



# 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

## SYLLABUS FOR B.Sc. MATHEMATICS

(2018 - 2021 Batch onwards)

Department of Mathematics

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

PRINCIPAL

K. S. Rangasamy College of Arts & Science  
(Autonomous)

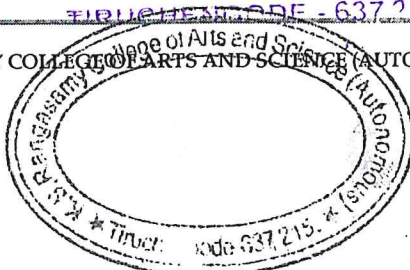
TIRUCHENGODE - 637 215

Mr. M. PRASAD, M.Sc., M.B.A., M.Phil.

Controller of Examinations

K.S. Rangasamy College of Arts & Science (Autonomous)

Tiruchengode - 637 215, Tamilnadu, India



**BACHELOR OF SCIENCE (MATHEMATICS)**

**VISION**

To be a global center of excellence in Mathematics for the growth of Science and Technology.

**MISSION**

- To provide quality education and research in Mathematics through updated curriculum and effective teaching learning process.
- To inculcate innovative skills, team work and ethical practices among students so as to meet societal expectations.

**PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

PEO 1: To provide a degree course, suitable for students of high ability by combining and relating Mathematics, Statistics and the Social Sciences.

PEO 2: To prepare students for further study or for professional and managerial careers, particularly in areas requiring the applications of quantitative skills.

PEO 3: To develop their positive attitude, skills which will enable them to become a multi facet personality shining in any chosen field.

**PROGRAMME OUTCOMES (PO)**

After completion of the programme, the graduates will be able to

PO 1: Think in a critical manner and recognize when there is a need for information and use that information for solving problems effectively.

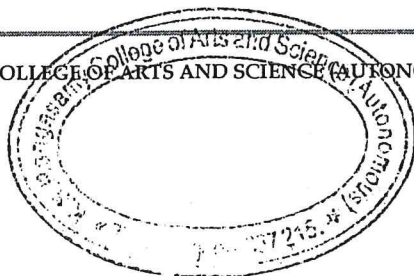
PO 2: Formulate and develop Mathematical arguments in a logical manner.

PO 3: Attain good knowledge and understanding in advanced areas of Mathematics and Statistics, chosen by the students from the given courses and acquires the ability to think independently paving way for life long learning.

PO 4: Understand and formulate and use quantitative models arising in social science, business and other contexts.

PO 5: Apply the concepts to design a Mathematical model and to solve the real life problems involving the concepts studied in Applied Mathematics.

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**PROGRAMME SPECIFIC OUTCOMES (PSO)**

After completion of the programme, the graduates will be able to

PSO 1: Acquire the knowledge and sound understanding on fundamentals of mathematical concepts including quantity, structure, space and change.

PSO 2: Analyze the basic concepts of advanced Mathematics.

PSO 3: Comprehend a range of general skills, to solve problems, to evaluate information using computers to develop software programming and to communicate with society effectively and learn independently.

PSO 4: Possess the effective skills to analyze problems in diverse fields such as Science and Engineering, Education, Banking, Public services, Business etc.

PSO 5: Develop the Analytical, Numerical and Mathematical skills to create Mathematical Models and improve the problem solving skills to find the solution to the real life problems.

**REGULATIONS**

**ELIGIBILITY**

Candidates seeking the admission to the first year of the Bachelor of Science (Mathematics) full-time degree programme shall be required to possess a Bachelor's Degree of any Recognized University.

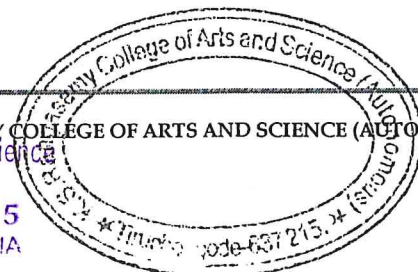
**DURATION OF THE COURSE**

The programme shall extend a three academic years consisting of six semesters. Each academic year will be divided into two semesters.

**MAXIMUM DURATION FOR THE COMPLETION OF THE PROGRAMME**

The maximum duration for completion of the UG Programme shall not exceed 12 semesters.

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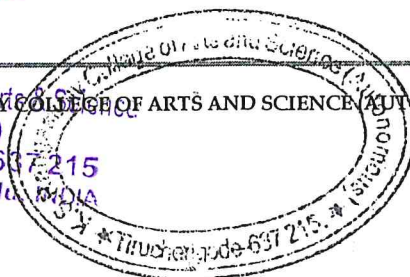


SCHEME OF EXAMINATION

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>

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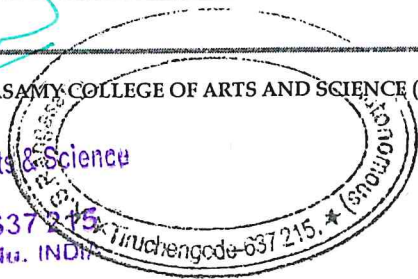


