KOLHAN UNIVERSITY

CHAIBASA

UNIVERSITY DEPARTMENT OF MATHEMATICS

Course Content of Mathematics

Under NEP 2020

Syllabus Scheme for FYUGP.

Effective from Academic Session 2022-2023.

UNIVERSITY DEPARTMENT OF MAHEMATICS
Kolhan University, Chaibasa

Four-Year Under Graduate Programme (FYUGP)
As per Provisions of NEP-2020 to be implemented from Academic Year 2022-23

COMPOSITION OF BOARD OF STUDIES

1. Dr. B. K. Sinha
   Head, University Department of Mathematics
   Kohan University, Chaibasa

2. Dr. Md. Moiz Ashraf
   Head, P. G. Department of Mathematics
   Karim City College, Jamshedpur

3. Dr. P. C. Banerjee
   Assistant Professor,
   P. G. Department of Mathematics
   Karim City College, Jamshedpur

4. Mr. Mahendra Kumar Rana
   Assistant Professor,
   University Department of Mathematics,
   Kolhan University, Chaibasa.

Head, Univ. Deptt. of Mathematics
K. U., Chaibasa

(Dr. B. K. Sinha)
Chairman & Head,
University Department of Mathematics
KOLHAN UNIVERSITY, CHAIBASA.

B. Sc. (Semester-1) Paper-1: Calculus

Program: Certificate Class: B. Sc.	Year: First	Semester: I
Subject: Mathematics		
Course Code: MJ1	Course Title: Calculus	

Course Learning Outcomes: This course will enable the students to:
(i) Assimilate the notions of limit of a sequence and convergence of a series of real numbers.
(ii) Calculate the limit and examine the continuity of a function at a point.
(iii) Understand the consequences of various mean value theorems for differentiable functions.
(iv) Sketch curves in Cartesian and polar coordinate systems.
(v) Apply derivative tests in optimization problems appearing in social sciences, physical sciences, life sciences and a host of other disciplines.

Credit: 6	Compulsory/Elective
Max Marks:100	Total Number of Lecture: 90

Unit-I: Sequences and Integration
Real numbers, Sequences of real numbers, Convergence of sequences and series, Bounded and monotonic sequences; Definite integral as a limit of sum, Integration of irrational algebraic functions and transcendental functions, Reduction formulae, Definite integrals.

Unit-II: Limit and Continuity
$\epsilon - \delta$ definition of limit of a real valued function, Limit at infinity and infinite limits; Continuity of a real valued function, Properties of continuous functions, Intermediate value theorem, Geometrical interpretation of continuity, Types of discontinuity; Uniform continuity.

Unit-III: Differentiability
Differentiability of a real valued function, Geometrical interpretation of differentiability, Relation between differentiability and continuity, Differentiability and monotonicity, Chain rule of differentiation; Darboux's theorem, Rolle's theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Geometrical interpretation of mean value theorems; Successive differentiation, Leibnitz's theorem.

Unit-IV: Expansions of Functions
Maclaurin's and Taylor's theorems for expansion of a function in an infinite series, Taylor's theorem in finite form with Lagrange, Cauchy and Roche–Schlomilch forms of remainder; Maxima and minima.

Unit-V: Curvature, Asymptotes and Curve Tracing
Curvature; Asymptotes of general algebraic curves, Parallel asymptotes, Asymptotes parallel to axes; Symmetry, Concavity and convexity, Points of inflection, Tangents at origin, Multiple points, Position and nature of double points; Tracing of Cartesian, polar and parametric curves.

Reference Books:

1. Real Analysis: Lalji Prasad
2. Integral Calculus: Lalji Prasad
3. Differential Calculus: Lalji Prasad
4. Differential Calculus: Gorakh Prasad
5. Aspect of Calculus: Gabriel Klambauer (Springer-Verlag)
7. Thomas' calculus: George B. Thomas Jr., Joel Hass, Christopher Heil & Maurice D. Weir (Pearson Education Pvt. Ltd. India)
8. Calculus: Howard Anton, I. Bivens & Stephan Davis (Wiley India)