KANNUR UNIVERSITY
കണ്ണൂർ സർവകലാശാല

(Abstract)

FYUG Mathematics Programme – Addition of three DSC Courses to the FYUG Course Basket – Approved and Implemented with Effect from the 2026 Admission – Orders Issued.

ACADEMIC C SECTION

ACAD/ACAD C1/8346/2026 Dated: 17.09.2026

Read:-1. U O No ACAD/FYSC- I I U2LO32 12024 dated 18.10.2024

2. U.O. No. ACAD C/ACAD CLI2L547 12024 dated 04.02.2025

3. U.O. No. ACAD C/ACAD CLI2L547 I2024 dated 14.08.2025

4. E-mail from the Principal , Mary Matha Arts and Science College, Mananthavady, Wayanad , dated 02.05.2026

5 . U.O No. ACAD/ACAD C1/ 18104/2025 dated 10.06.2026

6. Minutes of the meeting of the Expert Committee held on 22.06.2026 & 29.06.2026

7. E mail from the Dean, Faculty of Science , dated 23.07.2026

8. Orders of the Vice Chancellor in the file of even no., dtd 13.08.2026

ORDER

1. The Scheme and Syllabi of the First and Second Semesters of the B.Sc. Mathematics Honours/Honours with Research Programme (FYUGP) in the affiliated colleges under Kannur University were approved and implemented with effect from the 2024 admission, as per the paper read as (1) above. Subsequently, the syllabi for Second semester modified and the Third to Eighth Semesters were approved as per the papers read as (2) and (3) above, respectively.
2. Subsequently, the Principal, Mary Matha Arts and Science College, Mananthavady, submitted the syllabi of three Mathematics DSC Courses, designed by the Department of Mathematics of the College for inclusion in the FYUG Course Basket, as per the paper read as (4) above.
3. in the absence of a duly constituted Board of Studies, an Expert Committee was constituted vide paper read (5) above to scrutinize and verify the Syllabi of the three Mathematics DSC Courses, designed by the Department of Mathematics of Mary Matha Arts and Science College, Mananthavady and the above syllabi were forwarded to the Convenor of the Expert Committee .
4. The Convenor of the Expert Committee, Dr. Bijumon R., Associate Professor, Department of Mathematics, Mahatma Gandhi College, Iritty, submitted the minutes of the meeting of the Expert Committee, recommending the inclusion of these courses in the FYUGP B.Sc. Mathematics DSC Basket as per the paper read as (6) above. .
5. The minutes of the Expert Committee and the syllabi of the FYUG Mathematics DSC courses were subsequently forwarded to the Dean, Faculty of Science, for remarks. The Dean, vide the paper read as (7) above, conveyed his concurrence with the recommendations of the Expert Committee.

6. The Vice Chancellor, after considering the recommendations of the Dean, Faculty of Science, and in exercise of the powers of the Academic Council conferred under Section 11(1), Chapter III of the Kannur University Act, 1996, and all other enabling provisions read together therewith, has approved the syllabi of the three Mathematics DSC Courses designed by the Department of Mathematics of the College for inclusion in the FYUG Course Basket and incorporation into the First to Third Semester syllabi with effect from the 2026 admission, subject to reporting the same to the Academic Council.
7. The syllabi of the three Mathematics DSC Courses designed by the Department of Mathematics of the College for inclusion in the FYUG Course Basket and incorporation into the First to Third Semester syllabi with effect from the 2026 admission are appended to this U.O. and uploaded on the University website.
8. Orders are issued accordingly.

Sd/-
Bindu K P G
Joint Registrar (Acad)
For REGISTRAR

To: 1.The Principal,Mary Matha Arts and Science College, Mananthavady, Wayanad.
2. Dr. Bijumon R. (Expert Committee Convenor).