Third Semester							
Part I							
18UTALA301/ 18UHILA301 / 18UFRLA301	Tamil III/ Hindi III/ French III	5	3	25	75	100	3
Part II							
18UENLA301	Foundation English- III	5	3	25	75	100	3
Part III							
18UMAM301	Core V: Analytical Geometry of 2D and 3D	5	3	25	75	100	4
18UMAM302	Core VI: Statics and 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
Part IV							
18UMASB301	SBC I: Quantitative Aptitude - 100% Internal Evaluation	2	3	100	-	100	2
18UMANM301	NMEC I	2	3	25	75	100	2
Non Credit							
18ULS301	Career Competency Skills I	1	-	-	-	-	-
	Add-on Course *	-	-	-	-	-	-
<b>Total</b>		<b>30</b>				<b>800</b>	<b>22</b>
Fourth Semester							
Part I							
18UTALA401/ 18UHILA401 / 18UFRLA401	Tamil IV/ Hindi IV/ French IV	5	3	25	75	100	3
Part II							
18UENLA401	Foundation English -IV	5	3	25	75	100	3
Part III							
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
Part IV							
18UMASB401	SBC II : Statistics for Competitive Exams - 100% Internal Evaluation	2	3	100	-	100	2
18UMANM401	NMEC II	2	3	25	75	100	2
Non Credit							
18ULS401	Career Competency Skills II	1	-	-	-	-	-
	Add-on Course *	-	-	-	-	-	-
<b>Total</b>		<b>30</b>				<b>800</b>	<b>22</b>

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Third Semester							
Part I							
18UTALA301/ 18UHILA301 / 18UFRLA301	Tamil III/ Hindi III/ French III	5	3	25	75	100	3
Part II							
18UENLA301	Foundation English- III	5	3	25	75	100	3
Part III							
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
Part IV							
18UMASB301	SBC I: Quantitative Aptitude - 100% Internal Evaluation	2	3	100	-	100	2
18UMANM301	NMEC I	2	3	25	75	100	2
Non Credit							
18ULS301	Career Competency Skills I	1	-	-	-	-	-
	Add-on Course *	-	-	-	-	-	-
<b>Total</b>		<b>30</b>				<b>800</b>	<b>22</b>
Fourth Semester							
Part I							
18UTALA401/ 18UHILA401 / 18UFRLA401	Tamil IV/ Hindi IV/ French IV	5	3	25	75	100	3
Part II							
18UENLA401	Foundation English -IV	5	3	25	75	100	3
Part III							
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
Part IV							
18UMASB401	SBC II : Statistics for Competitive Exams - 100% Internal Evaluation	2	3	100	-	100	2
18UMANM401	NMEC II	2	3	25	75	100	2
Non Credit							
18ULS401	Career Competency Skills II	1	-	-	-	-	-
	Add-on Course *	-	-	-	-	-	-
<b>Total</b>		<b>30</b>				<b>800</b>	<b>22</b>

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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>

**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.

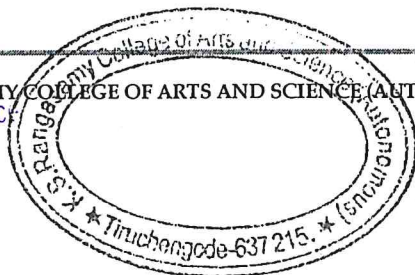
S.No	Subject Code	Name of the Subject
1	18UMAAC301	Data Analysis Using R-Software.
2	18UMAAC401	Numerical Computations Using MatLab.

**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.

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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>

### FOR COURSE COMPLETION

Student shall complete:

- Language papers (Tamil/Hindi/French and English) in I, II, III and IV semesters.
- Value Education Yoga and Environmental Studies in I and II Semester.
- Non Major Elective Course in III and IV semesters.
- Skill Based Course in III, IV, V and VI semesters.
- Extension activity in V semester.

18UMAM101	CORE I: CLASSICAL ALGEBRA	SEMESTER I
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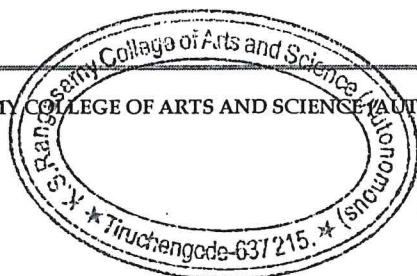
CO1	Learn Eigen values and Eigen vectors and to know how to solve the simultaneous linear equation.
CO2	Understand the concept of Binomial series and its application.
CO3	Understand the concept of Exponential series and Logarithmic series.
CO4	Understand the concepts of Polynomial equation and relation between roots and coefficients.
CO5	Learn how to transform the roots of the equation, understand the concepts of reciprocal equations.

MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	H	H	H	M	H	L	M	H	H
CO2	M	H	H	H	M	H	M	M	H	H
CO3	H	M	M	H	H	H	H	H	M	M
CO4	M	M	M	H	M	H	M	M	M	M
CO5	H	M	L	H	M	H	H	M	L	M

H-High; M-Medium; L-Low

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18UMAM102	CORE II: DIFFERENTIAL CALCULUS	SEMESTER I
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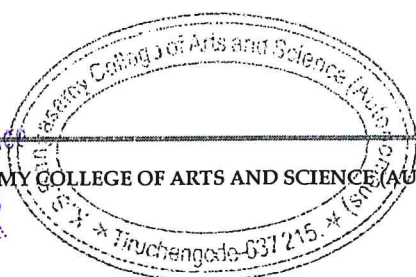
CO1	Learn successive differentiation and Leibnitz rule for nth derivative.
CO2	Understand the concept of Curvature and Radius of curvature.
CO3	Learn partial derivatives, successive partial derivatives and Euler's formula for homogeneous equation.
CO4	Understand the concept of expansion of trigonometric ratios, Hyperbolic functions and inverse hyperbolic functions.
CO5	Learn Logarithm of complex number, general and principal values and summation of trigonometric series.

MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	M	H	L	H	L	M	H	H
CO2	M	H	M	H	M	H	M	M	H	H
CO3	H	H	H	M	H	H	H	H	M	M
CO4	M	H	M	M	M	H	M	M	M	M
CO5	M	H	M	M	H	H	H	M	L	M

H-High; M-Medium; L-Low

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18UMAM201	CORE III: INTEGRAL CALCULUS	SEMESTER II
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CO1	Learn Integration, types of integration and Integration by parts.
CO2	Learn definite integral and its properties and understand the concepts of reduction formula.
CO3	Learn multiple integral and understand the concept of order of change of integration.
CO4	Learn Beta & Gamma functions, Properties of Beta and Gamma functions
CO5	Understand the relationship between Beta and Gamma functions.

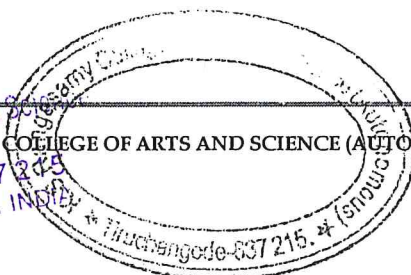
**MAPPING**

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	L	H	H	L	M	H	H
CO2	H	H	H	M	H	H	M	M	H	H
CO3	M	H	M	H	M	H	H	H	M	M
CO4	M	H	M	M	M	H	M	M	M	M
CO5	L	H	M	H	L	H	H	M	L	M

H-High; M-Medium; L-Low

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18UMAM202	CORE IV: DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORM	SEMESTER II
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CO1	Learn Exact differential equations and first order higher degree differential equations.
CO2	Learn Linear DE with constant coefficients and Linear DE with variable coefficients.
CO3	Learn Partial Differential Equations and Understand the concept standard types of PDEs.
CO4	Learn Laplace Transforms, Inverse Laplace Transforms and their properties.
CO5	Understand the concept of Inverse Laplace transforms using partial fractions and applications of Laplace Transforms.

MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	L	H	H	H	L	M	H	H
CO2	H	H	M	H	H	H	M	M	H	H
CO3	M	H	H	M	M	H	H	H	M	M
CO4	M	H	M	M	M	H	M	M	M	M
CO5	L	H	H	M	L	H	H	M	L	M

H-High; M-Medium; L-Low



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18UMAM301	CORE V: ANALYTICAL GEOMETRY OF 2 D AND 3 D	SEMESTER III
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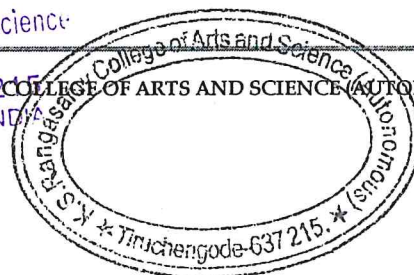
CO1	Understand the concepts of conic section parabola and its properties.
CO2	Describe ellipse and find the equation normal to the ellipse.
CO3	Find the equation of the hyperbola and rectangular hyperbola.
CO4	Find the equation of the plane and symmetric form of straight lines.
CO5	Compute equation of sphere and circle on a sphere.

MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	H	L	H	L	M	H	H
CO2	H	H	H	H	M	H	M	M	H	H
CO3	M	M	H	M	H	H	H	H	M	M
CO4	M	M	H	M	M	H	M	M	M	M
CO5	L	L	H	M	H	H	H	M	L	M

H-High; M-Medium; L-Low

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18UMAM302	CORE VI: STATICS & DYNAMICS	SEMESTER III
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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

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	H	M	L	H	H	L	M	H	H
CO2	M	H	M	M	H	H	M	M	H	H
CO3	H	H	H	H	M	H	H	H	M	M
CO4	M	H	M	M	M	H	M	M	M	M
CO5	H	H	M	H	L	H	H	M	L	M

H-High; M-Medium; L-Low

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18UMAA301	<b>ALLIED III: MATHEMATICAL STATISTICS I</b>	SEMESTER III
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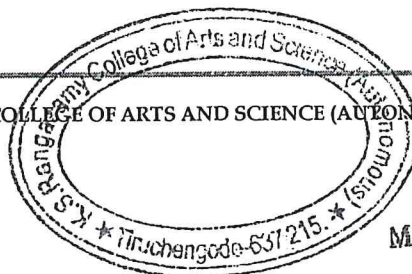
CO1	Define Random variables, Probability mass function and probability density function, Distribution functions and Find Joint probability function and Marginal probability functions and conditional distributions.
CO2	Compute expectation, covariance and MGF and show Chebechev's inequality.
CO3	Solve problems involving the concepts of theoretical discrete distributions.
CO4	Solve problems involving the concepts of theoretical continuous distributions.
CO5	Apply the concepts of correlation and regressions to solve problems in real life situation.

**MAPPING**

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	H	M	H	H	L	M	H	H
CO2	H	M	H	M	H	H	M	M	H	H
CO3	M	H	M	H	M	H	H	H	M	M
CO4	M	M	M	M	M	H	M	M	M	M
CO5	L	H	M	M	L	H	H	M	L	M

H-High; M-Medium; L-Low

  
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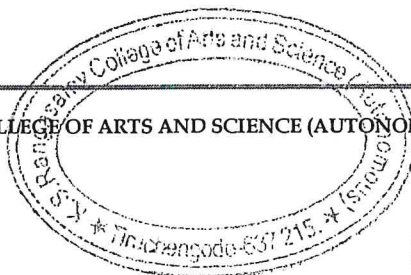




18UMAAP301	ALLIED PRACTICAL III: STATISTICAL PACKAGE (Ms - EXCEL)	SEMESTER III
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CO1	Understand the concepts of diagrammatic representation for statistical data.
CO2	Acquire the knowledge about some standard distribution.
CO3	Solve problems involving the concepts Geometric and Harmonic mean.
CO4	Find standard deviation and coefficient of variation.
CO5	Measure the coefficient of skewness.
CO6	Compute Correlation co-efficient.

