

Academic Planner

A. Teaching Plan

Teacher's Name: **VISHAL DHAWAN**

Department: **MATHEMATICS**

Year: **2021-2022 (Odd Semester)**

Course: **B.Sc. (Hons.) Mathematics**

Paper Type: **Theory**

Semester: **III**

| Sl. No . | UPC | Paper Name | Core/AECC/GE/SEC | Topic/Unit | Start Date | End Date |
|----------|----------|--------------------------------|------------------|---|------------|------------|
| 1 | 32351303 | Multivariate Calculus (Theory) | Core | Introduction to the Multivariate Calculus. Functions of several variables, Level Curves, Graphs of functions as cylindrical and non-cylindrical surfaces. | 16/08/2021 | 21/08/2021 |
| 2 | 32351303 | Multivariate Calculus (Theory) | Core | Limit and continuity of functions of two variables. | 23/08/2021 | 28/08/2021 |
| 3 | 32351303 | Multivariate Calculus (Theory) | Core | Partial differentiation, Tangent Planes and Normal Lines. Incremental Approximation. Total differentiability and differentiability. | 30/08/2021 | 04/09/2021 |
| 4 | 32351303 | Multivariate Calculus (Theory) | Core | rule for one and two independent parameters, directional derivatives, | 06/09/2021 | 11/09/2021 |

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| | | | | the gradient. | | |
| 5 | 32351303 | Multivariate Calculus (Theory) | Core | Maximal and normal property of the gradient, Tangent planes and Normal lines for general surfaces. | 13/09/2021 | 18/09/2021 |
| 6 | 32351303 | Multivariate Calculus (Theory) | Core | Extrema of functions of two variables: First derivatives test and second order partial derivative test. Absolute Extremum for continuous functions. | 20/09/2021 | 25/09/2021 |
| 7 | 32351303 | Multivariate Calculus (Theory) | Core | Method of Lagrange multipliers, constrained optimization problems. | 27/09/2021 | 09/10/2021 |
| 8 | 32351303 | Multivariate Calculus (Theory) | Core | Definition of vector field, divergence and curl. Double integration over rectangular regions, Double integration over nonrectangular regions. | 11/10/2021 | 23/10/2021 |
| 9 | 32351303 | Multivariate Calculus (Theory) | Core | Double integrals in polar coordinates, Triple integrals, Triple integral over a parallelepiped and solid regions. Volume by triple integrals. | 25/10/2021 | 30/10/2021 |
| 10 | 32351303 | Multivariate Calculus (Theory) | Core | Cylindrical and spherical polar coordinates. | 01/11/2021 | 06/11/2021 |
| 11 | 32351303 | Multivariate Calculus (Theory) | Core | Change of variables in double integrals and triple integrals. | 08/11/2021 | 13/11/2021 |

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| 12 | 32351303 | Multivariate Calculus (Theory) | Core | Line integrals, Applications of line integrals: Mass and Work. | 15/11/2021 | 20/11/2021 |
| 13 | 32351303 | Multivariate Calculus (Theory) | Core | Fundamental theorem for line integrals, conservative vector fields. Surface integrals, integrals over parametrically defined surfaces. | 22/11/2021 | 27/11/2021 |
| 14 | 32351303 | Multivariate Calculus (Theory) | Core | Independence of path, Green's Theorem. Stokes' theorem, The Divergence theorem. | 29/11/2021 | 07/12/2021 |

Year: 2021-2022 (Odd Semester)

Course: B.Sc. (Prog.) Physical Science

Paper Type: Theory

Semester: I

| Sl. No | UPC | Paper Name | Core/AECC/GE/SEC | Topic/Unit | Start Date | End Date |
|--------|----------|-----------------------|------------------|--|------------|------------|
| 1 | 42351101 | Calculus and Matrices | Core | Graphs of simple basic functions such as: Polynomial, Trigonometric, Inverse trigonometric, Exponential and logarithmic functions. | 22/11/2021 | 27/11/2021 |
| 2 | 42351101 | Calculus and Matrices | Core | Limits and continuity of a function including $\epsilon - \delta$ approach. | 29/11/2021 | 04/12/2021 |
| 3 | 42351101 | Calculus and Matrices | Core | Properties of continuous functions including Intermediate value theorem. | 06/12/2021 | 11/12/2021 |
| 4 | 42351101 | Calculus and Matrices | Core | Differentiability, Successive | 13/12/2021 | 18/12/2021 |