Copy To: 1. The Controller of Examinations (Through PA to CE)
2. JR (Exam)/ AR VII (Exam)/SO (EXC1)
3. The Chairperson, BoS in Mathematics (UG)
4. PS to VC/PA to R
5. AR/JR (Academic)
6.IT Cell (For uploading in the website)
7. SF/DF/FC

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Forwarded / By Order
SECTION OFFICER

KU1DSCMAT120: Mathematics for Data Science - I

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
I	DSC	100-199	KU1DSCMAT120	3+1	75

Learning Approach Hours/Week			Marks Distribution			Duration of ESE(Hours)
Lecture	Practical/Internship	Tutorial	CE	ESE	Total	
3	2	1	35	65	100	1.5

Course Description

This course introduces fundamental mathematical concepts—including sets, relations, functions and Boolean algebra —equipping data science students with the logical and analytical tools needed for modelling, data organization, and problem-solving.

Course Prerequisite

High school algebra and basic logical reasoning are recommended

Course Outcomes (COs)

CO No.	Expected Outcome	Learning Domains
1	Apply set theory concepts to represent and manipulate data using sets, subsets, power sets, and Venn diagrams.	Apply
2	Analyse relations to identify equivalence classes, partial orderings, and construct Hasse diagrams for data structuring.	Analyse
3	Demonstrate understanding of functions by identifying types, performing composition, and finding inverses.	Understand / Apply
4	Evaluate and simplify Boolean expressions, construct truth tables, and apply De Morgan's laws in logical and programming contexts.	Evaluate / Apply

Mapping of Course Outcomes to PSO's							
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓		✓	✓		✓	
CO 2	✓	✓	✓			✓	
CO 3	✓		✓			✓	
CO 4	✓		✓		✓	✓	

COURSE CONTENTS

Module	Unit	Description	Hours
I		**Basic Set Theory**	12
	1	Sets, Venn Diagram, Subsets, The Size of a set, Power set	
	2	Cartesian Products, Set notation with quantifiers, Truth set and quantifiers	
	3	Set operations, Set identifiers, Generalized union and intersection, Computer representation of sets	
II		**Relations**	10
	1	Relations and Properties, Representations	
	2	Equivalence Relations, Partial Orderings (Topological sorting excluded)	
III		**Functions**	13
	1	Basics of function, Domain, Range, Types of functions	
	2	Inverse Functions and Composition of Functions, Graph of Functions	
	3	Some important functions	
IV		**Boolean Algebra and Logic**	15
	1	Boolean Algebra	
	2	Propositional Logic	
V		**Teacher Specific Module** **Directions for practical-GeoGebra**	25
		1. Venn Diagram Representation of Sets 2. Power Set and Subset Visualization 3. Verification of Set Operations 4. Visualization of Equivalence Relations	

		5. Hasse Diagram Construction 6. Identification of Minimal and Maximal Elements 7. Function mapping visualization 8. Domain, Range, and Types of Functions using graphs 9. Truth Tables Using GeoGebra Spreadsheet 10. Verification of De Morgan's Laws.	

Essential Reading

1. Kenneth H. Rosen, *Discrete Mathematics and Its Applications*, 8th Edition, McGraw Hill.
2. Schaum's Outlines, *Discrete Mathematics*, 3rd Edition.

Reference Distribution

Module	Unit	Reference No.	Sections	Remark
I	1	1	Sections 2.1.1 - 2.1.5	*Exclude proof of theorem in 2.1.3*
	2	1	Sections 2.1.6 - 2.1.8	
	3	1	Sections 2.2.1 - 2.2.4	
II	1	1	Sections 9.1 and 9.3	*Exclude proof of theorem in 9.1.5*
	2	1	Sections 9.5 and 9.6	*Exclude 9.6.6 and proof of theorems in 9.5.4 and 9.6.1*
III	1	1	Sections 2.3.1 - 2.3.2	
	2	1	Sections 2.3.3 - 2.3.4	
	3	1	Section 2.3.5	
IV	1	2	Sections 15.1 - 15.5	
	2	1	Section 1.1	
V		1	Practical using GeoGebra	

Suggested Reading

1. Susanna S. Epp, *Discrete Mathematics with Applications*, 5th Edition, Cengage Learning / Cengage India, 2020
2. Judith L. Gersting, *Discrete Mathematics for Computer Scientists*, 7th Edition, W.H. Freeman / Macmillan Learning.
3. Seymour Lipschutz, *Schaum's Outline of Discrete Mathematics, 4th* Edition, McGraw-Hill Education.

