I.B. (PG) COLLEGE, PANIPAT
LESSON PLAN
SESSION 2023-24 (23.08.2023 to 30.11.2023)

Weekly Lesson Plan (Odd Semester)

PG (I -   Semester)

Name of the Paper:- Advance Abstract Algebra   **Class: M.sc (P)**

Name of the Teachers (Section Wise) : Sumit Geahlan

WEEK	DATE	TOPICS
1	**August (23-26)**	Automorphism of a group G
		Inner automorphism of a group G
		The group Aut(G) and Inn(G)
		Automorphism group of a cyclic group
	SUNDAY - 27.08.2023	
2	**August (28-29, 31) September (1-2)**	Normaliser of a non-empty subset of a group
		Centraliser of a non-empty subset of a group
		Theorems on normaliser and centraliser
		Theorems on normaliser and centraliser
		Conjugate elements and conjugacy class
	HOLIDAY - 30.08.2023 - RAKSHABANDHAN	
	SUNDAY - 03.09.2023	
3	**September (4-5, 7-9)**	Class equation of a finite group
		Applications of a class equation
		Derived group
		Perfect group
		Theorem on perfect group
	HOLIDAY - 06.09.2023 - JANAMASHTMI	
	SUNDAY - 10.09.2023	
4	**September (11-16)**	Zassenhau's lemma
		Normal series
		Scheier's refinement theorem
		Simple group and composition series
		Theorems on composition series
		Theorems on composition series
	SUNDAY - 17.09.2023	
5	**September (18-22)**	Jorden Holder theorem
		Composition series of group of order p^n and abelian groups
		Cauchy theorem for finite groups
		p-groups
		Sylow theory
		Sylow theory
	HOLIDAY 23.09.2023 - SHAHEEDI DIVAS/HARYANA WAR HEROES' MARTYRDOM DAY	
	SUNDAY - 24.09.2023	
6	**September (25-30)**	Sylow theory
		Problem discussion of section-1
		Test of section -1
		Characteristic of a ring with unity
		Prime fields,theorem on prime fields
		Field extension
	SUNDAY - 01.10.2023	
	HOLIDAY - 02.10.2023 MAHATMA GANDHI JAYANTI	
7	**October (3-7)**	Degree of an extension
		Algebraic and Transcendental elements
		Theorems on field extension
		Theorems on field extension
		Theorems on field extension
	SUNDAY - 08.10.2023	
8	**October (9-14)**	Simple field extension
		Theorems on simple field extension
		Theorems on simple field extension
		Minimal polynomial of an algebraic extension
		Conjugate elements
		Algebraic extension

SUNDAY - 15.10.2023 & HOLIDAY (MAHARAJA AGRASEN JAYANTI)		
9	**October (16-21)**	Finitely generated Algebraic extension
		Theorems on algebraic extension
		Theorems on algebraic extension
		Theorems on algebraic extension
		Algebraic closure and algebraically closed fields
		Splitting fileds
SUNDAY - 22.10.2023		
10	**October (23, 25-27)**	Theorems on splitting fields
		examples on splitting fields
		Finite fields
		Normal extension
		Theorem Normal extension
		Problem discussion of section-2
HOLIDAY - 24.10.2023 DUSSEHRA		
HOLIDAY 28.10.2023 - MAHARISHI VALMIKI JAYANTI		
SUNDAY -29.10.2023		
11	**October (30-31) November (2-4)**	Seperable elements
		Seperable polynomial and seperable extension
		Theorems on seperable extension
		Theorem of primitive element
		Perfect fields
HOLIDAY 01.11.2023 - HARYANA DAY		
12	**November (6-9)**	Dedekind lemma
		Fundamental theorem of Galois theory
		Frobenius automorphism of a finite field
		Klein's 4-group
Diwali Break - 10.11.2023 to 16.11.2023		
13	**November (17-18)**	Diheadral group
		Galois groups of polynomials
SUNDAY - 19.11.2023		
14	**November (20-25)**	Non-solvability of the symmetric group Sn
		Non-solvability of the alternating group An
		Roots of unity cyclotomic polynomials and their irreducibility over Q
		Radical extension
		Galois radical extension
SUNDAY - 26.11.2023		
HOLIDAY 27.11.2023 - GURU NANAK DEV JAYANTI		
15	**November (28-30)**	Solvability of polynomials by radicals over Q
		Construction with ruler and compass only
		Problem discussionof section -4