  
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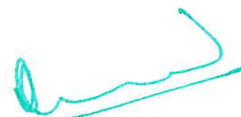
18UMASB301	SBC I : QUANTITATIVE APTITUDE ( 100% Internal Evaluation )	SEMESTER III
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CO1	Solve problems involving the concepts of Simplification and Average.
CO2	Solve problems involving the concepts of Surds and indices.
CO3	Solve problems involving the concepts of Ratio and proportion.
CO4	Solve problems involving the concepts of Profit and loss, Partnership.
CO5	Solve problems involving the concepts of age and percentage.

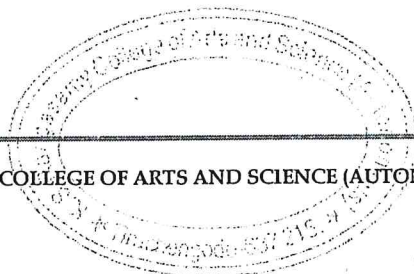
## MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	H	H	L	M	H	H
CO2	H	H	M	H	H	H	M	M	H	H
CO3	M	H	H	M	M	H	H	H	M	M
CO4	M	H	M	M	M	H	M	M	M	M
CO5	L	H	M	L	M	H	H	M	L	M

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18UMAAC301	ADD ON COURSE I: DATA ANALYSIS USING R - SOFTWARE	SEMESTER III
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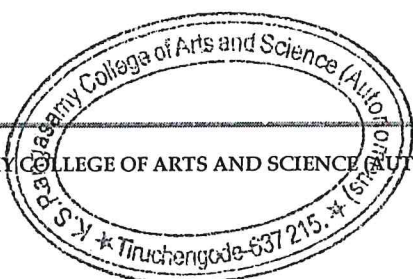
CO1	Know R-environment, R-Basic syntax and R- data types.
CO2	Understand the concepts of R- variables, R- operators and R- decision making.
CO3	Write program using R-loops, R-strings and R- functions.
CO4	Apply the concepts of R-vectors and R-matrices to create program in R-environment.
CO5	Create R- pie chart, R-bar chart. R-box plot, R- histogram and compute mean, median and mode.

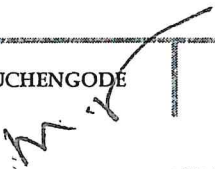
MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	H	H	H	H	L	M	H	H
CO2	H	M	H	H	H	H	M	M	H	H
CO3	M	H	M	H	M	H	H	H	M	M
CO4	M	M	M	H	M	H	M	M	M	M
CO5	M	H	M	H	L	H	H	M	L	M

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18UMAM401	<b>CORE VII : APPLICATIONS OF INTEGRATION AND VECTOR CALCULUS</b>	<b>SEMESTER IV</b>
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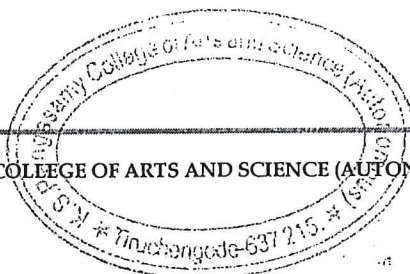
CO1	Find area under plane curve, closed curve , length of the curve and find volume of the solid revolution.
CO2	Obtain the Fourier series for periodic function, odd and even functions, Half range series.
CO3	Understand the concepts of Gradient, Directional derivative, Divergence, Curl, Solenoidal and Irrotational. Show the Vector Identities.
CO4	Compute Line integral - Surface integral - Volume Integral.
CO5	Apply the concepts of Stoke's Theorem - Gauss divergence theorem - Green's theorem to solve problems in vector integration.

### MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	H	M	H	H	L	M	H	H
CO2	H	M	H	M	H	H	M	M	H	H
CO3	M	H	H	H	M	H	H	H	M	M
CO4	M	M	H	M	M	H	M	M	M	M
CO5	L	H	H	M	M	H	H	M	L	M

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18UMAM402	CORE VIII: SEQUENCES AND SERIES	SEMESTER IV
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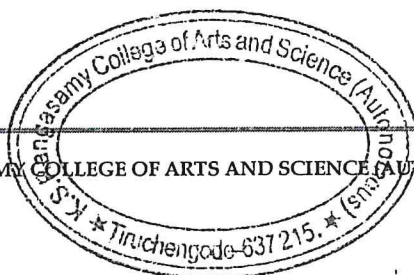
CO1	Define sequence, convergent sequence, divergent sequence and bounded sequence.
CO2	Understand the concepts of Monotone sequence, limit superior and limit inferior.
CO3	Identify whether the given infinite series is either convergent or divergent.
CO4	Apply various test to find the convergence and 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

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	L	M	H	H	L	M	H	H
CO2	H	H	M	M	H	H	M	M	H	H
CO3	M	H	H	H	M	H	H	H	M	M
CO4	M	H	M	M	M	H	M	M	M	M
CO5	M	H	H	M	L	H	H	M	L	M

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18UMAA401	ALLIED IV: MATHEMATICAL STATISTICS II	SEMESTER IV
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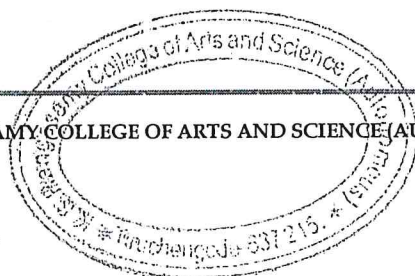
CO1	Define sampling and point estimation. Understand the concepts of Cramer Rao Inequality, Sufficiency and Rao Blackwel Theorem.
CO2	Understand the concepts of Estimation theory.
CO3	Apply the testing of hypothesis and compute type I and type II error.
CO4	Apply the large sample tests.
CO5	Solve problems using t-test, F-test and chi-square test.

