

SadakathullahAppa College

(Autonomous)

(Reaccredited by NAAC at an 'A' Grade. An ISO 9001:2015 Certified Institution)

Rahmath Nagar, Tirunelveli-11.

Tamil Nadu.

DEPARTMENT OF MATHEMATICS



Draft CBCS SYLLABUS

For

B.SC MATHEMATICS

(Applicable for students admitted in June 2021 and onwards)

**(Submitted before the <Mathematics> BOS Meeting
to be held on 15-03-2021)**

Department of Mathematics

Programme : B.Sc.

Programme Learning Outcomes

PLO	Upon completion of B.Sc. Degree Programme, the graduates will be able to:
PLO 1	Disciplinary Knowledge Acquire scientific knowledge and an understanding of major concepts and theoretical principles.
PLO 2	Creative Thinking and Practical Skills / Problem Solving Skills <ul style="list-style-type: none">• Enrich skills of observation/research related skills to draw logical inferences from scientific experiments/ programming and skills of creative thinking to develop novel ideas.• Hone problem-solving skills in theoretical, experimental and computational areas and apply them in research fields and real-life situations.
PLO 3	Sense of inquiry and Skilled Communicator <ul style="list-style-type: none">• Develop the capability to raise appropriate questions relating to the current/emerging issues encountered in the scientific field and plan, execute, and express the results of experiments / investigations through technical writings and oral presentations.
PLO 4	Ethical Awareness / Team Work / Environmental Conservation and Sustainability <ul style="list-style-type: none">• Equip them for conducting work as an individual / as a member, or as a leader in diverse teams upholding values such as honesty and precision and thus preventing unethical behaviours such as fabrication, falsification, misrepresentation of data, plagiarism, etc. academic integrity.• Realise that environment and humans are dependent on one another and know about the responsible management of our ecosystem for survival and the well-being of the future generation.
PLO 5	Usage of ICT/ Lifelong Learning / Self-Directed Learning Inculcate the habit of learning continuously through the effective adoption of ICT to update knowledge in the emerging areas in Sciences for inventions/discoveries and engage in remote/independent learning.

Programme Specific Outcomes

PSO	Upon completion of B.Sc. Mathematics Degree Programme, the students will be able to:	PLOs Mapped
PSO-1	Numerically literate and recognize the importance and value of mathematical thinking, training and approach to problem-solving on a diverse variety of disciplines	1,2
PSO-2	Acquire abstract reasoning, programming skills and make ideas precise by formulating them mathematically	1,2, 5
PSO-3	Learn lifelong independently to enhance and apply mathematical knowledge and to become a skilled communicator	1,2,3,5
PSO-4	Take up a Project Work as a team for enriching team work skills and to uphold academic and professional integrity	1,2,3,4
PSO-5	Use ICT to engage themselves in remote learning/independent learning	1,2,5

CBCS Syllabus – B.Sc. Mathematics (2021-22 onwards)

SEM	Part	P	Title of the paper	S. Code	H/W	L*	T*	P*	C	Marks		
										I	E	T
I	I	I L-I	இக்காலத்தமிழ்	21ULTA11	6				3			
			Grammar and Translation - I	21ULAR11								
	II	II L-I	Communicative English -I	21ULEN11	6				3			
	III	DSC-I	Differential Calculus	21UCMA11	5				4			
	III	DSC-II	Classical Algebra	21UCMA12	5				4			
	III	A-I/1	Statistics	21UAST11	6				4			
IV	AECC-I		Value Education-I	21USVE1A	2				2			
			Value Education-II	21USVE1B								

Semester – I

Course Title	Differential Calculus
Total Hours	75
Hours / Week	5
Code	21UCMA11
Course type	Theory
Credits	4
Marks	100

General Objective:

To recognize the appropriate tools of calculus to solve applied problems in a variety of settings ranging from physics and biology to business and economics

Course Objectives: The learner will be able to

CO	Course Objectives
CO-1	Recall the basics of differentiation.
CO-2	Apply the differentiation concept to find the extrema of various functions.
CO-3	Evaluate the radius, centre and circle of curvature of curves.
CO-4	List out the various types of singular points lying on a curve.
CO-5	Solve the simultaneous equations using Laplace transformation.

Unit I: Differentiability-Algebra of derivatives-Derivatives of some standard function - hyperbolic function-inverse function - chain rule – substitution method – logarithmic differentiation – parametric method- implicit function – nth derivative.

Unit II: Polar curves – Pedal equation of a curve -Maxima and Minima of functions of two variables

Unit III: Curvature – radius of curvature in Cartesian, parametric and polar coordinates – Evolutes - circle and centre of curvature.

Unit IV: Multiple points-Kinds of cusps - Asymptotes (Excluding Asymptotes of Polar curve).

