

Program: Bachelor's Degree		Year: Third	Semester: V
Class: UG			
Subject: Mathematics			
Course Code: MJ-9		Course Title: Mechanics	
Course Learning Outcomes: This course will enable the students to:			
<ul style="list-style-type: none"> a) Understand necessary conditions for the equilibrium of particles acted upon by various forces and learn the principle of virtual work for a system of coplanar forces acting on a rigid body. b) Understand the concept of friction and laws of friction. Student will be able to solve problems related to friction. c) Deal with the kinematics of the rectilinear and planar motions of a particle including the constrained oscillatory motions of particles. d) Understand concept work and energy and related laws. 			
Credit: 4 (Theory)		Compulsory	
Full Marks: 75		Time: 3 Hours	
Unit	Content		Hours
I	Reduction of system of coplanar forces, equation of resultant. Condition for equilibrium, astatic centre. Work and potential energy, Principle of virtual work for a system of coplanar forces acting on a particle or at different points of a rigid body, Forces which can be omitted in forming the equations of virtual work.		15 h
II	Laws, Angles and cone of friction, equilibrium on a rough inclined plane, particle constrained to move on a rough curve under any given forces.		15 h
III	Kinematics in two dimensions: tangential, normal, radial, transverse velocities and acceleration. Angular Velocity and acceleration. Rectilinear motion and simple pendulum: S.H.M., compounding of two S.H.M., Repulsive motion, motion under inverse square law.		15 h
IV	Rectilinear Motion (Kinetics): Newton's Law, work, KE, work Energy principle, impulse, Torque and angular momentum, conservation of energy, momentum and angular momentum, Hooke's law. Extension of an elastic string: horizontal & vertical case.		15 h
Sessional Internal Assessment (SIA) Full Marks . 25 Marks A Internal written Examination . 20 Marks (1 Hr) B Over All Performance including Regularity . 05 Marks			
Books Recommended: 1. Mechanics: Singh & Sen 2. <i>Statics and Dynamics</i> . A. R. Vashishtha Krishna. 3. Statics. S. Ramsey Cambridge University Press. 4. Dynamics. S. Ramsey Cambridge University Press.			

Program: Bachelor's Degree		Year: Third	Semester: V
Class: UG			
Subject: Mathematics			
Course Code: MJ-10		Course Title: Theory of Equation & Higher Arithmetic	
Course Learning Outcomes: This course will enable the students to:			
a) solve polynomial equation using relation of roots and coefficients b) solve cubic equation by Cardon's method. c) understand the concept of congruences and their properties. d) solve simultaneous linear congruences.			
Credit: 4 (Theory)		Compulsory	
Full Marks: 75		Time: 3 Hours	
Unit	Content		Hours
I	Relations of root and their symmetric functions with coefficients. Transformation of equations, Descarte's rule of signs.		15 h
II	Cardon's solution of a cubic equation, Descarte's solution of a bi-quadratic equation, Discriminant and nature of roots.		15 h
III	Divisibility, H.C.F. Primes & Unique factorization in N & Z the Diophantine equation $ax+by=c$. Residue class, complete and reduced residue system, congruences and their properties, Fermat's theorem, Euler's theorem, and Wilson's theorem.		15 h
IV	Algebraic congruences, Solution by inspection. Solution of $ax \equiv b \pmod{m}$, Chinese remainder theorem, non-linear algebraic congruency with respect to the modulus.		15 h
Sessional Internal Assessment (SIA) Full Marks .25 Marks A Internal written Examination .20 Marks (1 Hr.) B Over All Performance including Regularity .05 Marks			
Books Recommended: 1. Theory of equation: Lalji Prasad 2. Theory of Equation - Burnside & Penton 3. Basic Number theory : S. B. Malik 4. Introduction to Number Theory : Niven & Zukerman			

Program: Bachelor's Degree		Year: Third	Semester: V
Class: UG			
Subject: Mathematics			
Course Code: MJ-11		Course Title: Complex Analysis	
Course Learning Outcomes: This course will enable the students to:			
a) apply the concept of continuity & differentiability of function of two variables. b) apply the concept of analytic function & form analytic function. c) understand standard transformations. d) understand the concept of conformal mapping.			
Credit: 4 (Theory)		Compulsory	
Full Marks: 75		Time: 3 Hours	
Unit	Content		Hours
I	Real Functions for two variables. Simultaneous and iterated limits; continuity, partial derivatives, differentiability, and related necessary and sufficient conditions.		15 h
II	Functions of a complex variables: Limit, continuity, derivative Cauchy Riemann Equations analytic function, harmonic function, construction of analytic function Miln Thompson Method.		15 h
III	Geometric Importance of some standard transformations e.g. $w = z + c$ $w = cz$ $w = 1/z$, $w = (az + b) / (cz + d)$ (<i>bilinear</i>).		15 h
IV	Conformal transformation as transformation effected by analytic functions special conformal transformations $w = z^2$, $w = e^z$, $w = \sin z$		15 h
Sessional Internal Assessment (SIA) Full Marks . 25 Marks			
A. Internal written Examination . 20 Marks (1 Hr.) B. Over All Performance including Regularity . 05 Marks			
Books Recommended:			
1. Complex Analysis by Lalji Prasad 2. Complex Analysis by J. N. Sharma			