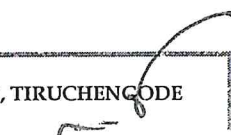
MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	L	H	H	H	L	M	H	H
CO2	H	H	M	H	H	H	M	M	H	H
CO3	M	H	H	M	M	H	H	H	M	M
CO4	M	H	M	M	M	H	M	M	M	M
CO5	L	H	H	L	M	H	H	M	L	M

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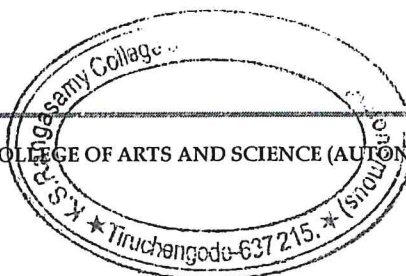
  
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18UMAAP401	ALLIED PRACTICAL IV: STATISTICAL SOFTWARE ( SPSS )	SEMESTER IV
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CO1	Understand the concepts of diagrammatic representation for statistical data.
CO2	Acquire the knowledge about some standard distribution.
CO3	Compute standard deviation, coefficient of variation, skewness and kurtosis.
CO4	Acquire the concepts in analyzing the data using Correlation co-efficient.
CO5	Understand the concept of regression.
CO6	Apply t-test.
CO7	Apply chi-square test for independent of attributes.
CO8	Acquire the knowledge different kinds of test.

  
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18UMASB401	SBC II : STATISTICS FOR COMPETITIVE EXAMS (100 % Internal Evaluation)	SEMESTER IV
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CO1	Classify, tabulate and analyse the collected data.
CO2	Understand the concepts of random sample and compute the sampling and non-sampling errors.
CO3	Apply time series analysis to compute trend and seasonal variations.
CO4	Solve problems involving the concepts of index numbers.
CO5	Compute birth rates, death rates, fertility rates and construct life table.


**MAPPING**

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	M	H	H	H	L	M	H	H
CO2	H	M	M	H	H	H	M	M	H	H
CO3	M	H	H	M	M	H	H	H	M	M
CO4	M	M	M	M	M	H	M	M	M	M
CO5	M	H	M	M	L	H	H	M	L	M

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18UMAAC401	ADD ON COURSE II: NUMERICAL COMPUTATIONS USING MATLAB	SEMESTER IV
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CO1	Understand the concepts of MatLab variables and Script M-files.
CO2	Apply MatLab predefined functions to compute maximum, minimum, average of given list of numbers. Do matrix operations in MatLab.
CO3	Write MatLab program using conditional statements and looping statements.
CO4	Know the handling of matrices in MatLab.
CO5	Solve differential equations and compute numerical integration.

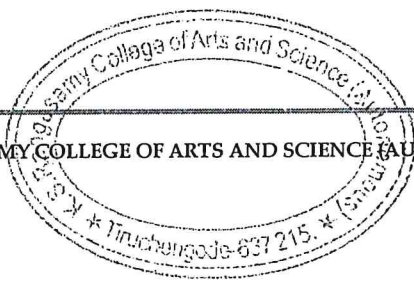
**MAPPING**

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	L	H	H	L	M	H	H
CO2	H	H	M	M	H	H	M	M	H	H
CO3	M	H	H	H	M	H	H	H	M	M
CO4	M	H	M	M	M	H	M	M	M	M
CO5	L	H	M	H	L	H	H	M	L	M

H-High; M-Medium; L-Low



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18UMAM501	CORE IX : ABSTRACT ALGEBRA	SEMESTER V
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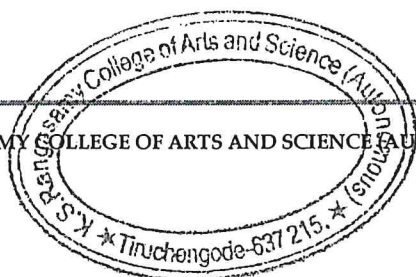
CO1	Understand the concept of Relation, Function and Binary Operator.
CO2	Defining elementary properties of a group and to acquire knowledge about Permutation groups.
CO3	Acquire knowledge about coset, Normal sub groups, Quotient groups and Isomorphism.
CO4	Learn about the concept of Ring, types of ring and its characterization.
CO5	Gain knowledge on Integral domain and to solve problems using Unique factorization domain and Euclidean domain.

MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	H	H	H	H	L	M	H	H
CO2	H	M	H	H	H	H	M	M	H	H
CO3	M	H	M	M	M	H	H	H	M	M
CO4	M	M	M	M	M	H	M	M	M	M
CO5	L	H	L	L	M	H	H	M	L	M

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18UMAM502	CORE X: REAL ANALYSIS I	SEMESTER V
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CO1	Understand the concept of function and sequence.
CO2	Learn how to find limit superior and limit inferior.
CO3	Identifying, the infinite series is either convergent or divergent.
CO4	Describe metric space and learn how to solve problems including the concept of continuous function.
CO5	Discuss about Open sets and closed set.