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| | | | | differentiation, Leibnitz theorem, Recursion formulae for higher derivatives. | | |
| 5 | 42351101 | Calculus and Matrices | Core | Rolle's theorem, Lagrange's mean value theorem with geometrical interpretations and simple applications. Taylor's theorem, Taylor's series and Maclaurin's series, Maclaurin's expansion of functions and their use in polynomial approximation and error estimation. | 20/12/2021 | 25/12/2021 |
| 6 | 42351101 | Calculus and Matrices | Core | Functions of two or more variables, Graphs and level curves of functions of two variables, Partial differentiation up to second order. | 27/12/2021 | 01/01/2021 |
| 7 | 42351101 | Calculus and Matrices | Core | Elementary row operations, Row reduction and echelon forms, Solution of systems of linear equations in matrix form. | 03/01/2022 | 08/01/2022 |
| 8 | 42351101 | Calculus and Matrices | Core | Linear independence and dependence. The rank of a matrix and applications. | 10/01/2022 | 15/01/2022 |
| 9 | 42351101 | Calculus and Matrices | Core | Elementary linear transformations like shear, translation, dilation, rotation, reflection, and their matrix form. | 17/01/2022 | 22/01/2022 |
| 10 | 42351101 | Calculus and Matrices | Core | The matrix of a general linear transformation. | 24/01/2022 | 29/01/2022 |
| 11 | 42351101 | Calculus and Matrices | Core | Eigenvectors & eigenvalues of square matrices up to order 3 and diagonalization. | 31/01/2022 | 05/02/2022 |
| 12 | 42351101 | Calculus and Matrices | Core | Geometrical representation of addition, subtraction, multiplication and division of complex numbers. | 07/02/2022 | 12/02/2022 |

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| 13 | 42351101 | Calculus and Matrices | Core | Lines, Circles, Discs in terms of complex variables. | 14/02/2022 | 19/02/2022 |
| 14 | 42351101 | Calculus and Matrices | Core | Statement of the Fundamental theorem of algebra and its consequences. | 21/02/2022 | 26/02/2022 |
| 15 | 42351101 | Calculus and Matrices | Core | De Moivre's theorem and its application to solve simple equations in complex variables. | 28/02/2022 | 05/03/2022 |
| 16 | 42351101 | Calculus and Matrices | Core | Revision | 07/03/2022 | 11/03/2022 |

Year: 2021-2022 (Odd Semester)

Course: B.Sc. (Hons.) Mathematics

Paper Type: Practical

Semester: III

| Sl. No | UPC | Paper Name | Core/AECC/GE/SEC | Topic/Unit | Start Date | End Date |
|--------|----------|-----------------------------------|------------------|---|------------|------------|
| 1 | 32351303 | Multivariate Calculus (Practical) | Core | Draw the given surfaces and find their level curves at the given heights. | 16/08/2021 | 21/08/2021 |
| 2 | 32351303 | Multivariate Calculus (Practical) | Core | Previous practical continued: Some more functions to be considered | 23/08/2021 | 28/08/2021 |
| 3 | 32351303 | Multivariate Calculus (Practical) | Core | Draw the given surfaces and discuss whether limit for a function of two variables exists or not as approaches to the given point(s). Also find the limit, in case if it exists. | 30/08/2021 | 04/09/2021 |
| 4 | 32351303 | Multivariate Calculus (Practical) | Core | Limit and continuity of a function of one variable. | 06/09/2021 | 11/09/2021 |
| 5 | 32351303 | Multivariate Calculus (Practical) | Core | Limit of a function using $\varepsilon - \delta$ definition to visualize the existence of the limit of one variable function. | 13/09/2021 | 18/09/2021 |

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| 6 | 32351303 | Multivariate Calculus (Practical) | Core | Limits at ∞ . Geometrical interpretation for the Rolle's Theorem. | 20/09/2021 | 25/09/2021 |
| 7 | 32351303 | Multivariate Calculus (Practical) | Core | Geometrical interpretation for the Lagrange's Mean Value Theorem. | 27/09/2021 | 09/10/2021 |
| 8 | 32351303 | Multivariate Calculus (Practical) | Core | Draw the tangent plane and the normal line to the given surfaces at the given point. | 11/10/2021 | 23/10/2021 |
| 9 | 32351303 | Multivariate Calculus (Practical) | Core | Continued: Draw the tangent plane and the normal line to the given surfaces at the given point. | 25/10/2021 | 30/10/2021 |
| 10 | 32351303 | Multivariate Calculus (Practical) | Core | Using incremental approximation to estimate the given functions at the given point and compare it with actual value. | 01/11/2021 | 06/11/2021 |
| 11 | 32351303 | Multivariate Calculus (Practical) | Core | Find critical points and identify relative maxima, relative minima or saddle points to the given surfaces, if it exists. | 08/11/2021 | 13/11/2021 |
| 12 | 32351303 | Multivariate Calculus (Practical) | Core | Continued: Find critical points and identify relative maxima, relative minima or saddle points to the given surfaces, if it exists. | 15/11/2021 | 20/11/2021 |
| 13 | 32351303 | Multivariate Calculus (Practical) | Core | Draw the given regions on 2D plane and check whether these regions are of Horizontally Simple or Vertically Simple. | 22/11/2021 | 27/11/2021 |
| 14 | 32351303 | Multivariate Calculus (Practical) | Core | Continued: Draw the given regions on 2D plane and check whether these regions are of Horizontally Simple or Vertically Simple. Preparation for the Practical Examinations | 29/11/2021 | 07/12/2021 |