Weekly Lesson Plan (Odd Semester)

PG (I - Semester)

Name of the Paper:- Diffrential Equation   **Class: MSC(P)**

Name of the Teachers (Section Wise) : Prof. Manish Kumar

WEEK	DATE	TOPICS
1	**August (23-26)**	Basic about differential equation
		degree and order,type of differential equation
		Related examples
		SUNDAY - 27.08.2023
2	**August (28-29, 31) September (1-2)**	Initial value problem
		approximation solution
		equicontinuous set of function
		Related examples
		Related examples
		HOLIDAY - 30.08.2023 - RAKSHABANDHAN
		SUNDAY - 03.09.2023
3	**September (4-5, 7-9)**	Cauchy euler theorem
		Ascoli arzela theorem
		cauchy peano existence theorem and its corollary
		Related examples
		HOLIDAY - 06.09.2023 - JANAMASHTMI
		SUNDAY - 10.09.2023
4	**September (11-16)**	Lipschtiz condition
		Related examples
		Related examples
		Differential inequalties and uniquness
		gronwell inequality
		SUNDAY - 17.09.2023
5	**September (18-22)**	succesive approximation
		Related examples
		Related examples
		Picard lindelof theorem
		Related examples
		HOLIDAY 23.09.2023 - SHAHEEDI DIVAS/HARYANA WAR HEROES' MARTYRDOM DAY
		SUNDAY - 24.09.2023
6	**September (25-30)**	continuation of solution
		maximal interval of existence
		maximal interval of existence
		maximal interval of existence
		Related examples
		SUNDAY - 01.10.2023
		HOLIDAY - 02.10.2023 MAHATMA GANDHI JAYANTI
7	**October (3-7)**	continuation of solution
		maximal interval of existence
		Related examples
		Test
		SUNDAY - 08.10.2023
8	**October (9-14)**	linear differential system
		linear homogenous system
		fundamental matrix
		Related examples
		Adjoint system
		SUNDAY - 15.10.2023 & HOLIDAY (MAHARAJA AGRASEN JAYANTI)
9	**October (16-21)**	linear system with constant coefficient
		linear system with periodic coefficients
		Floquet theory
		Related examples
		Theorem
		Class Discussion

SUNDAY - 22.10.2023		
10	**October (23, 25-27)**	linear differential equation of order n
		linear depandence,independence of solution
		necessary and sufficient condition of solution
		Abels identity
		Related examples
		fundamental set
HOLIDAY - 24.10.2023 DUSSEHRA		
HOLIDAY 28.10.2023 - MAHARISHI VALMIKI JAYANTI		
SUNDAY -29.10.2023		
11	**October (30-31) November (2-4)**	Adjoint equation
		Lagranges identity
		green formula
		linear equation of order n with constant coefficients
		Related examples
HOLIDAY 01.11.2023 - HARYANA DAY		
12	**November (6-9)**	dependance of solution on initial conditions
		continuity and differentiability
		maximal and minimal solution
		differential inequalities
Diwali Break - 10.11.2023 to 16.11.2023		
13	**November (17-18)**	Related examples
		Theorem
SUNDAY - 19.11.2023		
14	**November (20-25)**	wintner theorem
		kamke theorem ,
		nagumo theorem
		Osgood theorem
SUNDAY - 26.11.2023		
HOLIDAY 27.11.2023 - GURU NANAK DEV JAYANTI		
15	**November (28-30)**	Theorem
		Class Discussion
		Test

Weekly Lesson Plan (Odd Semester)

PG (I - Semester)

Name of the Paper:- Complex Analysis   Class: M.Sc. Mathematics (Previous)