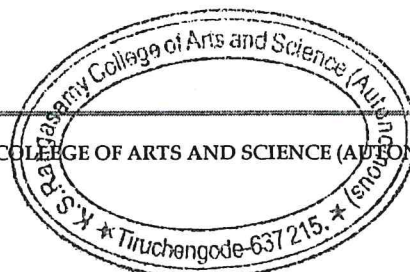
MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	L	M	H	H	L	M	H	H
CO2	H	H	M	M	H	H	M	M	H	H
CO3	M	M	H	H	M	H	H	H	M	M
CO4	M	M	M	M	M	H	M	M	M	M
CO5	L	M	H	M	L	H	H	M	L	M

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18UMAM503	CORE XI: OPERATIONS RESEARCH	SEMESTER V
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CO1	Define linear programming problem and to solve the problems using simplex method, Big-M method and Graphical method.
CO2	Understand the concepts two phase simplex method and dual simplex method.
CO3	Solve the problems using north west corner rule, Vogel's approximation method and MODI method.
CO4	Understand the concept of Assignment problem and travelling salesman problem.
CO5	Calculating network and scheduling by PERT/CPM.

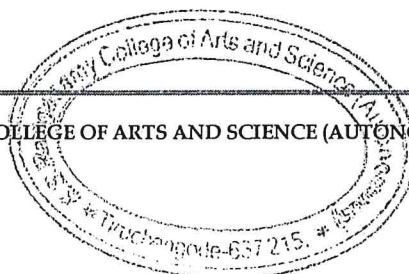
## MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	H	H	H	H	L	M	H	H
CO2	M	M	H	H	H	H	M	M	H	H
CO3	H	H	M	M	M	H	H	H	M	M
CO4	M	M	M	M	M	H	M	M	M	M
CO5	H	M	L	M	L	H	H	M	L	M

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18UMAM504	CORE XII: PROGRAMMING IN C	SEMESTER V
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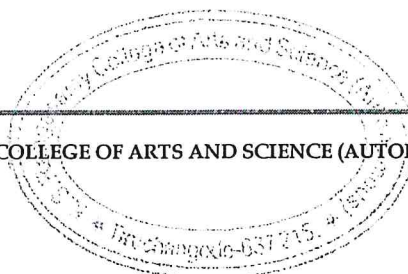
CO1	Understanding Basics of C Programming.
CO2	Implementing various commands in C Program.
CO3	Applying character Arrays and Strings.
CO4	Adopting user defined Functions.
CO5	Employing Printers and File Managements in C.

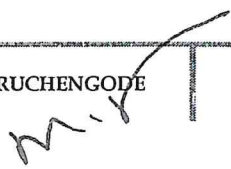
## MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	M	H	H	H	L	M	H	H
CO2	H	M	M	H	H	H	M	M	H	H
CO3	M	H	H	M	M	H	H	H	M	M
CO4	M	M	M	M	M	H	M	M	M	M
CO5	L	H	M	L	M	H	H	M	L	M

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18UMAEL501	ELECTIVE I: DISCRETE MATHEMATICS	SEMESTER V
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CO1	Understand the concepts of mathematical logic such as negation, conjunction, disjunction and formulate truth table.
CO2	Describe the principle of conjunctive normal form and disjunctive normal form.
CO3	Discuss about relation, function and its properties.
CO4	Acquire knowledge about lattices, homomorphism and its properties.
CO5	Compute Boolean algebra and Boolean function.

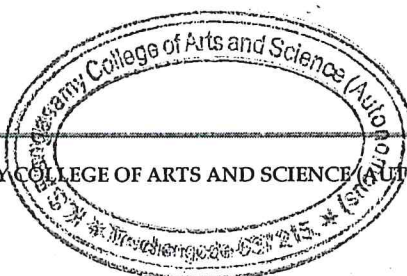
## MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	L	M	H	H	L	M	H	H
CO2	H	H	M	M	H	H	M	M	H	H
CO3	M	H	H	H	M	H	H	H	M	M
CO4	M	H	M	M	M	H	M	M	M	M
CO5	M	H	H	M	L	H	H	M	L	M

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18UMAEL502	ELECTIVE I: GRAPH THEORY	SEMESTER V
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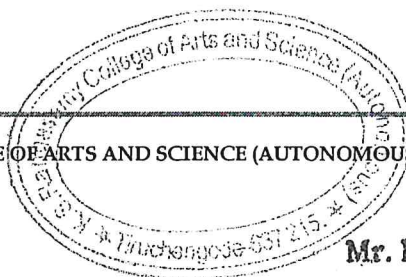
CO1	Understand the concepts of graph, sub graph and covering.
CO2	Compute walk, trail, path and connectivity.
CO3	Discuss about Eulerian graph and its theorem.
CO4	Understand the concepts of characterization of tree.
CO5	Describe about digraph, matrices and tournament.