Assessment Rubrics

Evaluation Type	Marks
End Semester Evaluation (ESE)	**65 (50 T + 15 P)**
Continuous Evaluation (CCA)	**35 (25 T + 10 P)**
Theory (CCA)	**25**
(a) Test Paper	10
(b) Assignment	10
(c) Seminar/Viva-voce	5
Practical (CCA)	**10**
(a) Skill	6
(b) Record	4
Total	**100**

* A student has to appear for at least two written tests. Average mark of best two tests is to be considered for internal mark.

Use of Scientific Calculators below 100 functions (that is, upto *fx 99*) shall be permitted.

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KU2DSCMAT120: Mathematics for Data Science II

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
II	DSC	100-199	KU2DSCMAT120	3+1	75

Learning Approach Hours/Week			Marks Distribution			Duration of ESE(Hours)
Lecture	Practical/Internship	Tutorial	CE	ESE	Total	
3	2	1	35	65	100	1.5

Course Description

This course introduces the fundamental concepts of differential and integral calculus along with their applications and provides an introduction to matrix theory with practical implementation using MATLAB. A sound knowledge of these topics is essential for students of mathematics to enhance their conceptual understanding and support further development in the subject.

Course Prerequisite

Functions, Domain, Range

Course Outcomes (COs)

CO No.	Expected Outcome	Learning Domains
1	Understand the notion of limit and limit laws.	Apply
2	Understand continuity of a function	Understand
3	Comprehend the notion of derivative of a function and differentiation rules	Understand
4	Comprehend the indefinite and definite integrals	Understand
5	Apply the notion of definite integrals to find area between curves and arc length	Apply
6	Evaluate rank of matrices, and solutions using Gauss-Jordan method.	Evaluate

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Mapping of Course Outcomes to PSO's							
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓		✓				
CO 2			✓			✓	
CO 3	✓		✓			✓	
CO 4	✓					✓	
CO 5	✓	✓		✓			
CO6	✓				✓		

COURSE CONTENTS

Module	Unit	Description	Hours
I	**Limits and Continuity**		**10**
	1	(a) Limit of a function and limit laws	
	2	(b) Continuity	
II		**Differentiation**	**13**
	1	(a) The derivative as a function	
		(b) Differentiation rules	
		(c) Derivatives of trigonometric functions	
		(d) The Chain rule	
		(e) Implicit differentiation	
		(f) Derivatives of inverse functions and Logarithms	
		(g) Derivatives of inverse trigonometric functions	
III	**Integration**		**15**
	Indefinite integrals		
	1	(a) Integral of a function	
		(b) The study of Integral Calculus	
		(c) Indefinite integral	
		(d) The substitution method	
		(e) Integration by parts	
		(f) Trigonometric substitutions	

		(g) Integration of rational functions by partial fractions	
	2	**Definite integrals**	
		(a) Definite integral	
		(b) Geometric interpretation of definite integral (without proof)	
IV	**Matrix basics**		**12**
	1	Related matrices: (a) Transpose of a matrix, Adjoint of a square matrix, Inverse of a matrix.	
	2	(a) Rank of a matrix, Elementary transformation of a matrix, Equivalent matrix, Elementary matrices, Gauss-Jordan method of finding the inverse	
V		**Teacher Specific Module**	**25**
		Directions for Practicals	
		Programmes **4.1 and 4.2 using MATLAB/Python** 1. Addition and Subtraction of matrices is associative (A+B)-C=A+(B-C)=B+(A-C) 2. Show That AB≠BA 3. Express given matrix A as sum of Symmetric and Skew Symmetric Matrix 4. Find $A^{-1} = \frac{Adj\ A}{\lvert A \rvert}$ 5. Inverse of a Matrix using Guass Jordan Method 6. Rank of given Matrix A 7. Find Matrix A if BAC=D 8. Prove that $(AB)^{-1} = B^{-1}A^{-1}$ for any A, B 9. Prove that $(AB)^{T} = B^{T}A^{T}$ for any A, B 10. Prove that $(A^{T})^{T} = A$ for any A	