Name of the Teachers (Section Wise) : Kirti Asija

WEEK	DATE	TOPICS
1	**August (23-26)**	Introduction to Power Set
		Power Series
		Power Series
		Convergence of power series
	SUNDAY - 27.08.2023	
2	**August (28-29, 31) September (1-2)**	Radius of Convergence
		Examples based on convergence and ROC
		Problem Discussion
		Sum and product
		Differentiabilty of Sum function of power series
	HOLIDAY - 30.08.2023 - RAKSHABANDHAN	
	SUNDAY - 03.09.2023	
3	**September (4-5, 7-9)**	Properties of differentiable function with derivative zero
		Exp z and its properties
		log z and its properties
		Power of a complex number (z)
		Branches with analyticity
	HOLIDAY - 06.09.2023 - JANAMASHTMI	
	SUNDAY - 10.09.2023	
4	**September (11-16)**	Path in a region
		Smooth path
		Piece wise smooth path
		Contour, Simply and multiply connected region
		Bounded Variation
		Total Variation
	SUNDAY - 17.09.2023	
5	**September (18-22)**	Complex Integration
		Cauchy Goursat Theorem
		Cauchy theorem for simply and multiply connected domains
		Class test based on the topics covered
		Index or winding number of a closed curve with simple properties
		Cauchy integral formula
	HOLIDAY 23.09.2023 - SHAHEEDI DIVAS/HARYANA WAR HEROES' MARTYRDOM DAY	
	SUNDAY - 24.09.2023	
6	**September (25-30)**	Extension of Cauchy integral formula for multiple connected domain
		Higher order derivative of Cauchy integral formula.
		Examples
		Gauss mean value theorem
		Morera's theorem
		Cauchy's inequality
	SUNDAY - 01.10.2023	
	HOLIDAY - 02.10.2023 MAHATMA GANDHI JAYANTI	
7	**October (3-7)**	Zeros of an analytic function
		Entire function
		Radius of convergence of an Entire function
		Liouville's theorem
		Fundamental theorem of algebra
	SUNDAY - 08.10.2023	
8	**October (9-14)**	Taylor's theorem
		Problem discussion
		Maximum modulus principle
		Minimum modulus principle
		Schwarz Lemma
		Singularity, their classification
	SUNDAY - 15.10.2023 & HOLIDAY (MAHARAJA AGRASEN JAYANTI)	
9	**October (16-21)**	Pole of a function and its order
		Laurent series and examples
		Cassorati – Weiertrass theorem
		Meromorphic functions
		Poles and zeros of Meromorphic functions
		The argument principle

		SUNDAY - 22.10.2023		
10	**October (23, 25-27)**	Rouche's theorem		
		Inverse function theorem		
		Examples based on above theorems		
		Problem discussion		
		Class test based on the topics covered		
		Residue : Residue at a singularity		

		HOLIDAY - 24.10.2023 DUSSEHRA		
		HOLIDAY 28.10.2023 - MAHARISHI VALMIKI JAYANTI		
		SUNDAY -29.10.2023		
11	**October (30-31) November (2-4)**	Residue at a simple pole		
		Residue at infinity		
		Cauchy residue theorem		
		Use of Cauchy residue theorem to calculate certain integrals		
		Definite integral		

		HOLIDAY 01.11.2023 - HARYANA DAY		
12	**November (6-9)**	Integral of different types		
		Poles on the real axis		
		Integral of many valued functions		
		Bilinear transformation		

		Diwali Break - 10.11.2023 to 16.11.2023		
13	**November (17-18)**	Properties of bilinear transformation and classification		
		Cross ration, preservance of cross ration under bilinear transformation		

		SUNDAY - 19.11.2023		
14	**November (20-25)**	Preservance of circle and straight line under bilinear transformation		
		Fixed point bilinear transformation		
		Normal form of a bilinear transformation.		
		Definition and examples of conformal mapping		
		Critical points		

		SUNDAY - 26.11.2023		
		HOLIDAY 27.11.2023 - GURU NANAK DEV JAYANTI		
15	**November (28-30)**	Problem discussion		
		Revision		
		Revision		

Weekly Lesson Plan (Odd Semester)

PG (I - Semester)