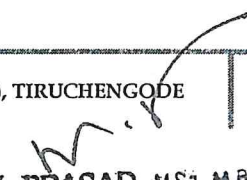
MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	H	L	M	H	L	M	H	H
CO2	M	H	H	M	M	H	M	M	H	H
CO3	H	M	H	H	H	H	H	H	M	M
CO4	M	M	H	M	M	H	M	M	M	M
CO5	M	L	H	H	M	H	H	M	L	M

H-High; M-Medium; L-Low

  
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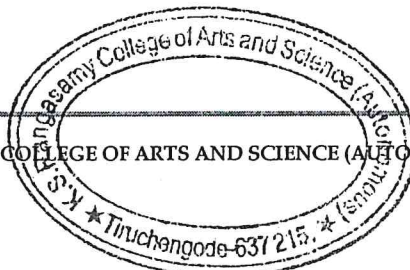


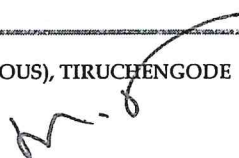
18UMAMP501	CORE PRACTICAL I : PROGRAMMING IN C	SEMESTER V
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CO1	Implementing the principles of C - Programming.
CO2	Employing C Programming in solving problems.
CO3	Organizing various commands of C Programming.
CO4	Applying C Program in solving simultaneous equations.
CO5	Utilizing C Program for Runge-Kutta Method.



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18UMASB501	SBC III : MATHEMATICS FOR COMPETITIVE EXAMS - I (100 % Internal Evaluation)	SEMESTER V
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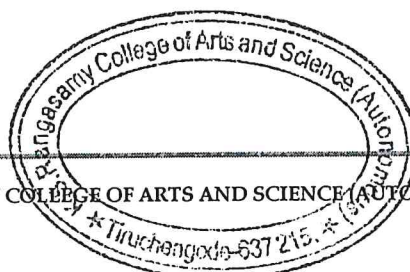
CO1	Understand the concept of matrix , determinant and properties of eigen value, eigen vector.
CO2	Formulating non linear equation and find nature of roots. Compute permutation and combination.
CO3	Discuss sets, relation, function and its properties.
CO4	Understand the concept of trigonometric equation and inequalities.
CO5	Identify limit, continuity and differentiability of function.

**MAPPING**

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	L	M	H	H	L	M	H	H
CO2	M	H	M	M	H	H	M	M	H	H
CO3	H	H	H	H	M	H	H	H	M	M
CO4	M	H	M	M	M	H	M	M	M	M
CO5	M	H	H	M	M	H	H	M	L	M

H-High; M-Medium; L-Low

  
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18UMAM601	<b>CORE XIII: LINEAR ALGEBRA</b> ( Fifth Unit as Self-Study )	<b>SEMESTER VI</b>
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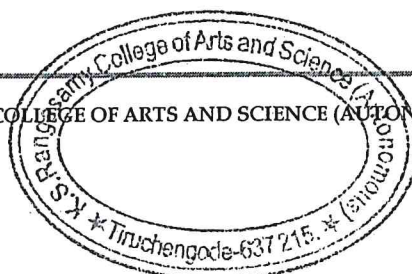
CO1	Define vector space, sub space and linear transformation.
CO2	Understand the concepts of rank of nullity and matrix linear transformation.
CO3	Discuss about inner product space.
CO4	Obtain theory of matrix.
CO5	Analyze Cayley Hamilton theorem and learn how to solve problems including the concept of eigen value and eigen vector.


**MAPPING**

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	M	H	H	H	L	M	H	H
CO2	H	M	M	H	H	H	M	M	H	H
CO3	M	H	H	M	M	H	H	H	M	M
CO4	M	M	M	M	M	H	M	M	M	M
CO5	M	H	M	L	M	H	H	M	L	M

H-High; M-Medium; L-Low

  
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18UMAM602	CORE XIV: REAL ANALYSIS II	SEMESTER VI
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CO1	Acquire knowledge about connected set and Completeness property.
CO2	Understand the concepts of continuity on compact metric space.
CO3	Learn about Reimann integral and existence of Reimann integral.
CO4	Understand the concept of Rolle's theorem, Fundamental theorem of calculus.
CO5	Gain knowledge on Dini's theorem and uniform convergence of series.

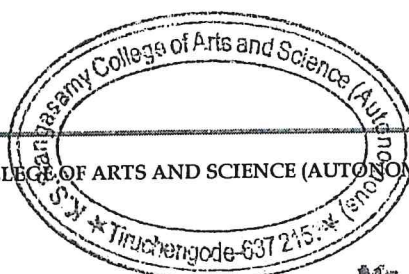
MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	H	H	H	H	L	M	H	H
CO2	M	M	H	H	H	H	M	M	H	H
CO3	H	H	M	M	M	H	H	H	M	M
CO4	M	M	M	M	M	H	M	M	M	M
CO5	H	M	L	M	L	H	H	M	L	M

H-High; M-Medium; L-Low



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18UMAM603	CORE XV: COMPLEX ANALYSIS	SEMESTER VI
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CO1	Learn about limit of function, differentiability and continuity of function.
CO2	Understand the concepts of bilinear transformation.
CO3	Identifying complex integration and solve the problems using Cauchy's integral formula.
CO4	Discuss Taylor's series, Laurent's Series and determining the nature of singularities.
CO5	Understand the concept of residues and definite integral.

