4 Year Bachelor of Science/ Arts (MATHEMATICS) CBCS

List of Minor Core Courses (MIC):

Sl. No.	Sem.	Course Code	Name of the Course	Credits	Marks
1.	I	MIC-01	Algebra	3	100
2.	II	MIC-02	Calculus &Geometry	3	100
3.	III	MIC-03	Real Analysis	3	100
4.	IV	MIC-04	Ordinary Differential Equations	3	100
5.	V	MIC-05	Theory of Real Functions	3	100
6.	V	MIC-06	Group Theory	3	100
7.	VI	MIC-07	Partial Differential Equations	3	100
8.	VI	MIC-08	Ring Theory and Linear Algebra-I	3	100
9.	VII	MIC-09	Multivariate Calculus	4	100
10.	VIII	MIC-10	Complex Analysis	4	100
Sub Total = 32					

GDSingh 14/06/23

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MIC-02: Calculus & Geometry (03 credits) (Lecture: 30)

Course Objectives: The primary objective of this course is to introduce the basic tools of calculus and geometric properties of different conic sections which are helpful in understanding their applications in planetary motion, design of telescope and to the real-world problems.

Course Learning Outcomes: This course will enable the students to:
i) Apply derivatives in Optimization, Social sciences, Physics and Life sciences etc.
ii) Compute area of surfaces of revolution and the volume of solids by integrating over cross-sectional areas.

Course Contents:

Unit 1 **(Lectures: 08)**
Successive differentiation and Leibnitz's theorem, Maclaurin's and Taylor's series of Expansion, Partial differentiation and Euler's theorem, Total Differential, L'Hospital's rule, Tangent and Normal, Asymptotes, Curvature.

Unit 2 **(Lectures: 08)**
Evaluation of definite integrals, Reduction formulae, Length of plane curve and area bounded by plane curves, Volumes and Surface area of solid revolution.

Unit 3 **(Lectures: 07)**
Transformation of rectangular axes, General equations of Conic and its Reduction to the normal form, Equation of the tangent and normal at a point of the Conic.

Unit 4 **(Lectures: 07)**
Sphere, Cone, Cylinder, Central conicoid, Paraboloids, Plane section of conicoid, Generating lines, Tangent plane and normal to a conicoid.

References:

1. Anton, Howard, Bivens, Irl, & Davis, Stephen (2013). *Calculus* (10th ed.). John Wiley & Sons Singapore Pte. Ltd. Indian Reprint (2016) by Wiley India Pvt. Ltd. Delhi.
2. Osborne, George. A. (1906). *Differential and Integral Calculus with Examples and Applications*. Revised Edition. D. C. Health & Co. Publishers. Boston, U.S.A.
3. Strauss, Monty J., Bradley, Gerald L., & Smith, Karl J. (2007). *Calculus* (3rd ed.). Dorling Kindersley (India) Pvt. Ltd. (Pearson Education). Delhi. Indian Reprint 2011.
4. SL.Loney , Coordinate Geometry
5. Thomas, Jr. George B., Weir, Maurice D., & Hass, Joel (2014). *Thomas' Calculus* (13th ed.). Pearson Education, Delhi. Indian Reprint 2017.

Additional Readings:

1. Lalji Prasad , Integral Calculus, Paramount Publications Patna
2. Shanti Narayan , P.K.Mittal , Integral Calculus, S. Chand, New Delhi
3. B.C. Das and B.N. Mukherjee, Differential calculus, Dhur& Sons Pvt.Ltd. Kolkatta

4. A skwith, The Analytical Geometry of the conic sections.
5. S L Loney ,Coordinate Geometry
6. Dasgupta, Differential calculus, Bharti Bhawan Patna

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