Name of the Paper:- REAL ANALYSIS-I   **Class: M.Sc**

Name of the Teachers (Section Wise) : Ms. Komal

WEEK	DATE	TOPICS
1	**August (23-26)**	Definition and existence of riemann integral function
		Definition and existence of riemann integral function
		theorem based on upper sum, lower sum
		theorem based on refinement and common refinement
		SUNDAY - 27.08.2023
2	**August (28-29, 31) September (1-2)**	theorem based on integration, differentiability
		cauchy criteria for integrability
		first mean value theorem
		Change of variable
		fundamental theorem of integral calculus
		HOLIDAY - 30.08.2023 - RAKSHABANDHAN
		SUNDAY - 03.09.2023
3	**September (4-5, 7-9)**	integration by vector valued function
		unit step function(introduction)
		rectifiable curves general introduction
		general introduction to sequence and series
		convergence of a sequence, series
		HOLIDAY - 06.09.2023 - JANAMASHTMI
		SUNDAY - 10.09.2023
4	**September (11-16)**	pointwise convergence and examples
		uniform convergence and example based on uniform convergence
		Cauchy criterion for uniform convergence
		weirstrass M-TEST, Abel's test, Dirichlet's test
		Uniform continuity and related examples
		RIEMANN STIELTJES INTEGRATION
		SUNDAY - 17.09.2023
5	**September (18-22)**	UNIFORM CONVERGENCE AND DIFFERENTIATION
		EXISTENCE OF REAL CONTINUOUS NOWHERE DIFFERENTIABLE FUNCTION
		Equicontinuous families of fuctions
		weierstrass approximation theorem
		intro about functions of several variables
		LINEAR TRANSFORMATION and Theorems
		HOLIDAY 23.09.2023 - SHAHEEDI DIVAS/HARYANA WAR HEROES' MARTYRDOM DAY
		SUNDAY - 24.09.2023
6	**September (25-30)**	derivative in an open subset of R^n
		definitions of fixed point contration mapping and examples
		banach fixed point theoprem(CONTRATION PRINCIPAL)
		CHAIN RULE
		DEFINITION OF CONVEX SET and some theorems based on it
		partial derivative and differential derivatives
		SUNDAY - 01.10.2023
		HOLIDAY - 02.10.2023 MAHATMA GANDHI JAYANTI
7	**October (3-7)**	INVERSE FUNCTION THEOREM, Implicit function Theorem
		JACOBIANS
		EXTREME PROBLEMS WITH CONSTRAINTS
		LAGRANGE'S MULTIPLIER METHOD
		derivative of hiogher order
		SUNDAY - 08.10.2023
8	**October (9-14)**	mean value theorem for real functions of two variables
		interchange of the order of differentiation
		differentiation of integrals
		REVISION
		REVISION
		TEST

SUNDAY - 15.10.2023 & HOLIDAY (MAHARAJA AGRASEN JAYANTI)	
9	**October (16-21)**	introduction to power series and examples
		uniqueness theorem for power series
		ABEL'S THEOREM
		TAUBER'S THEOREM
		TAYLOR'S THEOREM
		TAYLOR'S THEOREM
SUNDAY - 22.10.2023	
10	**October (23, 25-27)**	Exponential FUNCTION
		RELATED RESULTS AND THEOREMS
		logarithm fuctions
		RELATED RESULTS AND THEOREMS
		trigonometric functions
		RELATED RESULTS AND THEOREMS
HOLIDAY - 24.10.2023 DUSSEHRA	
HOLIDAY 28.10.2023 - MAHARISHI VALMIKI JAYANTI	
SUNDAY -29.10.2023	
11	**October (30-31) November (2-4)**	fourier series
		fourier series
		fourier series
		RELATED THEOREMS
		RELATED THEOREMS
HOLIDAY 01.11.2023 - HARYANA DAY	
12	**November (6-9)**	gamma function
		integration of differtial forms
		partitions of unity
		partitions of unity
Diwali Break - 10.11.2023 to 16.11.2023	
13	**November (17-18)**	REVISION
		REVISION
SUNDAY - 19.11.2023	
14	**November (20-25)**	TEST
		differential forms
		STOKES THEOREM
		Doubt Session
		DOUBT Session
SUNDAY - 26.11.2023	
HOLIDAY 27.11.2023 - GURU NANAK DEV JAYANTI	
15	**November (28-30)**	REVISION
		REVISION
		REVISION

Weekly Lesson Plan (Odd Semester)