B. Outstation Field visits for students

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| Project Name / Paper Name | | | |
| Destination | | Travel Mode | |
| Departure Month | | Return | |
| Faculty-in-Charge | | Number of Students going | |

C. Internal Assessment: House Exam (Test/Presentation etc.) & Assignment*

| Course Code | Course Name | Unique Paper Code | Topic Name | Day and Date | Date/s of Exhibiting the Assessment Sheet to students, Discussing the marks, Returning/Retaining |
|--------------------|--------------------------------|--------------------------|---|---------------------|---|
| 563 | B.Sc. (Hons.) Mathematics | 32351301 | Test: Multivariate Calculus | 04/12/2021 | 07/12/2021 |
| 582 | B.Sc. (Prog.) Physical Science | 42351101 | Test: Calculus and Matrices | 07/03/2022 | 11/03/2022 |
| 563 | B.Sc. (Hons.) Mathematics | 32351301 | Test: Multivariate Calculus (Practical) | 05/12/2021 | 07/12/2021 |
| 563 | B.Sc. (Hons.) Mathematics | 32351301 | Assignment: Multivariate Calculus | 22/11/2021 | 27/11/2021 |
| 582 | B.Sc. (Prog.) Physical Science | 42351101 | Assignment: Calculus and Matrices | 28/02/2022 | 05/03/2022 |

*Marks of the Internal Assessment to be submitted to the College 15 days before the last working day of every semester

Academic Planner

A. Teaching Plan

Teacher's Name: **VISHAL DHAWAN**

Department: **MATHEMATICS**

Year: **2021-2022 (Even Semester)**

Course: **B.Sc. (Hons.) Mathematics**

Paper Type: **Theory**

Semester: **VI**

| Sl. No. | UPC | Paper Name | Core/AECC/GE/SEC | Topic/Unit | Start Date | End Date |
|---------|----------|---|------------------|---|------------|------------|
| 1 | 32357611 | Linear Programming Problems and Theory of Games | Core | Linear programming problem: Formulation and solution by graphical method. | 03/01/2022 | 08/01/2022 |
| 2 | 32357611 | Linear Programming Problems and Theory of Games | Core | Extreme points; Basic solutions, Basic feasible solutions. | 10/01/2022 | 15/01/2022 |
| 3 | 32357611 | Linear Programming Problems and Theory of Games | Core | Reduction of any feasible solution to a basic feasible solution; Correspondence between basic feasible solutions and extreme points. | 17/01/2022 | 22/01/2022 |
| 4 | 32357611 | Linear Programming Problems and Theory of Games | Core | Algebraic Solution, Simplex Method: Optimal solution, Termination criteria for optimal solution of the linear programming problem, Unique optimal solution. | 24/01/2022 | 29/01/2022 |
| 5 | 32357611 | Linear Programming Problems and Theory of Games | Core | Alternate optimal solutions, Unboundedness. Simplex algorithm | 31/01/2022 | 05/02/2022 |