Unit V: Laplace transform – Inverse Laplace transform- solving linear differential equations & simultaneous equations of first order using Laplace transform.

Textbooks:

1. Arumugam S. and Isaac. *Calculus*, New Gamma Publications, Palayamkottai, Edition 2005.
2. Arumugam S. and Isaac. *Differential Equations and Applications*, New gamma Publishing House, Palayamkottai, Edition 2011.

Unit I : TB1: Part I – Chapter II : Section 2.0 – 2.12

Unit II : TB1: Part I - Chapter III : Section 3.2,3.3,3.7

Unit III : TB1:Part I - Chapter III : Section 3.4, 3.5

Unit IV: TB1: Part I – Chapter III: Section 3.10 3.11 (Excluding Asymptotes of Polar curve)

Unit V : TB 2: Chapter III

Reference Books:

1. Narayanan S.,Manicavachagam Pillay T.K. *Calculus (Volume I)*, S. Viswanathan Printers & Publishers Pvt Ltd,Chennai Edition 2014.
2. Joseph A. Mangaladoss. *Differential Equation and Vector Calculus*,Presi-Persi Publications, Tirunelveli, Edition 2012.

Course Outcomes

CO	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Find the derivatives of functions using various methods	1,3	Remembering
CO-2	Apply the concept of differentiation to find the pedal equation of a curve.	1,2,3	Applying
CO-3	Determine the centre and circle of curvature of curves.	1,3	Evaluating
CO-4	Understand the behaviour of curves using asymptotes and sketch the graphs.	1,3	Understanding
CO-5	Make use of the concept of Laplace transform and inverse Laplace transform for solving ODE.	1,3	Applying

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credit						
I	21UCMA11	Differential Calculus	75	4						
Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓	✓		✓	✓		✓		
CO-2	✓	✓	✓		✓	✓	✓	✓		
CO-3	✓	✓	✓		✓	✓		✓		
CO-4	✓	✓	✓		✓	✓		✓		
CO-5	✓	✓	✓		✓	✓		✓		
	Number of matches (✓) = 31					Relationship = Medium				

Prepared by

A. Rashetha Begam

Dr. M. HimayaJaleela Begum

Checked by

A. Rashetha Begam

Head of the Department

Semester – I

Course Title	Classical Algebra
Total Hours	75
Hours / Week	5
Code	21UCMA12
Course type	Theory
Credits	4
Marks	100

General Objective:

To provide a new and refined approach in the study of abstract mathematical relationships through the use of new symbolism

Course Objectives: The learner will be able to

CO	Course Objectives
CO-1	Illustrate the formation of equations.
CO-2	Relate roots and coefficients of algebraic equations
CO-3	Evaluate the Sum of the r^{th} powers of the roots of the given equations
CO-4	Find the Nature and Position of Roots of equations
CO-5	Evaluate an approximate solution of an equation using Newton's and Horner's methods.

Unit I: Formation of Equations -Division Algorithm – Fundamental theorem of Algebra.

Unit II: Relation between roots and coefficients-Symmetric functions of roots in terms of coefficients.

Unit III: Sum of the r^{th} powers of the roots – Newton's theorem- Reciprocal Equations.

Unit IV: Transformation of equations- Nature and Position of Roots-Descartes' rule of signs -Rolle's Theorem.(Excluding Sturm's theorem)

Unit V: Cardon's method for solution of cubic equation- Ferrari's method for solution of biquadratic equation - Approximate solutions of Numerical Equations using Newton's method and Horner's method.

Textbook:

Arumugam S. and Isaac, *Algebra (Theory of equations, Theory of numbers and Trigonometry)* New Gamma Publications, Palayamkottai, Edition 2011.

Unit I : Chapter 5 Section 5.1

Unit II : Chapter 5 – Section 5.2

Unit III: Chapter 5 - Section 5.3, 5.4

Unit IV : Chapter 5 - Section 5.5, 5.7(Excluding Sturm's theorem)

Unit V : Chapter 5-Section 5.8 – 5.10

Reference Books:

1. Joseph A. Mangaladoss, Firthous Fatima S, HimayaJaleela Begum M and Syed Ali Fathima S. *Classical Algebra*, Presi-Persi Publications, Tirunelveli– Edition May 2016.
2. Manicavachagam Pillai T.K., and Natarajan T. and Ganabathy K. S. *Algebra(Volume I)*, Viswanathan Printers & Publishers Pvt Ltd, Chennai Edition 2014.

