)**

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

CO1	Applying the concept of algebraic complex number.
CO2	Utilizing the quadratic equations and its roots.
CO3	Analyzing binomial theorem for positive integral roots.
CO4	Understanding the concept of differential equation.
CO5	Application of vectors and its related fields.





**B.Sc., Mathematics (Students admitted from 2018-2019 Onwards)**

18UMAAL401	<b>ADVANCED LEARNERS COURSE I: INDEX NUMBER &amp; TIME SERIES ANALYSIS</b>	<b>SEMESTER IV</b>	
<b>COURSE OBJECTIVES</b>			
The course aims			
<ul style="list-style-type: none"> <li>• To learn about Index Numbers.</li> <li>• To learn Analysis of Time Series and Methods.</li> <li>• To learn various methods of solving.</li> </ul>			
<b>Credits:02 Total Hours:25</b>			
<b>UNIT</b>	<b>CONTENTS</b>	<b>Hrs</b>	<b>CO</b>
I	Index Numbers: Definition-Uses-Types-Problems of construction of index numbers-Method-Simple aggregate-Weighted aggregate. <b>Chapter - 14</b>	05	CO1
II	Index Numbers: Test of consistency of index numbers-time reversal test-Factor Reversal Test-Unit Test Circular Test-Chain Base-Base shifting- Splitting -Deflating Consumer Price index-family budget-Limitation of index Numbers-Formula-Theoretical Questions, Practical Problems. <b>Chapter - 14</b>	05	CO2
III	Analysis of Time Series: Meaning-Definition-User-Time Series models, Secular Trend-seasonal variation-Cyclical variation-Irregular Variation. <b>Chapter - 15</b>	05	CO3
IV	Analysis of Time Series: Measurement of Secular Trend-Graphic Method-Semi average method-Moving average method-Method of Least Squares-Parabola curve. <b>Chapter - 15</b>	05	CO4
V	Analysis of Time Series: Measurement of Seasonal Variation-Method of Simple Average, Ratio to Trend Method-Ratio to Moving Average Method-Link Relative Method-Miscellaneous illustrations-Theoretical Questions, Practical Problems. <b>Chapter - 15</b>	05	CO5
<b>TEXT BOOK</b>			
1.	R.S.N Pillai, V.Bagavathi, Statistics. MS.Chand and Company Ltd, New Delhi.		



**B.Sc., Mathematics ( Students admitted from 2018 - 2019 Onwards )**

**COURSE OUTCOMES (CO)**

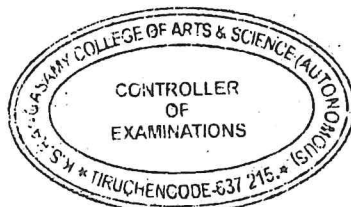
After completion of the course, the students will be able to

CO1	Construct Index numbers and solve problems involving index numbers.
CO2	Apply various tests to test the consistency of index numbers.
CO3	Understand the concepts of Time series Analysis and compute trend and seasonal variations.
CO4	Solve problems using semi-average, moving-average and Least square method.
CO5	Solve problems using Ratio to Trend Method, Ratio to Moving Average Method and Link Relative Method.

**MAPPING**

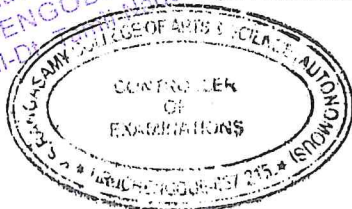
PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	M	H	H
CO2	H	M	M	H	H
CO3	H	H	H	M	M
CO4	H	M	M	M	M
CO5	H	H	M	L	M

