

JYOTI NIVAS COLLEGE
AUTONOMOUS
SYLLABUS FOR 2021-22 Batch Onwards
Programme: B.Sc.
SECOND SEMESTER SYLLABUS
Title: ALGEBRA II CALCULUS II

COURSE OBJECTIVES:

- Mathematics programme provides students with rigorous and thorough knowledge of a broad range of pure and applied areas of mathematics. It is designed to train students with different professional goals, ranging from employment in academics or industry to basic training in foundations needed to pursue mathematics-related fields. Develop a spirit of inquiry to the students.
- Summarize the fundamental concepts of groups and symmetries of geometrical objects.
- Explain the significance of the notation of coset decomposition, normal and factor groups.
- Classify the properties of Homomorphism and Isomorphism
- Solve problems, to perceive the basic structure of Mathematics in Cartesian and polar form in Calculus

LEARNING OUTCOME:

The students:

- Recognize the mathematical objects called Groups.
- Link the fundamental concepts of groups for symmetries of geometrical objects.
- Explain the significance of the notions of Cosets, normal subgroups, factor groups, homomorphism and isomorphism.
- Examine the concept of differentiation and fundamental theorems in Calculus.
- Apply radius of curvature formula in Cartesian and polar form.
- Solve pedal equations.
- Evaluate integrals, find arc-lengths, areas, surface areas and volume..

ALGEBRA-II

Unit-I: Groups-I: Definition of a group with examples and properties, congruence, problems. Subgroups, center of groups, order of an element of a group and its related theorems, cyclic groups, Coset decomposition, Factor groups, Lagrange's theorem and its consequences. Fermat's theorem and Euler's ϕ function. **15 hours**

Unit-II: Groups-II: Normal Subgroups-Examples & Problems –Quotient group-Homomorphism & Isomorphism of groups – kernel & image of a homomorphism –Normality of the kernel – Fundamental theorem of homomorphism – Properties related to isomorphism – Permutation group – Cayley's Theorem **15 hours**

CALCULUS-II

Unit-III : Polar Co-ordinates: Polar coordinates, angle between the radius vector and tangent. Angle of intersection of two curves (polar forms), length of perpendicular from pole to the tangent, pedal equations. Derivative of an arc in Cartesian, parametric and polar forms, curvature of plane curve-radius of curvature formula in Cartesian, parametric and polar and pedal forms-center of curvature, asymptotes, evolutes and envelopes. **15 hours**

Unit-IV: Integral Calculus: Recapitulation of definite integrals and its properties. Reduction formulae - $\int \sin^n x dx$, $\int \cos^n x dx$, $\int \sin^m \cos^n x dx$, Computation of length of an arc,

Area of plane curves, Surface area and Volume of revolutions in Cartesian and polar forms. **15 hours**