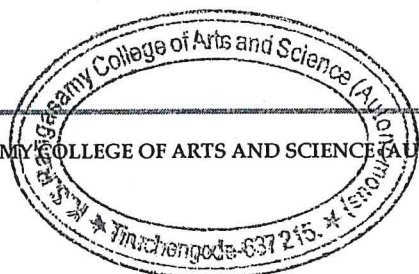
MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	L	M	H	H	L	M	H	H
CO2	H	H	M	M	H	H	M	M	H	H
CO3	M	H	H	H	M	H	H	H	M	M
CO4	M	H	M	M	M	H	M	M	M	M
CO5	L	H	H	M	L	H	H	M	L	M

H-High; M-Medium; L-Low



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18UMAM604	CORE XVI: NUMERICAL METHODS	SEMESTER VI
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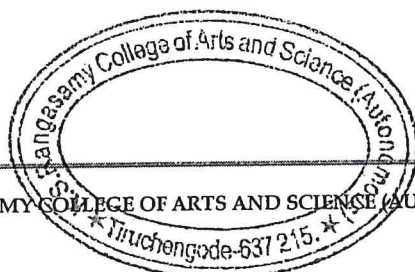
CO1	Understanding solution of algebraic equations and Transcendental equations
CO2	Application of various methods in solving simultaneous linear algebraic equations.
CO3	Applying interpolation formulas
CO4	Application of various numerical difference formulas, trapezoidal rule and Simpson's rule
CO5	Utilizing solution of Taylor's series, Euler's method and Runge-kutta methods

## MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	M	H	H	H	L	M	H	H
CO2	H	M	M	H	H	H	M	M	H	H
CO3	H	H	H	M	M	H	H	H	M	M
CO4	H	M	M	M	M	H	M	M	M	M
CO5	H	H	M	L	M	H	H	M	L	M

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18UMAEL601	ELECTIVE II: NUMBER THEORY	SEMESTER VI
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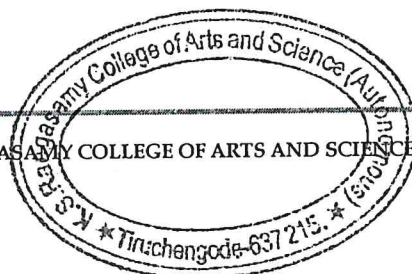
CO1	Understand the concepts of divisibility and congruence.
CO2	Solve the problems involving the concept of primitive roots and power residue.
CO3	Analyze Quadratic residues and reciprocity .
CO4	Understand the concepts of arithmetic functions and recurrence function.
CO5	Apply the concepts of simultaneous linear equation.

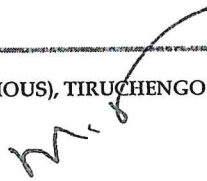
MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	L	M	H	H	L	M	H	H
CO2	H	H	M	M	H	H	M	M	H	H
CO3	M	H	H	H	M	H	H	H	M	M
CO4	M	H	M	M	M	H	M	M	M	M
CO5	M	H	H	M	L	H	H	M	L	M

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18UMAEL602	ELECTIVE II: OPTIMIZATION TECHNIQUES	SEMESTER VI
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CO1	Understand the concepts of inventory control
CO2	Analyze queuing theory and poisson process.
CO3	Finding recruitment and promotion problems
CO4	Discuss game, strategies on dominance property.
CO5	Compute sequencing problems using graphical method.

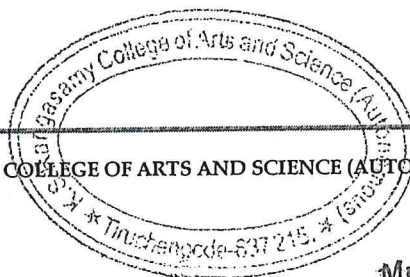
MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	H	L	H	H	L	M	H	H
CO2	M	H	H	M	H	H	M	M	H	H
CO3	H	H	H	H	M	H	H	H	M	M
CO4	M	H	H	M	M	H	M	M	M	M
CO5	M	H	H	H	L	H	H	M	L	M

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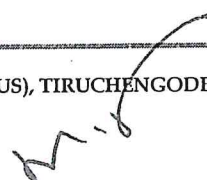
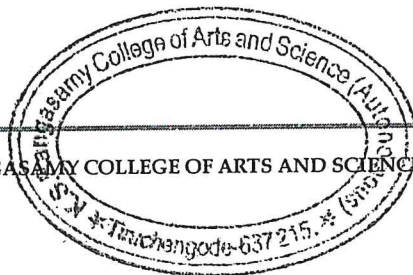


18UMAP601	CORE PRACTICAL II: SCILAB	SEMESTER VI
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CO1	Understand the concepts of sci lab in application of mathematical concepts.
CO2	Acquire the knowledge of matrix manipulations and its operations.
CO3	Applying programming concepts and its relevant areas.
CO4	Utilizing the concept of graphics and its applications.
CO5	Solving simultaneous equations and interpolation using sci lab techniques.



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18UMASB601	<b>SBC IV : MATHEMATICS FOR COMPETITIVE EXAMS - II (100 % Internal Evaluation)</b>	<b>SEMESTER V</b>
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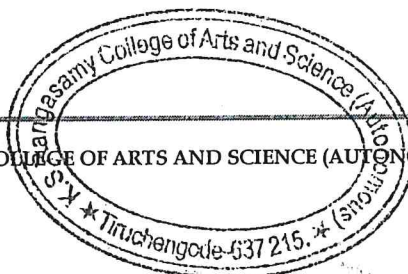
CO1	Applying the concept of algebraic complex number.
CO2	Utilizing the quadratic equations and its roots.
CO3	Analyzing binomial theorem for positive integral roots.
CO4	Understanding the concept of differential equation.
CO5	Application of vectors and its related fields.

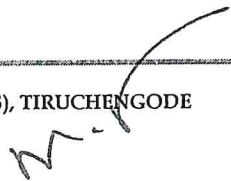
### MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	M	H	H	H	L	M	H	H
CO2	H	M	M	H	H	H	M	M	H	H
CO3	M	H	H	M	M	H	H	H	M	M
CO4	M	M	M	M	M	H	M	M	M	M
CO5	L	H	M	L	M	H	H	M	L	M

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