H-High; M-Medium; L-Low





18UMAAL402	ADVANCED LEARNERS COURSE II: THEORY OF NUMBERS & INEQUALITIES	SEMESTER IV	
<b>COURSE OBJECTIVES</b>			
The course aims			
<ul style="list-style-type: none"> <li>To learn the concepts of arithmetic and geometric mean.</li> <li>To learn categories of inequality and to understand the concept of congruence.</li> </ul>			
Credits:02		Total Hours:25	
UNIT	CONTENTS	Hrs	CO
I	Introduction to Inequality – Geometric and Arithmetic means. Chapter 4 ( Section 1 – 5 )	05	CO1
II	Weirstrass Inequality – Cauchy’s Inequality – Applications to Maxima and Minima. Chapter 4 ( Section 9 – 11,13 )	05	CO2
III	Prime and Composite numbers – Divisors of given numbers – Euler’s function – Integral parts of real numbers – Highest power of a prime – Product of r consecutive integer. Chapter 5 (Sections: 1 – 11)	05	CO3
IV	Congruences and its Properties – Numbers in arithmetic progression – Problems. Chapter 5 ( Section 12 – 15)	05	CO4
V	Fermat’s theorem – Generalisation of Fermat’s theorem – Lagrange’s theorem – Problems. Chapter 5 ( Section 16,16.1,18)	05	CO5
<b>TEXT BOOK</b>			
1.	Manicavachagom Pillay, T.K., Natarajan, T. and Ganapathy, K.S. 2010. Algebra - Volume II. S. Viswanathan (Printers and Publishers) Pvt. Ltd., Chennai.		



**B.Sc.,Mathematics(Studentsadmittedfrom2018-2019Onwards)**

**COURSE OUTCOMES (CO)**

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

CO1	Understand the concept of inequality and compute Geometric mean and Arithmetic mean.
CO2	Compute maximum and minimum value of a function.
CO3	Identify Prime and Composite numbers, Find the Divisors of given numbers, Integral parts of real numbers, Highest power of a prime and Product of r consecutive integer.
CO4	Solve problems involving the concepts arithmetic progression, Congruences and its Properties.
CO5	Understand Fermat's theorem, Generalisation of Fermat's theorem, Lagrange's theorem and solve problems involving these theorems.

**MAPPING**

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	M	H	H
CO2	H	M	M	H	H
CO3	H	H	H	M	M
CO4	H	M	M	M	M
CO5	H	H	M	L	M

H-High; M-Medium; L-Low



**B.Sc., Mathematics (Students admitted from 2018-2019 Onwards)**

18UMAAL501	<b>ADVANCED LEARNERS COURSE III: ASTRONOMY</b>	<b>SEMESTER V</b>	
<b>COURSE OBJECTIVES</b>			
The course aims			
<ul style="list-style-type: none"> <li>To focus on the Solar system, Celestial sphere, Dip-Twilight &amp; Kepler's laws.</li> </ul>			
Credits:02 Total Hours:25			
<b>UNIT</b>	<b>CONTENTS</b>	<b>Hrs</b>	<b>CO</b>
I	Celestial sphere – Celestial co-ordinates. <b>Chapter 2 ( 39 – 68 )</b>	05	CO1
II	The Earth : Section I. <b>Chapter 3 ( 87 – 90 )</b>	05	CO2
III	The Earth: Section II. <b>Chapter 3 (91-101)</b>	05	CO3
IV	Refraction <b>Chapter 4 ( 117 – 128 )</b>	05	CO4
V	Kepler's law <b>Chapter 6 ( 146 – 157 )</b>	05	CO5
<b>TEXT BOOK</b>			
1.	<i>S. Kumaravelu and Susheela Kumaravelu, Astronomy. 1990 Eight edition Janaki Calender Corporation, Sivakasi.</i>		

**COURSE OUTCOMES (CO)**

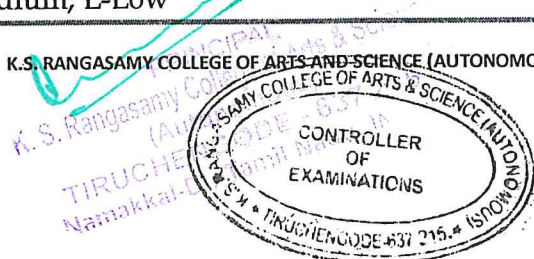
After completion of the course, the students will be able to

CO1	Acquiring knowledge of Celestial spheres and co-ordinates.
CO2	Understanding solar system, spherical trigonometry.
CO3	Understanding Twilight and geocentric parallex.
CO4	Learning about refraction, Tangent and cassinis formulas
CO5	Gaining the knowledge of kepler's law, eccentric and mean anomalies.

