

LESSON PLAN (FROM AUGUST 2022 to DECEMBER 2022)

Name : Dr. Manjeet Singh

Subject : Mathematics

Class : B.A/B.Sc. 1st Year

Paper Name : Solid Geometry

Semester : Ist

Sr. No. Time Period

Syllabus

August 22 to Aug. 31, 2022 :-

General equation of second degree. Classification of Conic sections
Tracing of Conics. Tangent at any point to the conic, chord of contact, pole of line to the conic, director of Conic.

September 01 to Sep. 10, 2022 :-

System of conics. Conic Through the intersection of two Given Conics. To find the equation of a Conic which passes through the intersection of a Conic and two Given straight Lines.

September 11 to Sep. 20, 2022 :-

Confocal conics, Polar equation of a Conic, tangent and normal to the conic. Polar equation of a conic with focus as Pole. Asymptotes of Polar equation of Conic.

September 21 to Sept. 30, 2022 :-

Sphere : Plane section of a sphere. Sphere through a given circle. Intersection of two spheres, radical plane of two spheres. Co-axial system of spheres.

October 01 to Oct. 10, 2022 :-

Sphere and a line. Tangent Plane, equation of tangent plane Condition of Tangency. Plane of Contact. Diametral Plane, Polar Plane, equation of the Polar Plane.

October 11 to Oct. 20, 2022 :-

Sem-Ist, Paper: Solid Geometry

Two or more spheres. Orthogonal spheres. Condition of orthogonality. Radical plane of two spheres. Cones: Right circular cone, enveloping cone and reciprocal cone.

DIWALI BREAK

FROM Oct. 20-26, 2022

October 27 to Nov. 08, 2022 :-

Quadric Cone Through the Axes. Enveloping Cone or tangent cone. Cylinder: Right circular cylinder and enveloping cylinder. Cylinder As the limiting case of a cone.

November 09 to Nov. 19, 2022 :-

Central Conicoids: Equation of tangent plane, Director sphere. Normal to the conicoids. Polar plane of a point. Enveloping cone of a conicoid. Enveloping cylinder of a conicoid.

November 20 to Nov. 30, 2022 :-

Paraboloids: Circular section, Plane sections of conicoids. Axes of plane sections of Paraboloids. Area of the section.

December 01 to Dec. 10, 2022 :-

Generating lines. Confocal conicoid. Generating lines of a Hyperbolic Paraboloid. Confocal Touching a given Plane. Reduction of second degree equations. Quiz competition & Tentative Lecturer Plan also.

December 11 to Exams start :-

(REVISION)

LESSON PLAN (FROM AUGUST 2022 TO DECEMBER 2022)

Name: Dr. Manjeet Singh

Class: BA/BSc-2nd Year

Semester: 3rd

Subject: Mathematics

Paper Name: Partial Differential Equation.

Sr.No | Time Period

Syllabus.

August 22 to Aug. 31, 2022:-

Partial differential equation: Formation, Order & degree, Linear and non-linear partial differential Equation, P.D.E of first Order: Complete solution, Singular Solution, General Solution, Solution of Lagrange's Linear eqⁿ, Charpit's general Method of solution, Jacobi's Method & its problems

September 01 to Sep 10, 2022:-

Test ch-1,2, Linear partial differential equation of second & higher Orders, Linear and non-linear homogeneous equation, Linear and non-linear non-homogeneous equation with constant coefficients, Partial differential equation with variable.

September 11 to Sep. 20, 2022:-

coeffⁿ reducible to equation with constant coefficients, their complementary function & Particular Integrals. Example and Exercise of ch-4.

September 21 to Sept. 30, 2022:-

Equation Reducible to linear equation with constant coefficients, Problems, Test-ch-4, classification of linear partial differential Equation of Second Order, & Examples.

October 01 to Oct, 10, 2022:-

Hyperbolic, Parabolic and elliptic types, Reduction of 2nd Order Linear partial differential Equation to Canonical (Normal), Forms & their solutions.

October 11 to Oct, 20, 2022:-

Solution of Linear hyperbolic Equations, Mongel's Method for partial differential Equation of Second Order.
Assignment for homework.

DIWALI BREAK

From Oct. 20-26, 2022

October 27 to Nov. 08, 2022:-

Problems and Exercise of Mongel's Method for partial differential Equation, Test ch-6, Cauchy's Problems for second Order Partial differential Equation.

