KANNUR UNIVERSITY
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(Abstract)

The Syllabi for the Mathematics courses offered by the Department of Mathematics for the First and Second semesters of the Five Year integrated Masters Programme in Physical Science offered by the Department of Physics and Department of Chemistry at SAT Campus -Approved and Implemented - w e f the 2025 admission -Orders issued.

ACADEMIC C SECTION

ACAD/ACAD C3/23458/2025 Dated: 24.12.2025

Read:-1. U O N o. ACAD C/ACAD C3/20400/2025 dated 13.10.2025

3. E mail dated 27.10.2025 from the Head, Dept. of Mathematics /Statistics .

4. E mail dated 28.10.2025 from the Dean ,Faculty Of Science ,Kannur University

5.Minutes of the meeting of the Standing Committee of the Academic Council held on 05.12.2025

6.Orders of Vice Chancellor in the file of even no. dated 24.12.2025

ORDER

1).Full Scheme and Syllabus of the Five Year Integrated Masters Programme (FYIMP) in Mathematical Sciences offered by the Department of Statistical Sciences/Mathematical Sciences, Kannur University, Mangattuparamba Campus was Approved and Implemented w e f the academic year 2025-26 as per the paper read as (1) above.

2).The Head, Department of Mathematics vide paper read as (2) above, has forwarded a letter requesting the inclusion of the following two new courses in the syllabus for Mathematics for the first and second semesters (2025 admission) of FYIMP in Physical Science.

1.Mathematics for Physical Sciences-I (for Semester 1)

2.Mathematics for Physical Sciences-II (for Semester 2)

3).The Syllabi for the courses were forwarded to the Dean, Faculty of Science for verification and the Dean has recommended to approve the same vide paper read as (3) above.

4). The Vice Chancellor after considering the matter in detail has ordered to place the same before the consideration of the Standing Committee of the Academic Council.

5) The Academic Council at its meeting held on 05.12.2025 considered the Syllabi for the above Courses and recommended vide paper read (5) above to approve the same.

6).The Vice Chancellor after considering the recommendation of the Standing Committee of the Academic Council 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 with has approved the Syllabi for the Mathematics courses offered by the Department of Mathematics for the First and Second semesters of the Five Year integrated Masters Programme n Physical Science, offered at the Department of Physics and Department of Chemistry, SAT Campus, subject to reporting to the Academic Council.

7).The approved Syllabus is appended with this U.O. and uploaded in the University website

8).The U.O read above stands modified to this extent.

Orders are issued accordingly.

Sd/-

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DEPUTY REGISTRAR (ACADEMIC)

For REGISTRAR

To: 1. The Controller of Examination (Through PA to CE)
2. The Head, Department of Statistical Sciences/Mathematical Sciences, Kannur University, Mangattuparamba Campus
3.The Head ,Department of Physical Sciences, SAT Campus ,Payyannur

Copy To: 1.Computer programmer
2.PS to VC/ PA to R/PA to CE
3.DR/AR(Acad), EXCI, EP IV
4.IT Cell (for uploading on the website)
5.JR II Exam
6.SF/DF/FC

Forwarded / By Order

SECTION OFFICER

KANNUR UNIVERSITY
CIVIL STATION P.O.
KANNUR
Pin-670 002
THAVAKKARA

Department of Mathematical Sciences

Kannur University

New additions in the syllabus of existing syllabus of FYIMP Programme in Mathematics

Semester I

KU01DSCMAT103MATHEMATICS FOR PHYSICAL SCIENCES -1

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	CORE	100	KU01DSCMAT 103	4	60

Learning Approach (Hours/ Week)		Marks Distribution			Duration of ESE (Hours)
Lecture	Tutorial	CE	ESE	Total	
4	1	50	50	100	3Hr

Course Objectives: The objective is to lay a solid foundation in basics of linear algebra,differential and integral calculus and different coordinate systems in mathematics, which is crucial for understanding more advanced topics in Physical Sciences ,Mathematics, and other fields.

Course Outcomes: At the end of the Course, the Student will be able to:

SL No	Course Outcomes
CO1	Students will demonstrate proficiency in understanding basics of linear algebra and its applications
CO2	Students will be able to understand the basics of differential calculus like limits ,continuity , differentiation etc and its applications
CO3	Students will develop competence in basic integral calculus and its applications
CO4	Students will master the concepts different types of co ordinatesystems , which have larger utilities in physical sciences

Mapping of COs to PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✓	✓	✓	✓	
CO2	✓	✓	✓	✓	
CO3	✓	✓	✓	✓	
CO4	✓	✓	✓	✓	

COURSE CONTENTS

Module 1: Linear algebra and Vector calculus Rank of a matrix, elementary transformation of a matrix, solution of linear system of equations, method of determinants, Cramer's rule, matrix inversion method; Linear transformations, orthogonal-transformation, vectors – linear dependence; Eigen values, eigen vectors, reduction to diagonal form, similarity of matrices, powers of a matrix. Vector operations, component form; inner product; cross product; triple products; position, displacement, and separation vectors.

Module 2: Differential calculus Limits and continuity; quick review of basics of differentiation; derivatives of standard functions; rules of differentiation; parametric differentiation; Successive differentiation; Functions of several variables; Use of partial fractions; Leibnitz's theorem for the nth derivative of the product of two functions; Homogenous functions, Euler's theorem on homogeneous functions, differentiation of implicit functions, change of variables. Gradient; the ∇ operator; divergence; curl; product rules; second derivatives.