Essential Reading

1. G.B. Thomas Jr., M.D. Weir and J.R. Hass, Thomas' Calculus: Early Transcendentals (12th edition), Pearson Education

2. S. Narayan and P.K. Mittal , Integral calculus, Revised Edition, S. Chand & Company Ltd.

3. Advanced Higher Engineering Mathematics (42nd edition), B.S. Grewal, Khanna Pub

Reference Distribution

Module	Unit	Reference No.	Sections	Remark
I	1	1	Section 2.2	*Proof of all theorems from section 2.2 excluded*
	2	1	Section 2.5	*Proof of all theorems from section 2.5 excluded*
II	1	1	Sections 3.2, 3.3, 3.5, 3.6, 3.7, 3.8, 3.9	
III	1	2	For 1(a), (b) & (c), Sections 1.1, 1.2, 1.3, 1.4 & 1.5	
	1	1	For 1(d), (e), (f) & (g), Sections 5.5, 8.1, 8.3 & 8.4	
	2	2	1.6,1.7,1.8	
IV	1	3	2.6	
	2	3	2.7	Exclude 2.7 (7)
V				

Suggested Readings

1. H. Anton, I. Bivens and S. Davis, Calculus, 10th edition , Willey
2. Higher Engineering Mathematics, B.S. Grewal (43rd edition), Khanna Publishers
3. E. Kreyszig, Advanced Engineering Mathematics (10th edition), Willey
4. Richard Bronson, Schaum's outline of Theory and Problems of Matrix Operations, Schum's outline series, The MaGraw-Hill Campanies

Assessment Rubrics

Evaluation Type		Marks
End Semester Evaluation (ESE)		**65 (50T+15P)**
Continuous Evaluation (CCA)		**35 (25T+10P)**
Theory (CCA)		**25**
1	Test Paper*	10
2	Assignment	10
3	Seminar/Viva-voce	5
Practical (CCA)		**10**
1	Skill	6
2	Record	4
Total		**100**

* A student has to appear for at least two written tests. Average mark of best two tests is to be considered for internal mark.

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KU3DSCMAT220: Mathematics for Data Science - III

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
III	DSC	200-299	KU3DSCMAT220	3+1	75

Learning Approach Hours/Week			Marks Distribution			Duration of ESE(Hours)
Lecture	Practical/Internship	Tutorial	CE	ESE	Total	
3	2	1	35	65	100	1.5

Course Description

This course introduces mathematical techniques used in data science, including numerical methods, interpolation, linear programming, systems of linear equations, eigenvalues, and eigenvectors. It also provides practical exposure through programming-based problem solving and helps students develop analytical, optimization, and computational skills for data-driven applications.

Course Prerequisite

Functions, Continuity, Differentiation, Matrix Basics, Basic MATLAB & Python Programming

Course Outcomes (COs)

CO No.	Expected Outcome	Learning Domains
1	Explain the basic principles and procedures of numerical methods used for solving algebraic and transcendental equations.	Understand
2	Apply interpolation techniques to estimate unknown values from a given set of data.	Apply
3	Explain the formulation of linear programming problems, canonical and standard forms, and solve them using graphical and simplex methods.	Apply
4	Analyse homogeneous and non-homogeneous systems of linear equations using matrix methods, nullity, and rank concepts.	Analyse
5	Evaluate eigenvalues, eigenvectors, properties of eigenvalues, and use the Cayley-Hamilton theorem to determine matrix inverses and solve related problems.	Evaluate

