Department of Mathematics

Teaching Plan

Name of the faculty: Dr. Supriya Mukherjee

Sem I Core Course 1: GEOMETRY

Month	Topics to be covered			
	1st week	2nd week	3rd week	4th week
July				
August	Rotation of axes and second degree equations, classification of conics using the discriminant, Practice Problems	Tangent and normal Practice Problems	polar equations of conics, Practice Problems	Equation of Plane The sides of a plane. Signed distance of a point from a plane. Practice Problems Equation of a plane passing through the intersection of two planes. Angle between two intersecting planes. Practice Problems
September	Parallelism and perpendicularity of two planes. Practice Problems Straight lines in 3D: Equation (Symmetric & Parametric form). Practice Problems	Direction ratio and direction cosines. Canonical equation of the line of intersection of two intersecting planes. Angle between two lines. Practice Problems	Distance of a point from a line. Condition of coplanarity of two lines. Equation of skew lines. Shortest distance between two skew lines. Practice Problems	Spheres., Cylindrical surfaces.
October	Puja Vacation	Puja Vacation	Puja Vacation	Central conicoids, paraboloids
November	plane sections of conicoids, generating lines,	classification of quadrics, illustrations of graphing standard quadric surfaces like cone, ellipsoid. Practice Problems	Tangent and normals of conicoids. Practice Problems	Doubt Clarification Internal Test
December	Tutorial	University Exam	University Exam	University Exam

Course: Sem II: no courses

Sem III : Core Course 7: Ordinary Differential Equation

Month	Topics to be covered			
	1st week	2nd week	3rd week	4th week
July	First order differential equations : Exact differential equations and integrating factors, special integrating factors and transformations, Practice Problems	Linear equations and Bernoulli equations, the existence and uniqueness theorem of Picard (Statement only), Practice Problems	First order higher degree equations, Practice Problems	Practice Problems
August	Basic Theory of linear systems in normal form, homogeneous linear systems with constant coefficients: Two Equations in two unknown functions, Practice Problems	Practice Problems	Linear differential equations of second order, Wronskian : its properties and applications, Practice Problems	Euler equation, Practice Problems
September	method of undetermined coefficients, Practice Problems	Practice Problems	method of variation of parameters, Practice Problems	Practice Problems
October	Puja Vacation	Puja Vacation	Puja Vacation	System of linear differential equations, Practice Problems
November	Planar linear autonomous systems : Equilibrium (critical) points, Interpretation of the phase plane and phase portraits.	Practice Problems	Doubt Clearing	Doubt Clearing Internal Test
December	Tutorial tests	University Exam	University Exam	University Exam

Sem IV: Core Course 9: PDE

Month	Topics to be covered			
	1st week	2nd week	3rd week	4th week
January	CU Exam	Partial differential equations of the first order and its formulation .	Practice Problems	Lagrange's solution of Ist Order linear equations , Practice Problems
February	Charpit's general method of solution, some special types of equations which can be solved easily by methods other than the general method	Cauchy Problems. Practice Problems	Derivation of heat equation, wave equation and Laplace equation	Classification of second order linear equations as hyperbolic, parabolic or elliptic.
March	Practice Problems	Reduction of second order linear equations to canonical forms.	Practice Problems	Solving the infinite and finite string problem, IVPs.
April	Solving the semi infinite string with fixed and free ends problem, IVPs.	Practice Problems	Practice Problems	Solution of Heat Equation
May	Practice Problems	Doubt Clearing	Internal Test	Tutorial tests
June	Exam			

Sem V: Core Course11: Statistics and DSE (B1): Linear Programing

Month	Topics to be covered			
	1st week	2nd week	3rd week	4th week
July	Sampling and Sampling Distributions Introduction to LPP	Sampling Distributions : Statictic, Sample moments. Sample variance, Sampling from the normal distri- butions, Chi-square, *t* and *F* -distributions, sampling distribution.	Estimation of parameters Graphical Solution of LPP, Practice Problems	Practice Problems Some basic definitions and theorems of LPP

		Formulation of LPP, Practice Problems		
August	Properties of good estimators - unbiasedness, consistency, sufficiency, Minimum-Variance Unbiased Estimator (MVUE). Simplex Method	Method of Maximum likelihood Problems using Simplex method	Practice Problems Problems using Simplex method	Statistical hypothesis, type I error and type II error Doubt clearing , Class test.
September	Practice Problems Two Phase Method	Simple hypothesis versus simple alternative, Neyman-Pearson lemma Problems on Two phase method	Practice Problems	Practice Problems
October	Puja Vacation	Puja Vacation	Puja Vacation	Goodness of fit.
November	Bivariate frequency Distribution, Correlation, Duality Theory	Linear Regression, Method of least squares Problems on duality theory	Practice Problems	Doubt Clearing Internal Test
December	Tutorial	University Exam	University Exam	University Exam

Sem VI: Core Course 14: Numerical Analysis, DSE (A2): Mathematical Modelling.

Month	Topics to be covered			
	1st week	2nd week	3rd week	4th week
January	CU Exam	Representation of real numbers. Introduction to Laplace Transform	Errors, Rounding of numbers, significant digits. Exsistence of LT, Exponential Order	Types of approximations- polynomial approximation, The Weierstrass polynomial approximation Practice Problems
February	Finite difference operators LT of some basic functions	Newton's forward Interpolation Practice Problems	Backward Interpolatoin Theorems on LT	Practice Problems
March	Lagrange Interpolation Inverse Laplace Transform	Practice Problems	Gauss Central Interpolation Convolution Theorem	Practice Problems
April	Stirling's formulas Application of LT to ODE, PDE	Practice Problems	Bessel's formula Power series solution of Bessel's equation	Practice Problem
May	Hermite interpolation	Practice Problem, Doubt Clearing	Internal Test	Tutorial tests

	Power series solution of Legendre's equation			
June	Exam			