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| | | Games | | and its tableau format. | | |
| 6 | 32357611 | Linear Programming Problems and Theory of Games | Core | Continued: Simplex algorithm and its tableau format. | 07/02/2022 | 12/02/2022 |
| 7 | 32357611 | Linear Programming Problems and Theory of Games | Core | Artificial variables, Two-phase method, Big-M method. | 14/02/2022 | 19/02/2022 |
| 8 | 32357611 | Linear Programming Problems and Theory of Games | Core | Continued: Two-phase method, Big-M method. | 21/02/2022 | 26/02/2022 |
| 9 | 32357611 | Linear Programming Problems and Theory of Games | Core | Motivation and formulation of dual problem. | 28/02/2022 | 05/03/2022 |
| 10 | 32357611 | Linear Programming Problems and Theory of Games | Core | Primal-dual relationships. | 07/03/2022 | 16/03/2022 |
| 11 | 32357611 | Linear Programming Problems and Theory of Games | Core | Statements of the fundamental theorem of duality and complimentary slackness theorem with examples. | 17/03/2022 | 26/03/2022 2 |
| 12 | 32357611 | Linear Programming Problems and Theory of Games | Core | Transportation problem. | 28/02/2022 | 02/04/2022 |
| 13 | 32357611 | Linear Programming Problems and Theory of Games | Core | Assignment problem. | 04/04/2022 | 09/04/2022 |
| 14 | 32357611 | Linear Programming Problems and Theory of Games | Core | Game Theory: Basic concept, Formulation and solution of two-person zero-sum games. | 11/04/2022 | 16/04/2022 |
| 15 | 32357611 | Linear Programming Problems and Theory of Games | Core | Games with mixed strategies, Dominance Principle. Linear programming method of solving a game. | 18/04/2022 | 27/04/2022 |

Year: 2021-2022 (Even Semester)

Course: B.Sc. (Prog.) Physical Science

Paper Type: Theory

Semester: IV

| Sl. No. | UPC | Paper Name | Core/ AECC/ GE/ SEC | Topic/Unit | Start Date | End Date |
|---------|----------|---------------|------------------------------|--|------------|------------|
| 1 | 42354401 | Real Analysis | Core | Finite and infinite sets, Examples of countable and uncountable sets. | 03/01/2022 | 08/01/2022 |
| 2 | 42354401 | Real Analysis | Core | Bounded sets, Statement of order completeness property of \mathbb{R} , Archimedean property of \mathbb{R} . | 10/01/2022 | 15/01/2022 |
| 3 | 42354401 | Real Analysis | Core | Real sequences, convergence, sum and product of convergent sequences, Order preservation and squeeze theorem. | 17/01/2022 | 22/01/2022 |
| 4 | 42354401 | Real Analysis | Core | Monotone sequences and their convergence with illustrations. | 24/01/2022 | 29/01/2022 |
| 5 | 42354401 | Real Analysis | Core | Bolzano–Weierstrass theorem (statement and examples), Cauchy Sequences. | 31/01/2022 | 05/02/2022 |
| 6 | 42354401 | Real Analysis | Core | Examples of Cauchy Sequences, Cauchy Convergence Criterion for sequences. | 07/02/2022 | 12/02/2022 |
| 7 | 42354401 | Real Analysis | Core | Definition and a necessary condition for convergence of an infinite series, Geometric series, Cauchy convergence criterion for series, positively termed series, convergence of p-series, Comparison test, Limit comparison test and examples. | 14/02/2022 | 19/02/2022 |
| 8 | 42354401 | Real Analysis | Core | D’Alembert’s ratio test. | 21/02/2022 | 26/02/2022 |
| 9 | 42354401 | Real Analysis | Core | Cauchy’s root test. | 28/02/2022 | 05/03/2022 |

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| 10 | 42354401 | Real Analysis | Core | Alternating series, Leibnitz's test, Absolute and conditional convergence. | 07/03/2022 | 16/03/2022 |
| | | | | MID-SEMESTER BREAK | 17/03/2022 | 20/03/2022 |
| 11 | 42354401 | Real Analysis | Core | Sequences and series of functions, Pointwise convergence. | 21/03/2022 | 26/03/2022 |
| 12 | 42354401 | Real Analysis | Core | Uniform convergence of sequence of functions, Mn-Test. | 28/02/2022 | 02/04/2022 |
| 13 | 42354401 | Real Analysis | Core | Cauchy general principle for uniform convergence of series of functions, Weierstrass M-Test. Definition of power series, Radius and interval of convergence, Power series expansions for exponential, sine and cosine functions and their properties. | 04/04/2022 | 09/04/2022 |
| 14 | 42354401 | Real Analysis | Core | Riemann Integration and examples. | 11/04/2022 | 16/04/2022 |
| 15 | 42354401 | Real Analysis | Core | Integrability of continuous and monotone functions. | 18/04/2022 | 27/04/2022 |

Year: 2020-2021 (Even Semester)

Course: B.Sc. (Hons.) Mathematics

Paper Type: Practical

Semester: VI

| Sl. No. | UPC | Paper Name | Core/AECC/GE/SEC | Topic/Unit | Start Date | End Date |
|---------|----------|------------------------------|------------------|---|------------|------------|
| 1 | 32351601 | Complex Analysis (Practical) | Core | Graphical representation of n^{th} roots of unity for $n=3, 4, 5, 6$ and 7 . | 03/01/2022 | 08/01/2022 |
| 2 | 32351601 | Complex Analysis (Practical) | Core | Solutions of complex variable equations. | 10/01/2022 | 15/01/2022 |