November 09 to Nov. 19, 2022:-

Characteristic Equation and characteristic curves of second Order partial differential Equation. Chapter -6, 7 (Problems) And Exercise Revision.

November 20 to Nov. 30, 2022:-

Method of Separation of Variables, Problems + Exercise: Solution of Laplace's Equation, Wave Equation (One or two dimensions).

December 01 to Dec. 10, 2022:-

Diffusion (Heat) Equation (One + two dimension) in Cartesian, coordinate system. Problems and Exercise.
Quiz Competition along with Tentative lecturer Plan also.

December 11 to Exam start:-

ch-8, Test and Problems Discuss.

(REVISIONS)

LESSON PLAN (FROM AUGUST 2022 to DECEMBER 2022)

Name: Dr. Manjeet Singh
 Class: BA/B.Sc IInd Year
 Semester: 3rd sem

Subject: Mathematics
 Paper Name: Advance Calculus

Sr. No.	Time Period	Syllabus
	<u>August 22 to Aug 31, 2022-</u>	Continuity, Sequential Continuity, Properties of continuous functions, Uniform continuity, chain rule of differentiability, mean value theorems.
	<u>September 01 to Sep 10, 2022-</u>	Rolle's Theorem & Lagrange's mean value theorem & their geometrical interpretations. Problems. Taylor's theorem with various form of remainders. Examples & Exercises.
	<u>September 11 to Sep. 20, 2022-</u>	Introduction to Indeterminate forms. Darboux intermediate value theorem for derivatives. Exercises. Test - Indeterminant form.
	<u>September 21 to Sep. 30, 2022-</u>	Limit and continuity of real valued functions of two variables. Problems & Exercises. Partial differentiation. Total differentials.
	<u>October 01 to Oct. 10, 2022-</u>	Composite functions and implicit functions. Change of variables, Homogeneous function and Euler's theorem on homogeneous function. Exercises.

October 11 to Oct. 20, 2022 -

3rd Sem P - Advance Calculus

Taylor's theorem for function of two variables. Problem
Discuss. Test ch-5

Assignment for Homework.

DIWALI BREAK

From Oct. 20-26, 2022

October 27 to Nov. 08, 2022 -

Differentiability of real valued function of two variables. Schwarz
& Young's theorem. Problems Discuss. Implicit function theorem.

November 09 to Nov, 2022 -

Maxima, minima and saddle points of two variables.
Lagrange's method of multiplication. Exercises and Problems
Discuss. Test - maximum and minimum of a function of Two
Variables.

November 20 to Nov. 30, 2022 -

Curves: Tangents, Principal normals, Binormals, Serret-Frenet
formula. Exercises & Problems. Locus of the centre of curvatures,
Spherical curvature, locus of centre of spherical curvature.

December 01 to Dec. 10, 2022 -

Involutes, Evolutes, Bertrand curves, Surfaces: Tangent planes
One parameter family of surfaces, Envelopes. Quiz Competition
Tentative Lecturer Plan.

December 11 to Exam Start -

(REVISION)

LESSON PLAN (FROM AUGUST 2022 TO DECEMBER 2022)

Name: Dr. Manjeet Singh
 Class: BA/BSc - Final Year
 Semester: 5th

Subject- Mathematics
 Paper Name: Groups + Rings.

Sr. No	Time Period	Syllabus
	<u>August 22 to Aug. 31, 2022</u> :-	Definition of a group with Examples, and simple Properties of Groups, Subgroups and Subgroup Criteria, Algebraic structure, Order of a Group, Addition Modulo (m) Multiplication Modulo (m), Generation of Groups.
	<u>September 01 to Sep 10, 2022</u> :-	Cyclic Groups, Cosets, Left and Right Cosets, Index of a subgroup, Coset decomposition, Lagrange's Theorem, and its consequences. And Revision of Group's Related examples.
	<u>September 11 to Sep, 20, 2022</u> :-	Normal Subgroup, Quotient Group, and Test of Ch-1. Homomorphisms, Isomorphisms, automorphisms and Inner automorphisms of a group. And Revision of Examples.
	<u>September 21 to Sep, 30, 2022</u> :-	Automorphisms of Cyclic Groups, Permutation Groups, Even and odd permutations Groups. And Revision of Theorems Related to Cyclic Group.
	<u>October 01 to Oct, 10, 2022</u> :-	Alternating Group, Cayley's Theorem, Centre of a group and derived Group of a Group + Revision of examples and Test Ch-3.