Mapping of Course Outcomes to PSO's							
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	✓				✓	✓	
CO 2	✓		✓		✓	✓	✓
CO 3	✓		✓	✓	✓	✓	
CO 4	✓	✓			✓	✓	
CO 5	✓	✓		✓	✓	✓	

COURSE CONTENTS

Module	Unit	Description	Hours
I	**Numerical Methods**		14
	1	**Solution to Algebraic & Transcendental Equations**	
		a) Bisection Method	
		b) The Method of False Position (Regula - Falsi Method)	
		c) Iteration Method (Aitken's method omitted)	
		d) Newton-Raphson Method	
	2	**Interpolation**	
		a) Newton's forward difference interpolation formula	
		b) Newton's backward difference interpolation formula	
		c) Lagrange's Interpolation Formula	
		d) Newton's divided difference interpolation Formula	
II	**Linear Programming**		12
	1	**Formulation of LPP & Graphical Solution**	
		a) Introduction	
		b) Formulation of the Problem	
		c) Graphical Method	
		d) Some Exceptional Cases	
	2	**Canonical & Standard Forms, The Simplex Method**	
		a) General Linear Programming Problem	
		b) Canonical and Standard forms of an LPP	
		c) Simplex Method	
		d) Working Procedure of the Simplex Method	
III	**Systems of Linear Equations**		12
	1	**Homogeneous Systems**	
		a) Introduction	
		b) System of homogeneous linear equations	

		c) Null Space & Nullity of a Matrix	
		d) Sylvester's Law of nullity	
		e) Range of a matrix	
	2	**Nonhomogeneous Systems**	
		a) System of Nonhomogeneous linear equations	
		b) Cramer's rule & Matrix inversion method	
IV	**Eigenvalues & Eigenvectors, Cayley Hamilton Theorem**		**12**
	1	**Eigenvalues & Eigenvectors**	
		a) Characteristic Equation of a Matrix	
		b) Eigenvalues & Eigenvectors of a Matrix	
		c) Properties of Eigenvalues (without proof)	
	2	**Cayley Hamilton Theorem**	
		a) Cayley Hamilton Theorem (without proof)	
		b) Verification of Cayley – Hamilton Theorem	
		c) Finding the inverse using Cayley – Hamilton Theorem	
V		**Teacher Specific Module**	**25**
		Directions for Practical - Programmes	
		a) Bisection Method	
		b) Lagrange Interpolation	
		c) Solving System of equations	
		d) Finding Eigenvalues & Eigenvectors	

Essential Readings:

1. B. S. Grewal, *Numerical Methods in Engineering & Science*, Khanna Publishers.
2. B. S. Grewal, *Higher Engineering Mathematics* (42^{nd} Ed.), Khanna Publishers.
3. S. Narayan & P. K. Mittal, *A Textbook of Matrices* (Revised Edition), S. Chand.

Reference Distribution

Module	Unit	Reference No	Sections	Remarks
I	1	1	Sections 2.8, 2.9, 2.11, 2.12	*Exclude proofs*
	2	1	Sections 7.2, 7.3, 7.12, 7.14	*Exclude proofs*
II	1	1	Sections 12.1, 12.2, 12.3, 12.4	
	2	1	Sections 12.5, 12.6, 12.7, 12.8	
III	1	3	Sections 6.1, 6.2, 6.3, 6.4, 6.5	*Exclude proofs*
	2	3	Section 6.6	*Exclude proofs*
		2	Section 2.9	
IV	1	2	Sections 2.13, 2.14	
	2	2	Section 2.15	
V			Practical using Python / MATLAB Programming	

Suggested Readings:

1. S. S. Sastry, *Introductory Methods of Numerical Analysis*, PHI Learning.
2. K. Swarup, P. K. Gupta & M. Mohan, *Operations Research* (18^{th} Ed.), S. Chand.
3. A. R. Vasistha, *Matrices*, Krishna Prakashan Media (P) Ltd

Assessment Rubrics

Evaluation Type	Marks
End Semester Evaluation (ESE)	**65 (50 T + 15 P)**
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Theory (CCA)	**25**
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