PG (I -   Semester)

Name of the Paper:-   Topology   **Class: M.Sc. Mathematics (Previous)**

Name of the Teachers (Section Wise) : Kirti Asija

WEEK	DATE	TOPICS
1	**August (23-26)**	Definition of topological space
		Examples of topological space
		Examples of topological space
		Neighbourhood system of a point and its properties
		SUNDAY - 27.08.2023
2	**August (28-29, 31) September (1-2)**	Neighbourhoods
		Interior point and interior of a point
		Interior of various topologies
		Theorems on interior point
		Theorems on interior point
		HOLIDAY - 30.08.2023 - RAKSHABANDHAN
		SUNDAY - 03.09.2023
3	**September (4-5, 7-9)**	Interior as an operator and its properties
		Problem discussion
		Closed set as a complement of open set
		Limit point of a set
		Derived set of a set
		HOLIDAY - 06.09.2023 - JANAMASHTMI
		SUNDAY - 10.09.2023
4	**September (11-16)**	Boundary of a set
		Theorems on boundary of a set
		Dense set
		Base for topology and its characterization
		Base for neighbourhood system
		Theorems on base for topology and neighbourhood system
		SUNDAY - 17.09.2023
5	**September (18-22)**	Sub-base for topology
		Induced topology and subspace of a topological space
		Alternate methods of defining a topology
		Kuratowski closure operator
		First countable space
		Second countable space
		HOLIDAY 23.09.2023 - SHAHEEDI DIVAS/HARYANA WAR HEROES' MARTYRDOM DAY
		SUNDAY - 24.09.2023
6	**September (25-30)**	Seperable space
		Complete lattice
		Problem discussion
		Continuous function
		Composition of continuous functions
		Open and closed functions
		SUNDAY - 01.10.2023
		HOLIDAY - 02.10.2023 MAHATMA GANDHI JAYANTI
7	**October (3-7)**	Homeomorphism
		Embedding
		Tychonoff product topology in terms of standard subbase
		Projection maps
		Characterisation of product topology as the smallest topology with projections
		SUNDAY - 08.10.2023
8	**October (9-14)**	Continuity of a function from a space into product of spaces
		T_0, T_1 Space, T_2, T_3 Space
		Hereditary property
		Quotent topology w.r.t. a map
		About Hausdorffness of quotient space
		Problem discussion

SUNDAY - 15.10.2023 & HOLIDAY (MAHARAJA AGRASEN JAYANTI)
9	**October (16-21)**	Completely regular and tychonoff space
		Hereditary, Productivity properties
		Embedding lemma, Embedding Theorem
		Normal and T4 spaces
		Urysohn's lemma
		Complete regularity of a regular normal space
SUNDAY - 22.10.2023
10	**October (23, 25-27)**	T4 implies tychonoff space , TIETZE'S EXTENSION THEOREM
		Filters on a set
		Collection of all filters on a set as a p.o. set
		Finer filter
		Ultra filter and its characterization
		Image of filter under a function
HOLIDAY - 24.10.2023 DUSSEHRA
HOLIDAY 28.10.2023 - MAHARISHI VALMIKI JAYANTI
SUNDAY -29.10.2023
11	**October (30-31) November (2-4)**	Convergence of filters
		Limit point and limit of a filter
		Continuity in terms of convergence of filters
		Hausdrorffness anf filter convergence
		Compactness
HOLIDAY 01.11.2023 - HARYANA DAY
12	**November (6-9)**	Relation of open cover of a subset of a topological space in the sub-space with that
		Hausdorff space and its consequence
		Regularity and normality of a comact hausdorff space
		Compactness and filter convergence
Diwali Break - 10.11.2023 to 16.11.2023
13	**November (17-18)**	Convergence of filters in a product space
		Tychonoff product theorem using filters
SUNDAY - 19.11.2023
14	**November (20-25)**	Hausdroff Compactification
		Hausdroff Compactification
		Stone-cech compactification
		Stone-cech compactification
		Problem discussion
SUNDAY - 26.11.2023
HOLIDAY 27.11.2023 - GURU NANAK DEV JAYANTI
15	**November (28-30)**	Test
		Revision
		Revision