Module 3: Integral calculus Quick review of basics of integration; Integration by successive reduction; Integration of trigonometric functions; Evaluation of the definite integral. Line integral; surface integral; volume integral; Fundamental theorem of calculus; Fundamental theorem for gradients; Fundamental theorem for divergences; Fundamental theorem for curls; Path Independence of line Integrals; potentials.

Module 4: Curvilinear Coordinates, Spherical-polar coordinates; Cylindrical coordinates; Relationship to Cartesian coordinates; Differential displacement vector; Differential area vectors; Differential volume element, Gradient operator, Divergence and curl operator in spherical-polar and cylindrical coordinates, Dirac delta function**.**

Reference Books:

.1. Advanced Engineering Mathematics (10th edition), E. Kreyszig, Wiley.
2. S Narayan and P.K Mittal , Differential calculus, Revised Edition, S. Chand & Company Ltd .
3. Theory of and Problems of Matrices, Frank Ayres JR, Schaum's Outline Series, McGrawHill Book Company.
4. Higher Engineering Mathematics (41st edition), B.S. Grewal, Khanna Pub

TEACHING LEARNING STRATEGIES
●Lecturing, Demonstration, Digital Learning, Team Work

MODE OF TRANSACTION
●Lecture, Seminar, Discussion

ASSESSMENT RUBRICS

End Semester Evaluation	50 marks
Continuous Evaluation	
Tests	20 Marks
Assignment	10 Marks
Seminar/Viva	20 Marks
Total	50 Marks

Semester II

KU02DSCMAT103 MATHEMATICS FOR PHYSICAL SCIENCES -II

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	CORE	100	KU02DSCMAT 103	4	60

Learning Approach (Hours/ Week)		Marks Distribution			Duration of ESE (Hours)
Lecture	Tutorial	CE	ESE	Total	

4	1	50	50	100	3Hr

Course Objectives: The objective is to lay a solid foundation in discrete mathematics, which is crucial for understanding more advanced topics in computer science, mathematics, and other fields.

Course Outcomes: At the end of the Course, the Student will be able to:

SL No	Course Outcomes
CO1	Students will demonstrate proficiency in understanding sequences and series
CO2	Students will be able to know the basics of complex numbers
CO3	Students will develop competence in ordinary differential equations which have ample utility in physical sciences
CO4	Students will master the concepts of partial differential equations which have practical applications in physical sciences

Mapping of COs to PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✓	✓	✓	✓	
CO2	✓	✓	✓	✓	
CO3	✓	✓	✓	✓	
CO4	✓	✓	✓	✓	

COURSE CONTENTS

Module 1 : Sequences and Series

Sequences, Series, Convergence Tests, Taylor and Maclaurin Series, Laurent Series, Fourier Series, Arbitrary period, Even and Odd Functions, Half-Range Expansions, Fourier Integrals.

Module 2: Complex Analysis

Complex Numbers and their geometric representation , Polar Form of Complex Numbers; Powers and Roots, Derivatives. Analytic Function, Cauchy{Riemann Equations. Laplace's Equation, Trigonometric and Hyperbolic Functions, Euler's Formula, Logarithm, Principal Value, Line Integral in the complex plane, Cauchy's integral Theorem, Cauchy's Integral Formula.

Module 3: Ordinary Differential Equations

First Order ODEs: Basic concepts (Modelling excluded), Separable ODEs (Modelling excluded), Exact ODEs. Second-Order linear ODEs: Homogeneous Linear ODEs of Second
Order, Homogeneous Linear ODEs with Constant Coefficients, Differential Operators, Euler-Cauchy Equations, Statement of Existence and Uniqueness theorem for initial value problems, linear independence of solutions, Wronskian, general solution, Nonhomogeneous ODEs, Method of undetermined coefficients.

Module 4: Partial Differential Equations

Basic concepts, Solution by Separating Variables. Use of Fourier Series, D'Alembert's Solution of the Wave Equation. Characteristics, Heat Equation: Solution by Fourier Series. Steady two-dimensional Heat problems, Laplace's equation, unifying power of methods, Laplacian in Polar Coordinates, circular membrane.

References

1 . Thomas' Calculus (12th edition), Maurice D. Weir and Joel Hass, Pearson India Education Services.
2. E. Kreyzig, Advanced Engineering Mathematics (10th edition), John Wiley.
3. S.L. Ross, Differential Equations, 3rd Edition, Wiley.
4. G. Birkho and G.C. Rota, Ordinary Differential Equations, 3rd Edition, Wiley and Sons
5. E.A. Coddington, An Introduction to Ordinary Differential Equations, Printice Hall
6. W.E. Boyce and R.C. Diprima, Elementary Differential Equations and Boundary Value Problems.

●Lecturing, Demonstration, Digital Learning, Team Work

MODE OF TRANSACTION
●Lecture, Seminar, Discussion

ASSESSMENT RUBRICS

End Semester Evaluation	50 marks
Continuous Evaluation	
Tests	20 Marks
Assignment	10 Marks
Seminar/Viva	20 Marks
Total	50 Marks