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|----|----------|---------------------------------|------|--|------------|------------|
| 3 | 32351601 | Complex Analysis (Practical) | Core | Geometrical representation of Solutions of complex variable equations. | 17/01/2022 | 22/01/2022 |
| 4 | 32351601 | Complex Analysis (Practical) | Core | Effect of rotation and translation while parametrically plotting the ellipse. | 24/01/2022 | 29/01/2022 |
| 5 | 32351601 | Complex Analysis (Practical) | Core | Plotting of complex functions. | 31/01/2022 | 05/02/2022 |
| 6 | 32351601 | Complex Analysis (Practical) | Core | Plotting of particular images of complex functions. | 07/02/2022 | 12/02/2022 |
| 7 | 32351601 | Complex Analysis (Practical) | Core | Images of open disk and half-planes under certain transformations. | 14/02/2022 | 19/02/2022 |
| 8 | 32351601 | Complex Analysis (Practical) | Core | Plotting of a line segment and computing integral over straight line. | 21/02/2022 | 26/02/2022 |
| 9 | 32351601 | Complex Analysis (Practical) | Core | Continued: Plotting of a line segment and computing integral over straight line. | 28/02/2022 | 05/03/2022 |
| 10 | 32351601 | Complex Analysis (Practical) | Core | Plotting of contours and Contour integration. | 07/03/2022 | 16/03/2022 |
| | | | | MID-SEMESTER BREAK | 17/03/2022 | 20/03/2022 |
| 11 | 32351601 | Complex Analysis (Practical) | Core | Continued: Plotting of contours and Contour integration. | 21/03/2022 | 26/03/2022 |
| 12 | 32351601 | Complex Analysis (Practical) | Core | ML-Inequality. | 28/02/2022 | 02/04/2022 |
| 13 | 32351601 | Complex Analysis (Practical) | Core | Laurent series expansion for complex function. | 04/04/2022 | 09/04/2022 |
| 14 | 32351601 | Complex Analysis (Practical) | Core | Poles and residues. | 11/04/2022 | 16/04/2022 |
| 15 | 32351601 | Complex Analysis (Practical) | Core | The Conduct of Online Practical Examination. | 18/04/2022 | 27/04/2022 |

B. Outstation Field visits for students

N.A.

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|---------------------------|--|--------------------------|--|
| Project Name / Paper Name | | | |
| Destination | | Travel Mode | |
| Departure Month | | Return | |
| Faculty-in-Charge | | Number of Students going | |

C. Internal Assessment: House Exam (Test/Presentation etc.) & Assignment*

| Course Code | Course Name | Unique Paper Code | Topic Name | Day and Date | Date/s of Exhibiting the Assessment Sheet to students, Discussing the marks, Returning/Retaining |
|-------------|--------------------------------|-------------------|--|--------------|--|
| 563 | B.Sc. (Hons.) Mathematics | 32357611 | Test: Linear Programming and Theory of Games | 18/04/2022 | 27/04/2022 |
| 582 | B.Sc. (Prog.) Physical Science | 423564401 | Test: Real Analysis | 20/04/2022 | 26/04/2022 |
| 563 | B.Sc. (Hons.) Mathematics | 32351601 | Test: Complex Analysis (Practical) | 25/04/2022 | 27/04/2022 |
| 563 | B.Sc. (Hons.) Mathematics | 32357611 | Assignment: Linear Programming and Theory of Games | 04/04/2022 | 09/04/2022 |
| 582 | B.Sc. (Prog.) Physical Science | 423564401 | Assignment: Real Analysis | 19/03/2022 | 25/03/2022 |
| 563 | B.Sc. (Hons.) Mathematics | 32351601 | Assignment: Complex Analysis (Practical) | 11/04/2022 | 16/04/2022 |

***Marks of the Internal Assessment to be submitted to the College 15 days before the last working day of every semester**

**D. Organization of Department/College Society Meetings by Staff Advisor/Convener
Participated as a coordinator in Department annual seminar and third year student's farewell.**

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| Event Topic | Fractals – Mysterious World in real life |
| Type / Nature (FDP/Webinar/Workshop etc.) | Qazi Zameeruddin Lecture |
| Details regarding invited Resource Person | Prof. Rashmi Bhardwaj, GGSIPU. |
| Date - 10.03.2022 | Timing: 10.00 a.m. – 12.00 noon |

E. College Functions N.A