October 11 to Oct, 20, 2022:-

Ring, types of Rings, Properties of Rings, Rings without or with zero divisors, Integral Domain, Field, Theorems Related to Ring. Subrings, Some Theorems On Subrings. Center of a Ring. Assignment for Homework.

DIWALI BREAK

From Oct, 20-26, 2022

October 27 to Nov, 08, 2022

Characteristic of a Ring, Some Theorems on characteristics of a Rings, Definitions of Ideals, Sum of two Ideals, Product of two ideals, Simple Ring, Principal Ideal, and Revision of Theorems.

November 09 to Nov, 19, 2022:-

Unity Ideal, Zero Ideal, Principal Ideal Ring and Principal Ideal Domain, Maximal Ideal, Prime Ideal, Semi-Prime Ideal, Co-maximal Ideals, Nilpotent Ideal, Nil Ideal. Revision of Ex. 6-1.

November 20 to Nov, 30, 2022:-

Ring Homomorphisms, Kernel of a Ring homomorphisms, Fundamental Theorems of Homomorphisms, First Theorem of Isomorphism, second Theorem of Isomorphism, Embedding of Rings, Field of Quotients of an Integral Domain.

December 01 to Dec, 10 2022:-

Euclidean Rings, Polynomial Rings, Polynomial Over the Rational Field, The Eisenstein's Criterion of Irreducibility. Polynomials rings over commutative Rings, Unique factorization domain. R unique factorization domain implies so is $R[x_1, x_2, \dots, x_n]$. Quiz Competition along with Tentative lecturer Plan.

December 11 to Exam start:-

ch-8,9 Test and Problems Discuss.

(REVISIONS)

LESSON PLAN (From AUGUST 2022 to DECEMBER 2022)

Name: Dr. Manjeet Singh

Subject: Mathematics

Class: BA/BSc - 3rd Year

Paper Name: Real Analysis

Semester: 5th

Sr. NO.	Time Period	Syllabus
	<u>August 22 to Aug. 31, 2022 -</u>	Boundedness of a set, Riemann Integral, Partition, Integration of Bounded Functions on \mathbb{R} , Darboux's Theorem, conditions of Integrability of continuous and monotonic functions, Examples and Exercises.
	<u>September 01 to Sep 10, 2022 -</u>	Primitive of a function, Improper Integral, convergence of Improper integral, comparison tests, Absolute convergence Examples.
	<u>September 11 to Sep. 20, 2022 -</u>	Abel's and Dirichlet's tests, Fubini's integral, Integral as a function of a parameter. Examples and Exercises.
	<u>September 21 to Sep. 30, 2022 -</u>	Continuity of the Integral. Differentiability and Integrability of an integral of a function of a parameter. Example - Problem Discuss.
	<u>October 01 to Oct. 10, 2022 -</u>	Definition and examples of metric spaces, neighbourhoods, limit points, interior points, Bounded and unbounded metric spaces.

October 11 to Oct. 20, 2022 -

Open and closed sets in metric spaces, Closure and interior, boundary points, Subspace of metric space, Adherent Point, Limit Point. Examples.

DIWALI BREAK

From Oct. 20-26, 2022

October 27 to Nov. 08, 2022 -

Equivalent metrics, Cauchy sequences, completeness of metrics, Cantor's intersection theorem, Baire's Category theorem, Contraction Principle. Examples and Problem Discuss. Exercise.

November 09 to Nov. 19, 2022 -

Continuous function, uniform continuity, Isometry, covers, Compactness for metric spaces, Bolzano Weierstrass Property, Sequential compactness.

November 20 to Nov. 30, 2022 -

Finite Intersection Property, ϵ -Net and total Boundedness, Separated sets, connected and disconnected sets, Properties of separated sets, continuity in relation with compactness.

December 01 to Dec. 10, 2022 -

Continuity in relation with connectedness, components, ~~to~~ Totally disconnected spaces, locally connected spaces. Example and Exercises. Quiz competition & Tentative Lecturer Plan.

December 11 to Exam Start -

(REVISION)