Course Outcomes

CO.NO	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Understand the fundamental concepts of algebra.	1,2	Understanding
CO-2	Find symmetric functions of roots in terms of coefficients.	1,2	Remembering
CO-3	Determine S_r using Newton's theorem	1,2	Evaluating
CO-4	Find the nature of roots of an algebraic equation using the concept of Descartes's rule of signs.	1,2,3	Remembering
CO-5	Determine the solution of cubic and biquadratic equations using Cardon's and Ferrari's methods.	1,2	Evaluating

Relationship Matrix

Semester	Course Code	Title of the Course	Hours	Credit						
I	21UCMA12	Classical Algebra	75	4						
Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)				
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO-1	✓	✓			✓	✓	✓			
CO-2	✓	✓			✓	✓	✓			
CO-3	✓	✓			✓	✓	✓			
CO-4	✓	✓	✓		✓	✓	✓	✓		
CO-5	✓	✓			✓	✓	✓			
Number of matches (✓) = 27					Relationship = Medium					

Prepared by
Dr.S.Firthous Fatima

Checked by
A. Rashetha Begam
Head of the Department

Semester I

Course Title	Allied I : Mathematical Statistics-I
Total Hours	90
Hours / Week	6
Code	21UAST11
Course type	Theory
Credits	4
Marks	100

General Objective:

To introduce various statistical tools to satisfy the need for concept personals and understand how sampling techniques are used in real-life problems.

Course Objectives: The learner will be able to

CO	Course Objectives
CO-1	Recall the measures of central tendency and compute different kinds of partition algebraically and graphically.
CO-2	Understand the meaning of the term correlation and the significance of its study.
CO-3	Compare variables and attributes.
CO-4	Apply sampling techniques to test the significance of large samples
CO-5	Estimate the test of significance using 't' and 'F' distribution.

Unit I: Central Tendencies: Introduction – Arithmetic Mean – Partition Values Median, Quartiles, Deciles and Percentiles - Mode - Geometrical mean and Harmonic mean - Measures of dispersion: Range- Quartile deviation- Standard deviation and Mean deviation – Coefficient of variation.

Unit II: Correlation and Regression: Karl Pearson's Coefficient of Correlation – Properties - Rank Correlation- Lines of regression - Regression coefficient and properties.

Unit III: Theory of Attributes: Introduction – Attributes - Consistency of data – Independence and Association of data – Coefficient of association.

Unit IV: Test of significance (Large Samples): Introduction – Sampling - Sampling distribution – Testing of hypothesis – Test of significance for proportion and percentage – Test of significance for means – Test of significance for standard deviation.

Unit V: Test of significance (Small samples): Introduction – Test of significance based on t-distribution – Test of significance based on F-test.

Textbook:

Arumugam S and Isaac. *Statistics*. New Gamma Publishing house, Palayamkottai, Edition July 2013.

Unit I : Chapter 2: Section 2.1 to 2.4, Chapter 3: Section 3.1

Unit II : Chapter 6: Section 6.1 - 6.3

Unit III: Chapter 8: Section 8.1 - 8.3

Unit IV: Chapter 14: Section 14.1 - 14.5

Unit V : Chapter 15: Section 15.1, 15.2

Reference Books:

1. Gupta S.C. and Kapoor V.K. *Fundamentals of Mathematical Statistics*. Published by Sulthan Chand & Sons, New Delhi, 11th Edition.

2. Gupta S.P. *Statistical Methods*, Published by Sulthan Chand & Sons, New Delhi 42nd Edition.

3. Pillai R.S.N. and Bagavathi, *Statistics*, Published by S. Chand & Company PVT. LTD, New Delhi, First Edition.

COURSE OUTCOMES

CO. NO	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Define central tendency and explain the concept of dispersion and the significance of measuring it.	1,3,4	Remembering
CO-2	Interpret important properties of correlation coefficient and regression.	1,2,4	Understanding
CO-3	Demonstrate the concept of association of attributes and obtain a qualitative measure of association between two attributes.	1,2,4	Understanding
CO-4	Make use of the various tests of significance for large samples.	1,2,4	Applying
CO-5	Test the significance of small samples using 't' and 'F' distribution.	1,2,4	Applying

Relationship Matrix

Semester	Course Code	Title of the Course					Hours	Credit			
I	21UAST11	Allied I : Mathematical Statistics-I					90	4			
Course Outcomes (COs)	Programme Learning Outcomes (PLOs)					Programme Specific Outcomes (PSOs)					
	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
CO-1	✓	✓	✓	✓	✓	✓		✓	✓		
CO-2	✓	✓	✓	✓	✓	✓	✓		✓		
CO-3	✓	✓	✓	✓	✓	✓	✓		✓		
CO-4	✓	✓	✓	✓	✓	✓	✓		✓		
CO-5	✓	✓	✓	✓	✓	✓	✓		✓		
		Number of matches (✓) =40					Relationship = High				

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