**MAPPING**

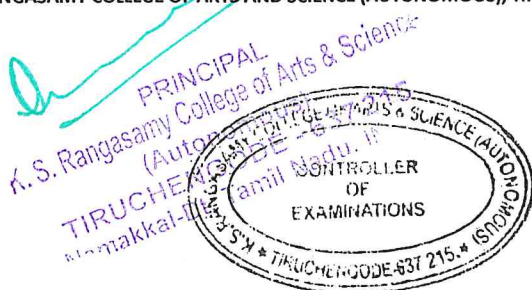
PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO					
CO1	H	L	M	H	H
CO2	H	M	M	H	H
CO3	H	H	H	M	M
CO4	H	M	M	M	M
CO5	H	H	M	L	M

H-High; M-Medium; L-Low



**B.Sc.,Mathematics(Studentsadmittedfrom2018-2019Onwards)**

18UMAAL502	ADVANCED LEARNERS COURSE IV: MATHEMATICAL MODELING	SEMESTER V	
<b>COURSE OBJECTIVES</b>			
The course aims			
<ul style="list-style-type: none"> <li>To provide a mathematical background to the principles of Economics.</li> <li>To convert the real life and scientific situation as a mathematical problem.</li> </ul>			
<b>Credits:02TotalHours:25</b>			
UNIT	CONTENTS	Hrs	CO
I	Mathematical Modelling through Ordinary Differential equations of First Order: Linear Growth and Decay Model - Non-Linear Growth and Decay Model - Component Model- Dynamics problems - Geometrical problems. <b>Chapter -2 ( Section 2.1 to 2.6 )</b>	05	CO1
II	Mathematical Modelling through Systems of Ordinary Differential Equations of First Order: PopulationDynamics- Epidemics - Compartment Models - Economics - Medicine, Arms Race, Battles and international Trade - Dynamics. <b>Chapter - 3 ( Section 3.1 to 3.6 )</b>	05	CO2
III	Mathematical Modelling through Ordinary Differential equations of Second Order: Planetary Motions - Circular Motion and motion and motion of Satellites - Mathematical Modelling through Linear Differential Equations of Second Order - Miscellaneous Mathematical Models. <b>Chapter 4 ( Sections 4.1 to 4.4 )</b>	05	CO3
IV	Mathematical Modelling through Difference equations: Simple Models - Basic Theory of Linear Difference Equations with Constant Coefficients - Economics and Finance - Population Dynamics and Genetics - Probability Theory. <b>Chapter 5( Sections 5.1 to 5.5 )</b>	05	CO4
V	Mathematical Modelling Through Graphs: Solutions which can be modeled through Graphs - Mathematical Modelling in Terms of Directed Graphs, Signed Graphs, Weighted Diagraphs and Un-oriented Graphs. <b>Chapter 7 ( Section: 7.1 to 7.5 )</b>	05	CO5
<b>TEXT BOOK</b>			
1.	J.N. Kapur, 1988, Mathematical Modelling, Willey Eastern Limited, New Delhi		



**Mr. M. FRASAD, M.Sc., M.S.A.,**  
 Controller of Examinations  
 K.S. Rangasamy College of Arts & Science (Autonomous)  
 Tiruchengode - 637 215, Tamilnadu, India.



**COURSE OUTCOMES (CO)**

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

CO1	Understanding mathematical modelling and its various application.
CO2	Applying modelling through systems of differential equations of first order.
CO3	Applying modelling through systems of differential equations of second order.
CO4	Utilizing modelling technique in linear difference equations.
CO5	Application of mathematical modelling through graphs.

**MAPPING**

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	M	H	H
CO2	H	M	M	H	H
CO3	H	H	H	M	M
CO4	H	M	M	M	M
CO5	H	H	M	L	M

H-High; M-Medium; L-Low